

THE NAVY



The Magazine of
**THE NAVY LEAGUE
OF AUSTRALIA**

JANUARY, 1984

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The magazine of the Navy League of Australia

Vol 46

JANUARY, 1984

No 1



HMAS Stirling's fleet support facility recorded a record crowd in excess of 15,000 people for its Navy Week Open Day on 23rd October. This total easily surpassed the previous record of 9,500. Ships present for the Open Day were the guided-missile destroyer HMAS HOBART, the guided-missile frigate HMAS CANBERRA, destroyer escort HMAS TORRENS and the US frigate USS MARVIN SHIELDS.

(Photo - LSPH Steve Given, RAN.)

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THE EDITOR'S COMMENTS

The loss of a new aircraft carrier for the RAN has motivated many naval writers to put before the public alternative schemes for the use of available manpower and monetary resources.

In this issue of "The Navy" several League members have adopted this theme with topical articles describing the use of both airships and hydrofoil missileships in the RAN of the future. Official thinking behind the new minehunter catamarans is also included.

On the historical front, Leut Joe Straczek, RAN, relates the story of Australia's first catamaran warship, the ELDER, built for the colony of Victoria in the mid-1800s. From Great Britain, further news of the Royal Navy's first submarine HOLLAND 1 reveals some unusual sidelights following her successful salvage.

For the first time in many issues, league and cadet news has been received in quantity and before the deadline. As a result, this section of "The Navy" provides a much improved coverage for the benefit of all members.

CONTRIBUTIONS

Although style requirements for articles in "The Navy" were published a number of issues ago, many contributors have yet to adhere to these requests. Specifically, all manuscripts should be in a typed format, double-spaced, with ships' names in capital letters, e.g. PAR-RAMATTA. Photographs accompanying articles are always welcome, and will be returned as soon as possible after publication of the magazine.

LETTERS TO THE EDITOR

The Editor is always pleased to assist readers with information, but cannot if no return address is included in the letter. So if Mr Charles Schuster would like to write again, I will be happy to respond.

THANK YOU

Mention should be made of the members and readers who contributed to this issue. Without their assistance "The Navy" magazine could not exist in its present format.

APRIL, 1984

The next issue of "The Navy" will include specially prepared articles for the magazine describing the conversion of the container ship MV ASTRONOMER to the helicopter carrier RFA RELIANT, Escort Carriers for the RAN and the Development of the Sea Harrier, including the "Skyhook" retrieval system for smaller warships.

A new feature making its debut will be the first 'Navy' crossword.

Next April also marks the 60th anniversary of the scuttling of the battlecruiser AUSTRALIA on 12th April, 1924. The event will be described and illustrated in full.

DEADLINE

All contributions should be mailed to reach the Editor by 1st February, 1984.

COVER PHOTO

HMAS ENCOUNTER, a Challenger class cruiser which served in the RAN from 1912, is depicted here in a fine painting by naval author and marine artist, John Bastock.

(Painting - Courtesy J. Bastock.)

viewpoint

The first major statement of the Hawke Government's defence objectives was tabled in the House of Representatives by the Defence Minister, Mr Gordon Scholes, on 3rd November, 1983.

In some respects the document was disappointing and in others encouraging. The strategic assessment could have been written at any time during the nineteen-seventies and conveys the same rather disturbing impression of complacency conveyed by previous assessments; there is little to suggest the tensions existing in many parts of the world today, not least in the Middle East and on the Korean Peninsula, and the speed at which events can take place, has a high priority in the thinking of those responsible for the assessment. On the other hand, the statement confirms Defence Minister Scholes' willingness to come to grips with difficult problems and to make decisions - even, if in the view of many people, some are unsound.

The Labor Government assumed office in a difficult economic climate and so far as defence is concerned, with equipment acquisitions in the pipeline amounting to some seven billion dollars. The financial problems are outlined in the Minister's statement and are understandable; what is not understandable is the omission of any reference to Australia's trade and the protection of the lines along which it must flow. Our sea lines-of-communication with the Persian Gulf, Japan and North America are vital to Australia in peace or war and it would not require an attack on the mainland to render the country impotent.

A pre-occupation with direct attack - planning ways to deal with a threat that has arisen, rather than by working with our allies to ensure that the threat does not arise in the first place - is, I believe, the main cause of the Navy's problems today and is likely to be the Nation's problem at some time in the future.

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Federal President, The Navy League of Australia



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F	France		Grolu Class— Mineshunter
G	Germany (FRG)		Type 143 Attack Craft Missile

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MTU8011



by CDRE J. A. ROBERTSON

K-69 airship taking off from the deck of the escort aircraft carrier USS MINORO during trials on 28th April, 1950. (Photo - USN)

IN November 1982 General Mike Carleton-Smith gave the Navy League an excellent presentation on the Falklands campaign. One of the more obvious lessons of that campaign was that war at sea today is not practicable without adequate air support for both air defence and anti-submarine warfare.

Furthermore, despite the high level of success enjoyed by the Sea Harriers in their air defence role against odds of 6 to 1, it was also plain that a major tactical deficiency in the British task force was the lack of airborne early warning to direct the carriers' fighters to the attacking aircraft. There is very little new in that — after all, we observed during the Battle of Britain, over 40 years ago, that the decisive difference between the Luftwaffe and the RAF's fighter defence was the command and control system which had been developed by Dowding around Watson-Watt's new invention, radar. I might say that this was in defiance of the Trenchard line which repeatedly asserted that "the bomber will always get through" — little wonder Dowding was treated so shabbily later. If there is one thing the Trenchardists cannot stand it is being shown to be wrong.

Now despite these glaringly obvious lessons of the Falklands, Mr Scholes and his advisors have not only killed the Fleet Air Arm, but are doing it so ruthlessly and quickly as to preclude any chance of its recovery. The consequence — and a quite intentional one in my view — is to prevent any potential to recover from the destruction caused to the Navy as an effective surface force, able to secure the use of the sea for the movement of bulk cargoes, either military or commercial, internationally or around our own coasts. And it is not that they have substituted an effective alternative. You will have noticed that, having decided to eliminate the potential to provide effective tactical support for ships, the minister has openly admitted his own poverty of intellect by asking to be advised as to what new direction naval force structure development should now take. An unintended consequence is that the Defence Department is left with the plain embarrassment of having some 12 destroyers in the inventory — with two more still building — and the dilemma of how to employ them in the event of hostilities. Either they would have to be constrained to the very limited areas of the coast where they could be provided with air defence fighters from land bases — skulking round the coast in rather the same unheroic way the Argentine surface Navy performed a year ago. The equally unpalatable alternative would be to send the ships out unsupported to almost certain destruction. But fortunately for those non-naval experts who have been a party to these decisions, none of them would have to take those ships to sea, which must make it so much easier to issue such calamitous instructions. After all, it's not their own skins at risk. And, of course, it would be one of those self-fulfilling prophecies if inadequately supported ships got sunk. All the assertions about the vulnerability of surface ships could be trotted out — and the Navy abused for being inadequately prepared for the war in which it found itself.

In the less doctrinaire and theoretical world the British inhabit — and with the chastisement for such peacetime self-indulgence in the past through the loss of SHEFFIELD, ANTELOPE, ARDENT, COVENTRY, the ATLANTIC CONVEYOR, SIR GALAHAD and SIR TRISTRAM — the British have now taken action to make good their lack of airborne early warning by fitting Sea King helicopters with a Searchwater radar. While this is a reasonably quick solution for the British, it is not without its drawbacks, mainly that every AEW helo embarked in their small sea control carriers displaces either a Sea Harrier fighter or a Sea King ASW helo — and the Invincible class is not over-endowed with space to carry many aircraft. But at least the RN now has a reasonably comprehensive air defence system, including AEW.

For the RAN this is no longer a possible solution, even if the Sea Kings we have were to be stripped of their ASW equipment and fitted with radar, because there is now no platform from which they could operate, nor any readily available fighters for them to direct. In any case, I have heard it rumoured that the Sea Kings are to be transferred to the RAAF — not for ASW, but for search and rescue duties in peacetime — yet another military capability discarded.

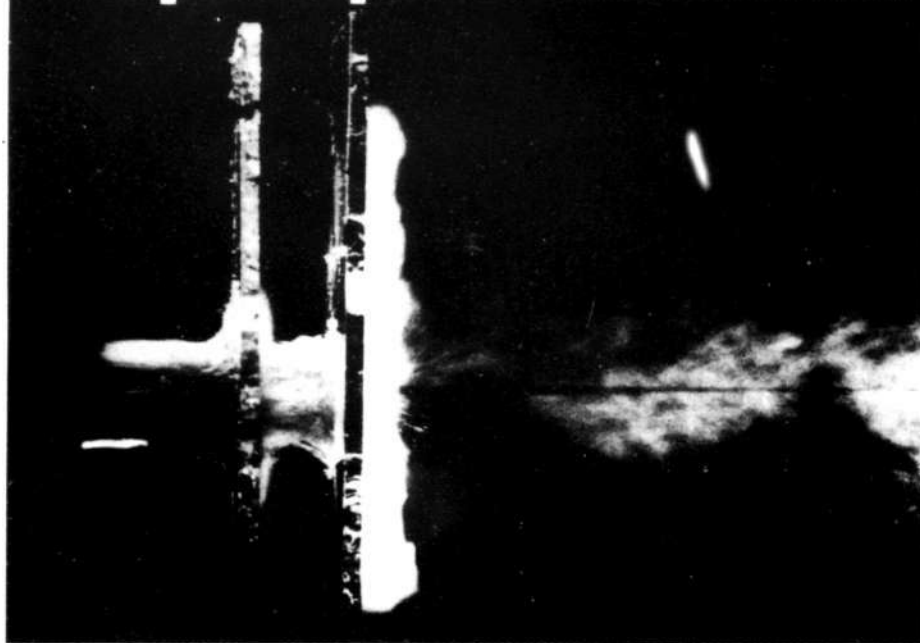
It is not that lack of AEW is a new problem for the RAN, there are those of us, and I am one, who have tried to draw attention to the fact for the last fifteen years or so that, even with the MELBOURNE and her aircraft, lack of AEW was probably the RAN's gravest tactical weakness. When this matter was raised with our seniors some behaved with remarkable complacency, saying that something would turn up in due course, probably in the form of an AEW helicopter. But, as we have seen, it took the loss of seven ships to get action and a less-than-optimum solution which, in any case is now not open to the RAN.

Concern about this problem of AEW led to my interest in airships some six years ago and, in particular, to the interesting developments taking place in Britain in this field. The company concerned has not been without its problems in that time, but it has gone from a small group of dedicated idealists to a pretty substantial public company, now called Airship Industries.

The first model they produced, the AD 500, got its permit to fly in September 1981. The next, and slightly larger model, the AD 600, was due to get its permit in September this year. A very much bigger airship, the AD 5000, is in detailed design at present. Contracts for the sale of three Skyships, as the company calls them, have been entered into and there are two leasing contracts — including one to the US Navy. The production envisaged is three more AD 500s and 5 AD 600s within the

Page Seven

Sting Ray explodes the myth of the torpedo-proof submarine.



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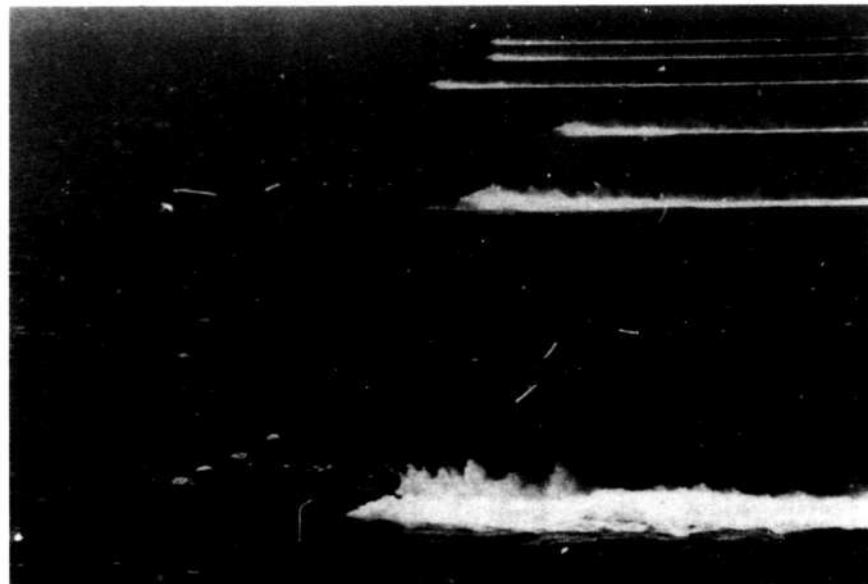
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PATROL HYDROFOIL MISSILES SHIPS PHM A New High-speed Weapon System



The six ship PHM squadron of the United States Navy. (Photo — Boeing)

Perhaps not so "new", the USN ordered its first large hydrofoil from BOEING in 1960, PHC-1 "HIGH POINT".

HIGH POINT was handed over in 1963, and has since been used to evaluate possible weapons and ASW equipment.

In 1966 two Patrol Gunboat Hydrofoils were ordered, PGH-1 FLAGSTAFF from Grumman and PGH-2 from Boeing. Both were delivered in 1968 and shipped to Vietnam in 1969 for six months of combat evaluation.

FLAGSTAFF was transferred to the USCG in 1976.

PGH-2 "TUCUMCARI", the first hydrofoil to have the now familiar combination of fully submerged foils, ACS (Automatic Control System) and Waterjet propulsion operated with the Pacific, Atlantic and 6th Fleets in 1971. She unfortunately ran aground in the Caribbean and was damaged beyond repair and written off.

In 1970, the USN and NATO countries decided that a larger Hydrofoil based on the Tucumcari design should be built.

In 1973, a 42.6 million dollar design and development contract was given to Boeing,

and after much on and off activity, PHM-1 "PEGASUS" was produced in late 1974.

PEGASUS was then used as a test vehicle and underwent extensive evaluation trials, which she passed with flying colours and was commissioned into the USN in July 1977. Five more vessels of the PEGASUS type were ordered to complete a Squadron of six PHMs. These are all commissioned and are at present operating as PHMRON 1, based on Key West, Florida.

EVALUATION

During the last few years many articles on PHM-1 PEGASUS have been published in journals such as MARITIME DEFENCE, INTERNATIONAL DEFENCE REVIEW, NAVAL FORCES, SEAPOWER, etc and closer to home the PACIFIC DEFENCE REPORTER. From this unclassified material much information on Hydrofoil vessels generally, and the PHM system particularly, has been made available.

by RADM PURVES, USN

These articles are unanimous on the following points:—

That PEGASUS represents a new high-speed and viable weapon system. Has sea keeping capabilities superior to DDs, Frigates or Patrol Craft in service in any Navy.

Is the USN's fastest and most lethal ship, also the most expensive ton for ton, but the best in cost effectiveness over its life. Offers a new concept in ASW when operating as a Group or with a Fleet.

Surprisingly, these articles, considering the complexity of the craft, have little adverse criticism. Two items which caught my eye were — (quote from Surface Warfare)

"At Foulbourn Speed (50 kts +) the Ensigns only last for two hours before being torn to shreds."

and
"rendering honours when passing a Senior Ship at 40 kts is difficult ... by about 1,000 yards."

The only serious weak point seems to be the Environmental Control System (Air Conditioning) ... it was ever thus.

BRIEF DESCRIPTION

Length
40 metres (131.2 ft)

Beam
8.6m (28.2 ft)

Weight
240 long tons

Draft
Foil retracted, 1.9m (6.2 ft)
Foil extended, 7.1m (23.2 ft)
Foilbourne (nominal), 2.7m (8.8 ft)

Speed
Hullbourne, 11 kts (Diesel)
Foilbourne, 50 kts +
"Take-off", 27 kts

Range
Hullbourne, over 1200 nm
Foilbourne, over 600 nm

MACHINERY

Propulsion: 1 - G.E. LM 2500 Gas Turbine and Aerojet Waterjet.
2 - MTU 8V331 TC 80 Diesels & 2 Waterjets with steering and reversing nozzles.
Ship Service Units (SSUs) 2 - Air Research ME 831 - 800 Gas Turbines driving 250 KVA/400 Hz / 450v / 3Ph Westinghouse Generators.

WEAPONS (as fitted)

8 - Harpoon (in canisters).
1 - Mk 75 76mm / 62 cal. Dual Purpose Automatic Gun. 400 rds ammunition.
2 - Mk 135 Chaff Launchers, 24 Mk 71 RBCC cartridges. (Sea Sparrow may also be fitted.)

COMMAND & CONTROL

2 - AN/SPA - 25 B displays.
1 - Weapon Assignment Unit.

NAVIGATION

1 - AN/SAN - 17 OMEGA.
1 - SMA3TM 20 - H RADAR.
1 - PL 41 E GYRO COMPASS & Vertical Reference.
1 - UL - 100 - 3 Underwater Log.
1 - DC - 723 D Echo Sounder.
1 - Type F Wind Speed & Direction Unit.
1 - DR Tracker & Analyser Indicator.

FIRE CONTROL

1 - Mk 92 (Mod 1) Gunfire Control.
1 - AN/SWG - 1 (v) Harpoon Ship Command/Launch Control Set.

INTERNAL COMMUNICATIONS

1 - MCS 2000 Intercom, PA & Alarm System.

EXTERNAL COMMUNICATIONS

1 - AN/UCR - 80 VHF 156 - 126 Transceiver.
2 - AN/ACR 138 (v) UHF 225 - 400 Transceivers.
2 - AN/URC - 75 (v) HF 2-30 Transceivers.
1 - Radio Teletype System.

SURVEILLANCE

1 - a/ms Mk 11 IFF System.

COUNTERMEASURES

1 - AN/SLR - 20 ESM System.

CREW

21 (four Officers, 17 Ratings).

GENERAL

The hull is all-welded and constructed from 5456 aluminium alloy, using a mixture of marine shipbuilding and aircraft construction technology.

The struts and foils are mainly "machined from solid" from 17 - 4 PH stainless steel, the foils incorporating control surfaces actuated by an electro-hydraulic system controlled automatically by gyros, electronic sensors, accelerometers and computers known as the ACS (Automatic Control System).

The idea of racing around in a state 5 seaway at a speed of 40 Kts under automatic control must be breathtaking to say the least. It is known in hydrofoil circles as "flying".

The conversion from Hullbourne to Foilbourne state is called "Take-off" and reversion from Foilbourne to Hullbourne operations is known as "Landing" ... as for Aircraft parlance.

However, it must work as the following figures show:-

The commercial Jet Foil fleet - some 22 ships operating in Europe, Asia, South America and Hawaiian Islands, has clocked up over:

160,000 hours
7,000,000 miles
14,000 passengers;
and
The PHMs have over
10,000 hours
250,000 miles.

The Royal Navy, Italian, Israeli and the Indonesian Navy, all operate or are building hydrofoils to Boeing design. The Indonesian Navy has already thoroughly tested the con-



USS TUCUMARI (PGH) foilborne during a high-speed run, May 1971.
(Photo - USN)

cept with a Boeing commercial type hydrofoil and are negotiating with Boeing for the first 10 ships of a 47 ship requirement programme.

Various Weapon Fits have been designed and tested. Sea Sparrow has been fired successfully.

Quick change facilities for Minesweeping, Minesweeping and ASW roles are available.

MAINTENANCE

Has been largely based on Aircraft maintenance practice.

The PHMs have been designed to be operated on a five-day seateime cycle operating from shore bases.

The shore based maintenance team and workshops are housed in trailers and move to new locations as required. A suitable ramp, a trolley and a tractor are used for "out of water" repairs to hull and foils.

THE FUTURE

MODEL 928 - 80 HYDROFOIL

The next step appears to be a larger vessel of some 400 tons, using a similar Foilbourne propulsion system as the PHMs, with the LM

2500 Gas Turbine uprated to its full potential - 25,000/30,000 shp (as opposed to 17,000 shp used in the PHMs) and uprated gearboxes and waterjets.

The use of larger Diesels - a 12 cylinder version of the MTU 8 cyl engines used in the PHMs driving "outdrives" - a retractable and 360(dm) steerable struts and propellers, in lieu of waterjets for Hullbourne propulsion, and Diesel driven SSPUs instead of Gas Turbine driven units, will result in a significant increase in range and payload.

Additional weapons for close range AA duty, twin 30 mm Gatling guns are contemplated and the Harpoon Missile outfit increased to 16 missiles.

The fuel load will be increased from 49.9 tons in the PHMs to 145 tons, and the increase in range in the Hullbourne mode is expected to be over 5 times that of the PHMs and the Foilbourne range increased by 66% (depending upon speed).

Length overall will increase by 8.1m to 48.6m.

Beam overall will increase by .7m to 9.3m.

Draft, Foils down, will increase by 1.3m to 8.4m.

Draft, Foils up, will increase by 1.4m to 3.3m.

COSTS

PHM with Weapons as fitted ... about US dollars 80 million.

Model 928 - 80 without Weapons ... about US dollars 100 million.

CONCLUSION

The PHM represents a new ship technology that allows small, very fast ships to operate in



USS PEGASUS (PHM) firing a harpoon surface to surface missile. (Photo - Boeing)

rough seas, providing a steady Gun/Missile platform and sea-sickness operating conditions for the crew.

They can carry out missions which may prove impossible to much larger ships, being twice as fast as most ships in calm waters and four times as fast in rough weather.

They are the fastest vessels in existence and can outrun any known craft on or below the surface of the sea.

With an operational crew of 21 they should prove cost-effective when compared with larger ships with ten times the crew numbers but with similar capabilities.

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THE ELDER — Australia's First Catamaran Warship

by LEUT J. STRACZEK, RAN



Artist's impression of the gun raft.

PRESENTLY under development for the Royal Australian Navy is a unique class of warship, the minehunting catamaran.

What makes this class of warship different from any other to have served in the RAN is that they will be the first Australian warships to be constructed using Glass Reinforced Plastic. These ships will also be the first catamaran warships to serve in the RAN. However they will not be the first catamaran warships built in Australia nor the first to serve in an Australian navy. This honour goes to an unusual vessel built in the Victorian Government Marine Yard at Williamstown during 1864.

The vessel in question, usually described as a gun-raft, was built as a result of concern over the adequacy of the defences of Port Phillip Bay. The intention was to acquire a vessel which could operate in the shallow regions of Hobsons Bay and thus provide supporting fire for the forts.

The idea of constructing a catamaran raft was originally conceived by the Rt Hon George Verdon, the Victorian Treasurer, after discussions with Captains Payne and Elder of the Naval Brigade. The detailed design work and the job of overseeing the raft's construction was carried out by Captain Elder, who as well as being in the Naval Brigade was also the Superintendent at the Marine Yard. Once laid down work on the raft progressed rapidly and by December 1864 the raft had been launched and

was ready to undergo her trials. The main reason for the rapid construction of the raft was the simple design.

The raft was constructed around two flat-bottomed pontoon boats of a type used by the military for river crossings. The two pontoons, each constructed of blue-gum timber and sheathed with copper, were joined through 5 inch by 8 inch beams. This gave a vessel with a deck approximately forty-six feet long and twenty-eight feet wide. This entire deck was then covered with oregon pine and had a large metal ring, upon which the gun would traverse, set into it.

The weapon selected to arm the raft was a 68 pounder muzzle loading gun weighing 95 cwt. This weapon was chosen to arm the raft for two reasons; firstly it was the most powerful gun available in the colony at that time, and secondly it was intended that the 68 pounder become the standard armament of the fixed fortifications. For this gun the raft carried sixty rounds of shells stowed in racks arranged around the raft's sides. Whilst the powder was stowed in a water-tight metal container which was secured to the deck.

Propulsion for the raft was to be provided by two lateen sails which were backed up by ten large sweep oars for use in calm weather. During trials carried out on Hobson's Bay on 3rd December, 1864 two temporary masts were fitted and it was estimated that a speed of approximately eight knots was reached.

For the trials the raft carried a full complement of twenty men under

the command of Captain Elder. Also on board for the trials was the Rt Hon George Verdon who was attending in his capacity as War Minister. The Ministry was part of the Treasurer's Department. Trials commenced at about 1.30 pm when the gun-raft led a small flotilla of boats out onto Hobson's Bay. Included in this flotilla was a small gun-boat under the command of Captain Macfarlane and crewed by 20 men of the Naval Brigade. This small gun-boat was constructed by cutting down a life-boat to a pinnace and mounting a 12 pounder Howitzer in the bows.

After clearing the jetty at Williamstown the tiny flotilla shaped a course for the firing area in Hobson's Bay. Upon arrival in the firing area the gun-raft anchored and the crew commenced securing the raft for the trials. The trials basically consisted of seeing how the raft behaved whilst the gun was being operated by the crew and also to see what effect, if any, the firing of the gun had on the raft. For the firings a target consisting of a moored buoy was set up at a range of 1200 yards from the raft. The honour of firing the first shot was given to Mr Verdon. After firing the shot and amid rousing cheers from the crew Mr Verdon christened the gun-raft ELDER, after the man who designed, constructed and currently commanded the vessel. Shortly after this, the trials were declared a complete success, the gun secured and all was made ready for the return voyage to Williamstown.

On the return voyage to Williamstown the raft ran into strong headwinds making the sails useless. The crew then manned the sweeps in an attempt to row back to the wharf. This also proved to be unsuccessful and the raft was eventually towed back by a steamer. The inability of the raft to make way against a headwind was probably a major disadvantage of the raft. Other disadvantages were an overall low speed, only a limited ammunition supply could be carried and the open nature of the vessel which exposed the crew to raking fire.

The overall opinion of all present was that despite any shortcomings in the design, the raft, a welcome addition to the colonies' defences and at a cost of approximately £350, represented good value for money.

In the latter part of January, 1865, the Naval Brigade along with units of the colonial militia took part in a Military Review held at Flemington Racecourse. The Naval Brigade's contribution to the Review consisted of 216 officers and men from Williamstown and Sandridge supported by the ELDER and numerous small craft. Included in the flotilla of small craft were two boats mounting 12 pounder Howitzer in the bows and two other boats carrying rocket tubes.

The finale of the Review was a mock attack by the Militia forces and the Naval Brigade on an enemy fortification near the river. On the commencement of the attack the Naval Brigade including ELDER, the gun and rocket boats and other vessels proceeded up the river until they were halted by an obstruction erected across the river. This obstruction consisted of two booms constructed of wood fastened together by iron and covered with canvas. Upon sighting the boom the light boats retired behind ELDER and the gun and rocket boats. All of them opened fire on the imaginary enemy positions. Under cover of this barrage a single boat sailed forth and placed a charge of 60lb gunpowder under the boom. This charge was then electrically detonated using equipment which had only just been introduced into service. After the second boom had been destroyed in the same manner the Naval Brigade and Volunteer Engineers constructed a pontoon bridge using Government dredging barges which had been pressed into service for the exercise.

With the pontoon bridge completed the Naval Brigade took up defensive positions at the head of the bridge so as to provide supporting fire for the infantry, cavalry and artillery as they crossed. Once on the other side of the river the Militia units formed up and commenced to assault the enemy fortifications. The final advance and assault was made under cover of a continuous barrage from the Horse Artillery and the Naval Brigade, which had formed up near the pontoon bridge. As would be expected the enemy position was eventually over-run.

On completion of the Review the Naval Brigade re-embarked into the boats and returned to their units. Of the twenty pieces of artillery used in the Review the 68 pounder carried onboard the ELDER was the most powerful.

This appears to be the last time ELDER was used as no further mention is found of her. Even during the visit to Melbourne by the Confederate commerce raider SHENANDOAH in February, 1865 no official mention or use was made of the ELDER. Because of this lack of further information it can be assumed that ELDER had a very short service life and was broken up after a more important use was found for her 68 pounder.

One interesting sideline to the story of the ELDER is that the Victorian Government Marine Yard where she was built has developed into what is now known as Williamstown Naval Dockyard. So the ELDER was not only the first catamaran warship built in Australia but was also the first warship to be built at Williamstown.

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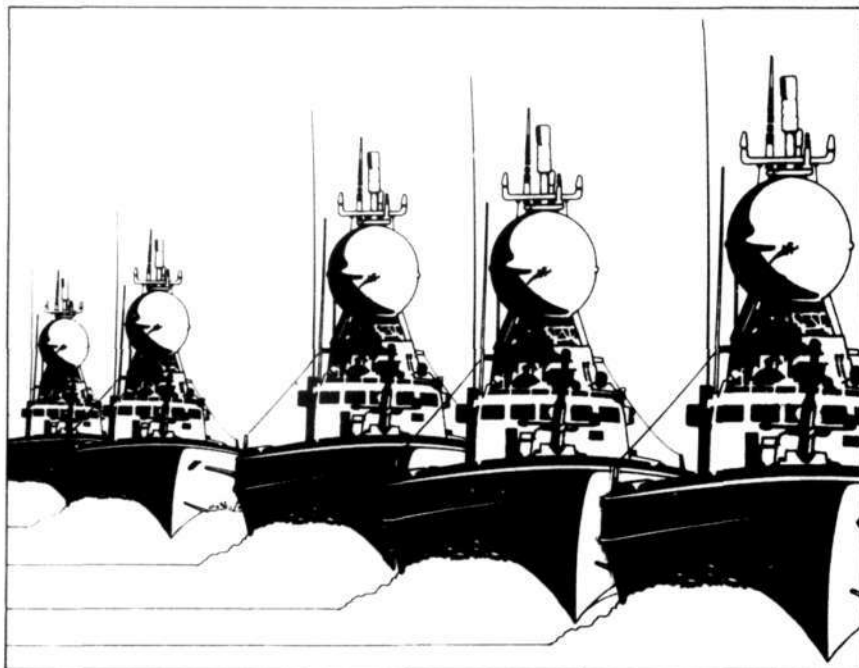
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Members of Garden Island's support craft 'fleet' paraded before the cameras on 24th October. Leading the 'fleet manoeuvres' was the 40 year old MWL 254, the harbour tug HTS 502 and HTS 504, crane stores lighter CSL 02 and four workboats.

(Photo — ABPH Steve Mapasa, RAN.)



Colonial naval history has come to life in the Sydney Maritime Museum's new naval exhibition at their Birkenhead Point complex on Sydney Harbour. The artillery piece on display here was used by the NSW naval forces. The colony's flagship, HMCS WOLVERENE, is also depicted in the large photo to the rear.

(Photo — ABPH Steve Mapasa, RAN.)

NATIONAL NAVAL MEMORIAL FOR ANZAC PARADE

A National Naval Memorial to commemorate the service of the many thousands of men and women who have served their country in times of war and peace in the Royal Australian Navy is to be erected in Anzac Parade, Canberra.

In a joint announcement the Minister for Territories and Local Government, Mr Tom Uren, and the Minister for Defence, Mr Gordon Scholes, said that the Canberra National Memorials Committee had approved a proposal by the RAN to establish the Memorial in time for unveiling during the Navy's 75th anniversary in 1985.

Mr Scholes said: "The Memorial will be a fine and fitting tribute to the tens of thousands of men and women who have contributed so much towards developing a naval heritage of which all Australians can be so justly proud."

Mr Uren said that the memorial would be funded by the National Capital Development Commission. "The Memorial will be the subject of a design competition," he said. "Details will be announced later, but it is important that the design should be a fitting monument to the dedication and devotion to duty of those who serve their country."

COMMISSIONING OF HMAS GAWLER

HMAS GAWLER, the ninth of 14 Fremantle class patrol boats being built for the RAN by North Queensland Engineers and Agents Pty Ltd (NQE4) at Cairns, was commissioned on Saturday, August 27, 1983.

HMAS GAWLER was launched by Mrs C. M. Fry, wife of the Chairman of Directors of NQE4, Mr R. G. Fry, on July 9, 1983.

HMAS GAWLER will be based in Darwin under the command of Lieutenant Commander Ian Gibson, of Neutral Bay, Sydney.

PACIFIC PATROL BOAT ANNOUNCED

Australia proposes to develop, in conjunction with South Pacific countries, a Pacific Patrol Boat to meet the expressed needs of regional States for an effective means of protecting their 200nm Exclusive Economic Zones.

In announcing the Pacific Patrol Boat Project the Minister for Defence, Mr Gordon Scholes, said that if regional countries agreed, the Government intended to develop a type of boat which would meet the unique surveillance requirements and maintenance capabilities of the South Pacific.

January, 1984

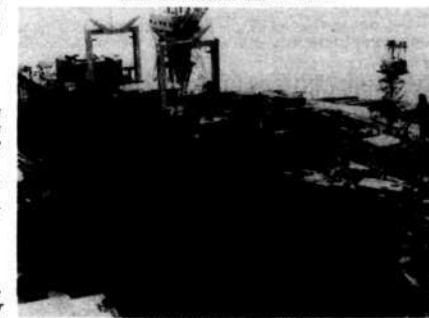
It would be developed in conjunction with the Australian shipbuilding industry.

Mr Scholes added that the governments of the Solomon Islands and Papua New Guinea had already expressed a clear interest in obtaining vessels of this type under the Australian Defence Co-operation Programme. From studies carried out by Australian defence technical experts and consultations with the governments concerned, it seems likely that a vessel of broadly similar characteristics would suit the needs of both countries and perhaps others in the region.

The Minister said that initial considerations indicated that some five to six vessels could be provided by Australia to regional States under the Defence Co-operation Programme.

It is expected that when interested South Pacific Forum members have agreed to the vessel's broad design requirements, the views of the Australian shipbuilding industry will be sought.

INCREASED COST FOR UNDERWAY REPLENISHMENT SHIP



SUCCESS, September 1983.

(Photo — Cockatoo Island.)

The Minister for Defence, Mr Gordon Scholes, and Minister for Defence Support, Mr Brian Howe, announced in September that the Government had completed a review of arrangements for the construction of an underway replenishment ship for the Royal

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Australian Navy, and had agreed to substantial increases in the project costs.

The Ministers said the order for the ship was placed with the Sydney shipbuilder, Vickers Cockatoo Dockyard Pty Ltd, and Vickers (Australia) Ltd, by the previous Government in 1979 after consideration of an earlier proposal to build the ship in France.

The contractor's tender, which was based on production documentation provided by the French designer/builder Direction Techniques des Constructions Navales (DTCN), was competitive with the French offer.

However, construction of the ship in Australia from the French documentation had proved a more complex task than anticipated by Vickers Cockatoo, and this had led to large increases in cost.

It was now clear that the scope of the shipbuilding task had been significantly underestimated in the Vickers Cockatoo tender. Support costs had also been underestimated, and additional funds were required for the purchase of spares, and for production of support documentation.

After lengthy discussions with Vickers Cockatoo Dockyard and the parent company, Vickers (Australia) Ltd, it had been agreed that the original contract would be renegotiated on a fixed price incentive basis with a target ship cost of \$132,795,000 in January 1983 prices.

The total approved project cost, which included construction of the ship, plus spares, documentation, training, design modification, and royalties and technical assistance, was now \$197.4 million at January 1983 prices. This figure was based on the "ceiling cost" of constructing the ship.

It represented a real increase of \$72,142,000 over the previously approved project cost expressed in August 1982 prices.

In addition to the considerable cost over-runs, delivery of the ship would be delayed. It was now expected that the ship would be launched next March, and be delivered to the RAN early in 1986, providing a necessary enhancement of the Navy's replenishment-at-sea capability.

The Ministers said the previous Government must accept substantial responsibility for the problems which had been encountered.

They were now satisfied that the project had been placed on a much sounder footing and that construction of the ship would proceed according to plan.

PATROL BOAT FOR INDONESIA

Indonesia has taken delivery of its fifth Attack Class patrol boat under the Australian Government's Defence Co-operation Programme.

HMAS BOMBARD was provided to the Indonesian Navy as part of an on-going Defence Co-operation Programme maritime patrol project aimed at increasing the Indonesian Government's coastal surveillance capability. HMAS BOMBARD will assist four other RAN Attack Class patrol boats previously provided to Indonesia to deal with smuggling, illegal entry, protection of fishing rights and search and rescue within Indonesia's archipelagic waters.

Commissioned into the RAN in 1968, HMAS BOMBARD will be renamed KRI SIRIBUA when it enters service with the Indonesian Navy.

RN TASK GROUP'S VISIT TO AUSTRALIAN PORTS

A Royal Navy Task Group of six ships arrived at Fremantle, W.A., on November 5, 1983.

The Minister for Defence, Mr Gordon Scholes, said that the ships would also visit other Australian States and New Zealand during a goodwill deployment lasting until January 3, 1984.

Mr Scholes said that the Government welcomed the visit of the Task Group, which would comprise the aircraft carrier HMS INVINCIBLE, the frigates HMS ROTHESAY and HMS AURORA, and the Royal Fleet Auxiliaries (RFA) OLMEDA, REGENT and APPLELEAF. The group would be under the command of Rear Admiral J. J. Black, DSO, MBE.

During the visit of the British Task Group, the Australian Defence Force would conduct passage exercises with the British ships in Australian waters.

HM ships INVINCIBLE, AURORA and ROTHESAY and RFA REGENT will visit Fremantle from November 5-12 and RFA OLMEDA and RFA APPLELEAF will visit Albany, WA, from November 6-13. The combined group will then leave for New Zealand.

In the period December 22 to January 3, HMS INVINCIBLE and

RFA OLMEDA and RFA REGENT will visit Sydney, HMS ROTHESAY and RFA APPLELEAF will be at Brisbane and HMS AURORA at Newcastle.



A Sikorsky Seahawk about to land aboard an FFG7 class frigate
(Photo — Sikorsky)

SHORT LIST ANNOUNCED FOR NEW RAN HELICOPTERS

Two helicopter types — one from the United States and the other from the United Kingdom — have been selected as final contenders for eventual use on the Royal Australian Navy's guided missile frigates and as Fleet utility aircraft.

The aircraft are the Sikorsky SEAHAWK (USA) and Westland LYNX 3 (UK).

Tendered proposals for three other aircraft, the Aerospatiale SUPER PUMA (France), Aerospatiale DAUPHIN (France) and Westland SUPER LYNX (United Kingdom) had been declined.

The Minister for Defence said that the three competing companies had submitted proposals last February for aircraft and weapon system options. While each contender had significant attractions, the extensive evaluation of proposals had led to a clear preference for the two finalists, one each in the medium and intermediate weight/capability areas. He emphasised that of the several Navy helicopter requirements, high priority was being given to providing our frigate helicopters with anti-submarine warfare capability.

Mr Scholes said that discussions would commence shortly with Sikorsky and Westland to refine their proposals, specify the preferred configurations, especially for Anti-Submarine Warfare equipment: develop in-country support plans, and delineate the involvement of Australian industry. These discussions would also explore the potential for achieving equipment and support standardisation between the aircraft for the RAN's frigates and Fleet utility roles and future Navy and Air Force helicopter requirements. However, the final choice of an Air Force helicopter would not necessarily be confined to those aircraft now short listed.

The Minister said it was planned that this study of refined proposals would lead to entering contract negotiations with the preferred tenderer by mid-1984.

PROGRESS ON SUBMARINE PROJECT

The Minister for Defence, Mr Gordon Scholes, has indicated that he was encouraged by the recent strong interest by Australian industry and State Governments in the project to acquire new submarines for the RAN.

The Minister reiterated a statement he made in July last year that no early decision was planned for the design and acquisition of a new class of diesel submarine for the RAN.

Mr Scholes said that tenders for definition studies were due to close last November. The tenders would be subject to comprehensive evaluation, and it was planned to award contracts for the studies in the second half of 1984.

He said: "The project definition studies are planned to identify the design, cost and other implications of constructing submarines for the RAN. They are to examine the role and extent of Australian industry involvement in the project, both in terms of construction and through-life support of the submarines."

Mr Scholes said it was expected that the project definition phase would be completed about 1986, and would be followed at a later date by a decision on construction. The timing of the decision on construction would be influenced by various factors. These included the extent of local industrial involvement and whether special facilities needed to be established, the availability of suitable submarine designs and their stage of development, and the need for the first of the new submarines to enter service in the early 1990s.

AUSTRALIA-NEW ZEALAND INFORMATION EXCHANGE ON SUBMARINES

The Minister for Defence, Mr Gordon Scholes, announced in early October that a Memorandum of Understanding (MOU) between the Royal Australian Navy and the Royal New Zealand Navy on the exchange of information relating to the procurement of submarines would be signed in the near future.

The MOU would provide for an exchange of information between the two countries on matters relating to the selection, equipping and purchasing of submarines. Such information would assist the New Zealand Government in further development of proposals it has under consideration for a future reorganised maritime Defence Force.



SYDNEY on trials prior to commissioning.
(Photo — RAN)

DELIVERY OF RAN FFGs

The Minister for Defence, Mr Gordon Scholes, has stated that the RAN's third missile frigate, HMAS SYDNEY, was expected to arrive in Sydney, as scheduled, in late March 1984.

However, a recent industrial dispute at the ship's builders, Todd Pacific Shipyard in Seattle, could cause some delay in the delivery next year of the RAN's fourth guided missile frigate, DARWIN.

Mr Scholes said DARWIN was still under construction in Seattle, and exact details on any new delivery date still had to be worked out with United States' authorities.

CONTRACT TO BELFAST SHIPBUILDERS FOR FALKLANDS FLEXIPOINT

Belfast Shipbuilders, Harland and Wolff, will now build the major part of the Flexiport which Britain's Ministry of Defence plans to install in the Falkland Islands. Additional orders announced in mid-October bring the total value of the company's involvement to just over \$10 million.

The overall project is basically a floating harbour installation with

facilities for discharging and loading container vessels, general purpose cargo ships and ro-ro vessels. Harland and Wolff will now begin work on all seven large existing barges on which the complex will be built and outfit these with storage buildings and the necessary services. Six steel dolphins for mooring the barges will also be manufactured at Belfast.

The company will be responsible for the manufacture of the 190-metre long steel causeway which will connect the floating harbour with the mainland at Port Stanley.

Harland and Wolff's chairman and chief executive, Mr John Parker, said that he was gratified at the significant role which the company will play in this unique venture. He added that in future, in addition to their shipbuilding, engineering and ship repair activities, the company intended to expand its involvement in offshore work and the manufacture of non-marine steel structures.

Mr Parker is an Ulsterman with strong views on the necessity to deliver work on time. Recently, two 110,000 tonne tankers for BP were delivered on schedule. A \$51 million ore-carrier under construction for British Steel is three weeks ahead of schedule and, in addition to the Falklands work, the yard is faced with the challenge of bringing a late order from the Blue Star Line on to schedule.

