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Message from THE MINISTER FOR DEFENCE

The Honourable D. J. KILLEN, MP

One of the dominating aspects of Australia's political geography is its isolation. It is an island, separated by seas from all other lands, and this fact must influence our defence thinking. In such a setting the importance of the Navy and the men and women who serve in it can never be underestimated.

Self reliance is not a phrase to be used merely in a political sense. It is a very real description of what must be our attitude to our position in the world. It means a continuing acceptance of our own responsibilities and a respect for the people who will shoulder the burden of them.

The Navy League plays several important roles in the defence scene. One of them is the communication of facts and ideas to the Australian people, the increasing of public awareness of the vital necessity of a strong naval power. Once a people become indifferent to their liberties, and the need to maintain them, they are on the way to losing them.
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A Message from the
Chief of
Naval Staff
Vice-Admiral
A. M. SYNNOT, A.O., C.B.E.

Australia is an island continent almost centrally placed in the largest body of water on the globe, the Indo-Pacific Ocean basin. It is well removed by sea from any other large land mass. The dominating effect of this unique geographical situation is reflected in our history, in our trade and in our relations with the rest of the world today; it will continue to have a major influence on our future.

Geography, the first of Mahan's elements of seapower, is still the basis of strategy. Despite many changes in technology and international situations, the relationship of seapower to geography has remained constant. This is particularly noticeable when one looks at Australia's place in the world.

When Britain and the USA provided the main military seapower to guard Australia and her strategic interests, it was not surprising that some Australians did not appreciate the significance and the need for our own naval power. Now that we are shaping a more independent stance, it is imperative that there is a wider understanding of seapower and of maritime strategy; and of their bearing on Australia's security.

This year our usual Navy Week activities have been reduced to allow participation in a number of other Defence Force activities especially programmed to mark Her Majesty's Silver Jubilee. The effect of these changes will be to increase the opportunities for Australians to see more of their navy, but not necessarily during Navy Week.

I place great importance, as the League does, on a better understanding of the Navy by those it exists to serve. Closer contact with the community at large can only be of mutual benefit.

For its part in making seapower more widely and properly understood and for its support of the Navy, I would like to take this opportunity to thank the Navy League on behalf of the Navy as a whole. Our best wishes for your continued success.
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Annual Message from ... The Federal President of the Navy League of Australia

Commander
F. G. EVANS, MBE, VRD, RANR

The principal aims of the Navy League are to train young Australians to understand the sea, and to urge upon all Australians the need to keep a watchful eye on the maritime security of their country. In one way or another I have referred to these aims in each of the six annual ‘messages’ written for THE NAVY magazine.

As one who has had the opportunity of observing and participating in Australian public life for the past twenty years or more, no one could be more aware of the advantages this country offers its people.

Yet in 1977, with thirty-two successive years of freedom to consolidate our good fortune, it seems to me that Australia is almost as much at risk from its own quarrelling inhabitants as it is from an external aggressor; indeed the two are related.

Internal feuding and bitterness, selfishness — these are not the characteristics of a strong and healthy nation; rather they are the symptoms of weakness and decay if history is any guide. The eventual fate of such nations is well known.

We need a good dose of commonsense, and I hope my Navy League colleagues will help ensure that it is injected into our affairs.
The USS WYOMING, one of the four dreadnoughts built in the 1906-1909 programme. She and her sister ship ARKANSAS had twelve 12 inch guns; the other two, FLORIDA and UTAH, had ten.

By the end of the war, the U.S. Navy was overloaded with obsolete battlecruisers. A Naval Disarmament Treaty in 1922 forced the navy to scrap most of these ships, but left the way open for development of new weapons which had proved their worth in the war — the submarine and the aircraft carrier. Shown above: the final moments of the MICHIGAN, commissioned 1910, scrapped 1925.

USS SARATOGA was initially constructed as a battlecruiser but before completion was converted to a fleet aircraft carrier in 1927.

The Washington Naval Agreement of 1922, halted the naval arms race, established a twenty year age limit before replacement ships could be built and tabled a maximum displacement of 35,000 tons for all new construction battlecruisers and battlecruisers. The Treaty also detailed the allowable tonnage for each of the five participating nations and set out restrictions on the modernisation of existing ships.

For the United States Navy the Treaty meant the cancellation of the six South Dakota and four Lexington class ships, as well as the Washington, a unit of the Colorado class. The South Dakota class were designed to displace some 10,000 tons more than the preceding Colorados, mounting four triple 16 inch 50 calibre guns, as well as four 6 inch 53 calibre and eight 3 inch 50 calibre guns. Although authorised in 1916, construction had been delayed to incorporate any improvements resulting from war experience.

Had the ships been completed as planned, the United States would have possessed the largest and most powerful dreadnoughts afloat. On 25 October, 1923, the first four ships were sold. The last pair were sold on 8 November, and the entire class broken up in their building slips.

The six ship Lexington class were the first battlecruisers designed for service with the United States Navy. Original plans had called for a main armament comprising ten 14 inch guns, but it was finally decided to fit eight larger 16 inch guns. In August, 1922, four of the class, Constellation, Constitution, Ranger and United States were cancelled and ordered to be scrapped on the slips. Fortunately, the Treaty terms allowed conversion of two of the unfinished hulls to aircraft carriers. Approval was given for the conversion of Lexington on 25 November, 1922, and Saratoga earlier on 30 October. Construction commenced to the new design almost immediately.

Lexington and Saratoga joined the fleet in December and November, 1927, respectively. Their main armament comprised eight 8 inch 50 calibre guns in four twin mounts, two before the island and two aft of the massive funnel structure. They were supplemented by another twelve 6 inch 53 calibre and eight 3 inch 50 calibre guns. Although authorised in 1916, construction had been delayed to incorporate any improvements resulting from war experience.

The Washington Naval Treaty provided that modernisation of existing ships was to be limited to an increase in displacement of not more than 3,000 tons. Commencing in 1924, with the twelve year old Ohio class, some ten other battleships were to be modified and rebuilt under an eleven year programme designed to extend the operational career of the older vessels and to include the latest improvements.

With her sistership Utah, Florida received additional 3 inch guns, an aircraft platform fitted onto "C" turret (amidships), and conversion from coal burning to oil fuel. Both ships received their second life and were modernised and rebuilt under an eleven year programme designed to extend the operational career of the older vessels and to include the latest improvements.

During the same year, modernisation commenced on Nebraska and Oklahoma. Within twenty-four months the two battlecruisers had been converted to oil fuel and received additional armour protection (including underwater). Two aircraft platforms were fitted, one on "C" turret as had become practice, and the second located aft on the poop deck. The former was later removed. The overall cost for both modernisations totalled approximately $14 million.

By 1926, eight battlecruisers had received their second life and were serving together in the Pacific and Atlantic fleets. Occasionally the ships joined forces for a massive show of strength and battle practice manoeuvres were held regularly.

In January, 1931, Wyoming commenced exercises carrying US Marines in the first amphibious operations to be undertaken jointly by the two services.
Wyoming continued in a training role and in 1944 was defensively re-armed with fourteen 5 inch and seven 20mm guns.

In comparison to Wyoming, the Japanese Ha! underwent complete reconstruction and modernisation from 1937 to 1940. She saw service in World War II, including Ceylon, Midway and Guadalcanal, before being sunk on 13 November, 1942. Iron Duke, like Wyoming, remained in her demilitarised state throughout the war and was lastly used as a stationary depot ship.

Emerging from dockyard hands in 1931 were the 36,500 ton Pennsylvania and Arizona. As well as receiving increased armour protection and aircraft platforms, the two ships introduced a new modern gunnery control system combined with a greater range of fire for their main 14 inch guns.

Utah commenced operations as a remotely controlled target vessel in 1932. All guns were removed, but the 12 inch turrets remained on board. Three years later she was designated a training ship, in that role served until 7 December, 1941, when she was sunk at Pearl Harbour by a Japanese submarine. Salvage was undertaken, but eventually abandoned, leaving Utah in her gravest of days.

New Mexico, 1931-33, Mississippi, 1931-32, and Idaho, 1933-34, were the final battleships to undergo reconstruction, as they had been completed late, during or immediately after World War I. The follow-on Tennessee and Colorado classes were regarded as excellent sea-going vessels and were not scheduled for any modernisation until the late thirties and early forties. Money had in fact been allocated for these vessels in April, 1939, but work had not commenced due to the delicate international situation threatening war at any moment. The Navy feared the worst and set about to ensure the availability of some proportion of their modern capital ships in dock and unable to be used against an aggressor on the East Coast.

The first battleships ordered for the navy for over 20 years were laid down in October, 1937, and June, 1938. Changes in the final design, together with the late delivery of materials, caused delays with their initial construction. Mounted on a displacement of 35,000 tons were nine 16 inch guns in three triple mounts, twenty 5 inch dual-purpose and four quadruple anti-aircraft guns. The main 16 inch turrets weighed 650 tons. Three aircraft were carried and flown off the decks via two catapults located on the stern.

North Carolina and Washington were approved for construction on 3rd June, 1938, as replacements for Texas and New York which were in line for replacement after serving twenty years — a condition of the Washington Naval Agreement. In service, the outbreak of war necessitated that both the older ships be retained, providing a battleship strength of seventeen vessels.

North Carolina and Washington commissioned in 1941. The battleships were stationed in the Atlantic and Pacific Oceans and on 7 December, 1941, were operating around, or based at: Pearl Harbour, Arizona, California, Maryland, Nevada, Oklahoma, Pennsylvania, Tennessee and West Virginia; Iceland, Idaho and Mississippi; Maine, Arkansas, New Mexico and Texas; and on the eastern coast, North Carolina and Washington. In Pearl Harbour and the Pacific, New York was based at California, while New York was at Norfolk.