Up-to-date facilities at Harland and Wolff and computer-aided design facilities go hand-in-hand with changes in management structure and practice introduced by Mr Parker.

Describing the Flexiport as not unlike the wartime mulberry harbours used in the allied invasion of occupied Europe in 1944, Mr Parker believed that this was probably the first time that a project of this kind had been undertaken since the war. It would be a challenging task, he said.

The basis of the port would be very large offshore barges of a type used in Britain's offshore oil industry. Harland and Wolff had a management and work-force which was prepared to take on unusual tasks.

NEW NAVY HELICOPTER FROM WESTLAND

Westland has announced a new, more powerful naval helicopter, the Navy Lynx 3. The new variant of Team Lynx was made public at the Royal Navy Equipment Exhibition at Portsmouth.

The Navy Lynx 3 is designed to maintain Lynx superiority over the ever increasing surface and submarine threat, advancing the capabilities of Navy Lynx with the most modern weapons and sensors.

At 12,000 lb (5445 kg) Navy Lynx 3 can carry a greater range of weapons and sensors, including active and passive sonobuoys, dunking sonar, magnetic anomaly detector and 360 degree radar and provides an increase in range and time on station.

It can be fitted with the new Stingray Mk 46 and Mk 44 torpedoes and depth charges. Combat proven Sea Skua missiles can be used against fast surface vessels and it is able to defend itself with Stinger air-to-air missiles or 20 mm cannon.

Capable of anti-surface vessel strike, anti-submarine warfare, electronic surveillance measures, search and rescue, as well as casualty



Westland Lynx 3.
(Photo — Westland)



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WESTLAND

evacuation, Navy Lynx can also carry nine equipped troops when used in the troop transport role.

It maintains the unequalled Lynx deck recovery agility, using the harpoon deck lock and negative thrust and has the same easy storage qualities as Navy Lynx, with folding tail cone and rotors.

Latest electronics include the digital core avionics system, with integrated cockpit displays and controls, incorporating a MIL-STD 1553 databus, which can integrate new weapon systems and sensors as required.



The guided-missile destroyer *HMAS HOBART* made history when she berthed at *HMAS Stirling* on 22nd September, 1983. *HOBART* was the 100th visitor to the base since its commissioning on 28th July, 1978. Ironically it was also the destroyer's first visit to *HMAS Stirling* since that commissioning. *HOBART* already holds a special place in the base's history as it was the first ship to come alongside when the wharves were completed way back on 11th August, 1975.

(Photo — LSPH Steve Given, RAN.)

SEA EAGLES WILL FLY FROM SHIPS

British Aerospace is to go ahead with the development of a new ship-launched version of the *Sea Eagle* air-launched sea-skimming anti-ship missile.

Sea Eagle as an air-launched weapon is designed to operate against enemy warships, including the largest ships equipped with the most advanced air defence and electronic countermeasures systems. It is in full development and a series of firing trials is under way. *Sea Eagle* is due to enter service in the mid-1980s with both the British Navy and Air Force.

While production of *Sea Eagle* has been authorised by a \$340 million UK Defence Ministry contract, the new ship-launched variant will have its development funded privately by British Aerospace (BAe). BAe has already offered the missile to meet the need of the UK Royal Navy for a new surface-to-surface weapon system.

The air-launched version will be fitted to UK Air Force Buccaneers and the Navy's Sea Harrier jump jets, and may be fitted later to the swing-wing Tornado. It is suitable for a range of other aircraft and has been ordered for Indian Sea King helicopters.

BAe says that there are "significant and wide ranging" advantages in producing a family of *Sea Eagles*. The ship-launched variant, to be known as *Sea Eagle SL*, will differ in having two additional side-mounted boost motors.

The missile will be housed and launched from a deck-mounted cannister. After launch it will be driven by a small turbo-jet engine, giving it very long range at sea-skimming height.

On-board digital computers give the missile a high degree of intelligence and the ability to penetrate sophisticated enemy defences, including severe electronic countermeasures.

BAe say that as well as providing ships down to 200 tonnes with an over-the-horizon anti-ship strike capability, *Sea Eagle* could also provide the basis for an air-launched stand-off missile for attacking high-value land targets.

January, 1984

THE NAVY



Seen alongside at *HMAS Stirling's* destroyer wharf during Exercise Kangaroo '83 in October are the guided-missile destroyer *HMAS HOBART* (39), frigate *USS LOCKWOOD* (1064), and aft of them the guided-missile frigate *USS CANBERRA* and the frigate *USS MARVIN SHIELDS*.

(Photo — LSPH Steve Given, RAN.)



MELBOURNE's second-last voyage saw the former flagship towed from Garden Island to the reserve moorings in Sydney Harbour on 13th October, 1983.

(Photo — RAN.)



Another view of *MELBOURNE* arriving at Athol Bight.

(Photo — RAN.)

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WORLD'S "QUIETEST" FRIGATE

Britain's Royal Navy is to be equipped with a new class of frigate which, it claims, will reverse the roles played by surface vessels and submarines.

Traditionally, the submarine has been regarded as the hunter and the surface vessel as the hunted, but the projected Type 23 frigate with its silent running and long-range detection capabilities will turn the tables. The ship is not only designed to seek, find and destroy submarines, but to do so without Task Force protection and is therefore fitted with powerful defences against any form of attack.

It is the first major warship to incorporate improvements resulting from experience gained during the South Atlantic conflict and is designed to NATO standards. As such, it will clearly enhance Britain's contribution to the Western Alliance.

Under-Secretary of State for Defence Procurement, Mr Ian Stewart, announced that detailed work on the design is well advanced at Yarrow Shipbuilders Ltd, part of British Shipbuilders, and a tender for the first-of-class ship will be invited in the next few weeks. The first order is planned for next year.

The role of the ship and the performance of its systems have been specified by the Ministry of Defence, but design objectives were drafted to allow shipbuilders to incorporate significant cost reductions.

Type 23, which will complement the existing Type 22, is designed to conduct anti-submarine warfare in the North Atlantic and general purpose duties worldwide. Mr Stewart said that the most modern technology would enable it to perform these vital roles.

The Royal Navy claims that the Type 23 will be the quietest major surface warship in the world. This is achieved by a unique combination of diesel electric and gas turbine propulsion systems. Major sources of noise transmitted to the sea can be the propulsion gearbox and the propellers, but in the new design, electric motors, directly coupled to the propellers, reduce transmitted noise to "an absolute minimum".

Another highly important feature of the ship's anti-submarine capability is its towed array sonar which, supported by target identification equipment, enables long-range detection of low-noise submarines. This is complemented by a ship-mounted sonar for medium and close-range detection and a helicopter with sonobuoys and maritime aircraft links.

Long-range attacks can be carried out using helicopter-borne weapons. Principal surface-to-surface weapon will be a sea-skimming missile, eight of which are mounted forward of the bridge, together with a 4.5 inch gun.



The HMAS Leeuwin-based seaward defence boat SDB 1325 celebrated its 40th birthday on 4th November with a special commemorative cake and informal celebration. The last of 28 SDBs to serve in the Royal Australian Navy, the Tasmanian-built vessel is seen here with the RAN Fleet Bank aboard a fortnight before its birthday.

(Photo - LSPH Steve Given, RAN)

Air threats will be met by vertically-launched Seawolf missiles controlled by either of two-frequency tracking radars with a specific anti-sea-skimming capability. Passive defence is provided by chaff/infrared decoy launchers.

However, versatility is basically the key to the armament fit and the ship is designed to allow a free choice of options to be fitted to meet individual operational requirements.

The vessel has been designed with a low profile using minimum superstructure with the aim of producing a frigate which will be low enough to escape missile detection. "Corners" have been smoothed out wherever possible to avoid giving a clear radar picture.

Capable of prolonged operation at up to 15 knots and a maximum speed of about 28 knots, the ship has an endurance of about 7,000 nautical miles - considerably greater than any Royal Navy frigate at present. This is a fitting performance for a vessel that will form the backbone of the Navy's anti-submarine surface force in the year 2000.

BRITISH MINISTRY OF DEFENCE ORDERS OBERON CLASS REPLACEMENT

A leading contender in the Royal Australian Navy's Oberon class submarine replacement programme has been awarded a major contract by the British Ministry of Defence.

Mr John Lee, Parliamentary Under-Secretary of State for Defence Procurement, announced to the House of Commons on November 2:

"... the order for the first of the Type 2400 class of patrol submarine is being placed today. The order goes to Vickers Shipbuilding and Engineering Limited at Barrow, who have been design contractors for this submarine."

The development of the T2400 had been undertaken in close co-operation with the British Ministry of Defence and the Royal Navy.

The T2400 had been developed as the successor to the highly successful Oberon class - in service with the RAN - and the British Government's announcement would be of major interest to defence planners in Australia and elsewhere.

The RN T2400 is an ocean-going diesel electric submarine, with a submerged displacement of 2400 tonnes, capable of a maximum submerged speed in excess of 20 knots and requires a substantially smaller crew than the Oberon class, which it will replace.

Variants of the T2400 are designed to meet the specialised requirements of individual navies.



HMS INVINCIBLE enters the Port of Fremantle in Western Australia on 5th November, 1983.

(Photo - LSPH Steve Given, RAN)



Seen entering the Port of Fremantle at the completion of the Exercise Kangaroo '83 is the submarine HMAS OXLEY. The vessel was in Fremantle between 14th-18th October and 20th-24th before returning to Sydney.

(Photo - ADPH Eric Pimen, RAN)



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Letters to the editor

91 Brompton Road
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16th October, 1983

Dear Sir,

I read with interest the article in July 1983 edition of "Cruisers of the World" which contained mention of the Russian cruiser ASKOLD. Coincidentally, I had just received issue number 12 of "The Gallipolitan" which is the quarterly publication of the British Gallipoli Association, of which I am an associate member.

In an article by the late Lt-Col R.F.E. Laidlaw, mention was made of ASKOLD and of the great affection felt by the men in the line towards this ship. I have enclosed an extract of this article and hope that it may be of interest to other readers.

Congratulations on a fine magazine

Yours sincerely
JOHN D. YOUNG

"One of the vessels which was constantly going in to shell these guns was the Russian cruiser ASKOLD. She was extremely daring and was a great favourite with the troops. She had five white funnels and so was nicknamed 'The packet of Woodbines'. When she was in the Straits the men looked at nothing else, and her every move and every shell fired, by or splashing near her, was reported by hundreds of voices all down the trenches. She seemed to bear a charmed life and was a great morale raiser, as were all the ships in the naval actions constantly going on round us."

49 Talford Street
Doncaster East
Melbourne, 3109

Dear Sir,

With regard to article on the KRAIT in the October issue of "The Navy"

I found the article very interesting, but disagree with the piece about the KRAIT being carried to Australia on the P&O steamer BALLARAT.

Between 1935 and 1954 there were no ships called BALLARAT in the P&O fleet.

Checking a 1942 Lloyds' list, there are no ships called BALLARAT during this period.

I am only writing this so as to set the record straight and would be interested to know which ship did carry the KRAIT to Australia, especially if it was a P&O steamer, as the history and ships of this company are my pet subject.

Yours faithfully
K. HODGES

If any reader can solve this problem, please contact me and I will publish any replies.

EDITOR

Dunraven
55 Clendon Road
Toorak, 3142

27th September, 1983

Dear Mr Gillett,

May I be allowed to add a footnote to the article "The Night that made KIWI Famous" in your October issue? At the time of the famous exploit, I was commanding a Commando Reconnaissance Unit, which included British, New Zealand, Fijian and Solomon Island personnel. KIWI, engaged on screening duties, very kindly gave me an open invitation to send on board for the day any patrol which had recently returned from combat duty. They had a lovely day lazing about, and in fact one patrol had been on board the same day of the action.

As was the custom in those days, KIWI duly had a diagram of a sinking submarine painted on the funnel. About a year later she steamed

into Port Purvis on some duty or other. At anchor lay the giant fleet for the next invasion, Okinawa or Pelilieu, I do not remember. Giant carriers, battleships, cruisers, etc, over a hundred, all anchored in rows. The British Pacific Fleet contingent was led by VICTORIOUS. Someone on the bridge looked down and saw this tiny ship wearing a large white ensign.

They signalled by Aldis, and Gordon Bridson chuckled and read out, "VICTORIOUS to KIWI. Congratulations and greetings from VICTORIOUS on your submarine. When did you get it?" Without any hesitation, Gordon jibbed the following:

"KIWI to VICTORIOUS. Thank you for your kind message. We got submarine a year ago. Are you frightened?"

Yours sincerely
MARTIN CLEMENS

103 Mapleton Road
Nambour, Qld, 4560
19th October, 1983

Dear Sir,

Congratulations must go to Carrington Slipways for their design of an LPH, desperately required by the RAN for ASW and AEW.

These LPHs will fill a role overlooked by the US of convoy protection. Each State should sponsor an LPH. I would gladly donate \$100 for HMAS QUEENSLAND.

Yours faithfully
C. J. MITCHELL

20 Karracatta Street
Goode Beach, Albany, 6330
24th October, 1983

Dear Mr Gillett,

I am enclosing a copy of the history of the ADA that I have recently researched in the interest of the Naval Reserve Cadets of TS VANCOUVER, Albany, Western Australia (see page 63).

Perhaps you will be able to publish a story in your magazine from the information I have enclosed and so give our Unit some publicity. So far as I am aware, this Unit has not previously contributed to "The Navy", though a good number of us are avid readers of your magazine.

At present, TS VANCOUVER has 40 active Cadets, both boys and girls, under the leadership of their Commanding Officer, Lt Bill Lyle. There are six other Staff members who enthusiastically train our Cadets.

Presently, TS VANCOUVER has five sailing craft (Corsair), a 10 foot aluminium dinghy with motor, and the CHATHAM, a larger motor boat used as a rescue boat, though she is past her prime and will shortly be helped in her duties by a Zodiac 5 to 6-man rescue craft, that the Navy League - Albany Branch - is in the process of purchasing for the Unit.

Then we have ADA, which is in the early stages of being repaired. We are hoping to make her seaworthy again in the near future and so have an adequate sailing yacht for the Cadets training programme.

As with most other Units, we do have a difficult time raising sufficient funds for all our needs, however we at the Navy League do not lack enthusiasm and are hopeful that this financial year we are able to fulfil our set goals.

However, we would be most grateful for any donations that were to come our way for the restoration of ADA.

Yours sincerely
(Mrs) C. WAGHORN
Hon Secretary
The Navy League - Albany Branch
Western Australia

KANGAROO '83

Confrontation Revisited Plus Escalation Plus P.R.

by Commodore J. A.
Robertson RAN (Rtd)

There is no one single simple description which can be applied to K'83. The exercise displayed different facets representing the diversity of its aims. No doubt there were other subsidising aims, but the three principal ones seem to have been:

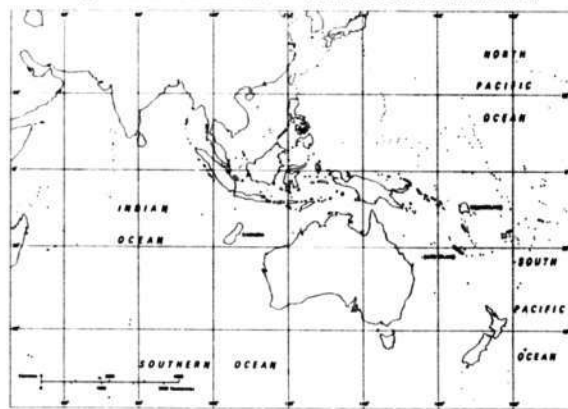
- To examine the requirements for dealing with a low level conflict on Australia's mainland (this was officially stated as "to examine the Australian Defence Force in Joint Operations in a low level conflict in the defence of the north-west of Australia");
- To escalate the conflict up to avert limited war; and
- To obtain the maximum PR value, externally with the media, within the Defence Department and, by no means least, with West Australia.

SETTING AND SCENARIO

The hypothetical enemy (Orange) for K'83 was a fictitious country, Kamaria, an island State located 1,000 km north-west of Learmonth. Geographically, Kamaria resembled the South Island of New Zealand (see map); its population was said to be predominantly Caucasian and its economy included a developed industrial base. But it appeared that friction between Australia and Kamaria arose mainly over Australia's actions against the Kamarian fishing fleet which, it was claimed, was merely exercising its traditional rights to fish in Australian waters.

FORCES INVOLVED

The Kamarian base was located at Port Hedland. The order of battle included:



January, 1984

THE NAVY

EX K'83 - ARMY UNITS

BLUE FORCE:

- Headquarters
- Operational Deployment Force (ODF) Battalion Group
- 1 x Infantry Battalion (INF BN)
- 1 x Artillery Field Battery (ARTY FD BTY)
- 1 x Engineer Field Troop (ENG FD TP)
- 1 x Signals Squadron (SIG SQN)
- 1 x Aviation Troop (AVN TP) which includes 4 Light Observation Helicopters (Kiowa) and 1 Nomad
- 1 x Brigade Maintenance Area (BMA)
- 1 x US Rifle Company (RIFLE COY)
- 1 x Army Reserve Rifle Company which is 5th Independent Rifle Company
- 1 x NZ Rifle Company
- 1 x Special Air Service (SAS) Squadron, including NZ members
- Norforce
- Miscellaneous Logistic and Communications elements, including elements of 10th Terminal Regiment.

ORANGE FORCE:

- Headquarters
- 2 x Rifle Coy
- 2 x Kiowa Helicopter
- 1 x Porter Aircraft
- 1 x Nomad Aircraft
- Special Action Forces element, including US Forces
- Logistics and Communications

NEUTRAL:

- Element of Field Hospital.

EX K'83 - SHIPS

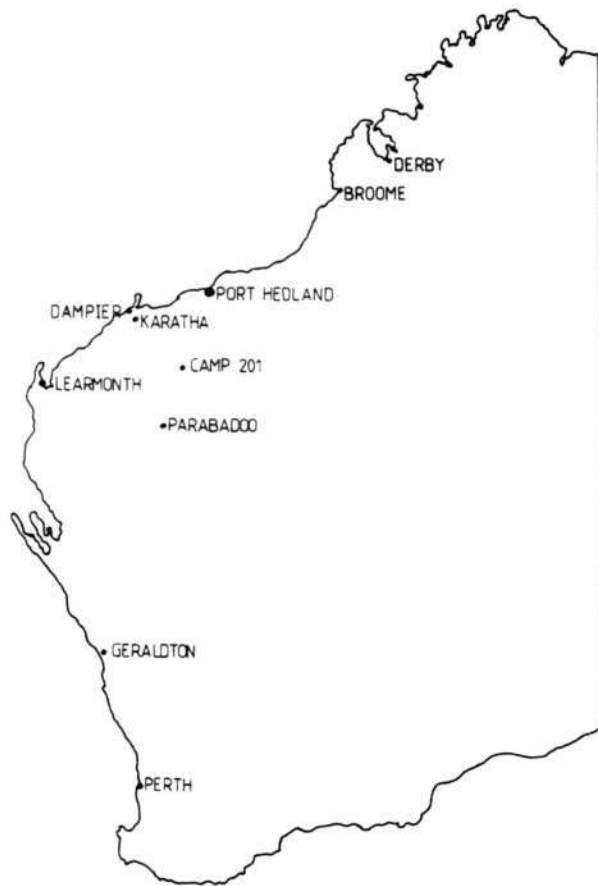
BLUE FORCE:

- 1 Fleet Tanker (AO) HMAS SUPPLY
- 1 Training Ship (AGT) HMAS JERVIS BAY
- 1 Landing Ship Heavy (LSH) HMAS TOBRUK
- 1 Guided Missile Destroyer (DDG) HMAS HOBART
- 1 Guided Missile Frigate (FFG) HMAS CANBERRA
- 1 Destroyer Escort (DE) - Royal New Zealand Navy
- 2 Frigates - United States Navy
- 4 Patrol Boats (PTF) HMAS BENDIGO, HMAS CESSNOCK, HMAS IPSWICH, HMAS TOWNSVILLE
- 3 Landing Craft Heavy (LCH) HMAS BALIKPAPAN, HMAS TARAKAN

ORANGE FORCE:

- 2 Destroyer Escorts (DE) HMAS TORRENS, HMAS SWAN
- 1 Submarine (SS) HMAS OXLEY
- 2 Patrol Boats (PTF) HMAS ADROIT, HMAS BARBETTE
- 1 Clearance Diving Team (CDT 4)

Page Twenty-Three



NOTE: 1 Landing Craft Heavy (LCH) HMAS WEWAK, will be neutral for a period during the exercise, yet to be determined.

EX K'83 - AIRCRAFT

BLUE FORCE:

- 2 x RF111
- 2 x P3C (ORION)
- 10 x M1R3 (MIRAGE)
- 8 x C130 (HERCULES)
- 1 x B707
- 7 x CC08 (CARIBOU)
- 3 x CH 47 (CHINOOK)
- 10 x UH1H (IROQUOIS)
- 1 x B206 (KIOWA) Royal Australian Navy
- 1 x Army KIOWA
- 1 x Army NOMAD

- 4 x SKYHAWKS (NZ)
- 1 x B727 (NZ)
- 2 x C130 (NZ)
- 1 x P3 (NZ)
- 2 x UH1H (NZ)
- 1 x P3 (USN)
- 1 x C141 (USAF) (STARLIFTER)
- 1 x MY20 or 578 (as required)

ORANGE FORCE:

- 4 x F111
- 2 x P3B (ORION)
- 4 x S2 (TRACKER)
- 1 x B206 AAVN (LOH)
- 1 x PC6 AAVN (PORTER)
- 2 x ANDOVER (NZ)
- 2 x B52 (USAF) TBC
- 2 x C130 (USAF) (HERCULES - SOS)

BLUE FORCE COMMAND STRUCTURE

Blue Force command arrangements included the CDFs with the ADF Command Centre in Canberra and a Joint Force HQ (Westforce) located at HMAS Stirling with separate Army, Navy and Air Components. In addition, FHQ, HQ OP Com, RAAF Pearce (Strategic Strike and Maritime Strike), RAAF Richmond (Strategic Air Transport), RAAF Amberley (Strategic Air Reconnaissance), RAAF Learmonth (Fighter Ops), Karratha and Roebourne (Air Transport), Cossack (Military Port), a logistic Support Force and finally various Army units in the Pilbara and Kimberleys - all these were listed in the official handout on command arrangements. The precise relations in this management structure were not entirely clear. Some are obvious, of course, others seem unnecessarily top heavy for the small forces involved and the low level threat posed.

A FREE PLAY EXERCISE

As much as possible Exercise control sought to make K'83 a free play exercise, that is to say, while Orange could be directed to initiate or refrain from certain activities, Blue for the most part, was on its own in deciding what it should do - within the limits of its directives and rules of engagement of course.

THE MEDIA EXPOSURE

Before commenting on the exercise it must be appreciated that for most of the media it was a fairly quiet run over the ground. Apart from the inevitable and ubiquitous Peter Young (Channel 10 and "The Australian"), who spent a lot of time in the north-west complete with TV crew, most of the media, including your correspondent, went by RAAF 707 from Richmond on Thursday, 29th September to Perth for a trip to the JFHQ and WA State Crisis Centre for a start. Then, that evening, on to Roebourne to cover the Pilbara area on Friday 30th. The third and final day, Saturday, 1st October, began with a C130 flight to Learmonth for a briefing by the RAAF and back to Sydney by 707 to Richmond that afternoon.

The deployment order to move Blue forces to the West had been given over two weeks earlier and the final ADF ground force was not fully assembled. The official media tour was thus timed to coincide with the last stages of the Army build-up as the exercise was shifting from low level guerilla war to conventional limited war. To some extent then we were all heavily depending on press handouts, briefings given each day and whatever discussions we could have with Blue force elements. It could hardly give us a comprehensive overview (this is not an implied criticism of the media arrangements) and what follows suffers from this limitation. At the same time, most of the highly complimentary reports of K'83 the reader may have also seen are based on no more (and often less) understanding of what the exercise was about.

THE GUERRILLA PHASE - CONFRONTATION REVISITED

The principal aim of K'83, of testing the arrangements to deal with a low level conflict on mainland Australian territory (in the Pilbara-Kimberley region) broke new ground,

as everyone has observed. It exercised live the "aid to civil power" organisation in dealing with guerilla and terrorist activities. The activation of the WA State Crisis Centre, and the interaction with both the Commonwealth Government and military forces, with local government, law enforcement agencies, Police and so on, was clearly much more realistic than any paper exercise. It was understood that a dummy "Cabinet" was established in Canberra to give "political" decisions.

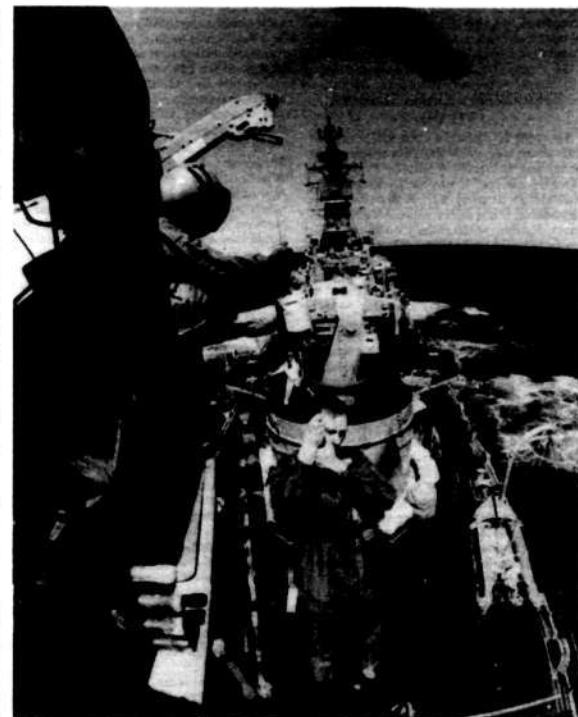
The Kamarians variously seized a radio station, a Police station, and took a pub full of hostages for a while; they distributed propaganda leaflets and made broadcasts to the people in the area, attempting to enlist support for their cause; they nationally destroyed fuel storages, electric generating plants and ambushed traffic. This sort of realistic exercise may put great demands on local officials, the State Emergency Services and the Police. The WA State Crisis Centre was manned round the clock. The people of WA generally, and those in the north-west particularly, entered into the spirit of the exercise with great enthusiasm - here, after all, were their frequently expressed fears of their vulnerability to such hostile acts made flesh, or at least a reasonable facsimile of it. And Norforce and the coastal surveillance system had "intruders" into Australia's sea, air and land space to detect.

Since the war began below the level of a clearly recognisable defence emergency it was therefore to be handled by civilian authorities until they called on Commonwealth aid from the Defence Forces. So it was that the WA administrative authorities who were paramount began including local military commanders in their councils and committees. And the distinct impression was that this phase of the exercise was 100% successful for all practical purposes. No doubt many useful lessons were learned, including I know, the need for much better and secure communications. But everyone we spoke to, without exception, tired and harassed as they were, was full of enthusiasm for this experience and its value.

As indicated, the Kamarians played their part with equal enthusiasm and panache. So much so that some transport divisions demanded armed escorts, others obviously enough, refused them. A lot was learned. So it would be fair to say that this live experience of what had only been planning arrangements up to now, was a most valuable exercise.

At the same time, for those of us who were involved in confrontation 20 years ago, there was some feeling of déjà vu. Then we were doing it with real guerillas on Malaysian and Singaporean territory. When we came back to Australia and offered to be debriefed on our experience, no one wanted to know how the civil-military organisation worked in that conflict. As in too many Defence matters, Australia has re-invented the wheel, 20 years' later. K'83's initial phase was Confrontation Revisited, and this raised other issues.

While there can be no doubt that Australia needs an organisation to deal with terrorists, whether imported or our home-grown variety - some of whom have been trained abroad - it is difficult to the point of impossibility to visualise a foreign power attempting to put any significant number of its own armed forces into Australia pretending to be independent volunteers, as Indonesia did over Malaysia. It will not have escaped the reader's



Pinpoint accuracy was required when Sergeant Rick Wetherell, of Bairnsdale, Vic, winched Flight Lieutenant Barry Coad, of Gumeracha, SA, onto the RAN guided-missile destroyer, HMAS HOBART, during Exercise Kangaroo '83. It is the largest tri-service exercise to be held in WA, involving more than 7,000 service personnel from the Australian Defence Force and members of the armed forces of New Zealand and the United States.

notice that the Kamarians were predominately Caucasian. Very convenient. But apart from the Kiwis and a handful of French in New Caledonia, none of Australia's regional neighbours are Caucasian at all. So that one of the guerilla's main advantages, of being able to disappear into the population, is not available. Furthermore, in confrontation, the Indonesians could expect some assistance from disaffected elements. There may be some disaffected people in our cities, but in the sparsely settled Pilbara? I doubt it.

So one is left to ponder the Defence Department's current interest in being able to deal with a foreign government-backed confrontation in those remote regions. Various possibilities suggest themselves, but one could be forgiven for believing that this very low level of military threat is the only sort of threat which the ADF's current capabilities could manage, given enough warning. Strategic judgements of this nature, tailored to the capacities of the force in being, are not at all

new. Democracies, unwilling to spend what they should on defence when there is no direct threat apparent, have been doing it for years. It is a dangerous course to adopt, reminiscent of Britain's refusal to fortify the north side of Singapore because "the enemy would only attack from seaward".

But to return to K'83.

It was said that there were some doubts in Blue force command circles whether the main Kamarian attacks would be in the Kimberleys or the Pilbara, and the early evidence suggested the Kimberleys. Accordingly, plans were made to put most of the troops into the more northerly area. But, fortunately for Blue, a Kamarian officer was captured with plans, to feint at the Kimberleys and then put the main weight of the Kamarian attack into the Pilbara. Blue's deployment plans were changed and the Pilbara reinforced.

The reader will forgive this correspondent's scepticism. If the main battle was not in the Pilbara, the Mirages at Learmonth would have

been of very little use. The brief for the exercise stated that the location of Kamaria was chosen with a view to realistic aircraft ranges.

THE OVERT LIMITED WAR PHASE

In order to extract a reasonable level of combat training, particularly for air and naval units, and no doubt to justify K'83 as an ANZUS exercise, it was clearly necessary to escalate up to overt war. While this is not impossible, it is a highly improbable development. Nations which embark on guerrilla war do so to avoid limited war, at least until they have terrorised or otherwise persuaded the mass of the population to be on their side, and hope that this low level suits the defender, as was the case in Confrontation. (One potentially effective defence is therefore a deliberate policy of escalation.)

In K'83's setting it was stated that neither side wanted to escalate, but the Kamarians did so eventually for understandable exercise reasons.

To this extent then, there was some dichotomy between the principal aim of the exercise and the necessity to go to higher levels and this exercise artificially created timing problems. While the guerrilla phase ashore was still being handled as a WA State Emergency problem yet to be taken over by the Commonwealth under its Defence powers, ships were being attacked and "sunk" at sea. Clearly there was some reluctance to transfer the responsibility for land operations, or some problem of how to effect the change. But it obviously needed a degree of schizophrenia to be involved in what amounted to two different enemies for a while. Though of course they were linked because the naval logistic support group TOBRUK and JERVIS BAY, was involved in both.

In the time available no very clear picture of the maritime aspects of K'83 could be gained. At no stage were observers given a briefing by any naval authority. Such briefings as we were given on maritime matters were all reported by RAAF personnel. At JFHQ, on the 29th, the touring observers did not even need any of the naval components commander's staff.

The command arranged at HMAS Stirling for West Force seemed odd. Instead of one integrated JFHQ there appeared to be four co-located headquarters. Observing that, in Borneo 20 years ago, one much smaller integrated JFHQ managed much larger forces, the need for the command organisation in K'83 is probably open to some serious re-consideration. It was also notable that instead of using the WA area Service Commanders as compound commanders each Service provided a one star as staff from elsewhere. This overlay would appear to raise some questions. Altogether some 500 additional people were deployed for the JFHQ and the post. It is difficult to see how such a smaller staff could be justified.

From a maritime aspect, Blue LRMP were not assigned to the maritime commander, but although the war at sea was already quite overt, remained under the air component commander. It was understood that the West Force Commander, AVM Law, decided on this command arrangement with the intention of operating the P3s this way for the first couple of weeks, transferring them to the naval

component commanders' operational control subsequently. It would have been of interest to hear the reasons for this return to the pre-1941 command arrangement which proved so disastrous in those days. One can only speculate that it was to "prove" that placing LRMP under one maritime component commander was unnecessary, if not inferior to leaving them with the Air component commander.

Air defence arrangements centred on the Mirages at Learmonth. They suffered from the absence of air defence and coastal radar. Accordingly, ship's air warning and control radars were pressed into service wherever possible. And at Learmonth it was said they would have liked more ships to use as pickets. As an exercise artificiality Orange aircraft tracks were passed to Learmonth as a substitute for line detections. This device apparently permitted a Mirage interception on an Orange P3 attacking ships at some 270m south-west of Learmonth — or so we were told. One wonders at the P3's tactics to be so ignominiously caught, and moreover, given the satisfaction with which this information was released at the briefing, how this incident will appear in the "lessons learned".

Furthermore, it was stated that a major Orange air strike on ships just off Cossack, the unloading port some 200m NNE of Learmonth, was backed by the Mirages. Yet we understood from other sources this Orange attack was at 0100, and squadron personnel when questioned, said they had been involved. Curious.

On the 30th, when observers went to a scheduled unloading at Cossack, Orange air strikes took place, both F111s and Trackers — the latter jumped the defences by coming from the landward side. These strikes were chased by Mirages which were very hard on the heels of the F111s, but one wonders how much this activity was laid on for the benefit of the TV cameras.

There were some other disturbing discrepancies from the official briefing at Learmonth. It was said that the 6 Mirages were putting up 10 hours availability each day; squadron personnel said 5 hours a day. It was said that the fuel farm was hardened, it appeared to be partially hardened with one half still exposed. There were no Rapier or other Sam batteries and the Airfield Defence Squadron personnel had been transferred to Roebourne, however, it was said that off-duty base personnel had been organised for airfield defence at Learmonth, and a quick reaction helicopter was available. But clearly, Learmonth was a soft target for all manner of attacks from guerrillas with mortars behind a ridge of hills to the west of the strip, to submarine-launched cruise missiles. One Orange DE came into Exmouth Gulf, we were told, but was tracked by one of the two Learmonth P3s fortuitously returning to base with 4 Harpoons still unexploded. Whether Harpoon is effective against targets with a land background is a moot point, but it is understood there are other versions of this incident. Again though, there can be little doubt as to how it will be reported.

One briefing included a statement that the order to deploy eastern State-based assets to Learmonth had been given on the 12th September and that the 6 Mirages and 2 P3s were fully operational in the west on the 18th. It was claimed that, with more C130 support such a deployment would take only 3 to 5 days. But if

the 12th September was a genuine "no notice" deployment it is difficult to understand why it was necessary to despatch a hired Dept of Administrative Services road convoy to leave for the west before that date. As well, the deployment included only token weapons. In answer to a question about the provision of weapon stocks, it was said that this was just a question of laying on more C130 flights. The reality is more likely to be that, given the vast logistic problems involving air, sea and road transport, there are simply not enough C130s available. At Karratha one soldier made the point that, of the first 60 C130 flights into the Pilbara, the first 40 were exclusively devoted to Air Force requirements.

And the Navy came in for its share of Army annoyance. It was said that the Navy refused to leave the band from TOBRUK to make room for Army personnel. There would appear to be no justification for this, and it is by no means the only Army complaint about TOBRUK. It would seem that the Navy needs to do some urgent fence-mending with the Army and certainly to avoid the feeling that the Navy requires ships for naval purposes and not for the joint balance they give to ADF structure. After all, this feeling, as much as several other strands of thought, brought about such united opposition within Defence to the aircraft carrier.

Despite the deployment of the Airfield Defence Squadron personnel to Roebourne, airfield defences in the Pilbara were thin, too. One officer at Karratha said that Kamarian guerrillas were believed to be within mortar range to the north of the strip. At the time the main mobile airfield defences were out to the south-east. It seemed, therefore, that if the Kamarians had mounted an attack of the kind the Vietnamese used so successfully on US air bases in Vietnam, it could have caused serious embarrassment. A C130 load of soldiers from Townsville was landing at the time and a neat row of Caribous was parked nearby.

Altogether airfield defences were suspect without considerable Army elements allocated to the task, and with Rapier and other anti-aircraft defences. It was admitted that fighter air defence of ships at sea was only practicable given adequate warning and intelligence (about 35 to 40 minutes). In any case, an air threat to ships close enough to be given fighter protection could also be seen as a potential attack on the airbase itself, with obvious difficulties over the decision whether to protect the airbase or the ships.

In K'83 the Mirages had to be fitted with a large belly tank, in lieu of Matra to achieve the ranges actually flown. This tank would have to be ditched in combat, making it unlikely the Mirage would get back to base. Of course, it can and will be claimed that this problem will be overcome by the longer-ranged F18s. Fair enough. But it was disturbing to hear such extravagant claims made for the actual effectiveness of the Mirages in K'83. The squadron personnel themselves were much more down-to-earth and realistic.

Similar inflated claims were made for Learmonth's fuel stocks (2-7 megalitres) and that, even if they were attacked, they could be replenished by road train from Damper. Of course, the Kamarians were in the business of ambushing road trains and worse. Damper got its aviation fuel by tanker, direct from Singapore.

The build-up of fuel stocks in the west for K'83 began nine months before the exercise itself began — another exercise in artificiality. Its importance was dismissed, saying that in a real emergency the fuel problem would be overcome by rationing the local population. Maybe. Fuel stocks could make a most attractive target and create severe difficulties for the deployment.

At the same time it would disrupt industry in the area and make life very difficult for the aviation population, perhaps creating a refugee problem for the authorities as well. The need to disperse security forces into static defences around vital logistic support facilities could also make them attractive targets for an intelligent enemy. I doubt if it is all as easy as K'83 may have made it seem to appear.

As it was, K'83 demanded a prodigious logistic and deployment effort. It was costly. For instance, it would have been cheaper to buy new trucks for the Army and sell them after the exercise, than to drive them from the Eastern States and back from as far away as Townsville. In fact, it was said that "budgetary restrictions" were the reasons for not deploying some elements regarded as essential. K'83 cost somewhere between \$30 million and \$35 million and, despite my reservations about certain aspects, was money well spent. Not to go further, to make it more effective, was a pity in my opinion, because "exercise artificialities", "national", "budgetary restrictions", and this interaction cast considerable doubts over the lessons learned.

It was, for example, lack of MCM capabilities which caused Exercise control to "cancel" a B52 minelay by Orange.

Finally, the lack of tactical aviators as seen for ASW and air defence, to some extent compensated for by Exercise Control intervention, needs no amplification for readers of this journal. And the usual continental bias of the Kangaroo series, and all its consequences, such as a tendency to use destroyers as patrol boats, tends to reinforce misconceptions in Canberra on the nature of strategy. Surprisingly, there were marginally more naval personnel engaged in K'83 than the other Services, but that is unlikely to be the popular impression.

PUBLIC RELATIONS ASPECTS

As a PR exercise with West Australians, K'83 was a resounding success. And as a PR exercise with the Australian media the Defence Department should be well pleased. The brief media tour was well organised and created a very good impression. The lack of briefings by naval spokesmen went unnoticed. When I tried to speak to the Naval component commander and his staff at HMAS STIRLING, I was rebuffed with the heated comment that the media tour was for "serious Defence journalists" and not for "tabloids". No doubt readers of this journal will be surprised to learn that it is a tabloid and that I am not serious about Defence. The incident left an unfortunate impression that the naval aspects were being played down deliberately, an impression which the lack of naval briefings reinforced.

In turn, the doubts engendered by those matters, and others mentioned above, left serious doubts in my mind as to how the

lessons learned would be used for internal PR reasons within the Defence Department. It will be a pity if K'83 is used to justify some of the highly contentious issues raised by the "Fortress Australia" strategy. Indeed, it will be more than a pity, it will be a grave disservice to a clear-eyed view of Australia's real Defence needs.

At a time when some of Australia's continentalists are seeking to divert more resources into terrestrial and air transport systems for national development, but with Defence in mind, it is ironic to note that the NSW railways alone are now being subsidised to the extent of \$1,000 million per year.

CONCLUSION

It would be wrong, however, to leave an impression that K'83 was not a success on its own terms. And on a more positive note, it was a source of hope that quite a number of middle-ranking officers in the Army and Air Force expressed concern at what has been done to naval force structure. They were more interested in a properly balanced ADF structure than scoring cheap points in the battle for too limited Defence resources at Russell Hill. Some were dismayed by the way the Navy's fixed wing aviators' loyalty and skills have been so brutally discarded. This is not much consolation for those so personally affected, but it suggests that the present distortions may be overcome in time if those broader-minded professionals are not alienated. If for no other reason, the K'83 experience was ultimately a most valuable one.

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FOUR HOURS BEFORE ARRIVAL**

The Fremantle Detachment

Late 1948. Eleven ships of the Fremantle detachment lie moored in Careening Cove, the site today of HMAS Stirling. Present is the frigate LACHLAN (inshore) and ten corvettes. PARKES, HORSHAM, DELORAINE, ECHUCA, BENALLA, TOWNSVILLE, KATOOMBA, LITHGOW, MILDURA and GLENELG. Also present are three support craft and an oil fuel lighter.

(Photo - RAAF)



The first two corvettes, HORSHAM (J235) and PARKES, to arrive at the Fremantle Reserve Fleet Detachment, Careening Bay, Garden Island, Western Australia in 1946.

(Photo - WA Newspapers Ltd.)



Lieutenant Commander Keith Gibson, RANR, c/o the Detachment from 1946 to 1956.



TOWNSVILLE (M205) and HORSHAM aground on a sandbar in Careening Cove after breaking adrift early on 1st April, 1955. By mid-afternoon the ships had been towed back to their mooring, both undamaged.

(Photo - WA Newspapers Ltd.)



The end of the line for the last three ships of the Fremantle Detachment of the Reserve Fleet, 27th November, 1957. Here the tug BUSTLER prepares to tow the corvettes KATOOMBA, GLENELG and PARKES to Hong Kong for scrapping.

(Photo - WA Newspapers Ltd.)



DELORAINE and LITHGOW (M206) being towed out of Careening Cove by the Dutch tug LOIRE bound for the shipbreakers in Hong Kong, 9th January, 1957.