Of the eight ships moored at Pearl Harbour in Battleship Row only Maryland, Oklahoma and Tennessee escaped serious damage and Nevada was beached before sinking. California and West Virginia both sank in shallow waters, Arizona, maintained as a war memorial, and the capsized Oklahoma under salvage to September, 1944, saw no further service.

The three battleships successfully salvaged were all rebuilt at the Puget Sound Naval Yard, at Bremerton on the American west coast from 1942 to 1944.

Joining the fleet between March and August, 1942, were the shorter hulled battleships South Dakota, Indiana, Massachusetts and Arizona, measuring almost 50 feet less than the veterans New York and Texas, and missing a single 16 inch calibre and 5 inch 38 calibre guns. The South Dakotas also displaced 35,000 long tons and possessed a top speed in the vicinity of 27 knots. Maximum armour protection was 18 inches thick.

The four South Dakota ships were ordered in December, 1938 and April, 1939, as replacements for the old dreadnoughts South Carolina, New Jersey, Missouri and New York.

In early August, 1942, the new Iowa, New Jersey, Missouri and Pennsylvania for the initial onslaught carriers then in service.

The 1920 vintage battleship Tennessee returned to the Puget Sound Navy Yard in September, 1942, to undergo extensive modernisation. Emerging from reconstruction in May, 1943, she boasted an impressive array of armament comprising thirty-two 14 inch and sixty-five 5 inch guns, complemented by over forty 40 mm and forty-three 20 mm anti-aircraft guns.

Tennessee's superstructure was completely rebuilt including armoured control tops while a larger single funnel replaced the two smaller ones. A comprehensive overhaul was undertaken on her engines and a new up-to-date array of radars installed.

On 8 November, 1942, Massachusetts, in company with the new Iowa, New Jersey and Pennsylvania, supported the North African landings. Attention switched to the Pacific on 12 December, when Guadalcanal came under attack from Japanese forces. The naval battle which followed ended in the loss of the battleship Hiei and battleships Kirishima, both sunk following their confrontation with the South Dakota and Washington. South Dakota was temporarily forced out of the battle after suffering power failure.

The last generation of American dreadnoughts were named Iowa, New Jersey, Missouri and Wisconsin. Ordered in 1940 at an approximate cost of $100 million each the Iowa class were the fastest battleships constructed for the United States Navy. The main armament again comprised 16 inch triple and 5 inch twin mounts. Extensive anti-aircraft batteries complemented the larger calibre guns. In true dreadnought tradition armoured decks were 11% inches thick and armoured turrets 18 inches thick. Protected by an eleven inch belt, the ships were further protected from Japanese aircraft. The Iowa class was to carry the all important radar ESM-1.5 on the Iowa, and ESM-1.2 on the New Jersey.

Sixteen battleships, including the new Iowa, New Jersey and Wisconsin, were present during the December, 1942, Battle of Guadalcanal. They supported the North African landings, some 1,5000 miles steaming at 12 knots. First of the class to commission was Iowa on 22 February, 1943, followed by New Jersey on 23 May.

From July to December, 1943, Iowa patrolled the North Atlantic and carried President Roosevelt on the trans-ocean leg of his voyage to Tehran and Yalta. In January, 1944, both ships joined Washington, Indiana, Massachusetts, New Mexico and Pennsylvania for the initial bombardments at Kwajalein, prior to amphibious landings by the 5th Fleet.

The planned follow-on five ship Montana class battleships were cancelled on 21 July, 1943, before construction had commenced.

The three old stalwarts, Arizona, Nevada and Texas bombarded the French coastal areas around Normandy immediately prior to and during the massive D-Day amphibious landings. In retaliation the German shore batteries replied, but inflicted no damage. During August, 1944, the three ships joined the Southern France invasion, shattering the enemy's coastal defences and completing preparations for the invasion of France.

In early August, 1945, saw further action at Iwo Jima, Okinawa and Wake Island. The three battleships, including two Amphibious landings, some 1,5000 warships, including nine fast battleships, provided the necessary escort and fire support duties.

The year 1945 saw further action at Iwo Jima, Okinawa and Wake Island. The three battleships, including two Amphibious landings, some 1,5000 warships, including nine fast battleships, provided the necessary escort and fire support duties.

USS COLORADO in February, 1942. This photograph was taken prior to her modernisation. Note the early type radar atop WEST VIRGINIA'S foremast.

Page Ten

THE NAVY

Aug/Sept/Oct, 1977

Page Eleven

THE NAVY

Aug/Sept/Oct, 1977
August, 1945, and 17 February, 1947, respectively. Despite being seventy-three percent complete, Kentucky was broken up from February, 1959, after various plans to convert her to the first guided missile battleship (B.B.G.1) were abandoned.