(Photo - WA Newspapers Ltd.)



HORSHAM (being stripped), PARKES and KATOOMBA at the old Rockingham naval jetty, 23rd June, 1955.

(Photo - WA Newspapers Ltd.)

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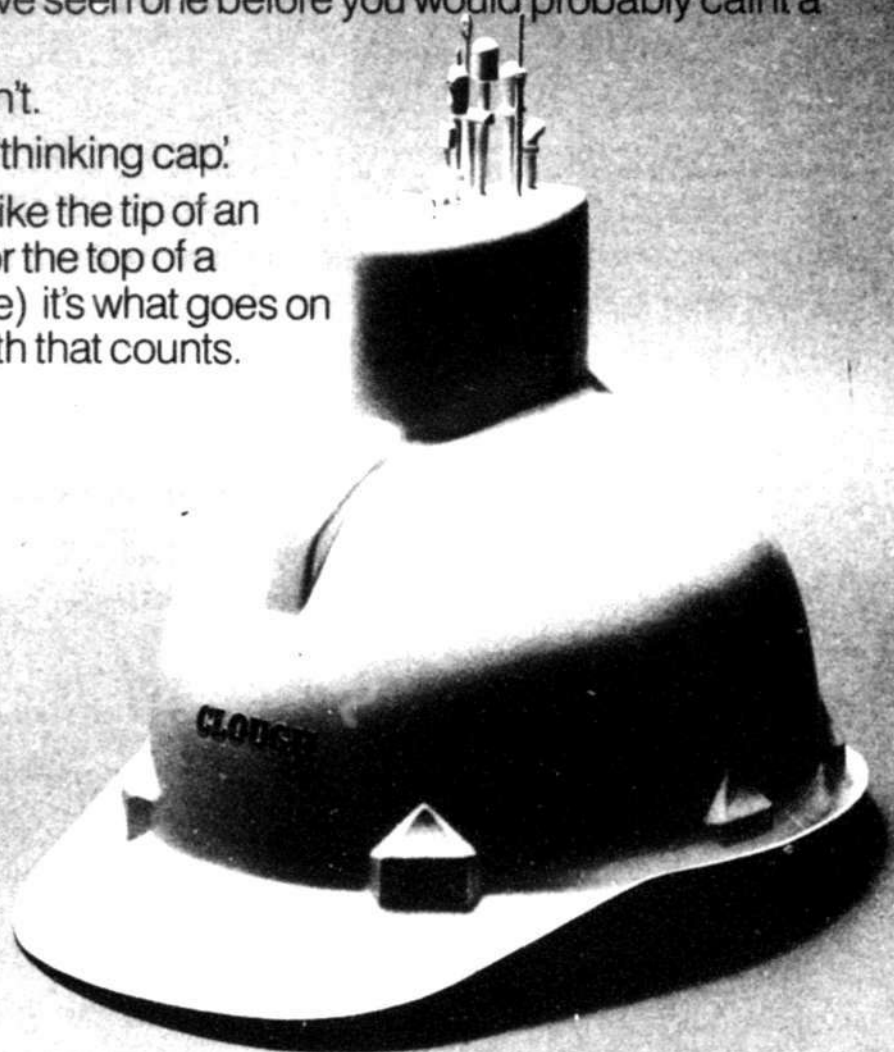
And where does our hat fit in?

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The Minehunter Catamaran

SUMMARY: The GRP minehunter catamaran to be built for the Royal Australian Navy is an ab initio project involving new concepts and technology. The design of the vessels must take account of stringent magnetic, acoustic and shock requirements and the construction of the hull needs specialised GRP facilities not currently available in Australia. The project encompasses construction of two prototype vessels; and, dependent upon successful trials and evaluation, the construction of a number of follow-on production vessels.

INTRODUCTION

About 98% of Australia's imports and exports are transported by sea, and much of Australia's defence capability depends upon safe passage through sea lanes and port entrances. The vast majority of both merchant and naval ships are susceptible to mine warfare and mines are a very potent and comparatively low cost weapon.

One of the classic examples of the use of sea mines was "Operation Starvation" carried out by the USA in the Second World War against Japan. During the campaign about 25,000 offensive mines were laid in Japan's shipping routes and harbours. As a result, 1075 enemy ships were sunk or damaged, and the campaign caused the virtual collapse of Japan's seaborne transportation and heavy industry.

A more recent example of the effectiveness of the sea mine was its use by the USA in Haiphong in 1972. The effect of the mining campaign was to paralyse sea traffic to and from the port, and a direct result was the negotiated early release of American servicemen held as prisoners of war in North Vietnam.

The two basic types of mine are: firstly, moored mines which are tethered at a variety of depths above their moorings, and secondly, ground mines which lie on the sea bed. Mines can be activated by contact (moored mines only), or by ship generated magnetic, acoustic, or pressure influences or by a combination of these influences. In addition, they can be set to activate at a predetermined time and to choose targets selectively.

There are two main methods of countering a mine threat — minehunting and minesweeping. Minehunting involves the use of specialised sonar to detect a mine and then the mine is destroyed, usually by placing an explosive charge near the mine and then detonating it from a safe distance. Minesweeping involves the use of wire sweeps to cut the tether of a moored mine and the generation of acoustic and magnetic stimuli to simulate target ships. The stimuli are emitted from sweep gear which is towed at a safe distance astern of the minesweeper.

Navy's present wooden hulled TON Class minehunters and minesweepers, HMA Ships *SNIPER*, *CURLEW* and *IBIS*, were built in the United Kingdom in the 1950s and purchased from the Royal Navy in the 1960s, all the ships then being equipped as minesweepers. Subsequently in the late 60s two were converted to a minehunting role. All three ships are now approaching the end of their lives and some of their systems are obsolescent.

The Navy's new minehunting capability will be provided by an Australian designed and built glass reinforced plastic (GRP) minehunter catamaran. This vessel introduces new concepts and technology into the Royal Australian Navy and the involvement of Australian industry is significant.

THE MINEHUNTER PROJECT

Project Background

Navy raised the requirement to replace the TON Class minehunters in 1974. Several options were proposed, including overseas designs, and in 1975 the GRP minehunter catamaran was chosen as the preferred option on the basis that it provided the required capability at least cost.

The project is divided into three phases:

Phase 1 — Project Definition.

Phase 2 — Prototype Construction and Evaluation.

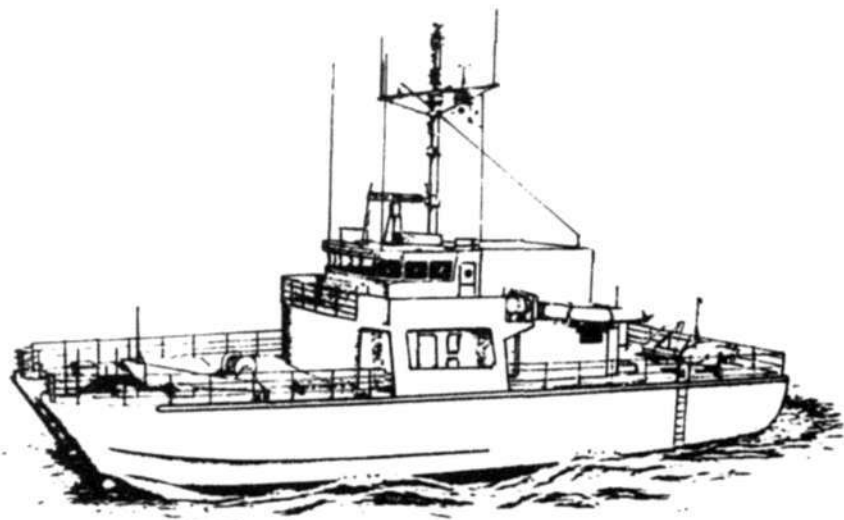
Phase 3 — Construction of Production Vessels and Provision of Support Equipment.

by Captain
P. DECHAINEUX, RAN

minehunting weapon system. Because of the specialised requirement of the minehunter, including a modularised and containerised weapon system, it was not possible to buy a complete system "off the shelf". System components had to be arranged in a format suitable for the hull concept and significant design work was involved in integrating the various navigation, sonar and tactical data inputs. Selection of the weapon system was made after exhaustive evaluation, and in 1981 a contract was let with a company based in the Federal Republic of Germany for a high definition sonar utilising a small circular array transducer and advanced digital data processing techniques.

Materials Testing Programmes

The Naval Design Branch of the Department



Artist's impression of the MHCAT.

Approval was given to proceed with Phase 1 in 1975. The major elements of Phase 1 included definition studies for the minehunting weapon system, costed studies for GRP construction, construction of scale models, GRP panel testing, tank tests and initial magnetic modelling.

Phase 2 was approved in 1976 and included the construction of a Land Based Magnetic Test Range at Kingswood, NSW, the acquisition of three sets of long lead equipments for the vessels, the construction of two prototype vessels, and their subsequent Trial and Evaluation.

Phase 3 has not yet been approved and is dependent upon the successful evaluation of the two prototypes.

Phase 1

In 1978 two sonar manufacturing firms were contracted to provide definition studies for the

of Defence initiated a series of material tests to develop materials and techniques for constructing the GRP hull. These tests were undertaken at the Materials Research Laboratories and the Aeronautical Research Laboratories in Melbourne, the Defence Research Centre in South Australia and the Admiralty Marine Technology Establishment in the United Kingdom. Tests were conducted on hull material panels and composite structures and included tensile, compression, shear, bending, fatigue and shock tests. Creep tests are continuing.

The culmination of the underwater shock test programme was the testing of a full scale hull section in December, 1980. The section was subjected to 13 underwater explosions of increasing intensity. The tests proved that the GRP hull was satisfactory and in fact allowed a slight design reduction of hull strength in certain areas.

Phase 2

Under Phase 2, three sets of long lead items are being purchased. Two sets will be fitted in the prototypes and the third set will be held as spare for use during the Trial and Evaluation period and will be used for fitting in the first production vessel if Phase 3 is approved.

The two prototype vessels will be constructed by Ramsay Fibreglass Australasia, a division of Carrington Slipways Pty Ltd in Tomago, NSW. Currently, no shipbuilder has the necessary facilities to construct the vessels to the standards required and therefore the initial stage of the shipbuilding contract will entail the construction of a specialised facility which will have extensive environment control equipment to maintain temperature and humidity within the exacting limits required for high strength GRP.

The equipment for the vessels is far from ordinary. The minehunters have to be able to operate in a minefield where there is an ever present danger of mine detonation. This leads to a requirement for high shock resistance. The magnetic, pressure and acoustic signatures of the vessel must be as low as possible. This means that, in general, ferrous metals cannot be used, conventional electric motors are not acceptable, all materials must have low magnetic permeability, the vessel displacement must be as small as possible, and all equipment and systems must be designed for minimum noise. The cost of producing such equipment is most significant; a price of ten times that for conventional equipments is not uncommon.

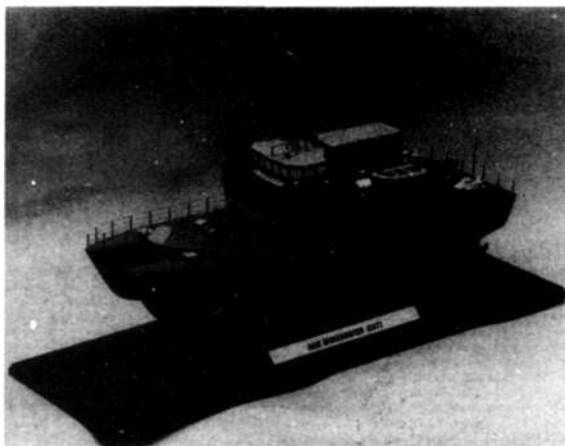
The Land Based Magnetic Test Range is also a specialised requirement. Every item of equipment and stores carried on board the vessels must be magnetically checked prior to embarkation. Every time an equipment is removed for repair it must be reranged to check that no magnetic contamination has occurred. The range itself consists of a track, over 100 metres in length, on which runs a trolley for carrying the item to be ranged. At the centre of the track is a sensor shed which contains magnetometers for sensing the magnetic signature of the item and field coils for negating the effect of the earth's magnetic field. The field coils can also be used to simulate differing ambient earth fields.

The prototype vessels will take about 20 and 27 months respectively to construct after completion of the shipbuilding facility. Following construction an extensive series of trials will be undertaken to prove the technical and operational aspects of the vessels prior to the decision to proceed with follow-on production vessels.

VESSEL CHARACTERISTICS AND DESIGN

The catamaran design was selected because it provided a stable deck with a large working area for the ship's size, the manoeuvrability is better than a mono hull due to separation of the propellers, and heavy items of machinery can be placed high in the ship thus reducing magnetic and acoustic signatures when measured at a specified distance below the keel.

The method of construction of the hull is based upon the use of a composite foam sandwich which precludes the necessity for a costly hull mould. The composite consists of a layer of 60mm thick high density rigid PVC



MHCAT builder's model.

foam and an 8mm inner and outer skin of five layers of alternating plies of glass woven rovings and chopped strand mat. The resin is thixotropic unsaturated isophthalic polyester. The main advantages of the foam sandwich are:

- ease of construction,
 - low maintenance,
 - minimum magnetic influence,
 - low noise transmission, and
 - good thermal insulation.
- The approximate principal characteristics of the minehunter are as follows:
- | | |
|--------------------------|-------------------|
| Length overall | 31.0m |
| Beam (Max) | 9.0m |
| Beam (each hull) | 3.0m |
| Draught | 2.0m |
| Displacement (Full Load) | 170 Tonnes |
| Speed | At least 10 knots |
| Accommodation | 14 |

Weapons System

The minehunting weapon system consists of four sub-systems ie, Sonar, Tactical Data, Precision Navigation and Mine Disposal. The sonar sub-system manufactured by Krupp Atlas Elektronik of the Federal Republic of West Germany is contained within a module located forward in the port hull. The tactical data sub-system and data processing and display units are within an operations room container situated on No 01 deck just abaft the bridge. Two mine disposal vehicles are situated aft on No 1 deck. Control of the vehicles is exercised from the operations room container. The modules, containers and weapons are easily removable allowing rapid replacement.

Data from the sonar sub-system is fed to the tactical data sub-system where it is integrated with data from the precision navigation equipment to determine the accurate geographic location of mines. The information is presented on tactical display screens in the operations room container and can be stored for later analysis.

Destruction of mines is achieved by using a PAP 104 mine disposal vehicle which can be

loaded with a bomb from a magazine underneath. The loaded vehicle is lowered into the water by crane and wire guided to the position of the suspected mine. Final mine classification can be made by the use of a TV camera situated in the vehicle and a TV monitor in the operations room container. The bomb is dropped in close proximity to the mine; the vehicle is guided back to the ship, and then the bomb is detonated from a safe distance. The mine disposal system is manufactured by Societe ECA of France.

Propulsion System

The propulsion system consists of two high speed 200 kW diesel engines each driving an electric generator at the forward end and an hydraulic pump at the aft end. The generators provide ship's power and the hydraulic pumps operate two propulsion steering units, one in each hull. The propulsion steering units use a "puller" propeller rather than the conventional "pusher" type and the thrust can be vectored through 360°. They can be removed from the hulls through openings in No 1 deck without the need to dock the ship.

When the ship is transmitting most of the diesel power will be directed to the hydraulic pump whereas, whilst undertaking slow speed minehunting operations, the load shifts to the generator for providing power to the weapons system.

Accommodation and Victualing

Accommodation for 14 men will be provided. The accommodation spaces are situated below No 1 deck whilst all operating stations are on No 1 deck and above. This arrangement provides crew safety since no personnel will be inside either of the hulls when operating in a minehunting mode.

Food preparation in a conventional ship requires normal galley equipment all of which adds to the weight and magnetic signature. The minehunter catamaran will employ pre-packaged and frozen airline type meals with a small convection or microwave oven.

VESSEL CONSTRUCTION

The hull construction method employs a simple inverted wood frame male mould on which the hull shape is built up with foam which is butt jointed and glued. After fairing the foam the outer skin is laminated, the hull and mould turned over, the mould removed and the inner skin is then laminated. Bulkheads and decks are prefabricated and then bonded into position. During the laminating and resin curing process the environment in the shipbuilding facility must be carefully controlled. The temperature limits are 18-24°C with relative humidity between 0-65%.

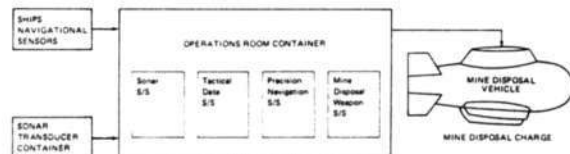
Electromagnetic Interference

GRP structures are transparent to electromagnetic radiations. These radiations can cause unacceptable effects which are extremely difficult to predict and often difficult and costly to rectify. For example, certain radio transmissions could trigger off an unrelated control circuit or a spurious signal could be generated in a cable on one side of a bulkhead on the other side of which is a power cable. The designers and constructors must be aware of this phenomenon and allow physical separation or radio frequency shielding.

Earthing and Bonding

As GRP is non conductive an electric earthing system has to be provided to earth all metallic equipment.

Extreme care has to be taken to prevent any large conductive loops. Any such loops will generate eddy currents when the ship rolls in the earth's magnetic field. These eddy currents set up their own magnetic fields which can prove unacceptable in terms of the ship's



Weapons' system.

signature. The effect that this requirement has on cabling systems and piping systems is dramatic. For example, before any pipe is connected, the mating parts must be checked to ensure that the connection will not form a loop. If it does then insulation must be inserted at some point in the loop.

PROTOTYPE TRIALS AND EVALUATION

The first prototype is expected to complete building in 1985 after which an extensive series of trials will be conducted. The types of trials envisaged are:


- Speed trials,
- Endurance trials,
- Ship motion trials,
- Structural evaluation trials,
- Manoeuvrability trials,
- Station keeping trials,
- Underwater shock trials,
- Airborne noise measurement trials,
- Underwater noise measurement trials,
- Assessment of electrical performance,
- Vibration trials,
- Weapons systems tests and trials.

- Communications trials,
- Radiation pattern trials,
- Electromagnetic interference trials,
- Precision navigation trials,
- Docking demonstration.

The objective of these trials is to validate the designers' predictions and prove the performance of ship systems. Following their successful completion a decision may be made to build further production vessels.

CONCLUSION

Production of the GRP minehunter catamaran is a complex project involving several interrelated major activities such as the land based magnetic test range and the shipbuilding facility. The design of the vessel is not only novel, it has to meet very stringent magnetic and acoustic requirements. Successful evaluation of the prototype vessels will prove the design concept and should lead to follow-on production of the only type of this vessel in the world. Not only will Australia have an improved minehunting capability; local industry will be developed and an in-country capability for producing the highest quality GRP vessels will have been established.



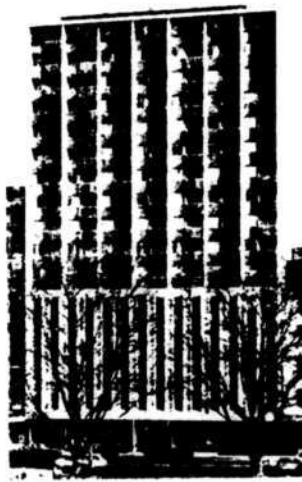
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Absorbing Secret of an 80 Year Old

by CHRIS SKREBOWSKI
Technical Editor, "International Petroleum
Times", London

The recovery of the Royal Navy's very first submarine, HOLLAND I, from the depths of the English Channel has excited the experts and left them with a tantalising mystery to solve.

A salvage operation that added to Britain's already considerable reputation in the field of marine archaeology found the vessel in such a remarkable state of preservation that the Royal Navy Submarine Museum, which organised the salvage, now plans to restore her.

When the submarine is opened to the public at the museum's premises at Gosport, on the south coast of England, later this year, she will have been restored to her original condition, with a few missing parts replaced.

The museum will then have a showpiece exhibit to rival Nelson's flagship VICTORY and the salvaged 16th century warship MARY ROSE, which both lie just the other side of Portsmouth Harbour in Portsmouth Naval Base.

As the museum is a charitable trust, the beneficiaries of HOLLAND I's return to land will be the submariners and their dependents, whom the trust aids.

SOLD TO THE BREAKERS

HOLLAND I, or HM Submarine Torpedo Boat No 1, as she is more correctly known, was launched in October 1901 and served with the Royal Navy until 1913, when effectively obsolete and outdated by a whole series of successors, she and two other submarines were sold to the breakers.

During the tow to the breaker's yard, while close to the Eddystone Lighthouse, she started to fill with water and the tug captain cut her loose and let her sink — an act for which all those interested in marine archaeology should be deeply grateful.

The probable cause of the sinking was that the conning tower could only be shut effectively from the inside and had probably been merely lashed down for the tow.

For the next 69 years HOLLAND I was to remain on the sea bottom, gathering fishing nets and marine growth and forgotten — but, in fact, not quite forgotten by all, because in 1977 a Mr M. Pearn sent a cutting he had found in the Plymouth library to the Royal Navy Submarine Museum recording the loss of submarine H-1.

When it was realised that HOLLAND I might exist, plans were immediately made to locate and salvage what was not only the Royal Navy's first submarine, but the only known example of an early submarine type that has served in many of the world's navies and had ushered in the submarine era.

LOCATED BY SONAR

According to Commander Richard Compton-Hall, director of the Royal Navy Submarine Museum, who planned the search and salvage, the first task was to get all the parties that might have claims to the submarine to relinquish these and give the wreck to the museum.

This accomplished, he then had to persuade the Navy to make the search and salvage of HOLLAND I a training exercise.

On 14th April, 1981, the minehunter BOSSINGTON, using sonar, located the submarine lying in 63m of water 6.5 km east of the Eddystone Lighthouse, off the extreme south-west of England. The diving vessel SEAFORTH CLANSMAN then moored over the wreck and a Navy deep diving team examined and filmed the submarine, proving it to be HOLLAND I and confirming that the hull was basically sound.

Commander Compton-Hall's next task was to persuade the Navy to make the salvage the annual training exercise for 1982. This was agreed and the salvage vessel PINTAIL was used in the operation, which took place in August.

TUNNELS MADE UNDER HULL

Using air blast guns, two tunnels were made under HOLLAND I's hull, fore and aft (the vessel was lying almost upright on a firm



HMS HOLLAND No 3.

sand/gravel seabed). Two broad wire mesh stroops were then passed under the hull and attached to PINTAIL's lifting gear. This consisted of 152 mm steel hawsers rigged with a three-fold purchase. The weight of the vessel to be raised was about 100 tonnes. The submarine was then lifted 9m and PINTAIL was carefully navigated to an area of clear seabed 9m shallower. HOLLAND I was then rested on the bottom, the tackle re-rigged and another 9m lift accomplished.

A total of six lifts brought the submarine, hanging beneath PINTAIL, into Plymouth Sound and then into No 12 dock and Devonport Dockyard.

Because underwater artefacts usually start to deteriorate quickly once exposed to air, the plan was to clean the hull of salt, scale and marine growth and then coat it with a rust converter and inhibitor. The cleaning was done by the Waterblast company using 5.5 MPa waterjets delivering 82 litres/min with a muzzle velocity of around 1290 km/h. The rust converter/inhibitor was a new product called Fertan, which was applied to the whole external hull.

Fertan, produced by Fertan Ltd, sets to a uniform hard black finish which stops any further deterioration. It was applied to HOLLAND I in less than an hour and, according to Commander Compton-Hall, has been a highly successful treatment.

ALMOST INTACT

Following the conservation treatment the hull of HOLLAND I was cut in three. This made transportation on low loaders back to the submarine museum at Gosport much easier. More important, however, it allows "walk-in" access for the conservation/restoration work and will give visitors to the museum "walk-in" viewing access.

Careful examination of hull and contents revealed that the submarine was in truly remarkable condition. Apart from three small holes near the bow, where fishing net shackles had rested, the hull was intact. To everyone's surprise, corrosion and metal attrition were little more than would be found in a five or ten year old ship. This was truly incredible for a vessel that had been in service for 12 years and at the bottom of the English Channel for a further 69 years.

MYSTERY DEEPENED

Inside the hull the mystery deepened further. It was expected that the mass of dissimilar metals — steel, cast iron, malleable iron, brass, bronze, lead and so on, would be badly corroded and everything seized solid. Amazingly, it was found that with minimum effort bolts undo, springs spring, hinges open and moving parts can be made to move.

The brass engine plate from the 52 kW Otto gasoline engine now gleams, uncorroded, in the museum director's office. The main flooding control valves (brass or bronze) have needed only a few new nuts and a new gasket to make them operable. The main engine is now having its flywheel removed and the shanks of the retaining bolts are as clean and undamaged as new ones. The engine can be turned, the valve gear operates. A spare spring found in the bilges is as springy and undamaged

as any old spring left around a workshop. The torpedo tube rear door opens, its shutting springs operates. All the rivets in the hull are firm and tight.

As if this were not enough, one of the batteries was sent to its manufacturer, Chloride, which cleaned it up, refilled it with electrolyte and recharged it. It promptly delivered 30 Ah — not its original capacity, but not bad for a battery that had spent 70 years under water.

THEORIES

At present, it is a complete mystery why HOLLAND I is so well preserved. Parts of the rudder that fell to the seabed away from the main hull have corroded in much the way that would be expected, so the clue lies in the hull itself.

Commander Compton-Hall believes it may have something to do with the strong magnetic field found within the hull, another theory is that the batteries provided some form of cathodic protection, but as there is no obvious sacrificial area it is hard to see how.

HOLLAND I may yet prove immensely valuable to corrosion technology as well as to marine archaeology.

As Commander Compton-Hall, who is a noted author and authority on submarines, explained, HOLLAND I's condition has provided the museum with a pleasing but unexpected problem. It has always been assumed that the museum would be conserving a very rusty and corroded submarine. But having found the vessel to be in excellent condition, the museum's experts now plan to restore it.

ORIGINAL PLANS FOUND

Vickers, the firm of British shipbuilders that built the HOLLAND I, has found its original shipyard plans of the vessel and is prefabricating the small number of missing pieces so these can be put back. A new periscope is to be made — the original periscope, designed by Captain R. Bacon, was one of the first in the world.

The story of the designing of HOLLAND I began in the 1890s when a number of navies, particularly those of France and the United States of America, were investigating the potential of submarines and building prototypes. A key figure, and an inventor of some genius, was J. P. Holland, the Irish-American who designed HOLLAND I.

His genius lay in the fact that he anticipated almost in its entirety the layout of a modern submarine. HOLLAND I has a forward firing

torpedo tube within the hull, horizontal rudders or hydroplanes, a trimming and diving mechanism using floodable buoyancy tanks, and electric propulsion under water employing an electric motor and lead-acid batteries.

The two key features of later submarine design absent on HOLLAND I are watertight bulkheads and double-hull construction with the buoyancy tanks between the hulls.

METAL PROTECTION LESSONS?

In one notable respect J. P. Holland was 50 years ahead of his time. He believed that for good underwater performance submarines should be short and fat, but subsequent designs favoured the long, thin cigar tube shape. The search for high underwater speeds following the invention of the nuclear submarine in the 1950s brought a reversion in design to something very close in shape to Holland's original designs.

HOLLAND I has been saved from the deep and will become a valuable addition to Britain's rich storehouse of marine archaeology. For the moment the secret of why the hull did not corrode during its long immersion remains. Perhaps it will yet teach us as much about protecting metals in hostile environments as it can about early submarine design.

HOLLAND I

HM Submarine Torpedo Boat No 1

(Specifications)

Built by Vickers Son and Maxim at Barrow, England.

Laid Down: February 1901.

Launched: October 1901.

Sea Trials: April 1902.

Length: 19.2m Beam: 3.66m.

Displacement: 115 to 124 Tonnes.

Surface Speed: 7.4 knots.

Maximum Speed Submerged: 5 knots.

Propulsion: Four cylinder, 119 kW Otto gasoline engine plus battery/electric propulsion underwater (52 kW electric motor). One-hour endurance under water at maximum speed.

Maximum Diving Depth: 30m.

Armament: One 355 mm torpedo tube with three 3.56m long torpedoes carried.

Crew: Two officers and five ratings (more were carried during training).

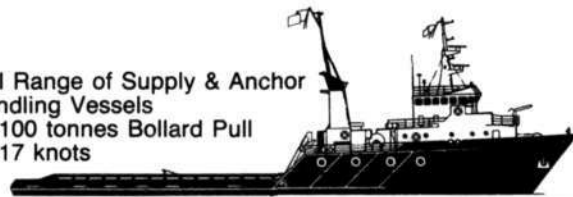
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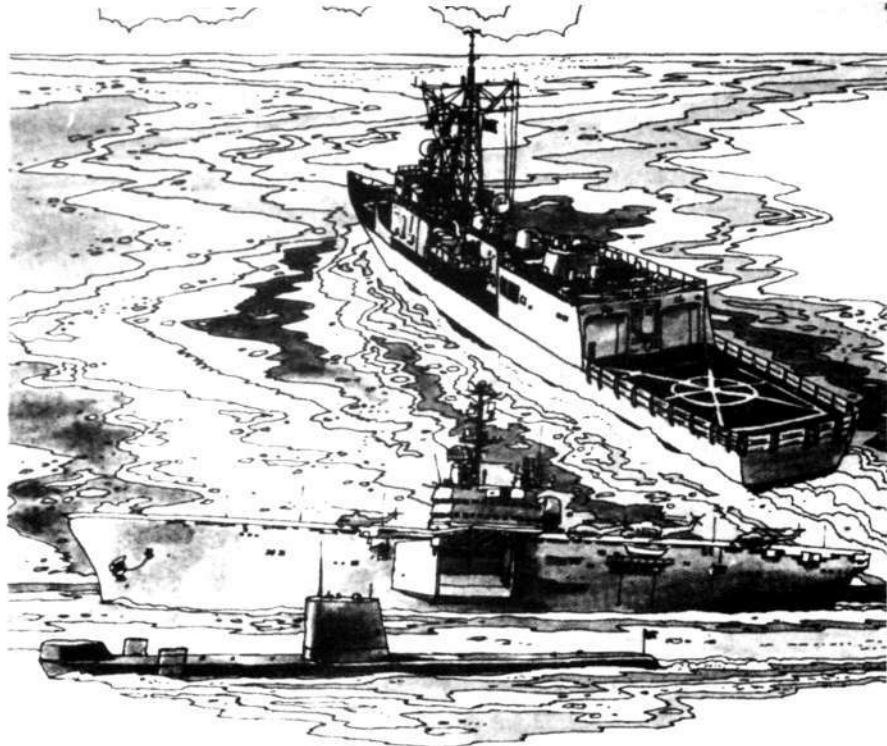
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NUCLEAR SUBMARINES —

TODAY'S CAPITAL SHIPS

I am honoured to receive this invitation to speak to the Navy League on the subject of nuclear submarines, and hope that in the time available I will be able to communicate to you something of a 'feel' for these powerful (and expensive) vessels, rather than the bare facts and figures, which I am sure, within this distinguished gathering, are well known. I hope, also, to remind you of the advantages and disadvantages of nuclear propulsion compared with diesel electric, and perhaps dispel some of the myths which have attached themselves to the nuclear powered submarine.

The first contact with a nuclear submarine is a memorable experience for most people, and to none more so than the submariner brought up in diesel boats. To him, the nuclear submarine appears enormous. In dry dock, the boat seems larger than the Hindenburg. Look-

(Paper read to meeting of the Navy League in Sydney on Tuesday, 3rd May, 1983.)

**by CMDR I. D. ROBERTS,
RAN (RTD)**

ing down a missile tube in a Polaris submarine is like looking down a mine shaft. He gets lost on board, because there are three decks instead of one. The smell is quite different.

At sea, running on the surface, the howling gale in the Control Room caused by the induction of diesel engines is absent, so is the



USS BATON ROUGE, 15th May, 1977.

(Photo - USN)



USS TREPANG.

(Photo - USN)

comforting roar of the superchargers. On the bridge, the sight of the hull being pushed through the waves at well over 20 knots for hour after hour reminds even the least technically minded person that something very special must be going on in the reactor compartment.

When dived, on a high speed passage, the sense of movement is virtually non-existent, unlike almost any other form of transport. The only indication of distance travelled is the read-out of the log and the SINS. The passage may last for days or even weeks, at a speed which would flatten the battery of a diesel boat in a few minutes.

All of these manifestations of nuclear propulsion are astonishing to the diesel submariner, but perhaps none as much as the fact that there is apparently unlimited hot water for showers, and a very definite tendency to the wearing of uniforms at sea.

One cannot help feeling sorry for young men who have been brought up in an all-nuclear submarine force; they have missed one of life's most memorable culture shocks, unless of course they find themselves, by some strange quirk, appointed to a diesel submarine.

The basic engineering features of nuclear propulsion are well known, and I will therefore be brief in describing them. All

Western Navy nuclear submarines use pressurised water cooled reactors, in which a primary circuit of water is circulated through the core of an enriched uranium reactor, either by powerful pumps or by natural circulation (similar to the hot water system in a multi-story house). The heat picked up from the reactor by the primary circuit is transferred to a secondary circuit via a heat exchanger called a steam generator, which acts as a boiler. The steam produced is used to power steam turbines which drive the shaft, usually directly through reduction gearing, but in some cases via turbo-electric drive. Auxiliary machinery may be powered by steam from the steam generator, or electrically from steam turbo-generators. The reactor itself is contained within a thick steel container, which is in turn contained within an unmanned reactor compartment with specially strengthened bulkheads. A large amount of duplication of critical circuits and extremely rigorous quality control have led to very high reliability in submarine nuclear power plants. Typical power figures for Attack class submarines are 20-40,000 shaft horse-power, and up to 60,000 for the larger ballistic missile carrying boats.

Other machinery which is unique to nuclear submarines is the air purification equipment. This is not required in diesel submarines, because fresh air is drawn into the boat via the snort mast every time the diesel engines are run for battery charging. In a nuclear submarine, CO₂ has to be removed from the atmosphere, and oxygen replaced, on a continuous basis. CO₂ is removed in the so-called CO₂ scrubber, a rather alarming piece of machinery full of dangerous chemicals, and oxygen is created from seawater by electrolysis. The unwanted hydrogen is pumped overboard. Air purification machinery is complex and expensive, and is a significant item in the cost of a nuclear submarine. In spite of all precautions, things can still go wrong. Freon, the gas used in many refrigeration plants, is quite harmless under normal circumstances, but it breaks down into phosgene at high temperatures, e.g. if in contact with a lighted cigarette. A Royal Navy submarine was once forced to ban smoking throughout an eight-week Polaris Patrol because of a freon leak.

What does this expensive form of propulsion and its attendant air purification equipment give us? It gives us three things:

1. Speed,
2. Endurance, and
3. The ability to fully exploit the submarine's great advantage and *raison d'être* — invisibility.

A diesel boat must at some stage expose a mast in order to snort; the nuclear submarine need never break the surface of the sea.

Speed is obviously of great importance. In rough terms, a nuclear submarine can maintain a speed of about three times that of a diesel submarine, over a long distance. The modern diesel boat, on battery drive, can achieve speeds of up to 25 knots, but only for an hour or so. When transiting, dived, over long distances, the requirement to snort brings the average speed down to about 10 knots, compared with the 30 knots plus that a nuclear submarine can achieve.

The high speed of the nuclear boat enables it to overtake most potential targets in order to



USS HAMMERHEAD.

(Photo — USN.)

bring them within weapon range, or to allow positive identification before firing. It allows the nuclear submarine to shadow or 'trail' high speed enemy units. It greatly reduces the non-productive time of transiting to and from the patrol area. It increases the area that can be searched in a given time. And, if necessary, it allows the nuclear boat the option of evading an engagement with a superior surface ship enemy. This is particularly important for ballistic missile-carrying submarines engaged in a deterrent patrol. High speed allows quick response to changing tactical instructions.

Modern nuclear submarines require 'refuelling', i.e. a reactor core change, about once every 10 years, and this is currently being extended to 25 years. So fuel is not a factor to consider when planning a patrol. Nor is it generally in the case of diesel submarines, which also have great endurance. In both cases, consumables such as food, lubricants, weapons, and some would say movies, are the limiting factor in the length of a patrol.

The ability to remain completely submerged at all times is a fundamental advantage of the nuclear submarine over the diesel submarine, which must snort. Modern diesel submarines require to snort for a much smaller proportion of time than World War II boats, but, sooner or later, that big solid snort mast must be raised above the surface. Under some circumstances this can mean the end of the patrol, and of the submarine.

Apart from the risk of detection by radar, snorting is a relatively noisy procedure and may reveal the submarine's presence to, for instance, an enemy nuclear submarine. It also tends to 'deafen' one's own passive sonars.

It can be argued that all submarines, including nuclears, must raise a mast above the surface from time to time, and this tends to negate the non-snorting advantage of the nuclear boat. There are several reasons for exposing a mast. The obvious one is to have a look around through the periscope, when the sonar picture has become incomprehensible.

Positive visual identification of a target may be one of the rules of engagement.

A mast must be raised to receive short wave, MF, UHF and VHF communications, or for transmission.

A navigational fix by sextant or satellite requires mast exposure. So does the need to obtain EW data.

However, in nearly all of these requirements there is an element of choice for the submarine. But when the lights have turned brown in a diesel boat, you must snort!

There are a number of possible partial solutions to the snorting problem. They all aim at providing an air-independent source of energy which can be used either as a means of avoiding snorting when it would be dangerous to do so, or to provide a high speed boost when attacking or evading. '24 knots for 24 hours' has for a long time been the catchphrase and dream of the diesel submariner. Methods of air-independent propulsions which show the most promise are closed-cycle engines, diesel or turbine, using HTP as fuel, and fuel cells. A technological breakthrough in this field would have a profound effect on submarine design, and might even bring about the decline of nuclear propulsion. It must be recognised, however, that at the present time no such air-independent forms of propulsion are in service, and it may be many years before they are. Formidable problems of safety, noise, cost and reliability exist in the development of a non-nuclear air-independent full power form of propulsion.

So, the nuclear submarine reigns supreme. Or does it? What are the snags?

One of the criticisms of nuclear submarines is that they are noisier than diesel submarines. This certainly used to be true. The sound of one of the earlier classes of Soviet nuclear submarines has been likened to that of a circus coming over a hill.

The main sources of noise from most nuclear submarines are the reactor coolant pumps, which circulate the water in the

primary circuit, and the main turbine reduction gearing.

A very determined and expensive programme of noise reduction has largely succeeded in overcoming the earlier noise problems in Western nuclear submarines, and this is unlikely to be a major factor in favour of the diesel submarine for much longer. Both classes of submarine, with a bit of luck, will make as much noise as a hole in the ocean. It must be remembered, however, that a diesel boat on battery drive is inherently quiet, whereas the nuclear boat has only been made quiet at vast expense, and can only be kept quiet by extremely skilful maintenance and refitting.

Another criticism of nuclear submarines is that they provide a good target for active sonar, but this is a criticism of their size, not their form of propulsion. Relatively small nuclear submarines can be built.

It is said that nuclear submarines cannot operate effectively in shallow water, but once again this is a question of size and speed, not of the form of propulsion. A relatively small nuclear boat at slow speed is as happy in shallow water as in deep.

What cannot be denied about nuclear submarines is that they are more expensive, not only to buy, but also to operate. It is not easy to make a direct comparison between the costs of nuclear and diesel submarines, because the former tend to be much bigger, more capable warships, carrying much more equipment than the diesel boat. The latest Los Angeles class US nuclear Attack submarines cost about \$500 million each, but they weigh 7,000 tonnes, and a 7,000 tonne diesel submarine would not be

exactly cheap if fitted with the same equipment as a Los Angeles. Nevertheless, it is undoubtedly true that a nuclear power plant is more expensive than a diesel electric plant.

The high cost of nuclear submarines was one of the factors which persuaded the Royal Navy to re-introduce a new class of diesel submarine — the 2400 (or 'Midnight') class. One of the guidelines in the development of the specification for the 2400 was that it should cost less than 1/3 of the price of a current RN Nuclear Attack class. It is believed that the latest Trafalgar class nuclear submarines, which displace 4,500 tonnes, cost about \$A350 million. This compares with roughly \$100 million for a modern diesel submarine, such as the 2400. So the 'one-third' rule seems to hold quite well. One-third the cost, and one-third the speed.

The difficult question is this: Is it better to have three diesel boats, or one nuclear? Can three diesel submarines do the work of one nuclear submarine, or vice versa? I suggest that the answer is: Sometimes yes, sometimes no.

For most countries, the question is academic. The real snag with nuclear submarines is not their cost, nor their performance, nor even the industrial back-up required to support them. It is the requirement to have an established, in-country, nuclear power industry. A nuclear reactor is a very exotic form of power, and with a very exotic form of failure. 'Reactor melt-down' is a very remote possibility, but it can happen, it has happened — in shore power stations, and it will almost certainly happen again. It has not yet occurred in a

Western nuclear submarine, perhaps because of the very high standard of operator training.

A reactor accident, taking into account the likely course of events, is not in fact as bad as many other engineering disasters. It would certainly 'spoil one's entire day' if it happened in your submarine, but it is unlikely to cause the casualties involved in even a very minor air crash. The problem is in the exotic nature of the accident. Public opinion, at present, will not tolerate anything but the very highest standards of safety with regard to potential nuclear radiation risks. Much higher standards are demanded than for the safety of, say, cars or aircraft.

The establishment of a national nuclear safety infrastructure would be an expensive prerequisite for a country which had not built up a nuclear power industry. The training and employment of large numbers of highly qualified scientists and engineers, together with the provision of all the equipment which might be required in the case of a reactor accident, would add considerably to the cost of the nuclear submarines. Without the establishment of such a nuclear safety organisation it is highly unlikely that nuclear submarines would be supplied by any of the countries at present capable of building them.

TO SUM UP:

Yes, nuclear submarines are the present capital warships, with a performance which far surpasses diesel submarines, and yes, they can be cost effective, in spite of their price, but no, you can't just go out and buy one, even if you have the money. You have to get those shore-based nuclear power stations first!

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THE EUROPEAN REPORT



Artist's impression of the new Type 23 frigate for the Royal Navy. (Photo - A. Preston)

As predicted in the July issue of The Navy (see 'The Royal Navy in 1983'), two new classes of warship have been ordered for the R.N. The first, early in November, was the Type 23 frigate, followed by the Type 2400 diesel-electric submarine a month later.

More information about the Type 23 has been released since the last issue, and it is now known that the Plessey bid was accepted for the Type 996 surveillance radar. In fact 996 was the number allocated to the competition, and Plessey's offer was one of several bids to meet the Naval Staff Requirement. The radar chosen is a dual mode type, made up of the AWS-5, already in service in Danish corvettes and the Nigerian MEKO frigate ARADU, and the AWS-6 a C-Band set derived from the Dolphin, which is the missile-detecting component of the Oerlikon-Contraves Sea Guard close-in weapon system. The two main components of the radar are therefore proven, allowing the new radar to be put into production with the minimum of delay.

Quiet running is of prime importance as the Type 23 frigate will deploy the new type 2031 tactical towed array, similar in function and performance to the US Navy's TACTASS. She also breaks new ground in the RN, as she will be the first operational warship to have a bow sonar, the Type 2016. The radar signature has also been reduced by careful shaping of angles in the superstructure, and it is hoped that she

by **ANTONY PRESTON**

may even escape detection by the current generation of anti-ship missiles.

Unlike the latest Type 22 frigates, the Coventry group, the Type 23 ships are not to have a close-in weapon, but they have been given the first vertically-launched Sea Wolf point defence, with a single 32-round box forward. A 4.5 in. Mk 8 gun has replaced the 76 mm originally proposed, as a direct result of Falklands experience.

Two major items of equipment are still not settled: the CIWS for the Coventry class and the new anti-ship missile for that class and the Type 23s. Three runners are fancied, the McDonnell Douglas Harpoon, the British Aerospace Sea Eagle (SL) and the Italian Otomat Mk 2. Harpoon has two outstanding advantages: first it is a proven, reliable and comparatively cheap system, and second, the sub-launched version is already in British submarines and the air-launched version is in RAF Nimrods. The ship-launched version of Sea Eagle is not yet ready and will undoubtedly be more expensive, but it will have considerable commonality with the air-launched version in the RAF and Fleet Air Arm, and will preserve jobs in British industry. An Italian purchase, which includes putting a Marconi seeker on the existing missile, carries with it at least a hope of valuable offsets, including the sale of the Sea

Harrier to the Italian Navy, so there are advantages to all three choices.

The CIWS competition includes some very interesting competitors. The RN has let it be known that it does not believe that anything less than 30 mm will be adequate against the next generation of missiles, which appears to rule out the Sea Guard system with its quadruple 25 mm guns. The General Dynamics' 20 mm Phalanx would also appear to be a non-starter, but the manufacturers have offered a Mk 2 version, using a four-barrelled 30 mm GAU-13 'Gatling'. The Dutch are anxious to sell their Goalkeeper, which uses Dutch radar with the General Electric GAU-8A revolving 30 mm gun, while Vickers are offering their Sea Dragon, also using the GAU-8A but mated with a modified Sea Wolf tracker and the Swedish Sea Giraffe missile-detecting radar.

NEW MINESWEEPERS

Although not as glamorous as submarines or frigates, mine countermeasures craft are as important. Accordingly, the RN is to get a dozen new Extra Deep Armed Team Sweep (EDATS) trawlers for sweeping deep minefields on the edge of the Continental Shelf. The names of the first four have been announced: CARRON, DOVEY, HELFORD and WAVENEY, and at least one has been launched. The new 'River' class will replace elderly wooden coastal sweepers acting as Royal Naval Reserve tenders, as well as the two prototype EDATS trawlers ST DAVID

* Naval Editor, Jane's Defence Weekly

(South Wales Division) and VENTURER (Severn Division).

The new ships are basically stern trawlers, but fitted to carry a 40 mm Bofors gun in time of emergency. Particulars are as follows:

Displacement: 900t
Dimensions: 56 ft x 34 ft x 7'
(47.55m x 10.4m x 7')
Speed: 16 kts (max)/12 kts (sweeping)
Complement: 30

The lead-ship WAVENEY will run trials early in 1984 and is to replace the ST DAVID in April.

AGIS AT SEA

The brand-new Aegis cruiser TICONDEROGA visited Portsmouth on 31st October, her first overseas port of call since becoming operational earlier this year. Although at first she seems outlandish, with her slab-sided superstructure and tall cylindrical 'chimney pots', she is a formidable fighting ship. Visitors were shown the futuristic CIC with simulated air-and missile-engagements to demonstrate the awesome capabilities of the AN/SPY-1A radar and the combat information system.

In effect the ship ran through a short engagement using its offices at their battle stations while explaining how to fight the battle. The SPY-1A system uses hundreds of small radiating elements in four planar array to scan electronically around the ship. Not only can the four arrays at the corners of the superstructure provide full hemispheric coverage out to some 250 miles, but it can also detect and isolate faults within the system without suffering more than slight degradation of performance.

With critics questioning the ability of the US Atlantic Fleet to send its Carrier Battle Groups (CVBGs) into 'harm's way' in the hostile environment of the North Atlantic and Arctic, the publicity given to the TICONDEROGA's formidable defensive power is intended to show the opposite. What is certain is that the nearest equivalent to the 9,000-ton TICONDEROGA is the 22,000-ton Soviet 'battlecruiser' KIROV, and there can be no doubt that the American ship is a better bargain. The current plans to give each CVBG an escort of three TICONDEROGAs will keep the big carriers in the game to the end of the century, for Aegis, the 'Shield of the Fleet' can handle the main threat of saturation attacks from air, surface and submarine-launched missiles.



HMS VENTURER, soon to be replaced by the new (EDATS) trawlers. (Photo - Royal Navy.)

SHIPBUILDING FOR IRAQ

The eagerness of the West to supply front-line weaponry to people likely to use them against ourselves raises some eyebrows, and the latest deal of that kind could turn out to be the Italian programme to expand the Iraqi Navy. Four *Lupo* class frigates and six corvettes are being built by Cantieri Navale Riuniti, along with an 8,000-ton replenishment ship similar to the *Stromboli* class, an order equivalent to US\$1,200 million.

The *Lupo* class are CODOG ships armed with eight Otomat anti-ship missiles, a 5 inch gun and a helicopter. The corvettes are diesel-driven craft displacing 650t (nominal) and two are also armed with Otomat missiles. Two will carry a light helicopter aft, mainly to give mid-course guidance to the missiles, but the other four will be of the standard type. These mini-frigates were first built for Libya as the *Wadi* (later renamed the *Aswad*) class, and subsequently for Ecuador. Although not nearly big enough for extended cruising, they are powerful reinforcements for a navy operating smaller strike craft. They also have the advantage of being cheap to operate.

The first of the Iraqi corvettes, the HUSSA EL HUSSAIR, is afloat and fitting out at Muggiano, near La Spezia, and her sister TARIK EBN ZIAD was launched recently. They will both operate a helicopter, probably the Agusta A-129 and will be armed with two Otomats, a 76 mm dual-purpose gun and a 4-cell Aspide SAM-launcher for point defence. Another pair, without a helicopter, have just been launched at CNR's Cantieri Navale

Breda's yard at Porto Marghera, near Venice, where Nos 5 and 6 are being built.

NEW GERMAN APPROACH TO MINE WARFARE

Like the British and other European navies the Federal German Navy is studying the problem of mine countermeasures, in the light of the Soviet Navy's known preference for this form of warfare. Having been the only navy to go down the route of unmanned drone sweeping craft (the Troika system) the Bundesmarine is now looking at a new type of fast MCMVs. Known as the SM 343 Type, the design is currently at definition stage by Messerschmitt-Bölkow-Blohm under a contract from the Bundesamt's Technology and Procurement Agency, with a view to ordering ten ships to replace the *Lindau* class (which are similar to the Royal Australian Navy's CMS design).

Unlike other MCMVs the Type SM 343 will have steel hulls, but the material will be a new non-magnetic rustproof steel. Equipment will almost certainly include the new Penguin mine disposal vehicle and a heavy defensive armament will be carried.

BIG NATO SUMMER EXERCISE

This year's large-scale NATO exercise 'Ocean Safari' was dedicated to studying the problems of protecting the sea lines of communication between the United States and Europe. Over 90 ships from the navies of the United States, United Kingdom, Belgium, Canada, West Germany, France, the Netherlands, Norway and Portugal took part



LUPU, as completed for the Italian Navy. (Photo - Naval Photograph Club.)

in the exercise, which lasted from 7th to 17th June. Although France is not a full member of the Alliance's military structure, she provided forces to take part in the exercise.

The force included four aircraft carriers and some 300 aircraft, and was deployed over a wide area of CINCEASTLANT's command, from south of the Azores to the south-western

approaches to the British Isles. Overall command was exercised by SACLAN, Admiral Wesley L. McDonald, USN. His forces tested procedures for the protection of shipping from attacks by 'Orange' submarines, aircraft and surface units. Convoys of chartered merchantmen sailed between the United Kingdom and Portugal.

One of the lessons which emerged from 'Ocean Safari' is the difficulty of getting convoys into British ports, which were assumed to have been blocked by mining. In wartime it might be necessary to route all major convoys as far south as Lisbon, until such time as US carrier aircraft and NATO shore-based aircraft had eliminated the threat from Soviet Backfire bombers.

NEW FALKLANDS GUARDSHIPS

Three new Falklands Islands Patrol Vessels (FIPVs) have been added to the RN's strength this year. The oil rig supply ships SEAFORTH SAGA, SEAFORTH CHAMPION and SEAFORTH WARRIOR have been renamed PROTECTOR, GUARDIAN and SENTINEL. The first-named has already been converted and sent to the South Atlantic. Displacing nearly 900 tons, she has been armed with two 40 mm L/60 Bofors guns, one on either side of the wheelhouse, and a davit for handling a rigid inflatable dinghy has been installed on the well deck. Apart from alterations to the accommodation and communications, she is otherwise unaltered.

The three ships will have the task of patrolling the remote bays and inlets around the Falklands, and are sufficiently rugged to cope with the appalling winter weather. The well deck is capacious and could accommodate a landing party or even a light vehicle such as a Land Rover, to be taken ashore by helicopter. Although in an emergency they can augment the warships stationed in the Falklands, their main duties will be to maintain contact with the outlying settlements. Each ship has a complement of three officers and 20 ratings.

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OUT OF THE PAST

When Sail Was King

The six Emerald class composite screw corvettes, EMERALD, GARNET, OPAL, RUBY, TOURMALINE and TURQUOISE, launched 1875-1877, were conceived in an age when tactics were still those of Trafalgar, admirals still swore by wood, sail and muzzle loaders, and iron and steam were toys of the boffins.

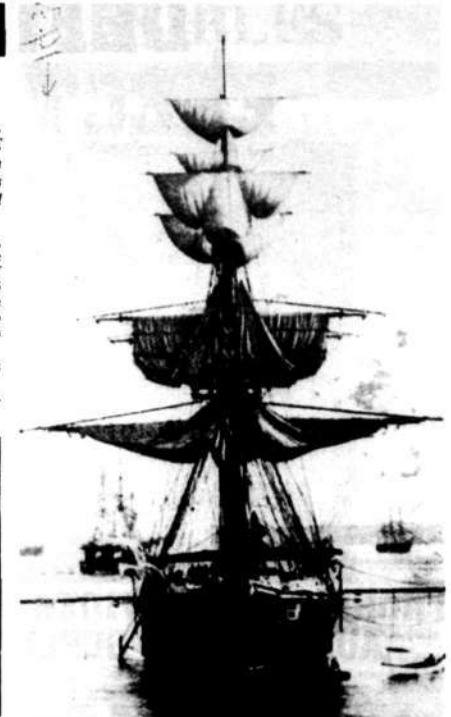
Of 2,120 tons displacement, with a length of 220 ft, a beam of 40 ft, and a draft of 18 ft, they were completed with ship rig and carried some 18,250 ft of plain sail. They had various horizontal compound engines of about 2,000 ihp driving a single shaft and giving a speed of about 12.5 knots. Under sail they could make about 12 knots. Initially all were armed with 12 x 64 pdr muzzle loading rifles, but between 1882 and 1886 some were converted to 4 x 6 in and 8 x 5 in breach loaders. Between 1880 and 1890 all were altered to barque rig.

All were out of service by the end of the century, but TOURMALINE survived in an ancillary role until scrapped in 1921.

These early cruisers and many others appear in the BMS publication, "Cruisers of the World".



*HMS TOURMALINE with her crew at ramming drill.
(Photo - Burgess Media Services)*



A bow view of HMS RUBY. (Photo - Burgess Media Services)



HMS OPAL after conversion to barque rig and lying in Auckland Harbour, New Zealand. (Photo - Burgess Media Services)

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S.R.D. SUBMERSIBLES

by PETER ARMSTRONG

In the July edition of "The Navy" I described some of the ships and activities of the Services Reconnaissance Department. As well as the larger vessels other types of submersible craft were acquired for special duties. Any readers who may have further information or photographs of any of the SRD vessels are requested to contact the editor.

SLEEPING BEAUTIES (SBs)

Officially described as Motorised Submersible Canoes (MSCs), the Sleeping Beauty was designed to remain underwater. Its usual manner of operation was porpoising, i.e. a quick rise to the surface before a shallow dive again. The principal motive behind regular surfacing was for the crew to check bearings and stay on course. During training for Operation Rimau, the cruiser ADELAIDE was used as the enemy vessel. On one occasion a SB accidentally surfaced behind the ship in full view of her crew, who were unaware of the exercise.

Each SB carried nine limpet mines; considered sufficient to sink two 10,000 ton ships. These claims were based on the assumption that the limpets were correctly placed.

Hydroplanes and a rudder controlled the SBs, giving each an amazing degree of manoeuvrability. One operator told this writer that he hopped into an SB and took her down without any troubles.



Sleeping Beauties being carried in an open boat

WELMAN

The SRD also operated the Welman Midget, a one-man battery-operated submarine. Each craft had a surface displacement of 4,600 lbs, were 16'5" long with a 3'3" beam and a maximum draft of 5'9". The latter was accentuated because of the large screw guard.

Each Welman was propelled by a 2.5 hp electric motor and could reach 3 knots submerged. At 1.7 knots the endurance was 20 hours. Although designed to operate at 75 feet, the Welman could dive to 300 feet.

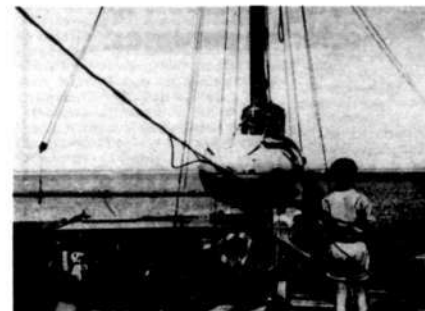
A 560 lb explosive charge made a false bow on the craft which could be dropped after the setting of the time fuse.

Welmans were very simple to operate and even more so when a periscope was added. In Australian service the Welman was used as a preliminary training vessel in the field of navigation for the larger Welfreighter. The type was used operationally in Europe.

WELFREIGHTER

This four-man submarine was designed to insert and extract a small number of men or materials. It possessed only a limited range and had to be towed close to the objective by a mother vessel.

Very little else is known about the Welfreighter, but they were being used for training purposes at Garden Island, 15 miles south-west of Fremantle.



Welman midget with a Snake class SRD boat in the background.



Welfreighter.



Welmans in storage.



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BOOK REVIEWS

SOVIET WARSHIPS

The Soviet Surface Fleet 1960 to the present.

by JOHN JORDAN

Published by: Arms & Armour Press,

London & Melbourne

Reviewed by: VIC JEFFERY

This book provides an interesting alternative view to the sometimes over-reactive reading of Soviet naval intentions.

Author John Jordan argues that the innovative nature of Soviet ship design and construction since World War Two is not, as has been implied, a quality that is admirable in itself, but one that has been made necessary by technological development by the West.

An in-depth study of the USSR's blue water fleet, providing a detailed analysis of the new generations of Soviet Surface ships from the Kynda class of the 1960s to the nuclear-powered battle cruiser Kirov. The book closely examines technical issues and its purpose is clearly to investigate and compare.

Consisting of 10 chapters, each dedicated to the major classes of Soviet warships, the book is supported by 133 excellent black and white photographs, including many from the United States' Navy, Ministry of Defence, Novosti, the French navy, Skyfotos and Tass.

The classes of warship covered are Kynda, Kashin, Kresta I, Moskva, Kresta II, Krivak, Kara, Kiev, Kirov and the new destroyers Sovremenny and Udaloy.

All aspects of these classes are studied in great detail. An example being the Moskva class helicopter cruisers. Divided into subsections the areas covered are Polaris, The Development of Soviet ASW, The Eastern Mediterranean Aspects of the Design, Flight Deck and Hangar, Helicopters, Anti-submarine Missiles, Smaller ASW Weapons, Sonars, Air Defence, Other Air Defence Systems, Replenishment and Service History.

Jordan stresses that there is one 'authority' on the Soviet Navy, and that is the Soviet Navy itself. Whereas Soviet-built tanks and Soviet-built aircraft have been widely employed in conflicts around the globe, and have been engaged, captured and examined by forces belonging to pro-Western regimes, no major Soviet-built surface ship has seen action since World War Two.

Recent Soviet naval developments are viewed in this book, not as an attempt to win control of the sea, but as a persistent drive to counter Western sea-power as a force capable of threatening Soviet territory.

Included in the book are more than 30 tables of ship specifications, missiles, guns and aircraft carried by each class. One interesting table compares the Ka-25 Helicopter with anti-submarine helicopters in service with Western navies.

A most interesting book with some interesting theories, it is available through Thomas C. Lothian Pty Ltd of 4-12 Tattersall's Lane, Melbourne, at a retail price of \$44.95.

SUBMARINE BOATS

The Beginnings of Underwater Warfare

by RICHARD COMPTON-HALL

Published by: Conway Maritime Press

Reviewed by: ROSS GILLET

Much too often naval-type books are written for the mass market, being simply filled with brief data tables and poorly researched narrative, leaving the reader more confused than before.

An exception to this recent practice is "Submarine Boats" by Richard Compton-Hall, produced to celebrate the successful recovery of the Royal Navy's first submarine, HOLLAND I. The book relates a great deal more than just the story of HOLLAND I and her eventual salvage, including as it does the remarkable story of her designer John Phillip Holland and the early years of submarine development around the world, up to and including the Great War (1914-18) when the submarine established itself as a viable weapon of war.

"Submarine Boats" also relates the more weird and unusual inventions, supported throughout by a marvellous collection of photographs from the Royal Navy Submarine Museum.

In his efforts to produce the most informative, yet historically accurate story, the author has delved into the pages of early newspapers and official reports. For the *fait accompli*, one of his interviewees was the last commander of HOLLAND I. With this kind of perseverance for historical accuracy, interwoven with both witty and humorous accounts, the reader can be assured of many hours of enjoyable reading time.

"Submarine Boats, The Beginnings of Underwater Warfare," is thoroughly recommended as a valuable addition to your naval library.

BATTLESHIPS & BATTLECRUISERS

by TONY GIBBONS

Published by: Salamander

Reviewed by: ROSS GILLET

Over recent years the Salamander range of military publications has steadily increased. Since the late 1970s the group has issued the interesting "Armed Forces of the World" series, while at the same time releasing new historical-type books. The latest book from the latter stable is "Battleships & Battlecruisers", an encyclopaedia of every capital ship from GLOIRE in 1860 to KIROV in 1961.

The book is arranged chronologically, with each entry supported by a table of data, commentary, photographs and in many cases a well researched line drawing.

Victoria's, and later the RAN's, monitor CERBERUS is included, as well as the battlecruiser AUSTRALIA. It is indeed com-

forting to read that the battlecruiser was scuttled off the east coast of Sydney, Australia, on 12th April, 1924, not the west coast as appeared in a recent book from England.

This new book is designed for both reading and perusal at a moment's notice; the great value of a reference over a purely narrative book. Some 324 classes of capital ships are described within 272 pages. The major drawback of the book is in many cases a poorly designed page layout. In many instances it is difficult to work out where the next entry begins and the last one finishes; the result of a four column page spread, I feel!

Despite the design drawback, I thoroughly enjoyed "Battleships & Battlecruisers", and hope that Salamander will continue the series with aircraft carrier, cruiser and destroyer volumes.

US DESTROYERS

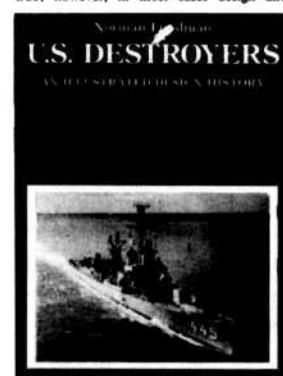
by NORMAN FRIEDMAN

Published by: Arms & Armour Press

Reviewed by: "MOSQUITO"

The design and development of the destroyer has over the years been a major topic for books dealing with warship design and development.

The large majority of these books have dwelt largely or entirely on the development of British destroyers. These books have given the impression that Britain was the only country to design and develop destroyers and that all the other countries either purchased or stole British designs. In some cases this may be true; however, in most cases design and



development was carried out by various nations to meet their own specific requirements. In his book "US Destroyers" Norman Friedman traces the development from the 1880s to the present, of what became the workhorse of the United States Navy.

In the course of writing this book Dr Friedman has not only presented the reader with a technical history of American destroyers, but has also given us an insight into the military and political decision-making process that has had such a large part in shaping the design of American destroyers. One of the most important decisions made concerning the construction of American destroyers was made in the 1880s when a Naval Advisory Board recommended that

preference should be given to the use of American manufactured materials in the construction of US ships. The Board recognised that this policy may have made the ships more expensive and militarily less capable initially, however it would pay dividends in the long run. Successive American administrations have followed this policy and the end result is clearly illustrated within the pages of this book.

Because of the chronological layout of the book, as opposed to being organised by class, some of the one-off modifications have been omitted, an example of this is the fitting of the lightweight 8 inch/55 cal mounting to USS HULL. However, the advantage of setting the book out chronologically is that the complete (as far as security and other restrictions allow) history of the design and development of American destroyers can be given.

As this book traces the development of American destroyers it also gives important background information on the design of half of Australia's destroyer force. Perhaps the most controversial of Australia's American designed destroyers are the Oliver Hazard Perry class and their much criticised single screw. The single screw was selected mainly as a means of keeping down the cost of the ships, however it has become a major point of criticism, especially as it appears to make the ship more vulnerable to battle damage. Taking up this point of vulnerability, Dr Friedman points out that "17 out of 30 destroyers hit by torpedoes broke up and sank at once, in which case the value of the second shaft is academic".

There is a mass of technical information contained within the pages of this book. In some cases the only limiting factors as to how much information to provide has been security restrictions and a lack of space. All this information is well backed-up by a large selection of photographs, some excellent line drawings and a very comprehensive index. A large number of the photographs used highlight modifications made to various ships during refits, thus making it easy to identify photographs of other ships and date them.

Overall "US Destroyers" is an excellent book which details the design and development history of American destroyers. Not only does it contain a mass of technical and historical information, but it is well organised and written in a style that makes it extremely readable. Undoubtedly "US Destroyers" will become the standard reference work on American destroyers, and rightly so.

UNITED STATES NAVY DESTROYERS OF WORLD WAR II

by JOHN C. REILLY JR
Published by: Blandford Press

Review copy from Australia & New Zealand
Book Co Pty Ltd

PO Box 459, Brookvale, NSW, 2100

Reviewed by: VIC JEFFERY

This book is truly a must for any naval historian or enthusiast with an interest in destroyers. The United States Navy "Tin Cans" became legendary during World War Two and their development is superbly documented in this book.

Comprising 160 pages, it is packed with 209 black and white photographs, many of them never seen before in any publications. The selected photographs depict destroyers under

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construction, in Navy yards during modernisation, on trials, and on active service in the Pacific, Atlantic and other areas of operation.

Amongst the photographs used are several showing the damage inflicted on US destroyers by Japanese Kamikaze suicide aircraft off Okinawa in the closing stages of World War Two. These photos are a testimonial to the American destroyers' ability to take enormous punishment.

The author, John C. Reilly Jr, explores in detail the whys and wherefores of the United States destroyer programmes before and during World War Two in terms of design, performance, armament, modifications, and

the influences of pre-war economics and tactical doctrine.

Divided into 17 chapters, commencing with Early Torpedo Boats and Destroyers and including Early Flushdeckers; The Farragut Class; More Experimentation; Build-up 1941; Anti-aircraft Defence; The Fletchers. The Allen M. Sumner and Gearing Classes and many other fascinating chapters, this is a sound record of how the US Navy met the challenges of the Pacific War, and problems such as heavier anti-aircraft and anti-submarine armaments, along with better sea-keeping qualities.

Four excellent appendices cover the recurring problem of stability, damage and loss in action and organisation of the Department of the Navy Part 1: 1934 and Part 2: 1944 and finally comparative tables of American destroyer classes 1931-45; - Part 1: Data, Part 2: Armament and Part 3: Destroyer programmes, cancellations, losses and suspensions.

This book, a concise history, is clearly based upon many years of extensive research and is a bargain for this type of work at a ridiculously low \$17.95. Thoroughly recommended.

UNITED STATES PT-BOATS OF WORLD WAR II

by F. D. JOHNSON

Published by: Blandford Press
Review Copy from: Australian & New
Zealand Book Co Ltd

Reviewed by: "GAYUNDAH"

This attractive book, 160 pages in length, is primarily an historical summary of US PT-boat operations in the Second World War.

Four main types of boats are highlighted, including the 70 foot Elco, 77 foot Elco, 78 foot Higgins and 80 foot Elco models. After a brief description of the origins of the PT-boat, the author discusses the production and modifications of the boats and their subsequent war service.

More than 800 boats were eventually completed by V-J Day, but by the end of 1945 all but three PT squadrons had been decommissioned. This number had been reduced to only four boats by late 1946.

Most of the PT-boats received unofficial nicknames, including such unusual ones as 'Sad Sack', 'Hirochito's Headache', 'Piston Packing Mama' and 'Impatient Virgin'.

Readers who thought that the old TV series 'McHale's Navy' gave a true picture of PT-boats are in for a surprise. "US PT-Boats of World War II" is a well produced and well written book and as such is thoroughly recommended.

US AIRCRAFT CARRIERS

by NORMAN FRIEDMAN

Published by: Arms & Armour Press
Price: \$69.95

Reviewed by: "MOSQUITO"

Following closely in the wake of his authoritative history on the design and development of US Destroyers, Dr Friedman has written a companion volume "US Aircraft Carriers". This book traces the design and development of American aircraft carriers from the USS LANGLEY through to the current generation of nuclear powered leviathans.

At times the development of the aircraft carrier in the United States' Navy has been far

U.S. AIRCRAFT CARRIERS

AN ILLUSTRATED DESIGN HISTORY
by NORMAN FRIEDMAN



from assured. As with all expensive weapons systems, the aircraft carrier has had its share of critics. The majority of these arguing that there are other methods of doing the same job at less expense to the taxpayer. Yet where were these critics during the Pacific campaign or the Korean, Vietnam and Falklands wars when carrier-based air power was the only form of tactical air power available? More than likely these critics were sitting in some land-based ready room or air-conditioned office ignoring the lessons history repeatedly teaches us.

Like its predecessor, this book is lavishly illustrated with many excellent photographs

and detailed line drawings. Perhaps the most unusual aircraft carrier photograph to be published is shown in this book. The photograph shows the USS YORKTOWN recovering a TBF Avenger over the bows whilst going astern. One of the most noticeable differences between "US Aircraft Carriers" and its predecessor, apart from subject matter, is that whilst both books are hard-covered, the covers on "US Aircraft Carriers" are softer and so not as durable.

The recent Falklands conflict, and even more recently the crisis in Lebanon, has highlighted the continuing need for aircraft carriers, as well as other ships that can be readily converted into aircraft carriers. The United States foresaw this need in the 1920s and 1930s when as a result of the Orange War Plan (Orange being Japan) the USN began to look for ships that could be converted into aircraft carriers. The studies of these conversions eventually led to the construction during World War Two of a large number of escort carriers, the famous Woolworths carrier, as well as light aircraft carriers.

Not only did these escort and light carriers provide invaluable service during the war, but many served on into the 1950s and 1960s. One, the USS CABOT, is still in service today as the Spanish DEDALO. Other ships were converted into the first helicopter assault ships. These early conversions gave the United States Marine Corps and the United States Navy the experience required to conduct amphibious helicopter assault operations and eventually led to the design of such ships as the USS TARAWA and the proposed LHD.

Dr Friedman also gives us a new insight into the reason why United States aircraft

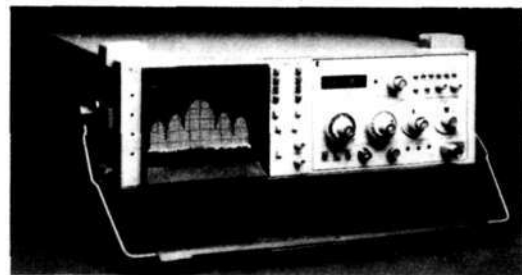
carriers had unarmoured flight decks whilst those on British carriers were armoured. American policy was to carry their aircraft on deck and use the hangar for maintenance purposes only. Whereas the policy of the Royal Navy was to strike down the entire air group into the hangar. In this context the British had to armour their flight decks, as any bomb penetrating into the hangar would have had disastrous effects. By using armour the British carriers were smaller than American carriers of equivalent displacement and carried less aircraft. However, events were to show that the American decision not to use armour was a costly mistake.

As can be expected, there are a large number of paper aircraft carriers, which are also listed in this book. The most spectacular of these is the USS UNITED STATES. This vessel, with its unarmoured flight deck, similar to the USS LANGLEY and USS RANGER, was conceived in the 1950s as a launch platform for large nuclear strike aircraft. Fortunately, this vessel was never built. However, the design work helped form the basis for all subsequent aircraft carriers from the USS FORRESTAL to the USS CARL VINSON.

When this book is coupled with Dr Friedman's earlier book "US Destroyers", and his proposed "US Cruisers", they represent not only an invaluable reference into the design of these ships, but also give an interesting and factual account of the development of the United States Navy into the most powerful navy the world has seen.

Overall the scope and detail of "US Aircraft Carriers" is like the ships it describes, awe-inspiring and a pleasure to behold.

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ADROIT Joins the Naval Reserve



by Leut VIC JEFFERY, RANR, Public Relations Officer, Fremantle Port Division

HMAS ADROIT underway in Cockburn Sound with the HMAS Stirling naval base in the background.

Friday, August 26, saw the Attack class patrol boat ADROIT transfer to the Royal Australian Naval Reserve.

In a handover ceremony conducted in the small boats harbour at the HMAS Stirling naval base in Western Australia, the former Commanding Officer, Leut Peter Lockwood handed over "the key" to the Commanding Officer of the Fremantle Port Division, Commander Don Bantock, RD, RANR.

Among those present to witness this auspicious occasion were the Naval Officer Commanding WA Area, Commodore David Orr, RAN, the Commanding Officer of HMAS Stirling Captain Daryl Fox, AM, RAN, and the Executive Officer of the Fremantle Port Division, Leut Commander D. Stone, RANR.

ADROIT had just completed a pre-handover refit at HMAS Stirling. First Commissioned on August 17, 1968, at the yards of Evans Deakin Ltd of Queensland, she was one of 20 Attack class boats built for the Royal Australian Navy.

Previously Darwin based, ADROIT became the WA based Permanent Naval Force patrol boat on January 21, 1983, when it replaced sister ship ACUTE. ADROIT was in turn replaced by another sister, ASSAIL, on July 1, when it was slipped for its pre-handover refit.

Displacing 149 tonnes ADROIT is armed with a 40/60 mm Bofors gun, 81 mm mortar and a variety of light arms. It has a length of 32.6 metres and a top speed in excess of 20 knots.

ADROIT is the third Attack class patrol boat to serve with the Fremantle Port Division.

ACUTE made headlines in May 1973, when manned by a RANR crew under the command of Leut Commander (now Captain) Pat Rodriguez, RANR, it arrested two Taiwanese fishing boats illegally fishing in WA waters.

The second Attack class patrol boat to serve with the Fremantle Port Division was BARRICADE between October 1981 and May 1982, when it was renamed KRI SIGALU and transferred to Indonesia.

In its new role with the Naval Reserve ADROIT is being used for fisheries patrols during annual continuous training periods. It is also providing valuable practical training in seamanship, navigation and technical training.

ADROIT has already participated in Exercise Kangaroo '83 as a Kamarian patrol boat. As part of its disguise it wore the name LAMOND in red paint, with her official name plates removed for the exercise.

Calling at Geraldton the patrol boat was greeted by a local Customs Officer who asked if she was the ADROIT, the crew immediately denying this.

"What a pity," said the Customs Officer, "because I've got the duty free beer ration for the ADROIT".

War games or not, the ADROIT quickly identified herself and the beer ration changed hands!



The acting commanding officer of HMAS ADROIT, Lieutenant Peter Townsend (left) hands over the 'key' to the commanding officer of the Fremantle Port Division, RANR, Commander Don Bantock.

(Photo - LSPH Steve Given, RAN)

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WESSEX COMING OF AGE

by TOM JACKSON

On Saturday the 19th November, HC723 Squadron at HMAS Albatross hosted a birthday party to celebrate 21 years of service with the RAN of the Westland Wessex helicopter.

The first of 27 Wessex was delivered to 817 Squadron in November, 1962.

The Wessex served with 817 and 725 Squadrons until 1975, when they were transferred to their present home at HC723.

The Wessex introduced a new capability to the RAN — that of Rotary Wing Anti-submarine Warfare (ASW), a role since taken over by the Westland Sea King. As well as its ASW role, the Wessex has provided valuable service as a search and rescue, medical evacuation and utility aircraft, coming to the fore during the Cyclone Tracy and Melbourne/Voyager collision disasters.

The Wessex birthday party was very well attended, over 1,400 people coming from all over Australia. Those invited included former Wessex aircrew, engineers and maintainers, as well as serving personnel.

The highlight of the celebrations was undoubtedly the formation flypast of all 14 Wessex of 723 (a great achievement by the maintainers), forming the figure "21" as they passed overhead of the spectators at the Base. The Iroquois and Bell 206 helicopters of 723 entertained the crowd while the Wessex were away "forming up".

Following the Wessex display the party guests were treated to a barbecue, a feature of which was the "Wessex Commemorative Port" bottling. The 200 dozen bottles sold attest to its popularity.

The festivities were interrupted by the unexpected arrival of two Sea Harrier jets from HMS INVINCIBLE in Jervis Bay. The crowd was treated to a spectacular flying display by the Falklands' veterans, with many past and present pilots watching with just a trace of envy. A formation flypast of Trackers from 851 Squadron and a "beat-up" by a Sea King of 817 completed the day's flying.

The activities were continued into the evening, with functions in the Wardroom, the Senior Sailors' Mess, and the Galaxy Inn.

Westlands' Director of Military Export, Mr Don Berrington, flew from England with his wife for the occasion. He presented a magnificent hand-blown glass bowl as a memento of the day. The Commanding Officer of 723 Squadron, Lieutenant Commander Mike Lehan, received a miniature replica. An impressive painting of a Wessex was presented by Hawker De Havilland.





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New Life for Navy Ship

by Capt BOB SPENCER

An aging motor refrigerated lighter destined for the scrap heap two years ago, is enjoying a new lease of life as a training vessel at HMAS Cerberus.

GAYUNDAH, formerly MRL 253 and now TV (Training Vessel) 282, was rescued from disposal after a 36-year career with the Royal Australian Navy.

The man responsible for her rescue, Lieutenant Commander John Riley, acting Officer-in-Charge, Seamanship Training School and Operations Officer at HMAS Cerberus, said the original intent was to refit the ship and use it as a sea-going training vessel.

Unfortunately, it seems unlikely at this stage that TV GAYUNDAH will be refitted for sea.

But dedicated volunteers at HMAS Cerberus have restored and tidied up the old lady and ensured at least that as a training vessel she looks her best.

Built by Johnson's Tyne Foundry in Melbourne, she was laid down in September 1945, launched in December, and completed in August the following year.

Her type was officially referred to as Motor Refrigerated Lighter, Steel, 120 Feet (Standard Type No 2B).



TV 282 (GAYUNDAH) with the old HDML 1324 at Williamstown in February, 1981.
(Photo - J. Straczek.)

The vessel had a displacement of some 356 tonnes, length of 37 metres, beam of seven metres and a draught of two metres.

Powered by Crossley HR4 diesel engines with twin screws, she produced an aggregate of 240 horsepower and a speed of about 9½ knots.

On completion, MRL 253 was placed in reserve at Melbourne, where she remained until July 1949 when she was brought into operational service.

She was towed to Lombrum, Manus Island, in the Admiralty Group by the tug RESERVE.

There she was employed on harbour duties as a tender to HMAS SEADLER (later HMAS TARANGAU).

In 1958 the vessel was towed to Sydney by SPRIGHTLY, again for harbour duties, where she came under the control of the Captain of the Port.

Mid-1966 saw MRL 253 transferred to Brisbane where, as a tender to HMAS Moreton, she became the Naval Reserve Training Vessel.

It was in May 1969 that the vessel was named GAYUNDAH and given the numerical designation TV 282.

She was named after the former Queensland maritime Defence Force gunboat GAYUNDAH which, with her sister ship PALUMA, served after Federation in the Commonwealth Naval Forces (later the RAN).

The original GAYUNDAH was paid off in 1918 and returned to the Queensland Government. She was sunk as a breakwater at Redcliffe in 1958.

TV GAYUNDAH arrived in Melbourne in May 1979 as a permanent training vessel for the Melbourne Port Division Royal Australian Naval Reserve, a role which she continued until 1981 when she was put up for disposal.

Her naval career would have ended there had it not been for the intervention of LCDR Riley, who inspected her. She was acquired for HMAS Cerberus in February 1982.

LCDR Riley said it was intended to have TV GAYUNDAH placed on the refit list and classified as seaworthy, enabling the Seamanship Training School to teach a varied range of subjects at sea.

But due to financial considerations, GAYUNDAH remains tied at the Main Wharf, Hanns Inlet, Westernport Bay.

The vessel is maintained by the School with the assistance of the technical departments at HMAS Cerberus, and it seems that there is no shortage of willing helpers.

Its bridge, although old, is fully operational and has been fitted with radar and gyro compass equipment.

The vessel is rigged for boarding at anchor - one of the many aspects of basic seamanship that are taught on it today.

LCDR Riley said that GAYUNDAH is frequently used as a training aid and its service to the school has proved invaluable.

While there appears little chance that the vessel will be refitted, LCDR Riley said he was optimistic that the situation could change some time in the future.

"TV GAYUNDAH has proved to be a great asset to the school and her worth as a training aid would increase immensely if we could take her to sea again," he said.



On the rigging boom on board TV GAYUNDAH is Leading Seaman Quartermaster Gunner Michael Dowton, 28, of Waterloo, NSW.

TARANAKI BOWS OUT



The shell of TARANAKI was recently towed from HMNZS Philomet's holler wharf to the Training Jetty East.
(Photo — Courtesy New Zealand "Navy News".)

The Royal New Zealand Navy has taken delivery of two more Westland Wasp helicopters, bringing the Wasp fleet to seven helicopters. In service in New Zealand, the Wasps will operate from HMNZ ships CANTERBURY, WAIKATO, WELLINGTON and SOUTHLAND. The latter two frigates are currently undergoing refits prior to commissioning. Refurbished by Westland Helicopters at its Weston-super-Mare factory, the Wasps were formally handed over by the company on 15th September. The first Wasp was air-freighted to New Zealand in October and the second in December.



The New Zealand frigate HMNZS CANTERBURY made her first visit to HMAS Stirling during Exercise Kangaroo '83. It is pictured here berthing on 22nd September.
(Photo — ABPH Eric Pitman, RAN.)



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NAVY LEAGUE DIVISIONAL & CADET NEWS

NEW SOUTH WALES

TS SYDNEY

Saturday, 22nd October, 1983, proved a special day for the cadets of TS SYDNEY, who had the honour of two Admirals on board together — a very rare event.

The Flag Officer, Naval Support Command, Rear-Admiral K. Vonthethoff, RAN and Mrs Vonthethoff kindly consented to bring Rear-Admiral A. J. Robertson, AO, DSC, RAN (Rtd) and Mrs Robertson to Spectacle Island in the Admiral's Barge, arriving promptly at 1400.

Commanding Officer, Lieutenant Commander John Hampson, OAM, NRC, met the Admirals and wives at the wharf, where a piping party comprising CPO Watson and two senior cadets gave the salute to the two senior officers.

Rear-Admiral Robertson inspected the guard of honour, who were neatly dressed in No 6s. The two Admirals were introduced to the distinguished guests, including the local Federal Member, Mr Michael Maher, MP, representing State Member (Mr J. Murray); Ald. Fran Scarlett; Commanding Officer's

wife, Mrs Pauline Hampson; Chief Superintendent of Supply, Mr J. Blunt and his wife; President of the Navy League of Australia (NSW), Commander P. Ballesty, Lieutenant Commander K. Grimley, representing Senior Officer Commander K. Adams; Mr & Mrs D. Price, Federal President HMAS Sydney Association; Mr J. C. Jeppesen, President Naval Association of Aust; Mr John Rivers, Editor and Publisher of our Newspaper (Spectacle Scrounge).

Over two-hundred people attended. The TS SYDNEY parents and friends committee, led by President Mr Colin Cole and Mrs Pam Cole, are to be congratulated on a first-class effort in arrangements for afternoon tea.

In fact, congratulations to all concerned in a well turned out parade.

The Island was extremely clean and tidy and it was evident some extra effort had been involved.

Lieutenant Commander J. Hampson, in his speech, made mention of thanks to the Foreman in Charge, Mr John Dyason, requesting his small workforce be given "well done".

Mr Douglas Price, Federal President of the HMAS Sydney Association, welcomed Rear-Admiral A. J. Robertson, AO, DSC, RAN

(Rtd) and thanked him for his acceptance of "Patron" to Training Ship SYDNEY.

In response, Admiral Robertson said the future of Naval Reserve Cadets was important, as some cadets will join the Royal Australian Navy and would benefit from the cadet training.

SEAFARERS' MEMORIAL SERVICE

30th October, 1983

St Andrew's Cathedral

Naval Reserve Cadets from TS SYDNEY, TS SIRIUS and TS PARRAMATTA represented metropolitan units and acted as flag bearer for annual Seafarers' Memorial Service.

Girl Naval Reserve Cadets from TS SIRIUS who were part of the contingent were a credit to their unit, very smart and well turned out.