With the war now over, decision was reached that the large battleship fleet was to be mothballed or sold. Arkansas, New York, Nevada and Pennsylvania all paid off during July and August, 1946, and were used as atomic test ships at Bikini. Both the Tennessee and Colorado class vessels decommissioned for the last time from January to April, 1947.

Missouri received a comprehensive overhaul to prepare her for the inactive fleet at the Puget Sound naval shipyard. She paid off on 24 March, 1951, and in August, 1957, was joined by New Jersey; Iowa and Wisconsin following in February and March, 1958.

Mississippi had been retained in service classified as an experimental ship (AG-128) from 15 February, 1948. With the majority of her original armament removed, she operated as trials ship for the new Terrier anti-aircraft missile system, launchers having been installed in the positions of "X" and "Y" turrets. Mississippi also shipped various experimental guns, their associated control systems and new radar equipment. On 17 September, 1966, she de­commissioned for the last time and breaking-up work commenced during December that year.

West Virginia, October, 1958, followed by her sisterships, Colorado and Maryland, as well as the Tennessee and California were all sold for scrapping during 1959. The first fast battleships placed on the disposal list were North Carolina and Washington and later the four South Dakota class. Like the Texas, North Carolina, Massachusetts and Alabama were handed over to their respective states for preservation as memorials. All four Iowa class remained in reserve until mid 1967 when, after much deliberation, one of the ships, New Jersey (see cover photo) was taken in hand for reactivation, costing approximately $21 million. She recommissioned on 6 April, 1969, for service in Vietnamese waters. Proposals had originally called for two 8 inch heavy cruisers, but the more powerful, longer-range gunned battleship (23 miles) was chosen for recommissioning. During her deployment on Vietnamese waters New Jersey "ran like a jewelled watch". She was in action for 120 days, and fired 5,668 rounds from her 16 inch guns as well as 15,000 5 inch shells. During the Korean war she fired some 3,600 16 inch projectiles.

Aug/Sept/Oct.1977

THE NAVY

With the Compliments of PHAEDRA TRADING AS ROCKINGHAM MASTER BUILDERS DIXON ROAD, ROCKINGHAM, WA Members of the Master Builders' Association Contractors to the Royal Australian Navy

Navy Week is one week in each year when Australians from coast to coast are urged to pay grateful tribute to those who have served and those now serving Australia at sea.

During this week it is fit and proper that a nation of free men and women give well-deserved honour and recognition to the patriotic and victorious achievements of its men of the sea. It is the week for Australians to recommit themselves to those principles of freedom and self-government which they cherish. It is a week in which grateful citizens should salute their Royal Australian Navy and make sure that it is adequate to fulfil its contribution to our national security.

In the Royal Australian Navy the month of October has always held special significance. The 21st commemorates the 172nd anniversary of the victory of the Battle of Trafalgar. Fought in the Atlantic, off the southern coast of Spain, it was the last great naval battle to be fought under sail alone.

Sixty-four years ago, on 4 October, 1913, the Australian Fleet steamed into Sydney Harbour. Navy week, 1977, was planned to coincide with the anniversary of the Fleet's entry.

The arrival of the ships in 1913 was an event Australians had looked forward to for half a century. They were their own ships, paid for by their own money and manned in large proportion by their own men; the nucleus of what they hoped would be their own Fleet.

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**Programme of Events arranged for NAVY WEEK, 1977**

**HER MAJESTY'S SILVER JUBILEE YEAR**

**OCTOBER, 1977**

**TASMANIA**

**Saturday, 1**

Navy League Ball, Paterson Barracks, Launceston.

**Sunday, 2**

Naval Reserve Cadets from T. S. TAMAR march to the Cenotaph with representatives of the Ex-Navalmens' Association.

**VICTORIA**

**Saturday, 1**

Navy Week Race Day, Flemington Racecourse. BAN. Band to play.

**Sunday, 2**

Naval Association Church Services —
- 9.30 a.m. St Augustine’s, Bourke Street (West) Melbourne.
- 2.00-4.00 p.m. a) R.A.N. Band concert, Myer Music Bowl, Kings Domain Gardens, St Kilda Road.
  b) Ex W.W.II corvette CASTLEMAINE, Gem Pier, Williamstown, adjacent to Esplanade Park —
   (i) R.A.N. Diving Display.
   (ii) Drill demonstration by the bofors gun crew.

**Monday, 3**

Tasmanian Big Band to play.

**NEW SOUTH WALES**

Navy Week in New South Wales will be celebrated from Sunday, 2 October to Saturday, 8 October.