Well done to all concerned

The Royal Life Saving Society — Australia New South Wales

TS SYDNEY has won The Ampol Shield for Naval Reserve Cadet Units, NSW and ACT division, 1982/83 season. This unit has won The Ampol Shield two years running.

"WELL DONE, SYDNEY."

QUEENSLAND

The League's Queensland Division held its second annual naval Symposium in the Lower Ground Floor Theatre of the Commonwealth Government Centre in Brisbane on Wednesday, 27th July last. The Commonwealth Government Centre is an impressive new complex in the heart of the city and it provided facilities that were most satisfactory for the ten speakers who took part.

The main thrust of the symposium was to do with amphibious actions, looked at from various aspects, including the roles of submarines (given by a World War Two submarine Commander, Captain G. E. Hunt, DSO, DSC) and the RAAF's F111 aerial reconnaissance aircraft. Naturally the sophisticated F111's capabilities could only be explained definitively by an Air Force Officer and this task was well handled by Squadron Leader P. Salvaire, an F111 pilot.

The importance of the Reserves and the Naval Reserve Cadets in Australia's overall defence was also looked at, particularly since the Brisbane Port Division of the Reserves have an LCH, LABUAN attached to them and their activities were closely aligned to the main topic of the symposium. The speaker outlining the Reserves' role was Capt E. T. Keane, ADC, the Naval Officer Commanding Queensland Area, while the NRC speaker was the Cadets' Queensland Senior Officer Cmdr Ian Fraser, NRC.

Lessons learnt from last year's Falklands involvement by the Royal Navy were discussed by Cmdr R. Wallis, RAN, Commanding Officer of HMAS MORETON, previously Commanding Officer of HMAS TOBRUK and details of the heroic but disastrous Dieppe Raid of World War II were given by LCDR C. R. Masterman, RANVR, who took part in that raid as a Senior Flotilla Officer in the Royal Navy's Tank Landing Craft. The experiences of both the Dieppe Raid and the submarine



RADM K. Vonthethoff, RAN, and RADM A. Robertson, RAN Rtd, with cadets from T.S. SYDNEY.

(Photo — RAN)



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Capt. E. T. Keane, ADC, RAN, NOC, Queensland and Ldr C. R. Masterman, RANVR, at the Symposium.

role in World War II landings formed an interesting comparison with modern techniques and problems.

Two speakers from Cairns in north Queensland also outlined the Service's activities in that area. They were Cmdr A. H. R. Brecht, Commanding Officer of HMAS CAIRNS, who gave details of the new naval establishment there and its capabilities, particularly to service the new Fremantle Class Patrol Boats attached to it, and Mr T. Dadds, the Quality Control Administrator from shipbuilders, North Queensland Engineers and Agents (NQE), who constructed the vessels.

The final speaker of the Symposium was Capt W. G. S. Bateman, RAN, of the Strategic and International Policy Division of the Department of Defence in Canberra. Capt Bateman explained the new International Law of the Sea and some of the implications it would have for Australia if it is ratified.

The Symposium was officially opened by His Excellency Commodore Sir James Ramsay, KCMG, KCVO, CBE, DSC, Governor of Queensland, and the gathering was honoured to have His Excellency present until afternoon tea.

The Chairman of the Symposium was the League's Queensland Division President, Surgeon Commander A. Robertson, OAM. Eighty-two people, including speakers, attended.

VICTORIA

NAVY LEAGUE YACHT RACE

This annual 10 mile race for single-hulled self-righting yachts was again conducted by the Royal

Yacht Club of Victoria at 1700 hours on Wednesday, 6th October.

To assist skippers to comply with the conditions of the race requiring at least 1 member of the crew being a member or ex-member of the RAN, RANVR, Reserve Cadet, or a member of the Navy League, 26 personnel from CERBERUS and LONSDALE and 6 members of the Navy League offered their services and all were "signed on" in the 12 boats participating.

Conditions were ideal as the yachts set off in the setting sun, and after a keenly contested race the winner, on corrected times, was "Mirabooka V" (G. Jensen-Muir), who also won last year, while second and third places were filled by "Maxambree II (P. Shell) and "Audacious" (J. Molloy).

Despite having the League's Federal President and Vice-President embarked, Don Jenkins "Roama" failed to fill a place and the Victorian President's efforts in "Moana" were not sufficient to win Lyle Turnbull a place.

The Geoffrey Evans' trophy was presented to Mr Jensen-Muir by Cmdr J. Speed, RAN, during a convivial social gathering in the Club rooms after the race.

WESTERN AUSTRALIA

An Annual General Meeting of the Western Australian Division of the Navy League of Australia was held at the Navy Club, Fremantle, on 19th October, 1983.

Strong emphasis was placed on the League's role over the past 12 months in promoting the need for a stronger Australian Defence Force.

During the year, the Council attempted to

offset both the publicity and effects of the growing number of people who paraded through the streets of Fremantle under the "Anti-nuclear Friends" banner.

The League however, did give full credit to those who marched in good faith, but deplored the efforts of the "professionals" amongst their numbers. The march, in effect, became an anti-American demonstration, as borne out by the 'graffiti' left on the walls of Fremantle.

The Navy League, therefore, joined with other defence orientated associations by presenting to the US Navy aircraft carrier USS CARL VINSON, a suitably worded plaque indicating that not all Australians supported this vocal minority.

This co-joint activity caused the WA Council to be more prominent in this and other matters, so inviting members of the Australian Defence Association to the monthly Council meeting.

It was agreed to join together with other defence associations to hammer out a common policy on all defence matters. This meeting was convened by the Council at Anzac House during August.

Several social events organised by the Secretary and Social Convenor over the past year were very much enjoyed by the members who attended.

With the introduction of female members to the Naval Reserve Cadets ASCC county units could not be substantiated and consequently closed down.

This then, leaves the one ASCC unit, TS SWAN, which operates from the WA Navy League headquarters in East Fremantle. However, viewing the activities of the Naval Reserve Cadets, the move was a very good one.

The meeting was followed by films from Navy Public Relations and the evening ended with refreshments and supper.

The office bearers for 1983-84 are:

President: Captain L. F. W. Vickridge, OCE, VRD, RANVR (Rtd); **Vice-Presidents:** Mr A. Bancroft, Mr A. Hewitt, JP; **Secretary:** Mrs G. Hewitt; **Treasurer:** Mr A. Hewitt, JP; **Committee:** Ldr J. Johnson, MBE, RAN (Rtd), Mr T. Vincent, Mr J. Steele, Mr M. Munro, Mr D. Cleak, Mr E. Hawkins, Mr G. Rogers, Mr E. Josling.

The new Navy League crests are now available from the WA State Secretary at a cost of \$11.60 each.

Supplies of the crests are available from: Mr Ray Pearce of Townsend Productions, PO Box 53, Berowra, NSW, 2081. Tel: (02) 455 2281.

'ADA' 1897 TO 1983

by Coral Waghorn

In the year 1897 the ADA was brought to Western Australia from South Australia by Johan (Charley) Schumann on the deck of the coastal steamship INNAMINCKA. ADA had three owners prior to this time and was purchased by Johan Schumann for the grand sum of £45.

She was thirty feet in length and was built from New Zealand kauri pine, with the stem, stern and post made from spotted gum. The

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sails were made from a coarse cloth known as duck; these sails always presented a problem to early sailors because they would become mouldy very quickly and would deteriorate rapidly. The fishermen would usually dip the sails into a tan solution that was made from wattle bark, to retard the mildew. After any rain the sails would be raised and dried to delay further the effects of mildew.

ADA was built fine in the bow section with a very thick stern and in her very early years, before she was modified, a baler was always aboard to keep her hull free of water. In strong winds, under sail of spinnaker she tended to pitch-pole (put her nose into the wave) and then broach. Consequently (because of her very low planking) she would take on considerable amounts of water.

ADA was used for net fishing the shallows in her earliest years with fine catches of pilchards, cobbler, herring, skipjack and red mullet taken. On occasions fishermen would drop the centre plate, instead of using an anchor, while hand-winch the net over the side. During this process she would ship some water over the lee side, due to her being so low wooded.

In the early 1900s Johan Schumann (a former Port Diver who worked on building the Princess Bridge in Victoria), used ADA to transport stores and mail across the Kalgan River prior to the building of the Kalgan Bridge.

The Kalgan River channel, being very narrow, required special skill to navigate this area. The stores and mail run were accomplished by ADA once a month and was the only link that some of the early settlers had with outsiders. On one such mail run John Alfred Hartman accompanied Charley Schumann aboard the vessel and had the pleasure of meeting Mr Phillip Affleck, a recluse known to be a remittance man. Mr Affleck later returned to England, supposedly to take on the title of Lord Affleck, but not before he discovered opal-bearing rock in the Albany area.

Charley Schumann raced ADA in the inaugural meeting of The Princess Royal Sailing Club on Monday, 15th November, 1909. She started in the 22 foot and upwards class on the scratch mark and was placed second in the race. Charley Schumann, along with his eldest son Jack, continued to race in events held by The Princess Royal Sailing Club for many years.

Having fished and sailed successfully from ADA for close on nineteen years, Charley Schumann sold her to Leon (Jack) Livesey in 1916 for £136.

In the early years of his ownership Leon Livesey fitted a single-cylinder petrol engine into the vessel.

Mr Fred Swarbrick remembers first being aboard ADA in 1918-19. His father borrowed ADA from Leon Livesey to transport their goods and chattels from the town to Emu Point, the site of the Swarbrick's family home. ADA was loaded in the harbour, just in front of where the old gaol stands.

Fred Swarbrick's family bought the ADA from Leon Livesey in the winter of 1935. At that time she was equipped with a single-



cylinder Regal engine and also sails. Mr Swarbrick remembers fishing out of the ADA for ten years, sometimes during mighty storms, but there was never cause for alarm as she was a remarkable old boat with a very thick stern and fine bow section. "People said we should have sailed her the other way around," says Fred Swarbrick, "but we were very proud of the ADA and particularly pleased with her performance."

Around 1944-45 Fred Swarbrick sold the vessel to Newton Sharp, a local fisherman, who continued to fish out of her for about two-and-a-half years. At this time she was still equipped with the Regal motor and sails.

On Tuesday, 11th June, 1946, Fred Swarbrick was fishing out of the ARIEL at the back of Migo and Stuart Islands when he noticed that the ADA had been washed ashore with a part of her hull broken out.

The beaching of ADA was reported in the Albany Advertiser on Thursday, 20th June, 1946, as follows:

Memories of notable yachting contests on the waters of Princess Royal Harbour and King Georges Sound are revived by the news that the 30 foot auxiliary yacht ADA has gone aground at Torbay as a result of recent heavy weather. The ADA, when owned by Mr Jack Schumann, participated in many contests and scored some memorable victories.

The reason ADA had been washed onto the beach was because one fluke had been cut from each anchor, to prevent the chains fouling them. This allowed ADA to tip her anchors over in heavy weather and drag them.

Newton Sharp sold the beached wreck of ADA in 1946 to Jack Livesey Jnr (nephew of a former owner, Leon Livesey) for the sum of £80. Jack arranged for Lionel Austin and his sons Geoff and Stan to salvage the vessel and bring her back to Albany.

This they did by hauling her up over the hill

away from the beach on skids and rollers. Two tractors were used in the salvage operation, one an English Fordson and the other a Farmait. ADA was eventually brought back to Albany, where she was fitted with new planks and ribs. When all repairs had been carried out on her, Jack Livesey valued her at £450.

Jack Livesey of Napier owned the ADA for only a short while and on one occasion had some difficulty navigating the Nornalup Inlet. He appeared to have run aground on a sand bank, so Tom Swarbrick, who was on board at the time, offered to push the vessel off and pilot her up to Rest Point. However, when he jumped over the side he was surprised to find himself in about eight feet of water. Apparently the centre-board had come free and had dropped into the sand.

It was towards the end of 1948 that ownership of the vessel passed on to Mr Pat McBride. Charley Jackman and his son Bert leased the ADA from Pat McBride for two years around 1948-50. The Jackmans fished from her in Princess Royal Harbour, mostly seine fishing, and continued to use McBride's mooring inside the Town Jetty. Pat McBride used her for pleasure fishing before selling the ADA to William Westerman Smith.

The new owner, a Kendenup farmer, used the vessel for pleasure fishing during his summer holidays and weekends spent at Middleton Beach. According to his son, Charles Westerman Smith of Mount Barker, ADA had a four-cylinder Rugby Continental petrol engine in her at the time of their ownership. This was probably installed for his father by Lionel Austin. At about this time the bow sprit was removed from ADA.

In the early 1960s, while Len Mellowship owned her, the Austins again worked on the ADA, this time fitting an Enfield two-cylinder opposed diesel motor into her. Len had the ADA for many years before selling her to Ron Armstrong in 1972.

During this period ADA's Engiel engine was reconditioned for pleasure fishing around Michaelmas and Breaksea Islands.

From 1975 to 1980 ownership changed another three times. Finally, in 1982, Jim Burton of Elleker relinquished ownership of the ADA in favour of the Naval Reserve Cadets of TS VANCOUVER. At this time she was moored at Emu Point in fairly shallow water and here she remained afloat for some time before sinking at her mooring.

ADA remained under water at her mooring for four to six months. The Naval Reserve Cadets attempted to raise her in the summer of 1982-83, but unfortunately this attempt failed.

The vessel was eventually raised in April 1983 when large drums were attached to her and filled with air from a surface-based compressor.

After having endured 15 owners ADA is at rest on land at Emu Point. The Naval Reserve Cadets and Staff of TS VANCOUVER have undertaken to restore her, however a lot of assistance will be required before she is once again seaworthy.

For over a century ADA has been a fine, even somewhat remarkable sailing craft and it will be a memorable day when once again she sails on Princess Royal Harbour.

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The people who read The Navy magazine will already have an interest in the sea or some aspect of maritime affairs; some will be interested in the Royal Australian Navy and naval events in general, others in sea cadet training and activities. A minority of readers will be members of the Navy League of Australia, which is very much involved with the maritime world.

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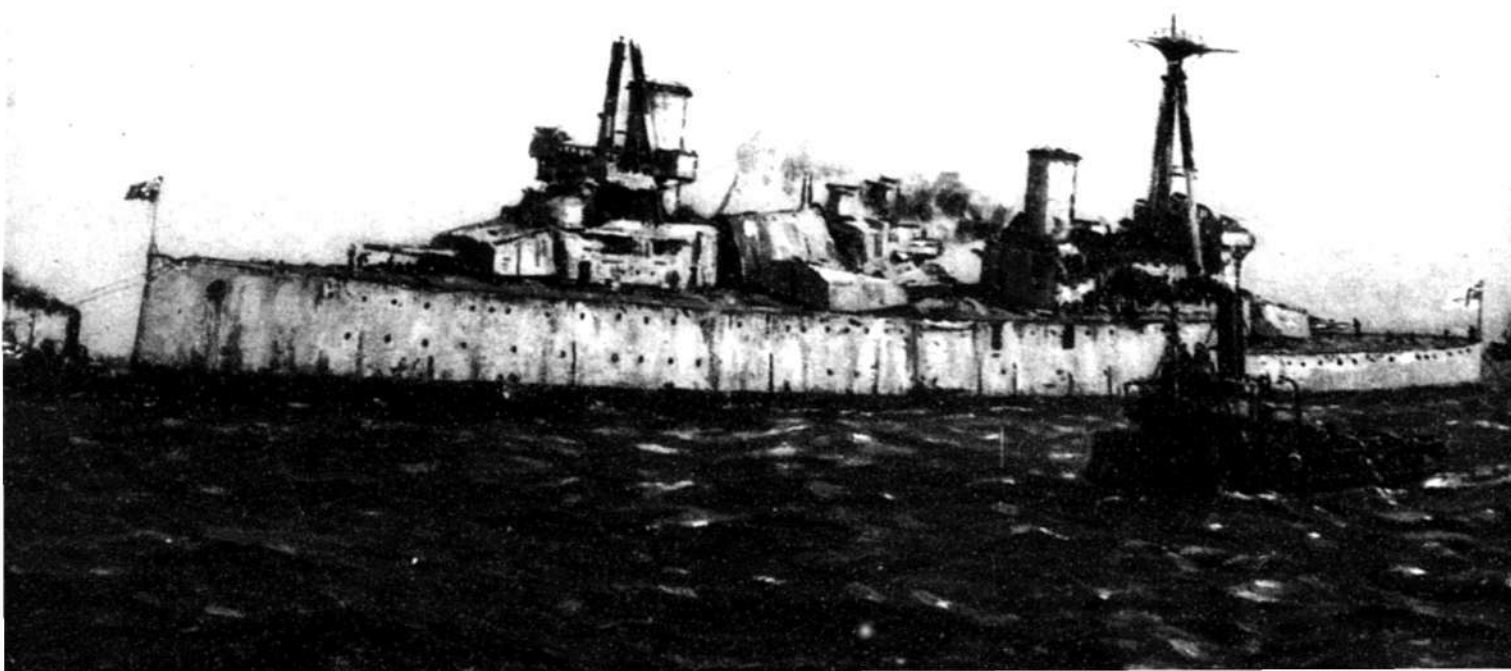
- (1) To keep before the Australian people the fact that we are a maritime nation and that a strong navy and a sound maritime industry are indispensable elements of our national well-being and vital to the freedom of Australia.
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THE NAVY



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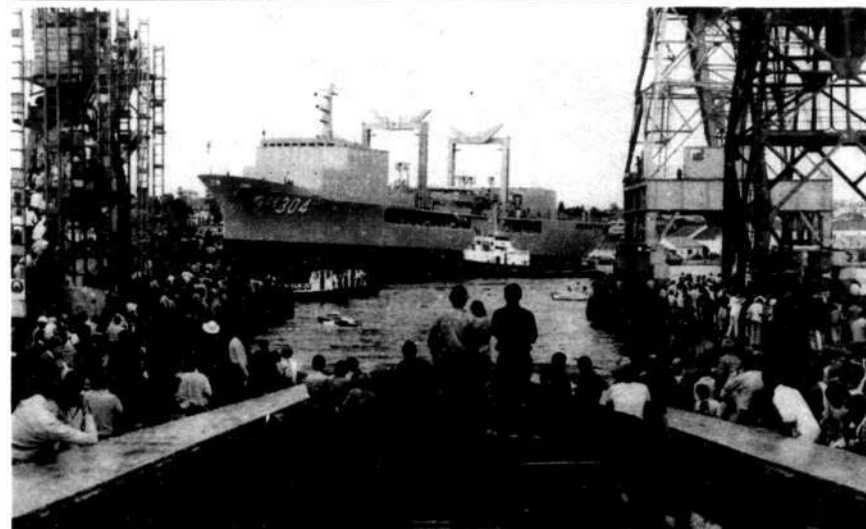
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SUCCESS, 3rd March, 1984. Photo — ABPH Steve Burton

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Looking Ahead

Your true character is revealed on the outside of your head. At least that's what the phrenologists of old believed.

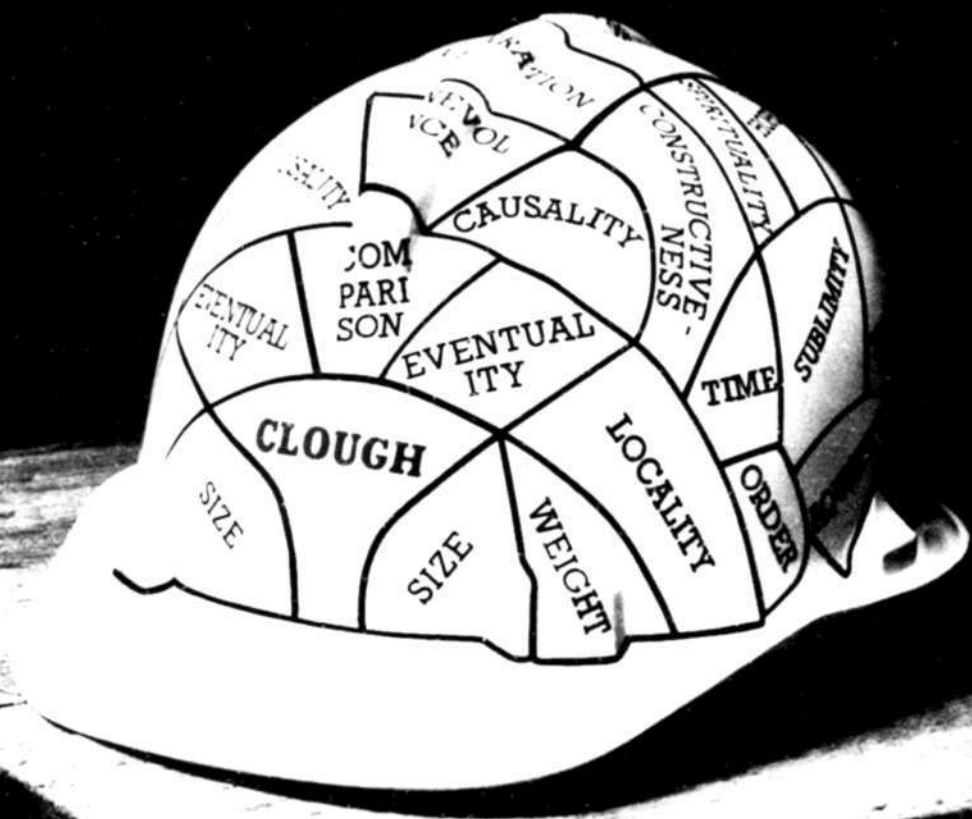
Later more learned theorists were to look inside but although their viewpoints differed, what they were seeking didn't.

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THE EDITOR'S COMMENTS

This issue contains a well balanced selection of articles, both topical and historic.

Contributors continue their special look at possible futures for the RAN Fleet Air Arm. The article, The Royal Darwin Navy, is reprinted from the new book by John Leggoe, "Trying to be Sailors", pictorial illustrating VOYAGER serves as a reminder to a past tragedy.

The RAN's versatile multi-purpose combatant HMAS TOBRUK is off to a "flying" start in 1984. Following an intensive maintenance period in Brisbane during December and January, TOBRUK has once again demonstrated her versatility in assuming the role of the Fleet aircraft carrier.

Tasked with transporting seven Wessex helicopters from RAAF East Sale to Jervis Bay, the LSH proved more than equal to the challenge. With the assistance of a Chinook heavy lift aircraft from RAAF Amberley the grounded helos were airlifted onto TOBRUK, despite the untimely intervention of some typical Victorian weather.

On arrival at Jervis Bay the Chinook again combined with the ship's aviation team to man the Wessex back to Albatross. Just five days after TOBRUK sailed from Brisbane the seven helicopters were safely back in their home base.

TOBRUK arrived in Sydney in mid-February to embark Army amphibious craft for exercises in New Zealand. Two 68-tonne LCM8s and six LARCs then journeyed to Garden Island on February 20. The landing craft were hoisted aboard via her 70 tonne twin derrick while the amphibious vehicles drove into the ship's tank deck through her stern ramp. The ship sailed from Sydney the next morning for the voyage across the Tasman.

At the present time many people would rightly claim that the heavy landing ship is the most versatile vessel in the RAN today.

In the three years since first commissioned TOBRUK has played a prominent role in maintaining the Defence Force's aviation expertise. In her short but busy life the ship has successfully logged in excess of 3000 deck landings by Chinook, Iroquois, Wessex and Bell 206 helicopters. These operations are only one facet of the ship's operational capabilities but there is no doubt she can justify her claim to the presently vacant title of "Fleet Aircraft Carrier".

DEADLINE

THE DEADLINE FOR THE JULY ISSUE IS 1st MAY, 1984

CONTRIBUTORS

In this issue of The Navy I would like to thank A. D. Baker III, John Bowler, Michael Burgess, PO Steve Dent, Geoff Evans, Peter Farr, ABPHOT Simon Freeman, Dennis Hursey, Tom Jackson, John Jepperson, Vic Jeffery, Charles Lammers, John Leggoe, Charles Mann, Michael Melliar-Phelps, John Mortimer, L-SPHOT Peter Simpson, LIEUT Joe Straczek, RAN and Len Vickridge.

COVER PHOTOS

Bottom — "Her Last Voyage": The battlecruiser AUSTRALIA, painted by Charles Bryant on the occasion of her ceremonial scuttling, 12th April, 1924. (Courtesy of the Australian War Memorial)

Top: HMAS TOBRUK — Fleet aircraft carrier. (Photo — RAN)



Mr Hayden's belated but necessary announcement of foreign policy on the Indian Ocean Littoral was welcomed throughout Western Australia.

Too long has this State, which is a third of Australia, been neglected, as each successive Government opted for no policy at all, rather than face up to spending money to update our maritime defence. The Western Australian Naval Base in Cockburn Sound, South of Fremantle, waited from 1909 for building to commence on Garden Island in 1969.



HMAS Stirling. (Photo — RAN)

The concept of HMAS STIRLING becoming an intermediate maintenance support base for one destroyer and four submarines is yet to be realised. It does not look like being achieved until 1990 or later on the present indications. The latest news is there is doubt as to whether a second destroyer will be home posted here.

What our Government should do immediately is to start planning and expediting a two-ocean maritime policy with the emphasis on building up the Western coast defence. This is where any threat in the future will come, out of the Indian Ocean. It is no longer good enough to leave the maritime defence of the Western coast to US Naval forces working in Indian Ocean Littoral. We learn from the final report of the Forty-third Anzus Treaty of April 1983 that we stated that we are responsible for regional defence. What is not clear is what constitutes the area of the region which we consider we are responsible for. Australia must appear to be working alongside the forces of the free world in the Indian Ocean area where thirty per cent of its oil passes through, and through which most of its exports and imports are shipped. No longer do we see the possibilities of a Defence Free Zone being possible as it could have been before the build up of Russian support bases in Massawa, Dahlak, Ethiopia-Socotra and Aden in the Red Sea. India and Vietnam now are also assisting in logistic support to Russian ships and long-range aircraft from Cam-Ranh Bay and Da Nang.

Mr Hayden's foreign policy of co-ordinating aid programmes and of ships' visits is good policy but to expect one destroyer escort, HMAS STUART, to be adequate in showing that Australia is interested in this region is impossible. Western Australians will not feel secure until they know the Commonwealth Government is genuine in attempting to right the neglect of decades by providing sufficient ships and submarines at HMAS STIRLING and give those ships adequate air cover when patrolling beyond the limits of land-based planes. Defence must be tailored to the needs of the defence of the nation, not to the depth of our pockets.

L. F. Vickridge

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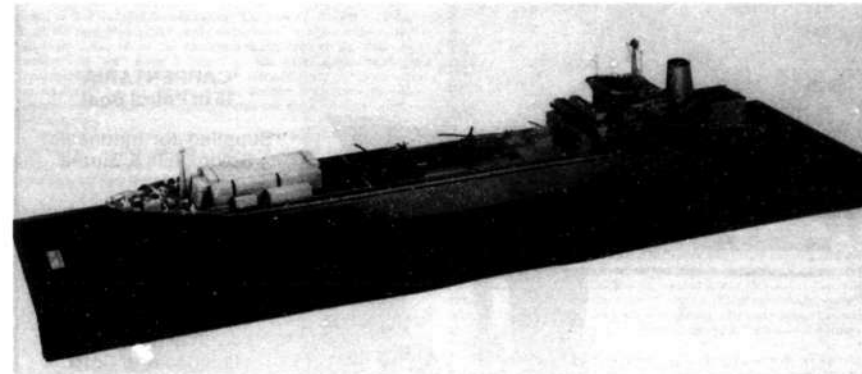
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SUPPLIERS TO THE DEPARTMENT OF DEFENCE SUPPORT AND THE ROYAL AUSTRALIAN NAVY

The Conversion of MV Astronomer to RFA Reliant



Model of RFA RELIANT.

by JOHN BOWLER, Bristol Aerospace

AS part of the British task force to recapture the Falkland Islands the container ship "Astronomer" was converted to operate helicopters. The Royal Navy has now selected the ship for a long-term conversion for the same role and designated it RFA "Reliant".

During operation "Corporate" in the South Atlantic, the Royal Navy chartered and requisitioned some 58 ships: these ranged from the much publicised and ill-fated Atlantic Conveyor, to the humble stern trawlers modified for the less glamorous minesweeping duties. One of the ships requisitioned for carriage of Harriers and helicopters to the Falkland Islands was the MV "Astronomer".

Up until that time "Astronomer" was owned by the Charente Steamship Company of Liverpool, England and operated by T. & J. Harrison. The ship is 204m in length and 27,867 GRT. Its fully cellular design is capable of carrying 872 TEU containers below deck, the

majority in four holds forward of the main superstructure. The 120m of relatively uncluttered deck area over the forward holds was used to provide the ship with a take off/landing pad for the aircraft and helicopters, and a protected area forward of this formed a rudimentary hangar and workspace. The conversion for the Falklands crisis took place in Devonport Naval Dockyard and was one of the longer conversions for operation "Corporate"; nine days in all. However, the flight deck was only a simple welded structure, and the hangar made up from containers for the side walls and centre support and a plated roof. Very few of the facilities to enable aircraft operations were provided. The primary role of the ship at that time was to transport aircraft to the battle zone for deployment from "Invincible" and "Hermes".

Following the return of the "Ships Taken Up From Trade", or STUIT ships as they became known, the Royal Navy made a decision to select a vessel from trade which could be modified for more permanent duties with the fleet in the role of a helicopter support ship alongside one of the carriers. This would mean that AEW (Airborne Early Warning) and ASW (Anti Submarine Warfare) tasked helicopters could be deployed and maintained from this ship and allow more fixed wing aircraft to be carried by the ski-jump equipped aircraft carriers. After some deliberation the ship selected was the ex-STUIT MV "Astronomer" which had since reverted to commercial duties. For reasons of convenience and to save some time, it was decided to take up an offer first made by the United States during the Falklands crisis to lease the prototype equipment which had been designed for the "Arapaho" project. Briefly, the United States Navy had funded development of the prototype equipment to provide an ISO (International Standards Organisation) compatible modular flight deck and hangar to operate their own ASW helicopters from commercial vessels in times of crisis.

The "Arapaho" modules which had been manufactured and put to sea for a two-day handling and deck landing trial consisted of deck units sufficient for a 200' x 64' flight deck and a 100' x 40' hangar which was fully enclosed and could be comprehensively equipped for helicopter support and maintenance. This provided a two-landing spot deck and hangar capable of housing four Sea King-type helicopters: nicely matched



MV ASTRONOMER before her acquisition by the British Defence Forces.



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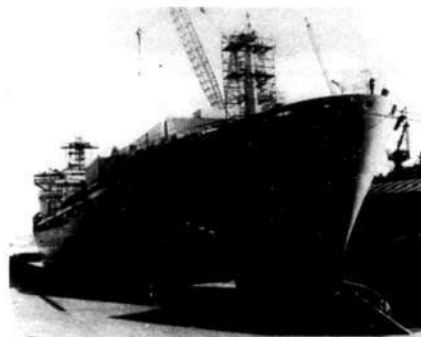
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to the requirements of the Royal Navy and to the size and general arrangement of the MV "Astronomer". To this basic equipment, ie the flight deck and 18 40' containers for the hangar, it was planned to add some sixty additional containers. These were to be for the fuel farm, accommodation, magazines, weapons, stores and generators. Also, one hold was to be devoted to naval stores so that the ship could operate as an RFA (Royal Fleet Auxiliary) for dry provisions and air stores supply to other ships. When fitted to MV "Astronomer", the layout would be similar to that installed for operation "Corporate": hangar immediately aft of the bow fairing and newly constructed breakwater; two-landing spot flight deck; aft of this the naval stores hold giving access to all containers in that hold; adjacent to the main superstructure the accommodation and services block for 120 additional naval personnel, and finally aft of the superstructure, another accommodation block purpose built to merchant ship standards for the RFA crew who have civilian status.

A factor which may have influenced the Royal Navy's choice of "Astronomer" is that the ship is equipped with its own gantry crane which can lift containers from the dockside, move them around on the upper deck and into the holds.



RFA RELIANT during conversion, late 1983.

The conversion itself has been handled in a very simple way. The flight system and essentially all work forward of the main superstructure has been the responsibility of British Aerospace; and the modifications to the ships' structure and the aft RFA accommodation has been the responsibility of the Cammell Laird yard of British Shipbuilders. This work has been carried out under contract to the Royal Navy. The shipyard has been a sub-contractor to British Aerospace for ship work associated with the flight system, with 12 other major sub-contractors providing the majority of the 60 additional containers required to make the prototype "Arapaho" equipment into a fully operational system. The dual status, military/civilian, of the ship has meant that specifications for services, accommodation and safety aspects have had to meet both Royal Navy and Lloyd's maritime standards. This situation would not occur if a future ship were taken up purely for naval duties and made a permanent addition to the fleet.

Because the ship is not being deployed on a campaign or crisis basis, care and time have been taken to design the containerised systems for long-term deployment. This has meant for example that the aviation fuel tanks have been built to fit into the hold cell guides and are three times the height of an ISO tank container. For equipment designed to be easily transportable for a rapid installation, a matrix of interconnected ISO tank containers can be used. For this role a ship must have been previously identified and prepared and could then be fitted in about 48 hours. The "Astronomer" conversion is not of this type although the modular systems and containers themselves are the same in most cases. A deliberate feature of the British Aerospace design for either type of system is that the ship should undergo only the minimum of preparation consistent with the needs to strengthen hatch covers and cell guides, make suitable connections to sea water intake and exits, and improve the fire-fighting and damage control capability of the vessel.

The work has been completed over a period of six months, this time being more dependent on the availability of dockyard resources than an indication of the actual work content in converting the ship. The



View of the main deck of RFA RELIANT during her conversion to a helicopter carrier.

containers were manufactured and fitted out away from the ship and were not on the critical path dictating the overall timescale. At each stage containers have been available when needed at the dockside and installed virtually complete. It is this type of routine fitting out which normally takes up the majority of dockside time during refit and has been avoided by the strict adoption of ISO compatible units for the major elements of the system.

From "Astronomer" in April, 1983, the ship is now transformed from a commercial containership to a military vessel able to operate and maintain five Sea King-type helicopters.

This has been achieved at a cost which although difficult to quantify, is clearly only a fraction of the cost of building a new or conventionally converting/refitting an existing ship.

A one-time STUFF merchant ship, the MV "Astronomer" has become the RFA "Reliant".

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BATTLECRUISER AUSTRALIA

12th APRIL, 1924

"The Anglo-Australian squadron has as its flagship the AUSTRALIA which, by itself, is an adversary so much stronger than our squadron that one would be bound to avoid it."

Admiral Von Spee, in a letter to his wife, August 18, 1914.

An international treaty ordains that AUSTRALIA must be utterly destroyed.

There must be left no trace of armour, hull or guns that might be of use in a period of hostility and to faithfully carry out the terms of the contract AUSTRALIA is to be sunk but the traditions she established as Australia's mighty ship, our first flagship, will remain.

Today a broken, battered thing went from foremast to stern, dismantled, dispoled of her brass embellishments, bereft of all the grace and glamour of the halycon pre-war days the AUSTRALIA recalls the brilliant day of sunshine and the early days of October 13 when she majestically entered Sydney Heads at the head of the Commonwealth's first fleet. She was the object of wonder and amazement to hundreds and thousands of sightseers throughout the Empire and indeed throughout the civilised world.

Its entry to these shores evoked a patriotic enthusiasm exceeded in wholeheartedness only in the testing days of war and amongst the well-



HMAS AUSTRALIA arriving Melbourne. (Photo — C. Lammer)

Many a lingering visit in silent sadness was paid yesterday to AUSTRALIA. They were by no means official visits. The British naval man is not of the make which carries his heart on his sleeve, but every officer and man cherishes deep regard for his old ship. It is by no means surprising that there was a rush of volunteers for the naval party which is to accompany HMAS AUSTRALIA to her sinking place. It was stated on Garden Island yesterday that a large number of naval ratings and officers volunteered for the work, but a very happy selection was made by those in high command. It was decided that only men who had served on AUSTRALIA would be eligible and so 15 Petty Officers and Stokers with long service on the vessel were chosen for the work. The party had a hard afternoon's work in making the necessary preparations for today's business and last night they slept on MARGUERITE. They will be called at a quarter to five this morning and will be ready on the ship long before dawn has broken.

At noon yesterday the contractors who had assumed the work of scrapping AUSTRALIA left the ship and although a naval working party was aboard until after 5 o'clock the work of ruin was completed. Since the beginning of January 24 two shifts of men had been working on the vessel which obsolete and all that she may have been, still retained her noble appearance, though bereft of that neatness and business-like appearance which the British nation is accustomed to view with proud



AUSTRALIA completing at Clydebank. (Photo — C. Lammer)

wishers of the Australian Government's policy to obtain the ship were the other British dominions.

From Canada the Prime Minister said: "The Government, on behalf of the people of Canada tender their sincere congratulations on the occasion of the reception of the battlecruiser AUSTRALIA and the cruiser SYDNEY. Be assured Canada stands shoulder to shoulder with Australia and the other overseas dominions in the firm resolve to safeguard our common heritage."

The Prime Minister of New Zealand sent the following message: "The arrival of the Australian fleet in Sydney Harbour is an occasion historic in the annals of the Empire. New Zealand admires and congratulates the Commonwealth of patriotism and self-sacrifice of its people in assisting the Empire by undertaking the heavy burden of the so splendid contribution towards the naval events of the southern seas. Australia may well be proud of the substantial mark of nationhood that New Zealand looks forward to an early opportunity of welcoming the fleet to its shores."

When the ship arrived in Sydney she arode in magnificent grace and beauty, 19,200 tons of massive grandeur, the biggest warship that has ever entered Sydney Harbour. "The sight of her revealed the nation's dreadnought in all her beauty and majesty, no longer a thing to be looked at on a printed page, but a living sentient thing whose mission is to guard our shores and protect our commerce and trade routes. We do not look upon her as standing for war but for peace, a peace which comes by being prepared for war. That broad built of steel armour seven inches thick whose great 12 inch guns 50 feet long hurl 860 pound shells through the air at a rate of something between 2000 and 3000 feet a second carrying death in their train remind us what terrible engines of destruction they are."



HMAS AUSTRALIA's picket boat. (Photo — C. Lammer)



In Farm Cove, 1922. (Photo — RAN)



Laid up in reserve, Farm Cove, Sydney, 1922. (Photo — RAN)



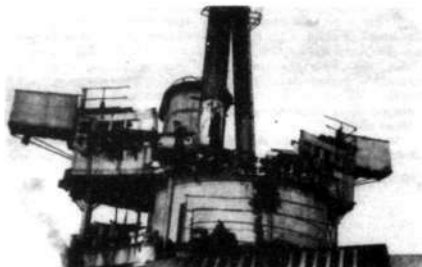
Being dismantled under the old sheerlegs, Garden Island, 1924. (Photo — L. Forsythe)



12th April, 1924. AUSTRALIA commences her last voyage under charge of civilian tugs. Her masts have been cut down. (Photo — RAN)



Another view of the battlecruiser off Garden Island. (Photo — RAN)



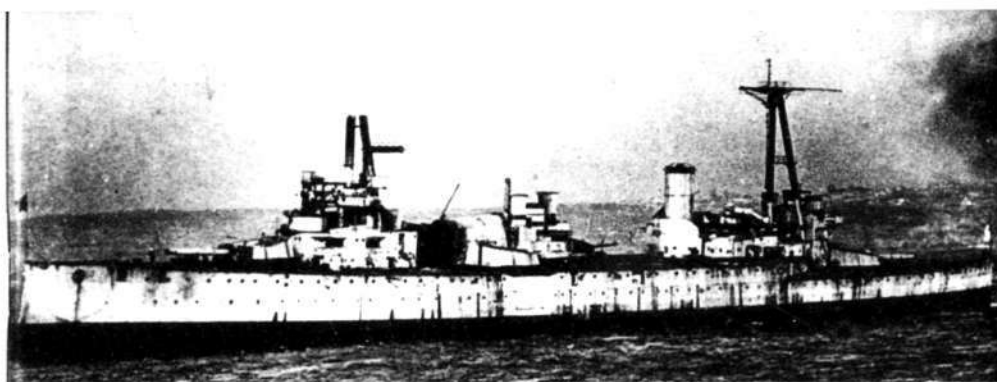
Floral tributes attached to her mutilated bridge. (Photo — S. T. Bridge)



Scuttling party aboard the old flagship. The ship has just passed Georges Head. (Photo — S. T. Bridge)



As she passed through Sydney Heads additional lines were attached to the tugs CHAMPION and ST GILES. (Photo — L. Forsythe)



Port broadside view showing the havoc wrecked as a result of the Washington Naval Treaty. (Photo — RAN)



Both the National Flag and White Ensign are clearly visible in this view as AUSTRALIA is towed into the open sea. (Photo — RAN)

approval in its men of war. Now every semblance of the majesty which the battlecruiser once commanded in the Pacific had passed, she is nothing more than a wretched mass of rusting iron.

Alongside the AUSTRALIA yesterday morning were the steamer GABO, a couple of lighters and the giant floating crane TITAN. In January last she was sold for a mere £3000 to a syndicate which undertook to scrap her. A glance from her decks, down upon that of the TITAN alongside, offered a small glimpse of what had been taken from her. There was an array of boilers, pumps, winches, portion of her steel top mast, hawsers, ventilators, solid shields, dynamos, boilers' drums and tubes, a propeller with only three blades, great lengths of piping and a host of fittings that go to make up a fighting ship.

On her main quarterdecks there was a scene of devastation. Her eight 12-inch guns still point fore and aft, but they are no longer guns. The oxy acetylene flame has cut the barrels half through in the middle and just enough remains to keep the barrel rigid. The barbettes have been cut through by the keen teeth of the flame. Portions of the tops have been lifted away and dropped down gaping holes cut through her decks of steel. In order to hasten her sinking when the end is at hand, below the decks themselves have been cut in all directions.

When the AUSTRALIA was a fighting unit, she was so constructed that there were about 500 complete compartments in her. It was impossible to walk any distance along any deck below and it was necessary in many places to come right up from below at one point to descend again to another part below. By cutting great holes through the decks and compartment walls the whole ship has been opened up and it is possible to see to the bottom of the former engine room. Down these holes has been thrown all the steel parts which have been torn from the upper portion of the ship and for which there was little use to the salvagers. Looking down one can only see dimly a hopeless tangle of debris. The huge fighting top which came from the foremast lies over the top of the gaping hole. On the starboard side of the quarterdeck

amidships and on the port side, is secured the mid funnel, which lies bruised on its side.

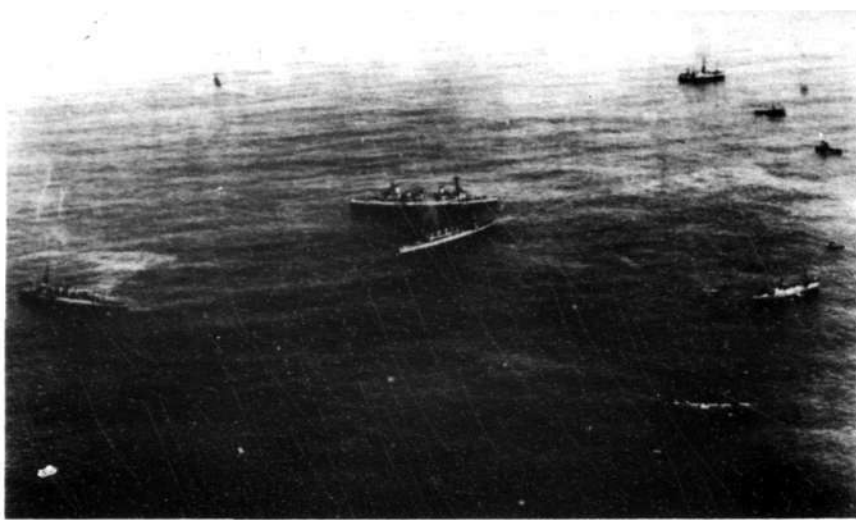
Below the former position of the funnel had been thrown three spare 12-inch guns. All the heavy moveable parts which were left by the contractors were moved towards the holes in the decks and dropped down yesterday afternoon. Among the remnants were some 12-inch projectiles of solid steel weighing 1200 pounds. These were rolled to the edge and tumbled over. Hurling headlong in their downward flight they often struck a projecting portion of the lower deck, throwing off great sparks while coursing onward to the bottom where they stopped with a roar sending a hollow rumble through the lower galleries of the ship. From the



Some of the scuttling crew leaving their mark. (Photo — RAN)



A cinemaman aboard AUSTRALIA films the final highlights as one of the accompanying cruiser's boats approaches to take off the last men. (Photo — RAN)



AUSTRALIA (centre top) is surrounded by other units of the RAN, civilian steamers and tugs just prior to her scuttling. (Photo — G. Lammer)

main deck as the wind whistled through carrying a cloud of wood paint and small metal chips to the deck below it was possible to survey desolation. Her decks were stripped of their former wood encasing and covered with small heaps of wooden chips and here and there the wind had piled up tangled heaps of oaken. Over her bows was a small length of anchor chain and aft of the main top, wood and rubbish was piled to a height of 20 feet of the forefunnel.

It was shortly before 8.00 am when the BRISBANE passed through the Heads. Behind her with funeral slowness some distance off came the



The scuttling charges are blown and the ship begins to list to port. (Photo — RAN)

AUSTRALIA. The tugs at last pointed her towards the Heads and she came slowly through. One tug was straining at her right ahead, another was on the port side and another on the starboard bow and the other was on the port quarter. She had a slight list to port. The little tugs were constantly manoeuvring her along her final course. She seemed almost reluctant to leave the Heads and go out to sea. She was making little or no progress. She was just swaying about from side to side.

At 9.00 am the Heads were still clearly in view. The BRISBANE was only two or three miles away from them and right in the rear of the four tugs was the once proud flagship of the RAN. Through the morning mist at about quarter past 9 o'clock, DELHI could be faintly seen inside the Heads. The DELHI as she majestically passed was saluting the Australian flag flying from the old AUSTRALIA. If the AUSTRALIA had been able to speak she would have returned the salute. But she was noiseless, she was helpless, so the BRISBANE spoke for her. She rattled out at five second intervals 21 booming, thunderous guns from her broadsides. Then the stage was re-cast for another brilliant picture. The flagship of the



Most of the accompanying ships, like the cruiser MELBOURNE shown here, remained in close proximity to the event. (Photo — J. Thomson)

RAN MELBOURNE, who in which the Prime Minister Mr Bruce was a guest for the ceremony, the ADELAIDE and the ANZAC flying for the first time the new navy port flag came into the scene.

It was five minutes past 2 o'clock at a spot 24 miles from the Heads due east and at 150 fathoms the tugs cast off their lines from the



Starboard quarter view of AUSTRALIA with MELBOURNE (left) and ADELAIDE (centre). (Photo — H. Cliff)



The sea has now reached her main deck. (Photo — RAN)



... and she begins to roll further to port. (Photo — RAN)

AUSTRALIA. Round her were the ships of the Royal Australian Navy and behind them the sightseers on the crowded steamers. Two aeroplanes dived overhead. On the decks of BRISBANE and the other ships everyone stood at attention. All eyes were fixed on the doomed ship. Her last moments had arrived. In that scene there was something deeply stirring. A signaller was semaphored from the AUSTRALIA.

It was at 19 minutes past 2 o'clock with open sea cocks when the second boat left AUSTRALIA. Then came the final message at 2.31 pm. It read everything is open. She was alone rolling helplessly with a list to port. A great explosion shook her, as Captain Crawford, waving his hand in signal, clamoured over the side, the last to leave her. A hole had been blown in the bottom of the hull forward. The men on the BRISBANE manned the guns for the plunge but the old ship seemed in no hurry about it. She was going to her death gracefully and in a manner becoming a great ship. Then the end came.

The sea poured like a cataract into a gaping hatchway on the deck.

Around the remaining funnel rose a great cloud of black smoke. There was a long warning rumble then a roar and she turned completely over. Only her bottom showed above water, like some monster of the deep and then that disappeared too as she dived gracefully out of sight stern first. It was nine minutes to 3 o'clock. A great column of water shot up from her from one side and on the other side the sea spouted up and made impressive cascades. A sharp salute of guns at five second intervals was fired by the BRISBANE. AUSTRALIA was no more.

The sinking of the AUSTRALIA permanently recorded as a reminder to us of the place that she occupied in our life and of the incalculable debt that we owe to her. From the BRISBANE, not only an army of pressmen and photographers recorded the scene but artists were also at work.

(Reproduced from The Sydney Morning Herald and Sydney Mail, 14th and 15th April, 1924 editions respectively.)



AUSTRALIA has now rolled 90 degrees. (Photo — R. Hart)



... and is lost from sight. (Photo — R. Hart)

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The Type 2400 is not only a **strike** weapon - it can also offer **forward long-range reconnaissance and surveillance** it can pose a **hidden and lethal threat** as a **deterrent** and provide a **close defensive mode** for own-ship protection. The British Type 2400 diesel-electric patrol class submarine has been developed to fulfil the above roles as a replacement for the now ageing Oberons of the Royal Navy. It is designed for long life - well into the 21st Century. Vickers have offered an even more powerful variant of the Type 2400 to the Australian Government, who are currently considering this in relation to future RAN needs.

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For further information please contact Mr. T.E. Brinkley,
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The order on VSEL
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THE TYPE 2400

— A New Patrol Class Submarine

AS nuclear-powered submarines (SSNs) began to join the British Royal Navy in the 1960s the Fleet planners inclined to the view that the very successful "Oberon" class of conventional or diesel-electric submarines (SSKs) — which had then just come into service — would be the last of their kind. All future boats would be nuclear-powered, since the operational advantages of the SSN — the "true submarine" capable of operating indefinitely under water — were so marked.

However, the use of nuclear power in submarines involves large displacements, high capital and through-life costs, and heavy demands on training, support and logistic facilities. Operational experience showed that the SSK, in addition to being much cheaper to build, man, operate and maintain, had the advantages of being more silent running and more suited to use in shallow waters. Although the SSK lacks the submerged speed and endurance of the SSN it is better suited for surveillance/reconnaissance duties and in the important context of training the SSK provides better, more demanding, target simulation for ASW forces generally.

It became evident that the nuclear submarine and its diesel-electric counterpart had complementary roles to play in the Royal Navy, both for peacetime tasks and in the event of war. Excellent though the Oberon has proved to be, the design was that of the early 1950s and although it had been updated there had been many developments in submarine technology in the years that followed.

With these facts in mind, in the mid-70s an Outline Staff Requirement was drafted for a new SSK for the Royal Navy. During this period Vickers Shipbuilding and Engineering Limited (VSEL), who were collaborating with the Ministry of Defence in the ongoing SSN programme, had continued to develop their own range of diesel-electric submarines for export, and had built six SSKs (including three Oberons for Brazil) for overseas customers.

The operational requirements of the world's navies vary widely, but market assessments indicated that navies with long coastlines to patrol, or who needed a full ocean-going capability, would require a new, larger class of SSK.

From discussion and increasingly close collaboration between the Ministry and VSEL (as a part of British Shipbuilders since nationalisation in 1977) the Type 2400 design has emerged. As Table 1 shows, the boat has a submerged displacement of 2400 tonnes — the same displacement as the Oberon. However, it is not merely an updated Oberon — it is a new class of diesel-electric submarine designed to meet the requirements of the Royal Navy for several decades to come. VSEL, with the full approval of the British Government is able to offer variants of that design to meet the operational requirements of navies such as those referred to above — for example Australia and Canada.

With the expectation that there will be at

least ten boats in the RN Type 2400 class there are clear advantages in keeping the RN version and export variants as similar as possible. However, differences in the operational requirements of overseas customers, and hence in design, are inevitable. Flexibility of the design is a feature very relevant to export potential and, where practical, alternative machinery, equipment, weapons and sensors will be introduced to meet the potential customer's requirements.

DESIGN DEVELOPMENT AND SUPPORT

With the collaboration and co-ordination already mentioned there has also been an extension by the Ministry of delegation of responsibility to Industry. Responsibility for design development was handed over to VSEL, who were also awarded the contract as Weapons Co-ordinating and System Design Authority. Included in that contract is the construction at Barrow of a comprehensive Shore Development Facility (referred to later), progress on which is now well advanced.

In the design process much use has been made of the CODEM system (Computerised Design from Engineering Models) which VSEL has developed intensively in recent years. Sections of the boat are modelled to 1/5th scale in perspex and other plastics, accurately and in considerable detail, providing a design tool that is used to optimise the arrangement of all the components and eliminating the need to produce elaborate drawings beforehand.

Table 1 — Some Comparative Data

	SSK (Oberon)	SSK (RN 2400)	SSN (Trafalgar)
Length overall (metres)	90.0	70.25	85.4
Beam (metres)	8.1	7.6	9.8
Submerged displacement (tonnes)	2410	2400	5200
Tubes	6	6	5
Submerged speed (knots)	(+ 2 stern)		
Complement	17	about 20	more than 25
	68	44	98

Sections, not exceeding a 2-metre cube, are then examined using a three-dimensional optical measuring system which enables data to be taken off the model. This is processed, via a micro-coder and associated computer systems, to print out isometric drawings for pipe production, parts lists, etc. The system is being developed for similar use on mountings, cabling and ventilation ducting.

Through-life support is a vital element in successful operational performance. In the Type 2400 Design Contract awarded to VSEL by the Ministry it was stated that:

"It is a requirement that the shipbuilder must give due priority to through-life support of the vessel during the design stage."

The VSEL Support Department embraces such activities as Technical Aid, Configuration Management, Lead-Yard Services and, more specifically Submarine Support. The Type 2400 Submarine Support Group comprises a number of qualified engineers, with various backgrounds, dedicated to the through-life support function, each taking individual responsibility



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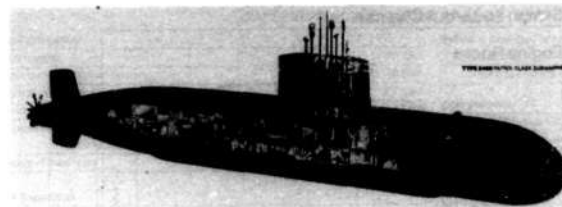
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Type 2400 patrol class submarine.

for an allocated number of systems and areas of the boat.

Involvement in availability and maintainability reviews during the early stages of design development ensures that the product is engineered to be supported in its operational environment. Engineers are responsible in their specific areas for initiating agreed procedures to cover upkeep policy, equipment identification, importance codes, documentation, etc.

The VSEL objective is, at the completion of build, to have a boat designed to be easily supported and to have that support available to the customer at hand-over.

The Support Group at Barrow maintains the Master Record (Data Base) Submarines, using a dedicated IBM System 38 mini-computer. The system can offer on-line options, standard format print-outs common to the RN fleet and some specific to submarines. A prospective customer would have the option to purchase all or part of a relevant package to run on his own System 38.

THE HULL OF THE 2400

Modern detection techniques and associated weaponry dictate that a submarine must avoid surface running by carrying out transits and patrols either snorting or submerged. Contemporary hulls are, therefore, designed for optimum performance under water. The adoption of single-skinned hulls with a high beam-to-length ratio, as in the Type 2400, enables good manoeuvrability and facilitates two or more decks, with a direct benefit to useful deck area.

The pressure hull is fabricated from high tensile steel and is of circular section, stiffened by internal high tensile steel frames. The forward and aft ends of the pressure hull terminate in dome bulkheads, as shown.

The forward and aft external structures are constructed from high quality steel, except for

the forward portion adjacent to the sonar array, which is of grp. The forward structure houses No 1 and No 2 main ballast tanks, the water transfer tank (part of the torpedo discharge system), the external portions of the torpedo tubes, the main passive sonar array, the anchor and cable, and the mooring arrangements. The torpedo tubes pass through the upper region of No 1 ballast tank emerging into the forward free-flood space. Torpedoes are discharged via independently operated bow shutters, contoured to the shape of the bow.

The aft external structure forms the boundaries of No 3 and No 4 main ballast tanks. The extreme aft end is free-flooding and contains the bearings, shafts and operating gear for the rudders and aft hydroplanes.

The bridge fin is constructed of grp on a steel support structure. It is of streamlined form and houses the masts, periscope upper bearings, etc, as well as providing a forward navigating position.

A steel keel extends for the full length of the pressure hull — its primary purpose is to provide a flat surface for operational bottoming and docking — but it also provides easily accessible stowage space for growth and stability ballast.

INTERNAL ARRANGEMENTS

Within the pressure hull the space is divided into three main watertight compartments by two transverse bulkheads. In the two forward compartments there is a two-deck arrangement, the aft compartment having a single deck. The allocation of these spaces is shown in the diagram.

Three hatches give external access to the forward compartment, for torpedo embarkation, battery loading (and general access) and the third forms part of the forward escape position. The No 1 deck level of the compartment is the torpedo stowage space, with the six torpedo tubes penetrating the

forward dome bulkhead. Stowage is provided for twelve 21-inch reload torpedoes. The No 2 deck level contains accommodation, the sonar console space and torpedo-tube operating equipment. Most of the space below that deck is occupied by the No 1 (forward) battery compartment.

The No 1 deck level of the centre section houses the Control Room, Communications and ESM offices and the CO's cabin. Two hatches give external access — one forward leads into the five-man escape chamber in the fin (shown in the diagram) and provides access to the navigation position. The other hatch, at the rear of the compartment, is the primary personnel access hatch and is also used for battery loading. The No 2 deck level provides the auxiliary machinery space and a continuation of the forward accommodation spaces. Below this deck is the No 2 (aft) battery compartment and various tank installations.

The aft compartment houses the main propulsion machinery, other machinery associated with the propulsion and power requirements, and air conditioning units. The space is actually divided into two by an acoustic/thermal bulkhead — the main propulsion-motor room aft and the engine room as the forward part. Oil storage tanks are underneath. The aft trim tanks are built into the aft dome space.

An important feature is the provision of a main machinery shipping opening in the pressure hull above the engine room. This is large enough to enable diesel engine removal with a minimum of dismantling. The engine room serves as the aft escape compartment, with a one-man escape tower located in the propulsion-motor room.

The lock-out chamber, already mentioned, is provided for use by divers when the boat is submerged. Inflatable dinghies and other equipment can be carried in a streamlined container which can be attached to the superstructure just behind the bridge fin. DSRV docking seats are fitted round the hatches of the two escape towers.

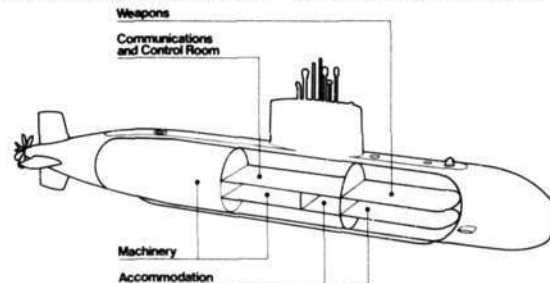
COMPLEMENT AND ACCOMMODATION

Crew numbers have a significant bearing on through-life and training costs, and by full attention to ergonomics, automation in machinery spaces and integrated fire control, substantial reductions in crew numbers have been achieved. The normal complement is seven officers, 13 Senior ratings and 24 Junior ratings — a total of 44, compared with the requirement of 68 for an Oberon — representing a reasonable balance between economy and safe, efficient manning during extended patrols.

Accommodation is provided for a maximum of 46 and by submarine standards is of a high order. The CO's cabin is adjacent to the Control Room, on No 1 deck, the Crew being accommodated on No 2 deck. Every officer and rating is provided with his own bunk and personal stowage space, and, separate from the sleeping quarters, the Wardroom, Senior and Junior ratings' messrooms provide reasonable eating and off-duty facilities.

MACHINERY AND POWER SUPPLIES

The single, fixed-pitch propeller is driven by a twin-armature electric motor sited in the aft



THE NAVY

section of the pressure hull and separated from the diesel generators in the engine room by the thermal acoustic bulkhead. Propulsion power is provided by two separate battery banks, which are charged by the diesel generators. Using appropriate series/parallel combinations for motor elements and battery and field control gives a continuance speed range between 20 and 100% approx. Below 20% a separate motor generator is used to supply the propulsion-motor armature. Particular attention has been given to maintaining high efficiency over the entire speed range.

There are two high-speed 16-cylinder mechanically supercharged diesel engines each coupled to an AC generator of approximately 1.25 MW output. The generators have in-built rectification providing the electrical power for charging the batteries when snoring or on the surface. Noise and shock attenuation is achieved by supporting the d.g. sets on resilient mountings.

The electrical systems may be considered as two parts, which share common battery and charging arrangements. One part is primarily concerned with propulsion and one with auxiliary and weapon services. The supply systems are at battery voltage, at 440 V 60 Hz three-phase (transformed to lower voltage as necessary), at 115 V 400 Hz, three-phase and single-phase, and at 24 Vdc. Supplies are configured to provide high integrity, and dedicated supplies are provided where this is considered necessary.

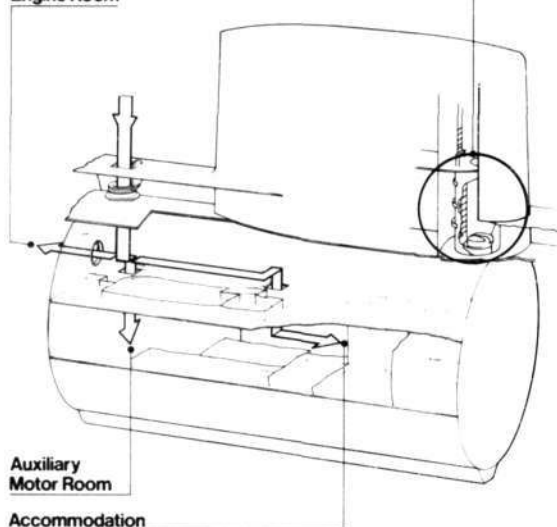
CONTROL AND INSTRUMENTATION

The need to reduce manpower, coupled with recent progress in remote control, indication and monitoring techniques, have resulted in the incorporation of significant improvements in ship and machinery control and instrumentation.

Remote control for most, and monitoring of all, ship and machinery control systems is centralised, the main aims being (1) to reduce the overall watchkeeping effort to a practicable minimum, (2) to ensure a high degree of efficiency and safety in the control systems, and (3) to produce ergonomically-designed control console arrangements — so as to co-

5-man Lock-out Chamber

Engine Room



Auxiliary Motor Room

Accommodation

ordinate ship and propulsion control, minimise operational error, and enable all ship and emergency operating procedures to be conducted safely and efficiently. The resulting watchkeeping structure is headed by the Second OOW, responsible for ship and machinery control.

An integrated control suite is the cornerstone of the centralised control, indication and monitoring concept. It comprises —

Systems Console (Control Room).

Machinery Control Console (Motor Room).

One-man Control Console (Control Room). In the event of remote control and/or monitoring failure, sufficient local instrumentation and controls are provided to enable safe plant operation, using additional watchkeepers if necessary.

A comprehensive monitoring system which is essential to centralised control is fitted, and it includes an efficient alarm annunciation and warning capability. Parameters directly associated with plant and submarine safety are monitored by the "hardwired" alarm system. Each channel consists of a sensor directly connected to a dedicated alarm indicator and a common audible warning. If a hardwired alarm is initiated, immediate remedial action is required.

Less important parameters are monitored by a comprehensive surveillance system. This is regarded as a second-level system, and its failure will not endanger the safe operation of machinery or the submarine.

WEAPONS AND SENSORS

The standard armament of the RN Type 2400 provides an effective weapons payload and this is complemented by a very sophisticated sensor kit. The six weapon tubes at the forward end of the torpedo stowage compartment are each capable of accommodating a range of 21-inch diameter weapons, including dual-purpose wire-guided heavy-weight torpedoes, antiship air-flight guided missiles and submarine mines.

Depending on the weapons mix the magazine space in the torpedo stowage compartment will accommodate up to 12 full-length reloads carried on special shock-mounted pallets and the associated handling system permits rapid

Main Parameters

Length overall	70.25m
Length between perpendiculars	70.25m
Length of pressure hull	47.55m
Outside diameter of pressure hull	7.6m
Displacement, surface (diving trim)	2180 tonnes
submerged	2400 tonnes
Reserve of buoyancy	10%

Tank Capacities

Main ballast tanks (90%) (blowable)	234m ³
Fresh water tanks (including distilled water)*	24m ³
Oil fuel tanks (usable)	214m ³
Lubricating oil tank	9m ³
Compensating tanks	55m ³
Trim tanks	36m ³
HP air tanks (at a pressure of 276 bar)	7m ³

* Distillers are fitted and are used to replenish the fresh water supply.

Construction

Pressure hull	steel
External structure and tanks	generally steel
Superstructure and bridge fin	steel and glass-reinforced plastic

Propulsion Plant

Main propulsion motor	4000kW
Propeller	1
Diesel generator sets	2
Maximum output per diesel	1350kW
Main battery	2, with 240 cells each
Weight of each 240-cell section (including connectors)	135 tonnes

Performance

Design diving depth	Over 200m
---------------------	-----------

reloading. Weapon embarkation and handling is power assisted.

The low noise emission qualities of the Type 2400 make it an excellent sonar platform and full advantage is taken of this, as is indicated in the list of principal particulars. The sonar suite provides long-range passive detection and analysis, using hull-mounted, passive, active and intercept sonars; passive bow sonar, capable of simultaneous LF and HF band operation, with adaptive processing channels to provide good target discrimination under adverse operating conditions. Simultaneous automatic tracking of several targets is possible, with digital data transfer to the Action Information Organisation (AIO).

The optical search and attack periscopes are electronically controlled and provide bi-ocular observation, range estimation, and are fitted for photography. An advanced ESM system uses the periscope antenna and there is also a special ESM antenna on its own mast. The ESM system provides multi-target detection and analysis, with high bearing accuracy. Radar provides target range and bearing at periscope depth and general navigational assistance.

The Action Information Organisation/Fire Control system has a multiple display with a high computer capacity — matched to sensor capability. Two computers are provided, either of which is capable of driving the maximum data handling load. Three display consoles are provided, but the system can operate using only one. A large-scale tactical auto-plot is also provided.

TABLE 2: PRINCIPAL PARTICULARS OF THE RN TYPE 2400

Speed: submerged (maximum)	About 20 knots
snoring (maximum)	Over 10 knots
surface (maximum)	About 12 knots
Complement	
7 Officers, 13 Senior Ratings and 24 Junior Ratings	44
Accommodation available	46
Communications	
Wireless communications include MF, HF, VHF and UHF, all of which can be transmitted and received when the submarine is surfaced or at periscope depth.	
Sonar	
Bow array	Expendable bathythermograph
Passive ranging	Echo sounders
Sonar analysis	Cavitation measuring
Flank array	Emergency underwater telephone
Underwater telephone	Beam pattern test equipment
Depth, sound, speed-measuring	Message format generator
Periscopes	
Search Periscope	Attack Periscope
Radar	
Scanner on retractable mast in the fin	
ESM	
Antenna on retractable mast in the fin	
Armament	
Six weapons tubes are fitted, and can accept a range of weapons, including:	
Dual-purpose wire-guided heavyweight torpedoes	
Anti-ship air-flight guided missiles	
Submarine mines	

A digital data bus to Mil Stan 1553 B is fitted, to cater for the extensive and complex flow of data between sensors, the AIO and the fore end. A dual redundant bus provides high integrity in the data transmission system with a minimum of wiring between equipments.

A semi-automatic plotting table, linked to the data bus, has its own built-in processor. Other navigational aids include Omega and Decca systems, compasses and an electro-magnetic log.

As already mentioned, the Weapons Department of VSEL have been contracted by the Ministry to undertake the duties of Weapons Co-ordination and Systems Design Authority, including the establishment of a Shore Development Facility in which weapon/sensor integration and the data bus system can be proved, and problems solved, at an early stage in the programme. This facility can also offer early crew training.

SUMMARY

Diesel-electric submarines — "conventional" submarines — will continue to serve important roles in maritime operations. Costs apart, there are certain circumstances where no other vessel — not even the nuclear submarine — can be as effective. Market assessments show that countries with long coastlines to defend and countries which require a full ocean-going capability need a new class of conventional large submarine. The Type 2400 has been developed to meet this need and is expected to meet the requirements of navies in various parts of the world.

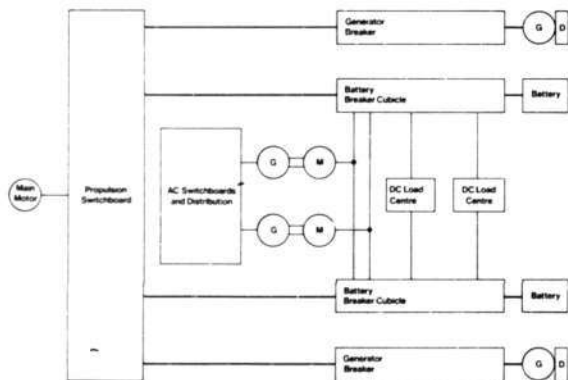
Designed in close association with the Royal Navy, the Type 2400 will have a submerged displacement of 2400 tonnes and, within the confines of its hull, can accept a wide variety of weapon fits, fire-control systems and communications equipment to meet the varying needs of different customers.

An entirely new design, the Type 2400 represents an extension of technology derived from the continuing VSEL nuclear submarine building programme for the British Royal Navy, combined with expertise gained from the design and building at Barrow of more than 300 submarines, over a period of 80 years, for the RN and overseas customers.

For customers requiring variants of the RN Type 2400 the whole spectrum of support services can be offered by VSEL, in consultation with the UK Ministry of Defence, and as in the case of Australia, a scenario based upon local industrial participation in building can be discussed.

The placing of long-lead orders for the first-of-class RN Type 2400 anticipated the announcement of its formal order at the beginning of November, 1983. Since then it has been confirmed that the boat will be named "Upholder" — restoring to the Fleet one of the most famous submarine names of World War II.

For conventional submarines the Type 2400 sets new standards in habitability, reliability and operational availability, and is expected to provide an exceptional patrol submarine facility well into the 21st Century — one worthy of the name "Upholder".



THE VERSATILE SHIP



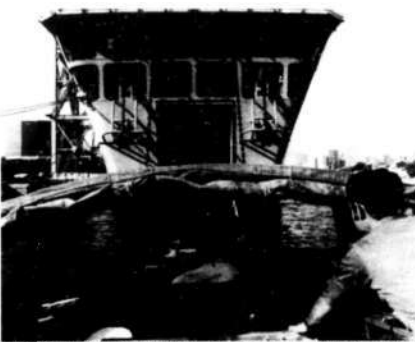
The fleet's new aircraft carrier at East Sale. (Photo — D. Hursey)



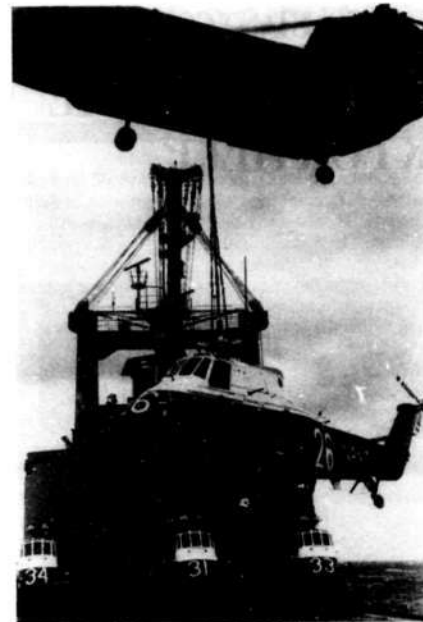
An RAAF Chinook heavy lift helicopter arrives with the first Wessex for transport to HMAS ALBATROSS. (Photo — D. Hursey)



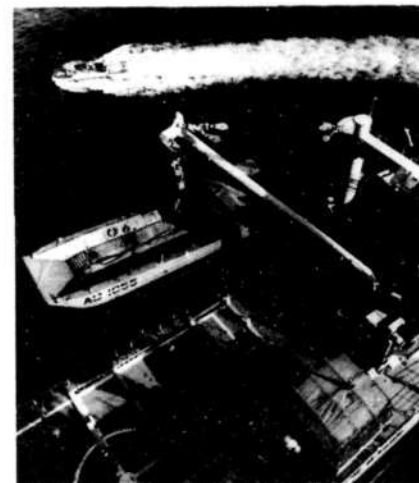
Placing the landing craft in its cradle is a combined effort of transport personnel and the twin derrick. (Photo — ABPHOT Simon Freeman)



Driving a LARC onto the stern ramp of the heavy landing ship and into the tank deck. (Photo — ABPHOT Simon Freeman)



Another view of the loading. Three of the helicopters could be carried across the deck. (Photo — D. Hursey)



Hoisting an LCM 8 aboard HMAS TOBRUK. (Photo — ABPHOT Simon Freeman)

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C66BYCA
April, 1984

PLANNING A DEFENCE FORCE

by GEOFFREY EVANS

Admiral Sir Anthony Synnot, Chief of Defence Force Staff from April 1979 to April 1982, is widely recognised in Australia and overseas as an outstanding Armed Forces leader and an exceptionally clear thinker. At a time when the direction of Australian defence policy is increasingly being questioned it is appropriate to re-examine the text of a surprisingly little-publicised address he gave in July 1981 to the National Party in Townsville on the many considerations involved in deciding the composition of a Defence Force.

Admiral Synnot commenced his address by stressing the need for a basic defence policy acceptable across political party boundaries — "defence is too costly and too complicated to be subject to the vagaries of party politics" — and supported by the community at large.

The Admiral then expressed his views on the factors to be considered in the practical business of determining defence objectives and structuring a Defence Force: —

"The Defence policymaker has to avoid being either over-optimistic or over-pessimistic; he may learn from past trends but he must do more than speculate on the future. He has to weigh up possibilities and likelihoods against risks. In essence he has to be practical and realistic about a very complex subject.

IDENTIFICATION OF INTERESTS

"To start with, one needs to identify principal national security interests. Examples might be the maintenance of sovereignty over one's own territories, the unimpeded flow of trade, the protection of off-shore resources, the avoidance of global war and of nuclear proliferation, and the reduction of tensions in one's region.

"Defence policy should then flow from a country's strategic circumstances. It is necessary therefore to develop strategic guidance covering political, economic and military circumstances, and perceived trends. As background to this, a searching intelligence assessment will be required even though its forecasts are bound to be limited in time compared to the long time-span of Defence planning.

THREATS

"We must decide whether there is now, or foreseeably, a major threat or threats. I would like to remind you of what are generally accepted as the two basic elements of threat. First capability — until and unless a potential enemy has the military capability he cannot be a military threat. Capability can be subject to assessment and there are limitations on how quickly any country can increase that capability. The second ingredient is intention; this can change very quickly. It will be more a matter of judgement than assessment to determine a potential enemy's intentions.

"Australia could become involved in a

variety of possible conflicts which might range from global conflict or disruption of our trade at the higher end, to raids on our coastal areas or disputes in our off-shore resources zone at the lower end.

"An assessment of 'no single likely contingency' or 'no single identifiable direct threat' indicates that emphasis should be given to acquiring and developing versatile capabilities; also at a time of no major direct threat, long lead-time equipments and skills will be more important than short lead-time ones.

"For contingencies more distant in time, one should have in one's Defence Force ingredients which can be expanded to the level needed within the likely warning time. Nevertheless one will always need to be able to deal with lesser tasks which could arise with little or no warning.

"On the other hand a clearly identifiable or developing threat would indicate a requirement for a higher state of operational readiness — for much trained manpower, in-service equipment and a logistic organisation with plenty of stocks on the shelves.

ENVIRONMENT

"One should then look at the enduring features of one's environment to make sure that one ends up with a Defence Force appropriate for the neighbourhood one lives in. To give some Australian examples: there are enduring geographic features, such as we live on an island with no land frontiers; there are enduring economic features such as the dependence of our country on trade and on overseas supplies; politically we are in the western camp and likely to remain there; demographically we have a small but technically sophisticated population. These and many other enduring features should help us in deciding the characteristics of our Defence Force.

ALLIANCES

"We also need to look at the influence alliances may have. Alliances may help to share the burden if one is under threat; but one must be careful to assess just how much one can rely on an alliance because one's ally could be preoccupied elsewhere in time of need. Our principal alliance is the ANZUS Treaty. This is



Admiral Sir Anthony Synnot.

a collective security agreement but it does not guarantee one's security. I suggest it would be reasonable to expect the United States to come to our assistance if there were a fundamental threat to our existence; but there could be many other occasions when we might be expected to, or might have to, deal with lesser but nevertheless very demanding situations on our own.

"I should point out here that in addition to direct security aspects, many important practical advantages flow to Australia from the ANZUS Treaty. These include exchanges of information in various fields such as intelligence, defence science, weapons technology, military tactics and operational procedures; it also gives us an opportunity for exercising with high technology forces.

DETERRENT AND DEFENSIVE STRATEGIES

"Apart from all the considerations so far, it is necessary for Government to decide on its broad military strategy. Will it depend on a deterrent strategy or a defensive strategy, or what mix of each? We have heard about deterrence but I think it is important to understand what I mean by a deterrent strategy in the non-nuclear arena. I refer to the generally accepted military definition of deterrence which is 'to prevent action by fear of the consequences. It is a state of mind brought about by the existence of a credible threat of unacceptable counteraction'.

"For a deterrent strategy to be effective, a potential enemy must be convinced of one's will to retaliate offensively and of one's capability to inflict serious damage. To do this one needs offensive forces capable of exploiting enemy vulnerabilities — I say offensive rather than aggressive as there is an important difference. I make the point here that modern conventional weapons systems give better potential for deterrence than used to be the case. One should also realise that a deterrent strategy based on retaliation is unlikely to prevent low-level contingencies occurring, although it should serve to limit escalation.

"The alternative of relying on a defensive strategy may be more attractive to countries

where there are large reserves of manpower, and where the costs of buying and maintaining complex offensive weapons systems may be beyond their means.

"In any case it is worth remembering that it is better, and more economical from every point of view, to deter war rather than to plan on winning it after it has started.

SELF-RELIANCE

"We need to decide on how much self-reliance is necessary and practical. Self-reliance can be expensive. I suggest that, being a long way from our friends, Australia should have a good degree of operational self-reliance; by that I mean the ability to operate for a period of time without having to rely on support from others. In saying this it should be appreciated that it is really only the super-powers that can hope to be self-sufficient in equipment development, manufacture and support; even they have problems with supply of some strategic raw materials. To be self-reliant in operations I believe we need the ability to re-supply our forces for a given period of time, to manufacture high usage items, and to maintain and repair weapon systems in inventory.

"Self-reliance must not allow us to overlook the importance of being able to operate effectively with the Defence forces of friendly countries. It is important that we continue to make a conscious effort in this respect, this will involve combined exercises.

TECHNOLOGY

"Changes in technology bring changes in operational concepts and even in the form of warfare. For instance in recent years there has been what might be described as an electronics revolution. There have been great advances in computer technology, data processing, micro-circuitry and fibre-optics. This has made possible the production of high-capacity, light and reliable equipment; equipment which is small enough to be of practical use in weapons systems. However we must not overlook the software problems and significant support costs which may be involved with such new equipments.

"Today one aircraft with precision guided weapons can do the work of perhaps ten aircraft with free-falling bombs. In the maritime strike role we are introducing the Harpoon anti-ship missiles, a fire-and-forget weapon, which can be used effectively from aircraft, surface ships and submarines against surface targets well beyond the horizon.

"Consideration must therefore be given to the level of technology we should seek. Good arguments can be made for modern technology where a saving of manpower is important and where it can reduce early obsolescence in equipments. It can however be expensive in initial capital cost and sometimes in support costs also. I believe Australia is well able to make good use of modern technology, but when I talk of modern technology I wouldn't want you to think necessarily of high complexity — there is a difference; and often there is an advantage in simplicity.

MOBILITY, ENDURANCE

"We should look at the degree of mobility required in our Defence Force. I. a country the size of Australia with a numerically small Defence Force we need to rely on a high degree of mobility as it would be impractical to garrison so many important places. Just how



Many equipments have been ordered years before they can be brought into service.

much of this mobility is to be achieved by air, land and sea transport is a matter for discussion. In any case, even though nowadays we have a very significant capability in civil transport, some specialised military transport will be necessary.

"The degree of endurance sought will be influenced by our geographical environment. For instance a long radius of action will undoubtedly be important for operating over our vast land and sea areas, whereas for other countries high performance, rather than great endurance, may be more important.

ELECTRONIC WARFARE

"Increasing emphasis nowadays needs to be given to electronic warfare. This does and will continue to affect all forms of warfare — for instance by rendering sensors of weapon control systems ineffective, or by disrupting communications.

"While modern command systems have the potential of allowing a commander to control military activities effectively from a distance, they depend on high quality communications. The possibility of disruption to communications emphasises the importance of commanders at all levels being trained to use their initiative, and to fight the battle intelligently in accordance with broad directives and well understood doctrine.

MANPOWER

"In mentioning the importance of initiative, a talk of this nature would be incomplete without emphasising the importance to a Defence Force of trained manpower. This of course encompasses not just the Regulars but also the Reserves. The problem is not so much one of numbers, but rather whether they are thoroughly trained in current weapons systems and modern tactics. The complexity of military systems now calls for more intensive training and regular exercising than used to be the case.

"Personnel should have a sense of purpose

and an understanding of the importance to national security of their tasks. There is no substitute for sound leadership and good morale. The serviceman will continue to be the most important single factor in the effectiveness of any Defence Force.

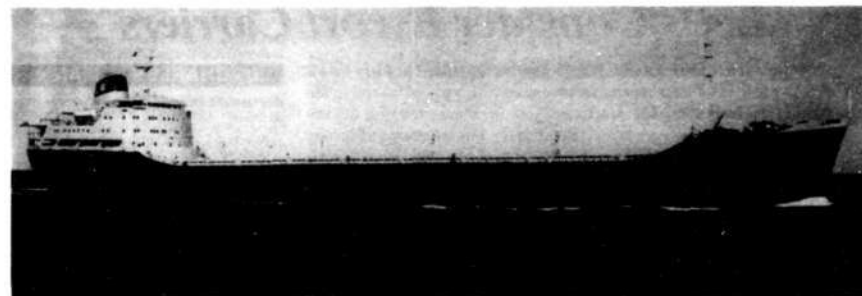
"In the past there was a tendency for the land, sea and air forces to operate in peacetime with a high degree of independence. More than ever before one must recognise the importance of interdependence; the various Arms of the Defence Force must learn to operate closely together in peacetime. In significant maritime and land operations one just cannot foresee one Armed Service operating independently of its sister Services. I might add that much has been done in recent years to develop joint Service doctrine and procedures for use by Australian forces.

PROCUREMENT

"The procurement of equipments and the expansion of our Defence Force in peacetime is necessarily a slow and deliberate process. The process is not susceptible to sudden or temporary budget increases; it demands a sustained commitment of resources. Many equipments have to be ordered years before they can be brought into service and new skills take time to develop. In peacetime the procurement process may seem slow, but it has to be conducted in a way that is acceptable to the taxpayer and his watchdogs.

FORMING THE POLICY

"In summary, in formulating a Defence policy one should first decide one's national interests; then assess the strategic circumstances; identify the degree of threat, potential or otherwise; and assess enduring features of one's environment; one should then decide on one's military strategy and broad operational concepts should flow from this. One must then proceed to plan the structure, size and characteristics of the Armed Forces;



At the higher end of the conflict ... disruption of our trade.

and to consider the part that civil infrastructure, industry, research laboratories and other Defence-related bodies might play. This may sound simple but in practice it is very complicated."

The Admiral expressed the opinion that: after taking all factors into account there was no one specific threat against which the Australian Defence Force should be tailored:—

"Australia is open to quite a wide range of potential threats, and, the further one looks ahead the less clear the threat situation becomes. This points to the need for a versatile Defence Force which can be expanded in a number of different ways to meet a range of possible major threats which could develop in the future. Such a Defence Force would

nevertheless have many elements which Government could use to meet Treaty or peace-keeping obligations further afield. I might mention a factor here — it is often wiser to peacekeep far from home, such as in Namibia, than close to home, such as in Kampuchea."

The Chief of Defence Force Staff concluded his address by referring to a range of initiatives taken by the Government to increase Australia's defence preparedness, initiatives undoubtedly spurred by the Soviet Union's invasion of Afghanistan and a deteriorating situation in Kampuchea.

For a short time it appeared that Australia was on the way to creating the balanced and versatile Defence Force so clearly seen to be necessary, a Force that would provide, in

Admiral Synnot's words "a very reasonable measure of insurance against uncertainty in a troubled world." Only too soon however the Coalition Government was cancelling or deferring many of the initiatives it had so recently announced and set in train a decline in the effectiveness of the Defence Force which the incoming Labor Government, far from arresting, accelerated with a hasty decision involving the Fleet Air Arm, and subsequently introduced economy measures.