**Sunday, 2**

10.00 a.m. Special combined Church services at — Garden Island Dockyard Chapel
  Chapel, H.M.A.S. Watson, Watson’s Bay
  H.M.A.S. Nirimba, Quakers Hill

**Monday, 3 (public holiday)**

2.00 p.m. At Garden Island Naval Dockyard, ships open for inspection —
  H.M.A.S. Stalwart Destroyer Tender
  H.M.A.S. Ovens (Oberon class submarine)

**Tuesday, 4**

(Navy Day)

H.M.A.S. Melbourne and other units of the Fleet will embark local dignitaries for a day at sea, including a mock battle, weapon firing demonstrations etc and concluding with a ceremonial entry into Sydney Harbour (by invitation).

12.00 Noon Fly-past over the City of Sydney by aircraft of the Fleet Air Arm.

Luncheon period R.A.N. Band recital at Display by Clearance Diving Team at Physical Training display at Navy personnel will talk at various schools.

6.30 p.m. Cocktail Party at TRESCO (by invitation).

**Wednesday, 5**

R.A.N. Band recital at Physical Training Display at Navy display caravan located at

**Thursday, 6**

12.30 p.m. Royal Australian Navy band and Guard perform Changing of the Guard ceremony at Cenotaph and then at the Pool of Remembrance, Hyde Park.

**Friday, 7**

R.A.N. Band recital at Physical Training Display at Navy display caravan located at

**Saturday, 8**

2.00-5.00 p.m. Units of the Naval Reserve Cadets will be open for public inspection and Cadets will execute individual displays and demonstrations —
  T.S. Parraweta, Ede Street, Rydalmere.
  T.S. Albina, Army Drill Hall, Harbour Street, Wollongong.
  T.S. Hawkesbury, Welwyn Grove, Point Clare.
  T.S. Tobruk, R.A.N. Drill Hall, Whitford Road, Newcastle.
  T.S. Campbelltown, Ingleburn R.S.L. Club, Chester Road, Ingleburn.
  T.S. Vendetta, Army Reserve Building, Duke Street, Coff’s Harbour.

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- R.A.N. (Navy personnel will talk at various schools)
- Physical Training Display at Navy display caravan located at

**Monday, 3-Friday 7**

Myer Bayside Shopping Centre, Frankston all day —
R.A.N. Cooking displays.

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The Welcome
The Royal Australian Navy welcomed its newest acquisition to the fleet on 28 January, 1977, when the former Australian National Line roll-on-roll-off passenger vehicular dockship Australian Trader was handed over. Made redundant on the Sydney-Tasmania route, the Trader had become uneconomic to operate and so temporarily withdrawn from service. After arriving in Sydney for the last time she was laid up at Woolloomooloo in readiness for her sale.

The prospect of acquiring a recently built ship at a bargain price prompted interest in Navy circles. Discussions with the Australian National Line (ANL) followed and on 16 January, 1977, she was purchased for conversion to the R.A.N.'s main training ship with a secondary role as back-up transport. The Trader was towed to Garden Island in March and conversion work commenced. Her bright yellow funnel was replaced sombre naval grey on 30 March and in May she entered the Captain Cook Dry Dock. She was constructed at the State Dockyard, Newcastle, and was launched in 1969. In ANL service she carried 172 passengers and 50 cars. She displaced 9,000 tons net, measuring 447'/4 feet in length and 70 feet in beam.

On 6 June, 1977, the Minister for Defence announced the name Jervis Bay had been selected for the ship. Such names as Tingira and Anzac had also been considered. Although no details have been announced, it is expected that Jervis Bay will receive several dual purpose small calibre guns, similar to those intended for installation on the new Logistic Landing Ship Teobrvk. Following conversion Jervis Bay will be the only training ship, taking over from the Daring class Destroyer Eureka, which the new Logistic Landing Ship Teobrvk.

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The prospect of acquiring a recently built ship at a bargain price prompted interest in Navy circles. Discussions with the Australian National Line (ANL) followed and on 16 January, 1977, she was purchased for conversion to the R.A.N.'s main training ship with a secondary role as back-up transport. The Trader was towed to Garden Island in March and conversion work commenced. Her bright yellow funnel was replaced sombre naval grey on 30 March and in May she entered the Captain Cook Dry Dock. She was constructed at the State Dockyard, Newcastle, and was launched in 1969. In ANL service she carried 172 passengers and 50 cars. She displaced 9,000 tons net, measuring 447'/4 feet in length and 70 feet in beam.

On 6 June, 1977, the Minister for Defence announced the name Jervis Bay had been selected for the ship. Such names as Tingira and Anzac had also been considered. Although no details have been announced, it is expected that Jervis Bay will receive several dual purpose small calibre guns, similar to those intended for installation on the new Logistic Landing Ship Teobrvk. Following conversion Jervis Bay will be the only training ship, taking over from the Daring class Destroyer Eureka, which the new Logistic Landing Ship Teobrvk.

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Vice Admiral Sir Richard Peek, a former Chief of Naval Staff, wrote to the Federal President of the Navy League (Commander F. G. Evans) commenting on what the Admiral regards as a lack of realism in establishing priorities in defence spending. The text of the letter is printed hereunder with Admiral Peek's approval.

"Dear Geoff,

I am greatly concerned by the government's failure to institute a reliable system of priorities in defence spending based on its own assessment that 'any confrontation or conflict would be, initially at least, maritime in character' (Defence White Paper 1976, page 13).

One cannot dispute this assessment but the same White Paper lists among 1976-77 acquisition decisions:

(a) All weather radar for Rapier. This will enable training and a limited operational deployment of an all-weather low level air defence system for a land battlefield.
(b) Fourteen more Leopard tanks. There will be sufficient tanks to allow training by a full armoured regiment, and
(c) To proceed with project development for a new tactical fighter and a tactical transport.

The cost of the first two items is $33 million, while the third is not costed but will certainly be hundreds of millions of dollars. None of the three items has the slightest relevance to the maritime defence of Australia unless the fighters chosen are able to operate and fight a hundred or more miles off the coast, and there is the means to control them when they are there. However, according to some sources the choice of an aircraft is between the best air superiority fighter and a fighter to assist in the land battle.

Taken overall, the White Paper — our defence planning guide — although an improvement on previous efforts, leaves me with the feeling that we are backing every horse each way, and still not facing squarely the problem of defending Australia. Examples of woolly thinking are to be found in several sections of the Paper.—

Commander F. G. Evans, President of the Navy League of Australia

Vice Admiral Sir Richard Peek"
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Concerning nuclear proliferation (p.9) no mention is made of what, if anything, we could do if we were threatened by nuclear blackmail. The facts seem so clear that I would have hoped that they would be spelt out if only to silence those critics who suggest that because of nuclear weapons all other defence is useless. The fact is that because no nation can defend itself against nuclear missiles, the alternative facing any nation is either to have one of the super powers deter a nuclear blackmailer on it's behalf, or to try to deter him by having their own nuclear deterrent.

Under the heading "Law of the Sea" and after discussing the 200 mile exclusive resources zone one finds: "Implications for the structure of the Australian Defence Force are receiving close study, and provision has already been made for some increase in our surveillance and patrol capability."

It is more than three years since the 200 mile zone became a likely starter, and if after this time the Defence Department has not made some definite recommendation to the Minister, some heads should roll and one must wonder about the value of our contingency planners whose task it is to forewarn of such situations.

Under the heading "Self Reliance" we read: "We believe that any operations are much more likely to be in our neighborhood than in some distant or forward theatre, and that our Armed Services would be conducting joint operations together as the Australian Defence Force."

But if the assessment already quoted is true, and the conflict would be maritime, the joint operations will involve the Navy, the long-range maritime patrol aircraft of the Air Force, and if an anti-ship missile is ever obtained for them, the F111s of the Air Force. The remainder of the Defence Force with some 65-70% of the uniformed personnel would not be involved.

Among the suggested characteristics of our force structure (p.14) is:

- Readily transportable and mobile land forces, with an adequate capability for reconnaissance, to meet hostile incursions at remote localities.
- How do we meet this characteristic? On page 22 we read: "The Regular Army element of the Field Force is based on a divisional structure and has organic to it combat units (Armour, Artillery, Engineers, Signals, Infantry and Aviation) and Logistic Units (such as supply, transport and electrical and mechanical engineers)."

This does not seem to bear any resemblance to a "readily transportable and mobile" land force.

- On a succeeding page (p.23) one finds the statement "armoured units are able to make use of their inherent mobility in most parts of Australia."

This refers to their mobility once they have arrived at the scene of battle, because in another part of the White Paper reference is made to the acquisition by the Navy of an amphibious lift ship "for the sea movement of heavy military cargoes such as the vehicles, weapons and equipment of army, engineer, terminal and airfield construction units" without recourse to established port facilities.

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Page Twenty-Four

THE NAVY
Aug/Sept/Oct, 1977

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Page Twenty-Five

THE NAVY
Aug/Sept/Oct, 1977

There is a whole chapter devoted to defence science and technology in the White Paper. The organisation employs over 6,000 people. Over the last five years it has cost over $316 million and this year it is budgeted to cost $86.9 million dollars. What do we obtain for this very considerable effort?

Obviously in an unclassified document some of the projects cannot be disclosed, but when, for example, the Rika is used to illustrate the scientists' work, one has a nagging suspicion there may be some fat in the operation because the main work on Rika was done ten or more years ago.

I could go on with other examples in the White Paper of Defence personnel to which I would be prepared to put forward my ideas for examination. In brief, then, I believe that Australia should not be involved in "confrontation or conflict" requiring the actual defence of the country.

(a) Because of the long time it takes to obtain ships and aircraft for maritime forces, any such attack would have to be met by the forces we had in being at the time.