Regrettably a basic defence policy "acceptable across political boundaries ... and supported by the community at large" seems a long way from realisation at the present time. It is a tragedy for Australia that this should be so at this stage in our history.

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INSERTED IN THE INTERESTS OF AUSTRALIA'S DEFENCE

Let's Consider Escort Carriers

On 17th December, 1903, Orville Wright had hardly landed at Kitty Hawk NC (USA) when naval men began experimenting with ways of marrying the airplane to the battleship. The Americans were the more successful but the Royal Navy was the more audacious.

In January, 1912, Lt Charles Samson (RN) flew a Short (S-27) biplane off the foredeck of the (obsolete) battleship AFRICA while the ship lay at anchor. Later in the month he landed beside HIBERNIA, was hoisted on board, and flew off while the cruiser steamed at 10½ knots.

Figure 1 shows a rare photograph of this event. The photograph was originally published in 1916 in a book entitled "Colliers Pictorial History of the Great War". Lt Samson also performed the same feat from the cruiser LONDON still later in the month.

Following Lt Samson's achievement the Royal Navy launched efforts in two separate directions. Britain was concerned, by this time in World War I and wanted to bomb targets in Germany. But the RFC also wanted to be able to launch land-type aircraft that could attack Zeppelins at altitude.

The Royal Navy initially developed the sea-plane tender. Ships of this type could transport and recover aircraft of high wing loading for bombardment of targets such as Friedrichshafen. They also experimented with specially designed aircraft carriers for the second purpose. These played little part in the 1914-1918 war but the pattern was set.

The little 600ft carriers such as ARGUS (1917) and HERMES (1919) gave way to FURIOUS (735ft — 1916) and EAGLE (1918). Later, as the Americans got into the act, carriers got bigger and more costly until they reached the massive sizes of World War II.

At this point in time the allies began to realise that a second type of carrier was needed for protection of mercantile convoys. The new type carrier did not need 80-100 aircraft and massive defensive armament. It only needed 10-12 aircraft and a few A-A guns.

The success of these "vest-pocket" carriers

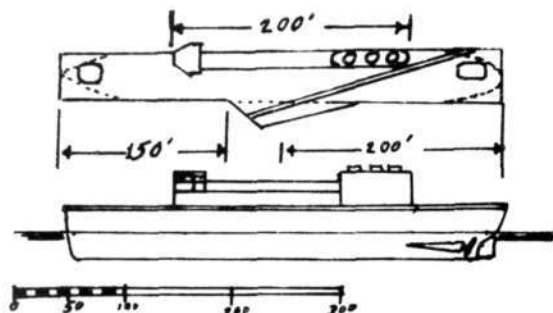
is (now) history. Also shown was the fact that even fewer than 12 aircraft could do the same job well. Those critical days of the U-boat war still have important messages today.

Most significant of all is the fact that there must be two distinct breeds of aircraft carrier. The first is the "Imperial" or "Fleet" type which is typified by USS ENTERPRISE and HMS HERMES. Carriers such as these are designed to support both attack, assault and

by CHARLES H. MANN

they demand. A small "carrier" is more than adequate.

Assume a "carrier" such as the sketch:—
LOA: 400 ± 5ft.
Displacement: 10,000-12,000 GWT (approx).
Machinery: 50,000-60,000 SHP.
Max Speed: 25 ± 3 knots max; 15-18 knots cruising.
No of aircraft: 3 or 4 (max).
No of helicopters: 5 or 6 (max).
NOTE: Aircraft may either be catapult launched or may be VTOL types — optional.



A possible escort carrier design.

battle. Only four nations — US, England, France and Russia — have any use for such mastodons.

All other nations of the world are mercantile or trading nations with no empire to (ever) protect or reconquer. They only require a low-cost, mercantile-naval, presence to do the job

Designed Cruising Range: 3500 nautical miles.

Personnel: 150-175 men.
Armament: To be determined.
A carrier of this sort is fully adequate for convoy and anti-submarine work. It would cause absolutely no stir in an "Imperial" fleet or off a "sphere-of-influence" port. Also, the cost of such a "carrier" would be little different from that of an FFG frigate.

The small or vest-pocket carrier is a deadly weapon against submarines. It is ideal for convoy or mercantile defence. Such a weapon, working with either small patrol craft or hydrofoils, can readily provide long range coastal defence as well.

The small carrier can carry and launch as many as 10-15 strike aircraft. Such a complement would be very exceptional but still a possibility. Thus, if there were ever a need to launch large numbers of aircraft at long range from the Australian coast, three small carriers could easily equate to an Enterprise class carrier. However, exceptions such as this paragraph describes are very difficult to envision. The Australian obligation is to protect Australian maritime commerce, not to prepare to engage the fleet of an imperial nation.

The Australian naval obligation to the small or new Asian, East African or Island Nations is supportive — not protective. If an imperial nation, with a military force larger than the Australian male population, were to attack an

allied small nation, the Australian armed forces could do very little on their own.

But the most important factor is the consideration of carrier defence. The large carrier such as ENTERPRISE or the medium carrier such as HERMES would require at least two to four FFG frigates to provide any sort of defensive confidence. The small or vest-pocket carrier is nearly self-protective or (at worst) expendable. The loss of a single ship of this class would not cripple the RAN.

There are (also) other arguments in favour of such a carrier. The most important of these is that such ships are entirely within the potential of Australian shipyards. This, from the viewpoint of the accountant AND the politician, is of vital importance.

Any vessel "bought in" from overseas represents a totally unreclaimable cost. The cash makes jobs for workers of the vending nation. However, a carrier built in Australia creates jobs in Australia. Such jobs become available instantly and meet the Government's "Job-Creation" philosophy. Further, the navy will spend immediately whereas the States spend politically. Thus, if job-creation money is given to the Navy, the country receives a useful product and meets the stated philosophy of the Government.

An escort-type aircraft carrier such as the one described above should cost approximately \$8 million in Australia. One such "carrier" could create two years' work for approximately 200 men in a shipyard. The steel necessary would create at least 50 more jobs and at least another 50 jobs would be created in the transport and coal mining industries.

The 300 jobs described above would have to come from the unemployment rolls and allow the Treasury to save (approx) \$2.3 million per



The best-known escort carriers were built during the Second World War for the Royal and United States navies. Shown here is USS CORAL SEA (later renamed ANZIO) in May, 1944.
(Photo — USN)

annum from dole payments. Also recoverable is (approx) 1/5 of the total expenditure as income tax. Therefore, assuming the expenditure to be over two years, this is \$1.3 million per annum. Consequently the unreclaimable cost of an \$8 million aircraft carrier reduces to \$3.1 million. Thus, for less than half the cost of a second-hand (British) aircraft carrier, Australia can have an escort

carrier, 300+ jobs and a full potential for additional construction. For the estimated overall cost of HERMES, the Navy could have as many as three such "carriers". Can we not afford to give some thought to this matter?

(Electronics and aircraft area not included in this figure)

(The editor invites comment on this article and will publish all letters in the next issue.)

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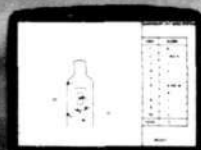
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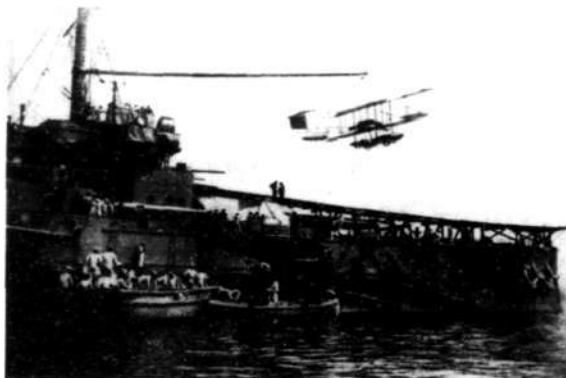
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LEUT Samson's S-27 being loaded aboard HMS AFRICA.

NAVAL ROUNDUP

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EXIT THE EXOCET — DOWNED BY SEAWOLF

Following its success in defending ships in last year's South Atlantic conflict, the British Seawolf anti-missile has just demonstrated its ability to destroy the notorious Exocet sea skimming missile.

The Seawolf system, now in service with Frigates of Britain's Royal Navy, is claimed to be the Western world's only operational anti-missile missile. A vertical launch version has now been developed to give it even more range and versatility.

In its early firing trials, Seawolf successfully intercepted aerial targets ranging from subsonic drones to supersonic rockets and naval shells.

Now the UK Ministry of Defence has reported that in a trial off the coast of Wales a Seawolf missile tracked and destroyed an Exocet even though it was at its maximum range.

The Exocet was fired from a Royal Navy ship that was over the horizon from the ship equipped with Seawolf. The Exocet was put on a course that presented itself as a crossing target to the Seawolf. One of the most demanding situations for a defence missile.

For safety reasons, this was the first time such a difficult trial had been attempted to confirm the capability of the lightweight, supersonic Seawolf.

British Aerospace, which builds the self-defence weapon, describes Seawolf as "a unique and combat-proven system". It was designed from the outset to counter both present and future missile threats. Especially manoeuvring small supersonic missiles under high electronic counter measure (ECM) and difficult radar conditions, plus destroy sea-skimming missiles such as Exocet.

The UK Royal Navy plans to continue fitting Seawolf to all its Type 22 Frigates, including an improved version with a new lightweight radar tracker.

The latest vertical launch version, which was developed by BAe as a private venture, is to be fitted to the navy's new Type 23 Frigates and is expected to remain an effective defence weapon into the 21st Century.

Since the Falklands campaign, considerable interest in Seawolf has been shown by a number of countries and the vertical launch version is already attracting the attention of governments carrying out new-ship construction programmes.

The UK Ministry of Defence earlier this year announced its backing of the development of a vertical launch version which should enhance the system by being lighter and easier to install on all classes of ship down to 600 tonnes. BAe says the range will be increased by the developments and there will be higher performance with no blind arcs and no re-load delays.

VI Seawolf has an add-on booster motor to provide extra power for its vertical launch and has been fired from a new simple type of canister that doubles as a transport storage container and launcher.

FIRST TO THE WEST

The Royal Australian Navy's recently modernised destroyer escort, HMAS STUART, sailed from Garden Island Naval Dockyard for Western Australia on Tuesday, January 10 to become the first warship to be permanently deployed to HMAS STIRLING in the western State.

The destroyer escort was originally built by Cockatoo Island Dockyard, Sydney, and first commissioned in June, 1963. Between 1979 and 1983 the ship underwent an extensive modernisation which was completed late in the year.

After arriving in Sydney last October STUART conducted working up and equipment trials.

After a maintenance period at HMAS STIRLING the ship will undertake a series of port visits on the Western Australian coast prior to sailing to Singapore, Hong Kong and subsequently China later in the year.

PATROL BOAT LAUNCHING

Mrs J. Rourke, wife of the Chief of Naval Material, Rear Admiral W. J. Rourke, launched the RAN's newest patrol boat, DUBBO, at Cairns, Queensland, on Saturday, January 21, 1984.

DUBBO is the eleventh of 14 Fremantle Class patrol boats to be built at Cairns by North Queensland Engineers and Agents Pty Ltd. The new DUBBO will be based in Cairns under the command of Lieutenant Commander M. S. Skopal of Adelaide.



The first destroyer to be based in Western Australia, the destroyer escort HMAS STUART seen in the Success Channel prior to berthing at HMAS Stirling on 20th January. (Photo — LS/PH Steve Given, RAN)

MINISTER'S COMMENTS ON WA HOMEPORTING OF HMAS STUART

The decision to base the destroyer escort HMAS STUART in Western Australia was of particular significance to the defence of Australia's western approaches, the Minister for Defence, Mr Gordon Scholes, has commented (Friday, January 20).

Mr Scholes said the arrival of STUART at the naval base, HMAS STIRLING, on Garden Island near Fremantle on 20th January, meant that for the first time in Australian history the western side of the continent would have a permanent naval presence.

STUART was joined in February by the Fremantle Class patrol boat GERALDTON which, with the Attack Class patrol boats ASSAIL and ADROIT, would provide the capability for response to a range of maritime situations.

The Minister wished the commanding officer and the ship's company of 242 men success in their new assignment. He was sure that they would all enjoy their posting to a base with excellent amenities and access to the hospitality for which Western Australia has long been noted.



The Fremantle class patrol boat HMAS CESSNOCK made its first visit to HMAS Stirling in January. It is seen here departing on the 24th. (Photo — ABPH/Eric Piman, RAN)

FRENCH AMPHIBIOUS SHIP VISITS AUSTRALIA

The recently built light transport JACQUES CARTIER of the



JACQUES CARTIER. (Photo — ABPHOT Simon Freeman, RAN)

French Navy arrived at the Garden Island Naval Dockyard at 10.30 am on Monday, February 6.

The 750 tonne vessel is fitted with bow doors and is equipped to carry vehicles and a helicopter. The JACQUES CARTIER carries a crew of 39 officers and men plus a contingent of 120 troops.

The Naval Officer-in-Charge of New Caledonia and its dependencies, Captain Bordier, travelled in the ship which was commanded by Commander Szernoviz.

During the visit of the French transport, the RAN supplied a bugler for the ceremony at La Perouse in honour of the great French navigator. The ceremony was attended by Captain Bordier and members of the crew of JACQUES CARTIER.

RAN SHIP SUCCESSFULLY FIRES PHALANX WEAPONS SYSTEM

The Royal Australian Navy's newest guided missile frigate, HMAS SYDNEY, successfully carried out firing trials of the Phalanx weapons system against an aircraft-towed target off the west coast of the United States during January, 1984.

The Chief of Naval Staff, Vice-Admiral David Leach, said that the Phalanx trial firing was of special significance because it ushered in a new era of fully automatic computerised defence protection for ships of the RAN against the current generation of anti-ship missiles.

He said that although SYDNEY was the only RAN ship to have Phalanx installed, it was planned to fit the system in DARWIN, now in the final stages of construction in Seattle, USA. It was planned that Phalanx be retro-fitted to both ADELAIDE and CANBERRA at the first available opportunity.

Admiral Leach said the Phalanx was designed as a self-defence weapon against anti-ship missiles such as those used against the Royal Navy Task Force in the Falklands campaign with such devastating effect.

In the trials by SYDNEY, two firing runs were conducted against a target towed by an A4 Skyhawk. On each run the Phalanx system successfully tracked, engaged, and shot parts of the target away.

THE ARLEIGH BURKE CLASS

The ARLEIGH BURKE DDG 51 Class multi-mission guided missile destroyer will replace existing USN guided missile destroyers which face retirement commencing in the late 1980s.

Designed to operate with Surface Action Groups and Carrier Battle Groups or as the lead combatant in support of replenishment and amphibious groups this primarily all steel ship will be 466' long, displace about 8200 tons, and possess superior sea-keeping capability. DDG 51 is designed with better survivability than her predecessors, with vital areas such as the combat information centre, radio rooms and magazines located deep within the hull and protected by additional armour. The ship will combine the best features of current design and newly developed systems.

DDG 51 will be powered by a propulsion system nearly identical to that installed in the CG-47 Class Cruiser. Four LM 2500 gas turbines and two controllable and reversible pitch screws will drive the ship at a top speed of at least 31 knots. The ship will be armed with two vertical launching systems accommodating a mix of 90 missiles (TOMAHAWK cruise missiles, SM-2 surface-to-air missiles and ASROC anti-submarine weapons), which can be varied to suit specific missions. It will also carry the HARPOON anti-ship missile, 5"/54 rapid fire gun, and the

April, 1984

electro-optical fire control, guided projectiles, PHALANX close-in weapon system and torpedoes.

A prime feature of this destroyer is its state-of-the-art multi-function SPY-1D phased array radar. Four fixed antenna arrays provide long range multiple-target detection and track in clear and hostile environments which include jamming and high clutter caused by rain, high sea states and chaff. Three MK 99 guided missile fire control system target illuminating radars will control the terminal engagement of the



The latest artist's impression of the new DDG 51, Arleigh Burke class for the USN. Note the vertical launch missile systems fore and aft.

(Photo — A. D. Baker III)

vertically launched STANDARD surface-to-air missile (SM-2). Additional defence against anti-ship cruise missiles will also include two PHALANX close-in-weapon systems and the SLQ-32 electronic warfare system with decoy launchers.

Anti-submarine warfare will be conducted with the SQR 19 integrated long range passive tactical towed array and active SQS-53C sonar systems. In addition to organic ASW weapons, the ship will be able to land, launch and control the LAMP MK III ASW helicopter.

Long range strike and anti-surface warfare capabilities are provided by vertically launched TOMAHAWK and canister launched HARPOON missiles. Semi-active laser guided projectiles will enhance naval gunfire support operations and close-in surface engagements.

DDG 51 entered contract design in Fiscal Year 1983 with lead ship contract award in Fiscal Year 1985.

SSK "UPHOLDER"

It has now been officially confirmed that the first-of-class Type 2400 diesel-electric patrol submarine for the Royal Navy, now building at Vickers at Barrow-in-Furness, will be called UPHOLDER — thus restoring to the Fleet the name of one of the most successful Allied submarines of World War II.

The earlier UPHOLDER, built by Vickers at Barrow in 1940 and commanded by Lt Cdr M. D. Wanklyn, VC, DSO, RN, arrived at Malta in January, 1941. Except for one of her 24 completed patrols, Lt Cdr Wanklyn remained in command of the boat throughout the next 16 months.

In that period UPHOLDER was credited with the sinking of three submarines, two destroyers and some 100,000 tonnes of shipping, had damaged other vessels and engaged in special operations. Lt Cdr Wanklyn was awarded the Victoria Cross in 1941 following the sinking of the heavily escorted troopship Conte Rosso.

UPHOLDER failed to return from patrol in April, 1942 — the exact facts are unknown but she was listed as having been sunk by depth charges from the Italian warship PEGASO. The Admiralty took the unprecedented step of issuing in August, 1942 a special communique praising UPHOLDER, her captain and crew for the manner in which they had performed their long and arduous duties in the Mediterranean, concluding with the words "The ship and her company are gone, but the example and the inspiration remain".

Even for that time, by submarine standards UPHOLDER was a small boat. Some comparative figures for the wartime vessel and the new SSK make interesting reading:—

	1941	1984
Length Overall (Metres)	58	70
Pressure Hull Diameter (Metres)	4.8	7.6
Displacement (Tonnes) Surface	630	2160
Submerged	730	2400
Complement	33	44

Page Twenty-nine

Strengthening Australia's defence communications: Plessey Pacific Defence Systems.

Plessey Pacific Defence Systems Pty Limited is a specialised group within the Plessey organisation which has been formed specifically to meet the command/control/communications needs of Australian, Asian and Pacific defence forces.

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Plessey Pacific Defence
Systems Pty Limited
PO Box 166, Canberra
ACT 2608
Telephone: (062) 47 6944

● PLESSEY

The Type 2400 and a variant to accommodate different customer requirements are currently being assessed by Department of Defence as contenders for the replacement of the Royal Australian Navy's Oberon submarines.

QUOKKA



QUOKKA ready for launch. (Photo — Navy News)

The first naval tug to be based at the HMAS STIRLING fleet support facility in Western Australia, QUOKKA — named after a WA marsupial, arrived at the base on February 5.

The Naval Officer Commanding WA Area, Commodore David Orr, took the opportunity to present a HMAS STIRLING plaque to the ship's master for the delivery voyage, Roger Timms.

QUOKKA displaces 110 tonnes, is built to full Lloyd's classification, incorporates 240 V power and air conditioning. At only 18 metres length the tug has an impressive bollard pull in excess of 8.5 tonnes from a total of 600 bhp. It was constructed at Portland, Victoria and delivery was by builder's crew with RAN personnel accompanying them on the delivery voyage.



Three minor war vessels, HMA ships, IBIS, LAUNCESTON and BUCCANEER seen departing Sydney for the fleet concentration in February. (Photo — LSPH Peter Simpson, RAN)



Handover of QUOKKA at HMAS Stirling. (Photo — ABPH Eric Pitman, RAN)

"SMILE ON THE FACE OF THE TIGER" RETURNS TO FLEET AIR ARM

Growth — and progress; these were the keynotes of the message from Rear Admiral Geoffrey Woolrych who, as Fleet Commander, presided at Station Divisions at HMAS Albatross on the occasion of reformation of 816 Squadron.

The Admiral addressed a full turnout of ship's company, relatives and friends against an impressive backdrop of the helicopters which will form the new unit — the indefatigable WESSEX 31B.

Formerly the unit which operated the RAN's tireless anti-submarine TRACKERS, 816 was disbanded as one of the painful consequences of the decision to pay off MELBOURNE and her fixed wing strength.

816 carried the well-known tiger emblem with pride in the TRACKER days — and Rear Admiral Woolrych told the big Division's turnout at HMAS Albatross that he spoke for the entire RAN in looking forward with pleasure to see that "smile on the face of the tiger" once more adorning our aircraft.

RADM Woolrych pointed to the double significance of the ceremony at NAS Nowra: not only was a squadron re-born, but the occasion marked a very symbolic turning point, ahead and upward. The Admiral's message to Divisions reflected the optimism of the moment:

"Later this year 723 Squadron will take delivery of its six Squirrel helicopters which will herald the introduction of our long-awaited operational helicopters for the FFGs. We look to a decision on the type of aircraft that will provide that operational capability — be it SEAHAWK, or the LYNX — in the fairly near future. Thereafter we will be doing everything possible to introduce the selected aircraft to the Fleet as soon as possible."

816 of course will operate the FFG helicopters, as is fitting for a unit which has been tasked with the critical roles of ASW, Surveillance, Over-the-Horizon Targeting and Limited Strike since the Squadron's inception in 1939.

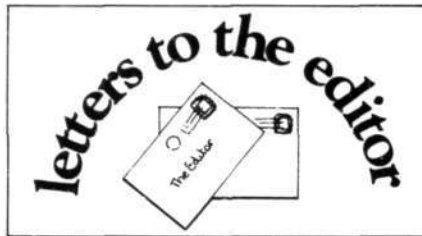
Until the arrival of the FFG aircraft, 816 is to operate as a utility squadron with the primary role that of Army support.

RADM Woolrych conceded that the Wessex (those "splendid old warhorses") had probably made more comebacks than Melba, but the part they would play was vital to the national security; that role brought with it the requirement for specialist aviation skills at a level equal to those of any helicopter squadrons in the free world.

The Admiral referred to the challenge ahead, and to the historic occasion which the day represented.

Observers, both Service and Media-oriented, agreed: the sense of the historic was there to be savoured, inasmuch as a new squadron was being created after a period of seemingly unrelieved setbacks to the Fleet Air Arm.

To this reporter, the events at NAS Nowra that day underscored the determination and defiance of our last Fleet Commander, RADM Mike Hudson, in his AIG after last year's events: "It is now time to look ahead — and not astern."



Royal Naval Reunion 1984
C/- Post Office Box 47
Canley Heights, NSW, 2166
5th January, 1984

Dear Sir,

During the Trafalgar Day Weekend last year the First Reunion of the Royal Navy, Royal Marines and WRNS was held in Adelaide, SA and was a great success.

I would like your readers to know that the 2nd Trafalgar Day Reunion to be held in Australia will be in Sydney on October 19, 20 and 21, 1984. HRH Prince Philip, KKT, is our Patron. Further information can be obtained from the above address. Hope you Matelots, Royals and "Jenny's" can join us on a good weekend "RUN ASHORE".

Yours sincerely
BERYL JACKSON

Cirrus Place
Flaxton Park
Mapleton, Qld, 4560
22nd January, 1984

Dear Sir,

In the article Airships by Cdre J. A. Robertson, he stated that Sea Kings have to be stripped of ASW equipment so as to be fitted with AEW.

This is not so. Searchwater AEW radar is fitted in addition to the ASW weapons. In fact the radar's ability to target Harpoon is an additional asset.

All it now needs is for the Australian Government to place an order with Carlings for five 7500 tonne LHPs fitted with ski ramps, and for the New Zealand Government to adopt the Sea Harrier as its replacement for the Sea Hawk to give the two countries a combined credible defence force.

Yours faithfully
C. J. MITCHELL

5 Charleotte Avenue
Clarendon Vale
Tasmania, 7019
11th January, 1984

Dear Sir,

With regard to the article on the KRAIT and K. Hodges' letter, January 1984, I agree with K. Hodges' details regarding P&O ship Ballarat, but I feel I can shed light on the subject.

In the series "Australia in the war of 1939-1945" series, 2 (NAVY) by G. Hermon Gill, it is stated that the KOFUKU MARU sailed from Sumatra in March, 1942 "— and was sailed to India by a civilian, W. R. Reynolds. After some months in India she came to Australia." This would indicate she sailed to Australia under her own power.

In the article "Save the Krait", in the section headed "Rediscovered", it is stated that "due to her poor condition — P&O came to the rescue, etc".

My 1961-62 Lloyd's Register lists BALLARAT SS 8792 gt, owners P&O Steam Nav Co built 1954. As my register and the transportation of the KRAIT from Borneo are of the same era, it seems reasonable to assume that the BALLARAT referred to is the 1954 model.

Yours faithfully
D. C. MARSHALL

230 Oceanic Drive
City Beach, WA
Australia, 6015
11th January, 1984

Dear Sir,

I wish to refer to the article in your January '84 issue which described the handover of HMAS ADROIT to the Fremantle Port Division, Royal Australian Naval Reserve.

Having had the privilege of commanding her sister ship HMAS ACUTE during a number of annual continuous training cruises, I may be forgiven for reading your story with particular interest.

However, having also served with Lieutenant Peter Lockwood in HMAS STUART, I can assure you that the officer in the photo, which shows the handover of the "key" to Commander Bantock, is NOT Peter Townsend as per your caption.

Yours sincerely
OTTO PELCZAR

ROGER ROONEY
7 Wyena Street
Rye, 3941

Dear Sir,

After reading the article in your January 1984 edition of The Navy I believe that there is a place for the PATROL HYDROFOIL MISSILE SHIP in the RAN. Its high speed, sea-keeping capabilities and its various weapons fit make it a very potent craft. It is a quantum leap over conventional patrol craft which has not got the sea-keeping capability, speed and range of either of the Boeing-designed craft.

The Model 928-80 would be more suitable to Australian conditions because of its increase in range and payload. It is expected to have a hullborne range of over 600 nm and a foilborne range of over 1000 nm depending on the speed of the craft. This compares well with the range of the FFG-7 class which seems to be going to make up the bulk of Australia's escort capabilities into the next century. Weapons seem to be one Mk 75 76mm/62 cal Dual Purpose Automatic Gun, 16 Harpoon surface/air missiles (in canisters), twin 30mm Gatling guns are considered, two Mk 135 Chaff Launchers 24 Mk 71 rboc cartridges, Sea Sparrow surface/air missiles may be fitted also. A very thorough defence/attack capability, one that covers every necessary avenue.

The Model 928-80 has better sea-keeping capabilities than DDs, Frigates or patrol craft in any Navy. So it is able to handle the rough blue water around Australia, this in turn means a more stable platform for the Gun/Missiles.

There are facilities for a quick change to Minesweeping/laying and Anti-Submarine Warfare. Maintenance is not much of a worry with transportable workshops.

The craft is twice as fast as most ships in calm water and four times as fast in rough waters. Meaning it can outrun anything above or below the water.

I'm not saying the RAN should completely be made up of these HYDROFOIL MISSILE SHIPS. I'm saying that these remarkable craft should supplement the ships already in the Navy. They can carry out many roles and with a crew of only 21 men and with the cost of the Model 928-80 without weapons being about US\$100 million each, the Government could buy two or maybe three of these for the price of one FFG-7. Over the life of these Hydrofoils, cost would be very much less than any Frigate or Destroyer, a very important fact considering inflation.

The PATROL HYDROFOIL MISSILE SHIP represents cost-effective craft and can perform more missions than larger ships with ten times the crew.

Yours faithfully
ROGER ROONEY

20 Karracatta Street
Goode Beach
Albany, WA, 6330
20th January, 1984

Dear Mr Gillett,

Thank you for publishing our story about the old sailing craft, the ADA, in the January issue of "The Navy".

However it is with regret that we have had to withdraw from this project due to lack of finance.

After much publicity and many invitations to the public to become involved and support this project it was disappointing that no support was forthcoming.

Yours sincerely
(Mrs) C. WAGHORN
Hon Secretary

April, 1984

7 Joyce Street
Elwood, 3184
6th February, 1984

Dear Sir,

As I am now 90 and recent research has disclosed that since 25th June, 1980 I am the "still living" earliest entrant into any Commonwealth Naval Force, you can understand what memories coursed through my mind when I removed the wrapper of the January, 1984 issue of "The Navy" and beheld John Bastock's remarkable picture of HMAS ENCOUNTER. (At first I thought it was a photograph!)

I was a JO in the old "bus-wagon" in 1915-16. When at sea, it was my daily duty — after "Divisions and Prayers" — to shin up the foremast's starboard ratlines to an improvised "Fire Control" in the foretop, and test "Gun-control Communications".

As the old bus could roll through an arc of 60 degrees, one had to be wary of the extremity of each roll. Being a coal burner, the fore rigging was always thick with "stokers", ie soot. And, as one was always in No 8 (white) rig, a goodly portion of one's seven-day-a-week pay of £3/12/8 was spent on dobbing.

My outstanding memory is: Our grounding at Johnson Island, about 600 miles SW of Hawaii, on August 18, 1915. (We did NOT ground at Fanning Island on 12th August, as wrongly recorded on page 223 of Vol IX of "The Official History of Australia, in the War of 1914-18.") Our bottom, which was corrugated from under the bridge, aft to under the main mast, was repaired in King's Dock, Singapore, from December 20, 1915 to January 16, 1916. (Johnson Island was obliterated by USA's test of their "H" bomb in the fifties.)

A half gin and water cost us a halfpenny. There were 19 officers in the Wardroom Mess, including three "total abstainers". Yet, out of six months' wine profits we were able to buy a £60 soda water machine. Three "gunroom" officers, Asst Paymaster "Jackie" Hehir, RAN, Eng Sub-Lieut Chas Cock, RANR (later the uncle of "Seeker" Judith

Durham) and I, RANR, messed in the Wardroom; for which we received 30/- per month "DMS". We were a very happy mess. Ah, "Them was the days!"

Yours nostalgically
R. S. VEALE
Commander, RANR, Ret'd

35 Mainsail Avenue
St Huberts Island
NSW, 2256
6th February, 1984

Sir,

In the January issue of Navy Mr K. Hodges asks which ship brought KRAIT from Bombay to Sydney in 1942. It was not, he believed, the P&O steamer BALLARAT as stated in the October issue of Navy.

I am indebted to Mr A. G. Rose, one of my former P&O-Orient colleagues for the information that KRAIT was indeed shipped from Bombay to Sydney in the BALLARAT — but BALLARAT of the P&O Branch Line, a member of the P&O Group. The shipment took place in 1942 after the fall of Singapore.

Referring to another point in your very interesting account of KRAIT's history I can confirm that after the vessel was rediscovered in Borneo in the sixties, arrangements were made by P&O (Australia) to ship her to Australia freight free. She travelled in a ship of another P&O Group member — NELLORE, of Eastern and Australia Steamship Company — which traded for many years between Australia and Japan. As your article states she was delivered from Sandakan to Brisbane. The date of the journey was April, 1964.

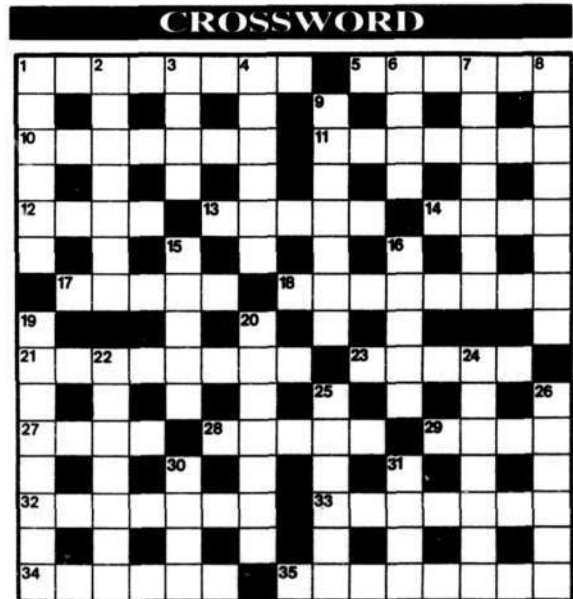
Yours
SIR JOHN BATES
Former Deputy Director
P&O Orient Lines

ACROSS

- What the RAN provides for Australia. (8)
- A gun fitted to most WWII auxiliary minesweepers. (6, 7)
- Name of patrol craft 83. (7)
- Ships are inclined to do this! (4)
- Former naval aircraft. Sea — (5)
- HMAS Tobruk is such a heavy ship. (4)
- RAN submarine. (5)
- Weapon used on early naval vessels. (5, 3)
- Part-time Navy forces. (8)
- Further towards the stern. (5)
- Sister ship to the Torrens. (4)
- Collective term for sea forces. (5)
- Navy personnel now do this at the former Torpedo Establishment at Pittwater, NSW. (4)
- Skill of an able seaman? (7)
- President Kennedy served in these. (1, 1, 5)
- Begin to fire at a target. (6)
- Name of Navy training establishment. (8)

DOWN

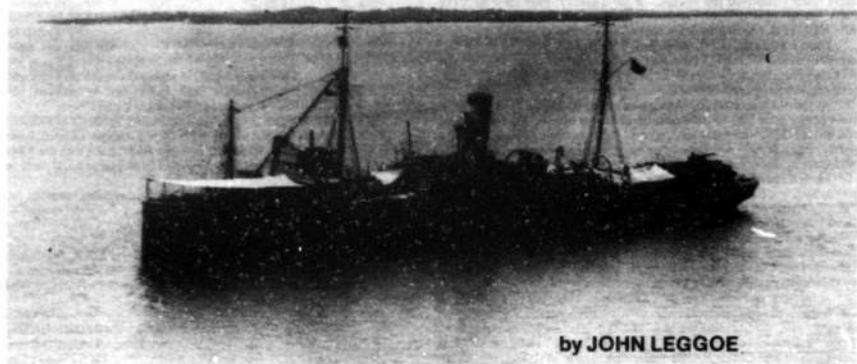
- RAN fleet oiler. (6)
- Former type of warship. (7)
- Lie at anchor. (4)
- What a GST vessel acts as. (6)
- Section of an amphibious assault group. (4)
- Type of craft, eg HMAS Tarakan. (7)
- Leaving a Skyhawk by emergency means. (8)
- Name of a Patrol Boat. (7)
- Enter a ship. (5)
- Naval mortar system. (5)
- Charles F. Adams class destroyer. (8)
- Assigns areas for naval units. (7)
- Aircraft used by the Fleet Air Arm. (3, 4)
- Adelaide class of ship. (7)
- Where 17 across might go to avoid detection. (6)



- More than just a container ship? (6)
- Sound of sonar signal searching for submarines. (4)
- Name of RAN minesweeper. (4)

See Page 43 for Solution

The Royal Darwin Navy



HMAS PLATYPUS, Darwin, 19th October, 1942. The tug WATO lies on her starboard bow. (Photo — AWM Neg No Z7446)

by JOHN LEGGOE

From "Trying to be Sailors", published by St George Books 125 St George's Terrace, Perth, 6000

We must have looked a comic-opera bunch — five self-conscious civilian types lined up outside the First Lieutenant's office at HMAS LEEUWIN naval depot in East Fremantle.

The bullion badges of our naval officers' caps sparkled in their virgin brilliance and the bottoms of our grey flannel slacks were encased in black patent leather gunnery officers' gaiters. In between we wore sports coats of various patterns and hues over variegated pullovers. It was the best we could do when we were half in and half out of the navy.

In our early thirties, we were remnants of a group of officers originally selected under the Yachtmasters' Scheme for service with the Royal Navy and subsequently switched to the Royal Australian Navy with the outbreak of the Pacific War. We had reported the previous day for mobilisation as sub-lieutenants (on probation) in the Royal Australian Naval Volunteer Reserve after nearly a year of sweating, examination, selection boards and medical tests. After going through the routine of joining we had kitted up under the guidance of the Officer of the Day. I had a feeling that we were being conned, because on top of the pile of clothing we each took home was a pair of black patent leather gunnery officers' gaiters and a pair of tan leather gloves. We were then sent to Perth to order our uniforms with orders to report at 0800 the next day in training rig, described loosely as "sports jacket, slacks and gaiters".

Now we stood at ease in the big barnlike drill hall trying to ignore the sniggers of messengers hurrying across the quarterdeck. Outside the cold sleety winter squalls whirled around the open doorway and swept across the river to spend themselves against the rearing black cliffs of Rocky Bay.

The OOD called us to attention, and as the First Lieutenant walked out of his office he pulled up dead in his tracks and goggled at us. His face went purple and he seemed to be going to have a seizure.

"Tell them to get those gaiters off," he roared at the OOD, "then take them down to the gunnery school and get them some webbing gaiters."

It was some weeks before I discovered the enormity of our offence. Patent leather gaiters and gloves, it seemed, were the hallowed vestments of the gunnery school, worn by the elite of the navy — gunnery officers.

"Why the hell did you tell us to get them?" I asked the OOD as we

took off the offending gaiters in the gunnery school and changed to the lowly webbing gaiters worn by ratings.

"Well, they could come in handy if you are leading the march in the victory parade at the end of the war," he said, adding as an afterthought, "that's if you're still alive."

Those gaiters remained in my bottom drawer at home until after the war. Many years later I found them most useful to keep the mud off my pants while working with sheep and cattle on the farm.

In this intake of yachtmaster officers there were five West Australians, my companions being John Dent, a Perth real estate agent, Colin Cadd, a Perth businessman, Bert Gordon, a life insurance agent from Bunbury, and Peter Corbin, who had come straight from managing a North-West sheep station. Except for John Dent, who had spent some time in pearling luggers out of Broome, none of us had any seafaring.

It was August 18, 1942. A week earlier the Australian navy had suffered one of its heaviest blows of the war, the sinking in a fierce night encounter off Guadalcanal of CANBERRA, one of the navy's two eight-inch-gun cruisers. In New Guinea the 21st Brigade of the AIF was clawing its way up the Kokoda Trail in a desperate effort to halt the thrust on Port Moresby. Australian troops were hanging on to a toe-hold in Milne Bay and the American marines were locked in a bloody battle with the Japanese on Guadalcanal. On Australia's northern coast Darwin was still reeling from the February battering by carrier-borne squadrons and the first Allied Kittyhawk fighters were just starting to hit back at the raiding Japanese bombers. Across the Timor Sea a few Australian commandos were still fighting a guerrilla war against a cruel and merciless enemy in the mountain jungles of Timor.

That was all.

In the whole vast arc of ocean and island territories from Burma and Singapore, right around to the Solomon Islands, Japan was supreme — victorious and undefeated. Three months earlier the inconclusive Battle of the Coral Sea had halted the Japanese thrust southward but the weight of American arms and men had still to arrive and the Allies were fighting a holding war.

Here in East Fremantle the war seemed far away. We were making rather heavy weather of adapting to naval life. Bert Gordon dashed around in business-like style saluting everyone from petty officers to commanders. His approach to senior officers was friendly and confidential as though trying to sell them a life insurance policy. Peter

Corbin, on the other hand, seemed to be in a perpetual dream, as though still on a horse in one of the back paddocks of Minderoo. The rest of us tagged along trying to look as inconspicuous as possible.

The tailors did a crash job with our uniforms and soon LEEUWIN, with evident relief, had us out of its hair and on the train to HMAS CERBERUS, Flinders Naval Depot, on the other side of the continent. Flinders — FND to everyone in the navy — was Australia's main training establishment. It was a sprawling collection of barracks, messes, drill halls and schools built around a vast parade ground on the dank swampy shores of Westernport Bay, south of Melbourne. Located as it was just about the most southerly part of the continent, it was not a place that looked forward to in the winter months.

Surrounded by well kept gardens and screened by an immaculate hedge, the CERBERUS wardroom, a dignified red-brick building, had the atmosphere of an exclusive country club. It had been built to accommodate a more or less permanent peacetime staff and never really adjusted to the intrusion of hundreds of wartime reserve officers. Accommodation was hopelessly overstated and we were bedded down in some bitterly cold converted wooden classrooms.

On the first morning we were issued with forms on which we were asked to record biographical details of ourselves.

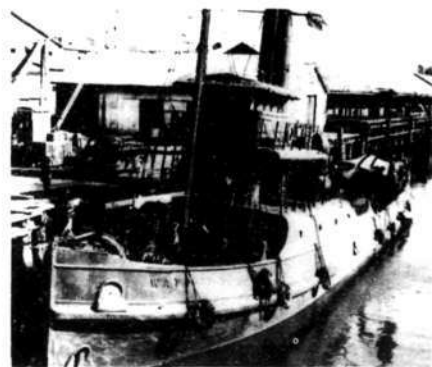
"What's all this about?" said Peter Corbin, studying the form with a puzzled frown.

"Oh, it's so that they will be able to give the newspapers an obituary," I said. "You know the type of thing: 'The late Sub-Lieut Corbin was born in Adelaide, the son of Dr Corbin. He was educated at St Peter's College...'"

Twenty sub-lieutenants from all States were in our class and the navy set about the daunting task of making naval officers out of us in four weeks. This amounted to not much more than a fleeting glimpse of the gunnery school with brief sessions of torpedoes, signals, asdic, navigation and depth charges. John Dent did not complete the course. At the end of the third week he was whipped out of the class at an hour's notice and sent with all speed to Sydney to take a lugger under sail to Port Moresby. I did not see him again.

At the end of the fourth week when our drafts were posted there were four of us for Darwin, my appointment specifying: "HMAS MELVILLE, for LDVs". This meant that I was to go to the Darwin shore depot for allocation to one of the local defence vessels. The other three in the draft were Carl Sodersteen and Bill Lowen from Sydney and Bob Bain from Launceston.

Three days later a Guinea Airways Lockheed Electra landed in a cloud of dust on the wartime Batchelor airstrip forty-five miles south of Darwin and deposited four naval sub-lieutenants, blinking in the fierce tropic sunlight and nakedly white beneath new khaki shorts and shirts. We looked like seagulls in the desert. Our aircraft had flown from Adelaide, staying overnight at Katherine. Darwin airport had not been used by the civil airlines since the Blitz of February 19 and Batchelor had become the northern terminal for the services from Adelaide and Perth. Even so, Batchelor was well within the range of Japanese bombers and the civil crews wasted no time unloading and loading before heading south again.