(b) Any defence against conventional attack would be provided almost exclusively by maritime forces.

(c) Because of the long time it takes to obtain ships and aircraft for maritime forces, any such attack would have to be met by the forces we had in being at the time.

(d) Unless the navy and Air Force are able to maintain control of our maritime environment at a level effective enough to prevent landings on our territory by anything larger than small raiding parties, our country will be virtually defenceless. This is so irrespective of the size of the land and air defence forces we maintain, because, with our small population, large geographical area and lack of ports, roads, railways, airstrips, etc. in much of the country, we could not produce the soldiers, airmen and their equipment in the right place, at the right time and in sufficient numbers to meet a major landing or landings.

The same applies, of course, to any land force we may have, whether it be a divisional or field force. The only thing that can be defended in any confrontation or conflict is the air defence field we are spending too much money on forces which at best would not be required "initially", and which would possibly not be required at all. At the same time we are spending too little on the maritime forces which are acknowledged to be those which will take the initial blow and which I believe must be able to control the maritime environment if Australia is to be defended in any confrontation or conflict.

I decided to express my views to you because I know you share my concern at the seeming inability of Defence to establish priorities in spending, and because of the League's awareness of deficiencies in the maritime situation. I hope it will be of some help to the League in its continuing efforts to do something.

Yours sincerely,
R. I. PEEK*
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THE NEXT EDITION
A special edition of "The Navy" will be prepared for the Joint Services Weekend, 3-4
December, 1977. Persons submitting manuscript for insertion in this issue should dispatch it
to arrive not later than Wednesday, 12 October, 1977 to permit the magazine to be
It is anticipated that this special edition will contain a feature article on the fighting
forces of Japan, particularly the Maritime Self Defense Fleet.
Safer Sea Routes through Magellan Straits and the Patagonian Islands

by Captain de Fragata (E.) Gonzalo Ruiz, Jefe Servicio Selazacion

In 1969 the Hydrographic Institute of the Chilean Navy began work on a programme of extension and rehabilitation of the entire system of lights, buoys and beacons marking inshore channels through the archipelagoes of Patagonia and Tierra del Fuego (see map).

The first stage, covering installation in the north and central areas of some $1,200,000 worth of main lights and fog signal stations supplied by a British firm, was completed between 1971 and 1974. In this article Commander Gonzalo Ruiz (Fig.1), Chief of Aids to Navigation of the Hydrographic Institute, describes how a further $3,000,000 worth of equipment, including radar transponder beacons, will establish new safe routes for international shipping through the Straits of Magellan and from Golfo de Penas down to the Beagle Channel and Cape Horn.

The map of Southern Chile is very like that of Norway in reverse, with fringing islands backed by snow-capped mountains, and fijords running deep inland — some with glaciers at their heads. But whereas Norwegian coasts are warmed by Gulf Stream water from the Caribbean, it is the icy Humboldt Current from Antarctica which sweeps up the coast of Chile, bringing hard winter weather and icebergs in summer, with rain, perpetual wind and snow storms all the year round.

Out in the Southern Ocean enormous swells, driven round the world by westerly winds, pile up off Cape Horn in high steep and awkward seas. So the more sheltered inshore routes have become important to ships of all nations, and increasingly so since oil has been discovered and tanker loading terminals established on both sides of the Straits of Magellan.

New and Safer Channels

Our aims when planning improvements to navigational aids throughout the area were, first, to make existing channels safer for the larger, faster vessels who might wish to use them, and secondly, to open up new safe channels through the islands for ocean-going ships.

The choice of equipment presented some unusual problems, especially in the south where the whole Stage II area, from Golfo de Penas down to Cape Horn — a distance of more than 1,200 km — contains only one city and two small towns. A total population for the area of only 86,000 suggested that maintenance teams would be difficult to find, and most of the remote stations must be relied on to operate unattended for long periods. In addition, the perpetual wind, almost continuous rain or snow with violent squalls, and 6-10 knot tides through the narrower passages, meant that materials used must stand up to ceaseless buffeting.

Glassfibra buoys

To meet these conditions, Stone Plant "Mallard" and "Osprey" buoys and beacon towers, all made of glass-reinforced plastic, are being manufactured under licence by Industries Aliberti S.A. of Sao Paulo, Brazil. All are impregnated with the appropriate colour patterns and will not need painting; but the most important advantages of GRP are, of course, its resistance to corrosion and high strength/weight ratio, making it less vulnerable to impact damage. The stainless steel mooring and lifting rings of the buoys are connected internally, so that stresses are well distributed. Buoy bodies are filled with polyurethane foam to provide a reserve of buoyancy, and their twin-cone underwater form gives them exceptional stability in strong currents.