HMAS WATO. (Photo — R. Gellert)



KURU. (Photo — RAN)

Batchelor was nothing more than a strip hacked out of the bush. Not a breath of air stirred the shimmering heat haze of the late Dry. Tall grass like a heavy tangled out crop bordered the airstrip and overhead kite hawks wheeled on motionless wings, like pieces of black paper sucked aloft by a summer whirlwind. Except for the ground staff servicing the aircraft, the only sign of life was a few army types in shorts, boots and wide-brimmed hats with "meat tickets" strung around their necks on greasy bootlaces. Like the vehicles they drove, they wore a coating of red dust through which their sweat ran in tiny rivulets.

Quickly we learnt that in the Darwin area you used your initiative in regard to travel. Even if the navy knew you were coming it seldom knew when and, working on the premise that you would turn up sooner or later, left you to find your own way. It would probably have sent a car to Batchelor for a brass hat, but newly recruited sub-lieutenants (on probation) hardly rated a thought. Enlisting the help of the army, we hitched a ride to Darwin, seated on a load of picks and shovels in the back of a utility.

All the way to Darwin we passed the camps of army and air force units dispersed in the bush, a build-up in strength that had now rendered Japan's chance of a successful invasion much more difficult than it had been six months ago. On the outskirts of the town the gaunt blackened girders of aircraft hangars marked the wreckage of the RAAF station, virtually wiped out by the onslaught of February 19. It was a day of horror which for ever after was referred to as the Blitz.

Our truck ran on through the battered town, now deserted by its civilian population. Most of the undamaged houses were being used as billets for the navy and army. The naval depot, HMAS MELVILLE, was housed in a group of dwellings at Myilly Point, up on the cliff above Mindil Beach. The truck ground to a halt on the gravel outside the regulating office and the OOD took us straight in to meet the Commanding Officer, Commander L. E. (Pup) Foxer, RAN. He was a short, nubby man with the enormous chest and shoulders of a rugby forward. From his ruddy face there sparkled the merriest pair of blue eyes I had ever seen.

He told us the jobs to which we had been appointed. I received the impressive appointment of "HMAS MORUYA, in command". To have attained the exalted position of captain of one of His Majesty's ships of war in a brief five weeks from civilian life seemed to me worthy of a place in the Guinness Book of Records — particularly as I had not yet been to sea. However, I soon returned to earth when I found that MORUYA was a boom patrol boat with a broken down engine. In fact she did not move from her moorings during the few weeks that I commanded her.

After seeing the Captain of MELVILLE we were handed over to Eric Sodersteen, a brother of Carl, to be shown around the port. Eric, another RANVR yachtmaster lieutenant, was CO of IBIS, one of the four ancient pearling luggers that had been commissioned by the navy for reconnaissance work and odd jobs up and down the coast. We piled into the depot utility and bumped our way through the bombed out streets to the main wharf area.

Here we came face to face with the havoc which the Japanese had inflicted on shipping during the Blitz. The main wharf was a mass of twisted metal, the loading berth being severed from the shoreward end by a huge gap where a bomb had scored a direct hit. Alongside the berth on her side lay the motorship NEPTUNA. Filled with explosives, including a big consignment of depth charges, she had caught fire and blown up with a mushroom blast like that of an atomic bomb. It had rocked the town and parts of the ship were later found in the town. Some little distance out from the wharf the tanker BRITISH MOTORIST lay on her side. She had settled to rest after spewing blazing oil all over the harbour. To the left of her and over towards Middle Arm could be seen the empty davits of the

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sunken ZEALANDIA, a troop transport which in peacetime had been a passenger ship on the Sydney-Fremantle run.

Over towards Tale Head on the far side of the harbour two United States transports, MEIGS and MAUNA LOA, sat squarely on the bottom, their masts, derricks and upperworks clearly visible. Away to the left up East Arm the venerable old windjammer KELAT rested on the bottom, masts at a drunken angle. She had been towed to Darwin loaded with coal and was still full of coal. There was no sign of the American destroyer PEARY, which had gone down with her guns blazing, out near the boom. Three other ships, TULAGI, BAROSSA and PORTMAR since February had been salvaged and towed south.

"There's the Royal Darwin Navy," said Eric with an all-encompassing sweep of his arm towards the motley collection of down-at-heel vessels that dotted the wide expanse of Darwin Harbour.

Central to the whole picture was HMAS PLATYPUS — PLATS to every sailor in the navy. She lay placidly at anchor surrounded by a collection of small craft rather like an old duck with a clutch of ducklings. A relic of the 1914-18 war, she was built as a submarine mother ship and served as a depot ship in Sydney between the wars. She arrived in Darwin about a year before the Blitz and remained at anchor in the harbour as mother ship to all the small vessels which the navy operated up and down the coast and on occasional sorties to Timor and islands in the Arafura Sea. It was to PLATYPUS that I was redrafted on my appointment to MORUYA.

Of 345 tons and 325 feet long, PLATYPUS was a grey slab-sided hulk of a vessel with a high-angle four-inch gun mounted right aft. She looked, and pretended to be, nothing more than a floating workshop working under difficult conditions with inadequate and out of date equipment on ailing and decrepit vessels that should have been scrapped years ago.

What might be described as the flagship of the local fleet, mainly because she was the only ship to offer any creature comforts to her ship's company, was the small 300-ton mission steamer SOUTHERN CROSS. She always looked top-heavy, and with a speed of only eight knots was battling to make headway against some of the fierce tide rips along the coast. She had been requisitioned from the Bishop of Melanesia and the sailors loved to recount the discovery of a cache of contraceptives in the bishop's cabin.

Next in order of seniority were TERKA and TOLGA, nicknamed the T-class destroyers. About the only thing they ever destroyed was morale. Built by Dorman and Long in 1925 to carry stone for the construction of the Sydney Harbour Bridge, they were launched with the lordly names of Sir Dudley de Chair and Sir T. Hugh Bell. They were the most ungainly ships ever to come off a shipyard. They had high square bows drooping to a low-well deck and rising again to a high poop with the accommodation right aft. They displaced just over 400 tons and to the stokers who shovelled coal in the boiler-rooms they were sheer hell in the tropics. Some humourist in Navy Office had equipped them with oarboard Oropesa mine-sweeping gear. With their sweeps streamed they were capable of just four knots and as they frequently had to sweep against a four-knot tide rip they would steam all day and stay in the same place. Another piece of fanciful armament which TERKA and TOLGA carried was a brace of full-size depth charges on two sets of rails mounted right aft on the high poop deck. Without ascid it is difficult to understand what use the depth charges would be, and to drop one would have been much more hazardous to the ship than the submarine.



HMAS TOLGA. (Photo — RAN)

During the Blitz TERKA and TOLGA, in common with most units of the Royal Darwin Navy, served with distinction in the harbour rescuing survivors amid the blazing oil. Their most frequent work around the port, and later in New Guinea, was as water carriers.

Two years after I first saw her, TERKA, tired of tramping around

New Guinea ports like the yardman of a country pub, expired quietly one night in Madag, sinking to the bottom of the harbour while at anchor. Her CO was playing bridge in the depot mess ashore. It was said that on returning in the motorboat and finding his ship sitting on the bottom, the CO went back to the wardroom and said conversationally, "I say, you chaps, can you give me a bed for the night? My ship has sunk."

I happened to pass through Madag a week or so after this happened and while in the First Lieutenant's office saw a signal from Navy Office granting two weeks' survivors leave to the ship's company of TERKA. That must have been the most easily earned survivors' leave of the war.

It was one of the embarrassments of the Royal Darwin Navy that, in 1942, it still had four coal burners, PLATYPUS, TERKA and TOLGA and the tug WATO, and no bunkering facilities. The old coal hulk KELAT had been towed from Fremantle to Darwin and anchored in East Arm, but in the confusion following the Blitz someone forgot to pump her out and she settled on the bottom. From then until the end of 1942, when the coal burners departed from Darwin, it was one of the periodic chores for PLATYPUS to send a working party with a barge to KELAT to fish for coal with a grab.

One of the hardest worked ships in Darwin in 1942 was PATRICIA CAM, a 300-ton wooden vessel with a vast hold and a huge derrick forward. The ship's company lived in a cockroach-ridden leaky forecastle and a few sauna-type cabins above the engine-room right aft. She was driven by twin diesel engines at a maximum of eight knots and mounted a point-five machine-gun on the forecastle. Most of her work was carrying supplies and fuel to isolated army and air force posts, missions and coast-watching stations around the coast, from Wyndham in the far north of Western Australia to the Gulf of Carpentaria near the Queensland border. It was a job for which she was well suited as, with her shallow draught, she could get in and out of the restricted and ill-charted bays and inlets which she had to visit. Her CO, Lieut A. C. (Sandy) Meldrum, who had roughed it in the merchant service as a Pacific Island shipmaster, was just the man to handle the special problems the job entailed.

I did not know then that a few months later I would sail as First Lieutenant in PATRICIA CAM on her last voyage.



CHINAMPA as completed. (Photo — R. Giffert)

Two other workhorses around the port were small wooden vessels of about 50 tons, CHINAMPA and MAROUBRA, which did much the same type of work as PATRICIA CAM but usually not as far afield. CHINAMPA had been riddled with bullets some months before while participating in an abortive attempt to land Australian troops at Saumlaki in the Tanimbar Islands, 298 miles north of Darwin. MAROUBRA was subsequently sunk by enemy aircraft at Millingimbi on the Arnhem Land coast, caught with a load of high-octane fuel by Japanese Zeros, which reduced her to a blazing wreck.

Rather similar craft to these two were AMBON and GRIFFIOEN. A lumbering old wooden Dutchman, GRIFFIOEN had been commandeered by a group of Allied soldiers escaping from Ambon after the Japanese occupation. They sailed her to Darwin using coconut oil for fuel in the heavy old diesel engines.

The two gamest and most audacious little ships in the Darwin fleet were KURU and VIGILANT, the "cockleshells" which inaugurated and operated for over six months the Timor Ferry Service. They maintained a tenuous sea link with Sparrow Force, the Australian commandos still fighting a guerrilla war on Timor. At that time KURU was commanded by Lieut John Grant, and VIGILANT by Sub-Lieut Alan Bennett, a young State Shipping Service officer from Western Australia. When not engaged on Timor sorties or other missions up and down the coast KURU and VIGILANT did boom patrol, a chore they shared with COONGOOLA, a luxury yacht which had belonged to the Southern Cross Windmill

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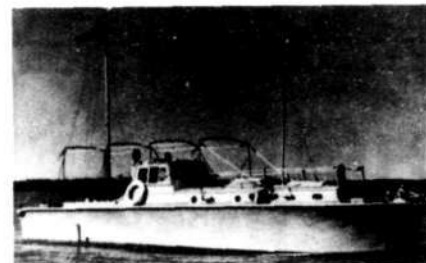
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HMAS VIGILANT. (Photo — RAN)

Company in Queensland, KIARA, a small pleasure launch, LARRAKIA, a peacetime coastal patrol vessel, and MORUYA.

Eric Sodersteen's lugger, IBIS, was one of four operating out of the port, the others being RED BILL, commanded by Lieut Lloyd Thornton, ARTHUR ROSE, commanded by Lieut George Stooke, and ST FRANCIS, the Roman Catholic mission lugger commanded by Lieut (Brother) Andrew A. Smith.



HMAS LARRAKIA as channel patrol vessel, Darwin. (Photo — R. Gillett)

Brother Smith, a consummate seaman and coastal navigator, was one of the most delightful and colourful characters on the Darwin waterfront. His long and eventful life had been about evenly divided between the Church and the navy. A slight man a little below average height, he was quiet, unassuming and soft spoken and a pair of clear blue eyes shone from a deeply tanned and weather-beaten face. His wiry frame carried not an ounce of surplus flesh and he could still pack the punch he learnt as a competent boxer in his lower-deck days. For as far back as the 1914-18 war the navy had been his life, since boyhood, from minesweeping in the English Channel to surveying on the Great Barrier Reef in HMAS GERANIM.

In later life he left the navy and joined the Catholic Church as a missionary, but the sea was still his life for he took over the mission lugger, ST FRANCIS, which was the sea link between Darwin and the missions at Bathurst Island and Port Keats. He had an intimate knowledge of the coastline and the fierce tide rips encountered. When the navy took over ST FRANCIS and commissioned her they took over Brother Smith and commissioned him Lieut Smith, RANVR. However, the Church still came first with him and whenever the Church needed him the navy had to wait.

A fifth lugger, MAVIE, the first to be commissioned, had disappeared by the time I reached Darwin, sunk during the Blitz by a direct hit while secured alongside PLATYPUS for fitting out. For months afterwards any naval stores missing in PLATYPUS were written off as

having been lost in MAVIE. She would have sunk in any case by sheer weight of equipment if she had carried all the stores that were written off in her.

WATO was a Fremantle harbour tug requisitioned by the navy in 1941 and sent to Darwin. During the Blitz her captain took her through blazing oil to get a line aboard the cargo ship BAROSSA and tow her clear of the burning NEPTUNA just before NEPTUNA blew up. A floating dock anchored up East Arm, three boom working vessels, MALANDA, a small pleasure steamer, and YAMPI LASS, an old scow from the iron ore port at Koolan Island on the Western Australian coast, completed the weird fleet we surveyed with Eric Sodersteen that morning.

In overall command of the navy in north-western operational areas was the Naval Officer in Charge, Darwin, a post held during the second half of 1942 by Commodore C. J. Pope. One of the old school of naval officers, Pope had seen a lifetime of service both in the Royal Navy and the Royal Australian Navy through two world wars. He joined the RN in 1902 and served from 1914 to 1919 in the first SYDNEY, transferring to the RAN in 1919. He had his headquarters and staff in the centre of the town.

Under him were three distinct commands in the port, each run by a brass hat who jealously guarded his preserve against encroachment by



HMAS KARANGI laying a boom defence at Darwin. (Photo — RAN)

either of the other two. The first of these was MELVILLE, the shore depot and its associated establishments, which was commanded by Commander Tozer. Then there was PLATYPUS and her clutch of small craft commanded by Commander Jack Donovan. The third command was virtually another little navy of its own, the Boom Defence, commanded by Commander A. E. (Chook) Fowler. Darwin had the world's longest boom, which was maintained by three boom working vessels, KANGAROO, KOALA and KARANGI. They operated from a depot at the boom wharf and Fowler's headquarters were in a substantial old stone building high up on the cliff overlooking the harbour.

(The above excerpt from "Trying to be Sailors" is reproduced courtesy of the author.)

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On trials and flying the Red Ensign. (Photo — RAN)



Leaving Sydney for exercises as HMAS VOYAGER. (Photo — RAN)



Pictured in the Port of Fremantle in the mid-1950s with HMS CHICHESTER (left) and HMNZS ROYALIST (right). (Photo — Vic Jeffery)



Builder's trials off the NSW coast. (Photo — RAN)

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BOOK REVIEW

BATTLE-CRUISERS — A HISTORY 1908-1948

by RONALD BASSETT
Published by Macmillan

Reviewed by PETER FARR

Ronald Bassett has written a fine book and a fitting testimonial to the ships that sprang from the folly of a decaying genius and seduced a generation. "Jackie" Fisher was a genius and like all true geniuses he was an unfathomable mixture of profound insight and irrational obsession. Newton believed in Alchemy: Fisher believed in Battle-Cruisers.

Battle-Cruisers represent an emotional zenith in modern ship design. They were fast, extremely handsome, large and hard hitting. If appeal wins wars then the Battle-Cruisers would have won all in sight. However, they had one problem: they were like a boxer with a glass jaw. They couldn't take punishment. Altogether Britain built sixteen, seven died in action (two as converted aircraft carriers) bravely without shame, fighting actions that they should never have been involved in.

This book chronicles the story of the Battle-Cruisers in accurate detail but focuses on two aspects: The contention that the ships were improperly used because they looked like battleships; and the contribution of the "people", those much forgotten, unsung heroes who paid such a price for the Battle-Cruiser folly.

Bassett shows how eventually the Battle-Cruisers came to be seen as ersatz battleships and how this meant that they were employed disastrously in that role. In 1907 Brassey's prediction:

"...an admiral, having 'Invincibles' in his fleet will be certain to put them in the line of battle, where their comparatively light protection will be a disadvantage and their high speed of no value".

When war came in 1914 Brassey's warning seemed to have been forgotten. At Heligoland Bight, Beatty brought his Battle-Cruisers out of the mist and dramatically fell upon the German light cruisers. To a victory hungry Britain the success was timely, but Beatty was lucky. The Falklands, that so-called classic Battle-Cruiser action, seemed to prove the theory. The ocean greyhounds had shown their metal. More sober analysis would show that Sturdee was nearly caught napping.

The Dogger Bank had had ominous for the future, but the naval establishment and the

public couldn't or wouldn't see them. By May, 1916 the seduction was complete. At Jutland Beatty hurled his "splendid cats" at the German Battle-Cruisers in an action that was actually a battleship action fought without adequate armour and at high speed. The result is history. Bassett takes us through it. The run to the south, INDEFATIGABLE gone then QUEEN MARY, "there seems to be something wrong with our bloody ships today," the run to the north, INVINCIBLE goes, 3304 men dead, 15 survivors from three ships. There was indeed something wrong with the ships and, as Beatty is supposed to have said, the system also.

By 1939 there were only three left, the remainder having been broken up or converted. Still they were used as the equivalent of line-of-battle ships. The "mighty 'Ood' took two 15" shells and was blown to atoms. Only three survivors. REPULSE died by a new predator, air power. The only survivor was RENOWN, significantly the only one that had undergone any sort of rational reassessment and implementation of protection needs. As history showed Fisher's folly was deadly. Bassett shows us all this and provides a wealth of historical and technical detail.

The other theme that Bassett weaves through his narrative is the contribution of the "people". The lower deck has been very badly done by in many histories and many writers, who should have known better, write as though they didn't exist. It was the "people" who enabled the whole thing to happen. It was they who were the heirs to two traditions, oddly accreted in the coal burning warships. They inherited the mantle of Nelson and Drake's people but they were also the culmination of the Industrial Revolution of Victorian England and it seems incongruous that these traditions should come together. Deeper analysis, however, shows that the two traditions were manifestations of the same characteristics that made Britain the jewel in the Western crown. It was they who paid the price of the Battle-Cruisers: over five thousand of them died. It is a pity that the story of the lower deck is still to be told, but it provides fertile ground for a perceptive social historian.

I enjoyed this book very much. I found it honest, objective and stimulating. A few criticisms exist, some typographical errors, a rather poor selection of photographs, but these are minor. The format is good with plan and elevations of each ship shown and Bassett includes an excellent, detailed select bibliography. He does raise one question in my mind relating to that perpetual conundrum: "Did the 18" guns belonging to FURIOUS go to Singa-

poré?" Bassett claims to have actually seen them there in 1946. Other distinguished authors have said they didn't go. Do any readers know?

If there is one general lesson to be learnt from Ronald Bassett's excellent Battle-Cruisers it's that even the most eminent naval authorities can sometimes get it totally wrong. We would be wise to remember it.

HIGHLY RECOMMENDED.

WARSHIPS OF THE UNITED STATES NAVY

by S. L. MORISON & J. S. ROWE

Published by Jones
Review Copy from Thomas Nelson
Price \$29.95

Reviewed by ROSS GILLET

After many years of neglect, the USN is blossoming again. The Reagan Administration's naval construction programmes have halted the downward trend in operational ship numbers established by the previous Carter and earlier governments. This has been achieved through a specific programme of new construction and the reactivation of moth-balled ships still capable of fighting in the 1980s.

Chief amongst the latter is the modernisation of the Iowa class battleships with new command and control facilities, Phalanx air defence guns, Harpoon and Tomahawk missiles, in addition to the original nine 16-inch guns to act as a counter to the appearance of the Soviet's Kirov class of battle-cruiser. New warships now in service or recently ordered include a continuing programme for Ohio class ballistic missile submarines, the arming of the Los Angeles and earlier classes of attack submarines with the Tomahawk cruise missile systems, the placing of orders for two 91,000 ton carriers in 1982/83, new Ticonderoga class missile cruisers and Arleigh Burke class missile destroyers, as well as new types of amphibious ships and the creation of an effective rapid-deployment force.

The number of war-built combatants remaining in the navy inventory has reduced to less than a dozen, including two gun cruisers, SALEM and DES MOINES. Due to a lack of fleet flagships, proposals have been made to reactivate one of these ships as the Sixth Fleet Flagship, despite the fact that both cruisers were completed in 1948/49 and were laid up during 1959/61.

In the area of auxiliaries the USN has now taken delivery of the three former Ness class stores ships, declared redundant by the Royal Navy. Like the front-line warships, a new building programme has been instituted for ammunition, ocean surveillance, fleet replenishment, fast combat support and salvage ships. At the same time, a number of 1950 vintage support ships have been modernised and reactivated to replace World War II-built tonnage.

"Warships of the United States Navy" provides a complete picture of the American fleet today and its plans for the future. The authors have illustrated their book with an excellent selection of photographs from the impressive carriers and battleships to the insignificant but still important harbour support craft. Good reading and good browsing.

THOROUGHLY RECOMMENDED.

WARSHIP 29

Published by Conway Maritime Press
Reviewed by "GAYUNDAH"

One of the most interesting issues in its eight years of publication, Warship 29 includes twelve separate articles. Some of the more unusual describe and illustrate the development of HMS UNICORN, the aircraft maintenance ship designed as a carrier during 1937-39, and the story of the Chinese battleship fleet acquired by that nation during the 1880s.

The importance of the merchant ship at war is highlighted in an article summarising a forthcoming Conway publication describing the merchant ships taken up during the Falklands conflict. In a recent issue of "The Navy", Australian semi-submersible attack craft were described and illustrated. A good comparison with similar craft of the Imperial Japanese Army has been printed in the current Warship.

Warships Wings describes the Sopwith Pup, an aircraft which the RAN was involved with during the Great War.

RECOMMENDED.

RING OF FIRE

Australian Guerrilla Operations Against the Japanese in World War II

by DICK HORTON

Published by The MacMillan Company of Australia Pty Ltd, 1983
Price \$17.95

Reviewed by BRIAN ALSOP

The Allied Intelligence Bureau (AIB) was formed on 6th July, 1942, to control and co-ordinate the activities of such "special operations" organisations as the Inter-Allied Forces Dept (IAFD) and the Z Special unit which were formed in Australia during 1942.

Their aim was the organising of guerrilla warfare, subversive activities and sabotage in those areas occupied by the Japanese, to such an extent that the Japanese, not knowing where the next attack would come from, would find themselves encircled by a Ring of Fire from which there would be no escape. The IASD was renamed Special Operations Australia (SOA) in 1943, and in January, 1944, became the Services Reconnaissance Department (SRD).

"Ring of Fire" by Dick Horton is the first book published which has attempted to unbrood the details of secretive operations conducted against the Japanese by the SRD during the Second World War. In 164 pages, Horton, with the aid of six maps, outlines details of some of the key operations

conducted, from the training raid "Scorpion" against Townsville Harbour by members of Z-Special unit in June, 1943, to the two raids on Singapore, Operations Jaywick and Rimau, to operations in Borneo and Timor. Those operations detailed in "Ring of Fire" serve to illustrate that, as intended by the SRD, a "ring of fire" was indeed thrown around the Japanese so successfully that no escape was possible from such operations. The Japanese clearly had no answer to the activities of the SRD.

The SRD also operated its own small fleet of vessels, ranging in size from 125 foot wooden cargo ships originally built for the Australian Army and used as Mother ships, to the Snake class SRD vessels, to the KRAIT, to 62 foot launches, to luggers and small landing craft. From 1944 all the larger SRD vessels were commissioned as HMA Ships.

However, the most unusual craft used by the SRD were their small specialist attack and transport craft — the folboats, Sleeping Beauties, Weiman, the Wellfreighter and the Witch. Although little detail is given by Horton in "Ring of Fire" about the specifications of these unusual craft, his accounts of SRD training and operations give some idea how they were used.

By the end of the Second World War, the Services Reconnaissance Department and its offshoots had grown to a force of 1500 officers and other ranks. They had inflicted 1700 known casualties on the Japanese, for a cost of approximately 112 lives, and had raised and equipped over 6000 guerrillas in Japanese-occupied territories.

"Ring of Fire" by Dick Horton is recommended to anyone interested in Australian military or naval history, since it describes some of the most unorthodox joint service operations that have ever been conducted.

AUSTRALIAN & NEW ZEALAND WARSHIPS 1914-45

by ROSS GILLET
Published by Doubleday Australia Pty Ltd
Reviewed by VIC JEFFERY

The recently published "Australian & New Zealand Warships 1914-45" is the most comprehensive book ever published on the naval forces of these two nations covering the major significant periods of two World Wars.

Illustrated by more than 650 photographs and more than 100 line drawings the 360-page book is superbly laid out in three parts — Australia, New Zealand and Appendices.

Each part is carefully researched by Australia's youngest, and a highly respected naval historian and author, Ross Gillet.

The first part covers the Royal Australian Navy in three chapters: the Great War 1914-1918, the Mid-War Period 1919-1939 and the Second World War 1939-1945.

The Australian Army's Small Craft are not forgotten in Chapter Three, ranging from 16 foot powered dinghies to the ill-fated hospital ship CENTAUR.

Following the Army Small Craft section is the Royal Australian Air Force Marine Section which is covered in great detail. This section covers everything from rescue launches through to 350 ton motor lighters.

Part Two traces the development of the navy in New Zealand, under the New Zealand Government 1914-21, New Zealand Division of the Royal Navy 1921-41 and lastly the Royal New Zealand Navy 1941-45.

The Appendices listed in Part Three are most comprehensive and include RAN Shipbuilding Policy and New Construction 1939-45, Losses of RAN Ships, RAN Pendant Numbers, Naval Ordnance and Shipboard Aviation.

"Australian & New Zealand Warships 1914-45" describes and illustrates more than 900 warships and auxiliaries which served with the RAN and RNZN and its predecessors.

This book is one of the best ever published on these areas of naval history and is destined to become a collector's item. Moderately priced at only \$35 for a work of this type.

THIS BOOK IS HIGHLY RECOMMENDED.

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NAVY LEAGUE DIVISIONAL & CADET NEWS

QUEENSLAND

History was made for the Queensland
Division of the Naval Reserve Cadets on
September 24 last when for the first time cadets
from each of the State's twelve units came
together on a parade ground at the one time.
The occasion was the consecration and presentation
of the new Colour to the Division by His
Excellency Commodore Sir James Ramsay,
KCMG, KCVO, CBE, DSC, Governor of
Queensland at the army's Gona Barracks in the
Brisbane suburb of Kelvin Grove and it was
most fitting to have every unit, stretching as
they do from Cairns to the Gold Coast,
represented.

Amongst the distinguished guests present at
the ceremony were: Capt E. T. Keane, ADC
(NOC, Qld); Cmdr R. A. K. Walls, CO,
HMAS TOBRUK; Cmdr R. Poulton, RANR,
CO Port of Brisbane Division; L. Cdr N. A.
McPherson, RAN, representing Director of
Naval Reserves and Cadets; Surgeon
Commander A. Robertson (Retd), Qld President
Navy League; Cmdr N. Pixley (Retd), RANR,
high ranking representatives of the other
services and Office Bearers of the Naval Association. As well, some three hundred parents,
relatives and friends of the cadets, officers and
instructors also attended.

The appearance of the cadets, both boys and
girls was first class at the presentation and the
drill particularly that of the Colour Guard
could not be faulted. Indeed His Excellency
graciously made the point at a Cocktail
function hosted by the Divisional Senior
Officer, Cmdr Ian Fraser, NRC, following the
Presentation, that he had never attended a
finer cadet parade. Consequently congratulations
are in order for Officer of The Guard L.
Cdr A. Schwartz (CO, TS Gayundah) and
Parade Commander Lieu K. Saville (CO, TS
Norfolk) for their efforts in training the cadets.
Special mention should also be made to
POQMG, Gus Dundas from HMAS Moreton
for his attention to preparing the parade party.

The need for the Consecration and Presentation
of the Colour arose from the fact that
when the Australian Sea Cadets were formed
under the auspices of The Navy League in 1954
their Sea Cadet Colour was subsequently
presented to them by Cmdr N. Pixley, RANR
(Retd), the President of the League at that time
in 1959. However with sponsorship for the
cadets assumed by the RAN in 1974 and the
change of name to the Naval Reserve Cadets
new colours had to be prepared.

All procedures relevant to the changeover
had been completed by 1983 and the excellent
parade of September 24 saw a fitting climax to
the changeover.

A particularly significant part of the



His Excellency presenting the Divisional
Colours.

afternoon's events was the parading of the Old
Colour for the last time and its presentation to
Cmdr Pixley by the Cadets' Senior Officer for
Queensland with the request that Cmdr Pixley
act as custodian of the Colour for the time
being. This event has special meaning when it is
pointed out that Cmdr Fraser was one of the
Cadets on parade when Cmdr Pixley made the
original presentation in 1959.

Overall 250 Cadets took part in the parade
including the Colour Guard of 60. The Cadets
were led by a contingent of 50 Officers and
Instructors. Music was provided by the Naval
Reserve band conducted by L. Cdr Trevor
Fenlon, RANR and the Division is most
grateful to Brigadier Sam Harrison, Senior
Army Reserve Officer for Queensland,
commanding 7 Brigade who are based at Gona
Barracks and who arranged for the excellent
facilities to be made available for the occasion.

VICTORIA

TS BARWON'S CO TO RETIRE

After an association with the Training Ship
Barwon spanning 30 years, Lieutenant
Commander Bob Appleton is retiring from the
Royal Australian Naval Reserve Cadets.

L. Cdr Appleton attended his last parade of
this very successful unit on Friday, 9th

December at TS Barwon's annual breakup and
presentation night. This was to be held at the
10th Mod Regt drill hall, Myers Street.

Joining the Unit in 1953, L. Cdr Appleton
was Commanding Officer from 1954 to 1958,
served for a brief period on "Barwon's"
committee until the pressure of business
prevented further involvement.

Reappointment to the position of Com-
manding Officer in 1978, he has led the unit
through its most successful 5½ years in its 51
years of existence.

Lieutenant Commander Appleton said that
one of his projects in 1984 would be to write
the history of TS Barwon. "At the 50th
Anniversary celebrations of the unit held last
year," he said, "so much information came my
way that a history became a distinct possibility.
If there are any people who have any
information, newspaper cuttings, photographs
or any facts about the Training Ship
'Barwon', please contact me on (052)
43 1066. Every snippet of information will
help."

Plain "Mr" Bob Appleton also wants to
enjoy spending more time with his young
daughters, Katrina aged 11 and Rebecca aged
7. "Both keen swimmers, they'll keep me busy
... and happy," he added.

Lieutenant Commander Appleton's
successor will be Lieutenant Dennis Treagus.
"Following a Skipper like L. Cdr Appleton will
not be an easy sail," Lt Treagus said. "But
with the enthusiastic staff of officers and
instructors that are in 'Barwon', we will be
able to maintain the high standards that
have been set."

L. Cdr Appleton says that the ship is in good
hands, the training staff are keen and need only
to continue pulling their weight to keep
"Barwon" at or near the top for many years to
come.

NAVAL CADETS PRESENTATION NIGHT

Over 250 parents and friends of the ship's
company of the Geelong-based Naval Reserve
Cadet Training Ship BARWON, enjoyed the
final parade and presentation night held in the
10 Mod Regt Drill Hall.

Among the guests were:

The Mayor and Mayoress of the City of
Geelong, Cr and Mrs Ian Inglis; The Mayor of
the City of Newtown, Cr Jan Laidlaw; the
Deputy President of the Shire of Bellarine and
his wife, Cr and Mrs Wal Nairn; Cr and Mrs
Rod Charles of Geelong West; Geelong City
Councilors, Cr and Mrs Howard Glover and
Cr and Mrs Jim Fidge; the Deputy Senior
Officer, Naval Reserve Cadets, Victorian
Division, L. Cdr and Mrs Joe Dows; Chief
Superintendent Max Porter, Barwon Police
District; The President of RSL, Mr and Mrs
Keith Mortimer; Captain and Mrs Bill Lewis,
Mrs F. S. Curnow, Mr Jim Baker, Mr and Mrs
John Barrett and Mr and Mrs Rob Robbins.

Opening the proceedings, the Executive
Officer of TS BARWON, Lieutenant Dennis
Treagus, said that there was a strange set of cir-
cumstances as the Guest of Honour was none
other than the Commanding Officer of the
Unit, Lieutenant Commander Bob Appleton.
"The entire ship's company would have it no
other way," he said. "As this is L. Cdr
Appleton's last official parade before his

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retirement from Naval Reserve Cadets on January 10, 1984."

True to Naval Tradition, L Cdr Appleton was "Piped aboard" at 2000 precisely to the accompaniment of the shrill sounds of the Bosuns' whistles, the Ship's company standing stiffly to attention and the sharp order of the commander of the Guard of Honour, "GUAAARD ... PREEEEZE ... ARMS!!"

After returning the salute, then inspecting the guard drawn up in his honour, L Cdr Appleton presented the trophies to the successful cadets and divisions.

In his address, L Cdr Appleton said that the night was the end of a very hard working year for all cadets, officers and instructors. "But that is the only way to success," he said. "To the cadet Petty Officers and Leading Seamen," L Cdr Appleton said, "find the talents of your crews, harness them to the best advantage then lead by your own example." "Remember, as you sow, so shall you reap," he added.

Before formally handing the Training Ship BARWON over to the new Commanding Officer (Lieutenant Dennis Treagus), Lieutenant Commander Appleton gave a short resume of Lieut Treagus' Naval career.

L Cdr Appleton was presented with an engraved plaque of HMAS BARWON's Crest from the officers and instructors, an original painting of a "T" Class submarine from the Unit Committee and a beautifully inscribed ship's bell from the cadets of the BARWON.

The entire ship's company then broke ranks, surrounded their outgoing CO and sang "We'll Meet Again". With a smile of happiness and tears in his eyes, Lieutenant Commander Appleton then shook hands with every cadet present and spoke a few words of encouragement and advice to each one.

Supper was then served.

TS BARWON AWARD NIGHT FRIDAY, 9th DECEMBER, 1983

AWARD WINNERS

Best Recruit, 1983: Snn Cara James, East Geelong, Belmont.

Best Able Seaman, 1983: Lsmn Jamie Newenhuus, Norlane.

Best Senior Sailor, 1983: PO Lochiel Crafter, Highton.

Marksmen of 1983: Lsmn James Guthridge, Newcomb.

Best Attendance, 1983: Snn Kathy Hunter, Newcomb.

Top Coxswain, 1983: OO Sean Buyl, Bannockburn.

Most Improved Cadet, 1983: Lsmn Donald Storrar, Newcomb.

Most Outstanding Cadet, 1983: PO Sean Buyl, Bannockburn.

Most Enthusiastic Cadet, 1983: AB Stephen Carter, Inverleigh.

Excelling in Seamanship, 1983: PO Jeffrey Paul, Newcomb.

Cadet of the Year, 1983: PO Sean Buyl, Bannockburn.

Inter-divisional Competition: Won by Quarterdeck Division.

Inter-divisional Shoot: Won by Mainport Division.

Inter-divisional Sports Trophy: Won by Quarterdeck Division.

Crit and Determination Trophy: Able Seaman Stephen Carter, Inverleigh.

Special awards were made to:

PO Sean Buyl, PO Jeffrey Paul, AB Robert Aitken, AB Andrew Myers (for their part in winning the inter-unit sailing regatta on Corio Bay in November).

April, 1984



LIEUT Dennis Treagus (left) takes the wheel from LCDR Bob Templeton.

(Photo — Courtesy "Geelong Advertiser")

Mention was also made of PO Lochiel Crafter and AB Peter Bowers who have been successful in their quest to enter the Royal Australian Navy as Cadet Officers. They both leave shortly for HMAS CRESWELL to commence their training.

On the day that Lieutenant Commander Bob Appleton retired from Navy life, the 10th January, 1984, a cadet of TS BARWON entered the RAN. He is Leading Seaman Adrian Duggan of Hamlyn Heights. Lsmn Duggan was presented with miniature Submarine Dolphins (the badge proudly worn by trained submariners) by L Cdr Appleton with the instructions: "To carry on where I left off".

NAVY LEAGUE YACHT RACE

Again one of the highlights of Navy Week in Victoria was the sailing of the Navy League Yacht Race for the Geoffrey Evans Cup.

As usual the excellent organisation and

THE NAVY

hospitality of the Royal Yacht Club of Victoria made the event a resounding success.

The race, an evening event between 6 and 7.30 pm, in its closing stages run against a backdrop of the lights of Port Melbourne and the city, and is a sight to behold.

Participants and guests in the race and at the dinner/reception thereafter included 20 from HMAS Cerberus, 12 from Lonsdale and lesser numbers from Yarra, Stuart, Navy Office and Naval Reserve Cadets. Also attending was Mary Tanner, the State President of the Naval Association. Commander Alex Baie, Captain of the Yarra, took part and used his ship's boat as the start boat.

The placetellers on handicap were:
1. Metung, Skipper W. C. Woodward.
2. Doris V, Skipper R. Ware.
3. Red William, Skipper W. Hales.

The presence of the Federal and State Presidents aboard ROAMA and MOANA respectively, failed to gain a place for those boats.

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SBLTs Sue Miller and Bruce Turner, TS MILDURA with cadets at the recruiting drive, November, 1983. (Photo — PO Eric Tomlinson NRC)

TS MILDURA

1983 has been an active year for Training Ship MILDURA. After ten years with the Unit the Commanding Officer, Lieut Harry Goodall, moved to the unattached list.

The Executive Officer, Lieut Scott Smith, was appointed CO while the Unit received its first woman Officer with the promotion of PO Sue Miller to Sub Lieut. Sub Lieut Bruce Turner is now Executive Officer.

Several very successful weekend camps were held "afloat" aboard the Murray River excursion Paddle Steamers PS WANERA and PS COONAWARRA, courtesy of the WANERA Shipping Co of Mildura. Full ships' routine including standing all night gangway watches, painting and cleaning ship, preparing meals etc were carried out by Cadets during these Murray River weekends.

To show appreciation of the generosity of the Wanera Shipping Co in allowing TS MILDURA Ships Company to use their vessels, the CO Officers, Instructors and Cadets of TS MILDURA presented Captain Leon Wagner, Master of the Paddle Steamer WANERA with a new Murray River Flag. During these weekend camps, the Naval Reserve Cadet ensign was flown from the paddle boats. During school holidays the Wanera Shipping Co has made two berths available aboard PSs COONAWARRA and WANERA for TS MILDURA Cadets who thus gained experience aboard these river boats as deck hands, stewards, etc.

The co-operation of the Wanera Shipping Co is gratefully acknowledged.

Possibly the highlight of the year was a combined (with the Mildura Flight of the Air Training Corps) dinner at Mildura's Grand Hotel in October, 1983 when Chief Petty Officer W. A. T. Stewart completed twenty-five (25) years' service with TS MILDURA. Tommy Stewart joined TS MILDURA in 1956 after war service in the RAN (HMAS PLATYPUS, VENDETTA, ADELAIDE and others). It was a memorable occasion with Commander Jim Speed, RAN, presenting the Admiral's Commendation to Chief Stewart. His retirement from TS MILDURA was both a happy and sad occasion.

The final activities of the year were a display, recruiting drive and fund-raising car wash at the Mildura Centre Plaza — Target Shopping Complex on the weekend of 19th November.

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This was led by Sub Lieuts Miller and Turner and Petty Officer Eric Tomlinson while the Parents Committee organised and staffed the car wash assisted by Cadets. This event has led to increased public interest in TS MILDURA and four (4) new potential recruits fronted up on the Friday night following the display.

While this was being held in Mildura, the CO of TS MILDURA, Lieut Scott Smith, NRC, drove with three Cadets the 574 kilometres to take part in the Annual NRC Regatta at Geelong where the Mildura crew acquitted themselves well considering their lack of blue water experience! Cadets from TS MILDURA recently built and entered two rafts in a raft race held on the Murray River at Mildura.

The year concluded for TS MILDURA with a weekend sailing camp at Lake Hawthorn over the weekend of 9/10/11th December and finally a function for the Cadets arranged by the Parents Committee on Saturday, 17th December, 1983.

The "ADA" Project Abandoned

It was announced to the public on January 19, 1984 that the TS VANCOUVER Naval Reserve Cadets have abandoned their ambitious project to restore the old sailing vessel ADA. The cadets announced late last year plans to restore the old boat and use it for

teaching purposes, but they have withdrawn from the project due to lack of finance.

Everyone involved in the project regretted abandoning the plans, but in-depth studies into the vessel and cost of renovation were beyond the resources of the cadets and the Navy League-Albany Branch. Initial costs to get ADA into a seaworthy sailing condition was estimated at over \$4000.

Zodiac Rescue Craft

The Navy League-Albany Branch and TS VANCOUVER have recently purchased a 12 foot (5.6 man) Zodiac rescue craft equipped with a 25 hp Mercury motor, for use by the Unit as their safety/rescue craft. The motor is specialised for safety and some features included are a safety guard surrounding the propeller, a deadman's handle and controls on the hand piece.

WESTERN AUSTRALIA

TS VANCOUVER ALBANY

Annual Inspection — Cadets Parade for Colours

On Saturday, 5th November, 1983 Albany's Naval Reserve Cadets put their best feet forward for their annual inspection — which could win them State colours for the next twelve months.

The 45 cadets including 10 girls were inspected by Commander (NRC) Geoff Curran (also in attendance was the Cadet Liaison Officer (RNL) Lieutenant Cops).

The cadets mounted a parade beside the brig Amity before a large crowd of parents and friends, who were delighted by the precision marching, particularly of the guard, all of whom paraded in magnificent fashion.

Commander Curran and Lt Cops then spent some considerable time observing the cadets at sailing, rigging and other organised activities including a fire drill exercise.

The cadets' Commanding Officer, Lieutenant (NRC) Bill Iyle, explained that marks awarded at the end of the yearly inspection which was being carried out now throughout the State would decide which of WA's eight units is to carry the State colours.

Albany won the competition about three years ago.

Over sixty people attended this year's Annual Inspection.



Members of TS VANCOUVER on parade.

THE NAVY

April, 1984

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