The "Mallards" have a diameter of 1.5 m and a height above water of approximately 2.9 m. The "Ospreys" (Fig. 2), which carry a ZP20 "Seagull" lantern, are 2.2 m in diameter and 10 m high. This method of construction ensures good strength and stability, it also provides storage for batteries in the tower base and sheltered access to the lights by internal climbing rungs.

The towers are designed to withstand winds of over 100 knots, their twin-cone underwater form giving them exceptional stability in strong currents. The “Mallards” have a diameter of 1.5 m and a height above water of approximately 2.9 m. The “Ospreys” (Fig. 2), which carry a ZP20 “Seagull” lantern, are 2.2 m in diameter and 10 m high. This method of construction ensures good strength and stability, it also provides storage for batteries in the tower base and sheltered access to the lights by internal climbing rungs. The towers are designed to withstand winds of over 100 knots, their twin-cone underwater form giving them exceptional stability in strong currents.
Three Different Light Sources

All light sources are being supplied by Stone Platt Crawley Ltd, direct from Britain. They will be of three kinds — Power Beam Beacons, ZP20 lanterns and "Penguin" minor lights.

The Power Beam Beacons (see Fig 3) will be operated by wind-driven generators of 150 watts capacity. They have a single continuously-burning lamp and a revolving lens with two tiers of 6 acrylic panels, any of which can be obscured or shaded to give different light characteristics (see Fig. 4, A & B). A photo-electric switch lights the lamp when darkness falls at night or during snow storms, and extinguishes it when daylight returns.

With a 60 watt lamp, the maximum luminous range in clear weather is 27 sea miles (50 km). An automatic lamp-changer carrying 4 lamps ensures that the light will never fail.

Lightbuoys and many shore stations will be equipped with ZP20 lanterns, which have tungsten-filament lamps with lamp-changers and photo-electric switches, all enclosed in polycarbonate lenses. Fitted with a 16 W lamp, the ZP20 has a maximum range of 10 miles; a 60 W lamp increases the range to 14 miles. "Penguin" minor lights are equipped with inert-gas electronic discharge-tubes, Xenon tubes burning white, Neon tubes red and Argon tubes green. They have a maximum range of 4 km (over 2 sea miles) and a life of more than a year.

All buoys will be fitted with radar reflectors and, in addition, Stone Platt Crawley Ltd will supply four new Marconi "Seawatch 300" radar transponder beacons (called "Racons") which transmit amplified reply pulses when stimulated by signals from an approaching ship's radar.

Eastern Approaches

In all, Stage II will require the installation of 19 Power Beam Beacons, 123 ZP20 lanterns, 20 "Osprey" and 41 "Mallard" buoys, 3 "Penguin" minor lights, 47 cylindrical towers and 90 minor daymarks.

Starting at the eastern entrance to the Straits of Magellan (Plan A), a Power Beam Beacon with a luminous range of 22 miles will replace the existing 13-mile light on C. Espiritu Santo. Further west, a new "Osprey" buoy will mark Banco Narrow, a 19-mile beacon will replace the 13-mile Punta Satellite light, and a "Racon" will be installed at Punta Baza.

Spring tides running at 6-8 knots through Primera Angostura fan out as they emerge from the narrows, so that ships bound westwards on the north side of the channel are set strongly northwards into shallow water. An important improvement, therefore, will be the laying of new "Osprey" buoys with radar reflectors to mark the Satellite and Triton banks.

Further west the most important additions will be a "Racon" at Punta Segunda Angostura, while in Canal Nuevo, where strong cross tides have always been a problem, new "Osprey" and "Mallard" buoys will mark Banco Nuevo and Banco Marta respectively. Lights in the entrance to Bahia Gente Grande will be improved, for the convenience of ships wishing to reach the oil terminals at night.

A GRP tower carrying a ZP20 lantern will be erected at C. Holland on the north shore of Paso Froward, and all existing lights in Paso Froward, Paso Ingles, Paso Largo and Paso del Mar will be changed. In Paso Tortuso, where tides from the Atlantic and Pacific Oceans meet, a new ZP20 light and tower will be placed on C. Crosstide, and green-flashing "Penguin" lights will be placed on small structures off Anson and Crooked rocks. Three new lights on Canal Joronimo will make it possible for ships to enter Seno Oway by night, in spite of strong and irregular tides.
Inshore Route

The most extensive changes of all will be made on the inshore route northward through the Patagonian Islands, with almost every buoy and beacon being replaced and many new ones established. In particular, all existing marks in Canal Gray will be replaced by “Mallard” buoys, while beacons carrying ZP20 lanterns on Islas Thomson and Sin Nombre will allow ships bound for Puerto Natales to pass through Seno Union at night, giving them more time to deal with 9-12 knot tides which may be running through Angostura Kirke or White. Canal Sarmiento is without dangers for most of its length, but icebergs from the glaciers of Cerro Blanco have sometimes been seen in the fairway in spring. All existing lights in the channel will be improved and four new ZP20s on towers will be established. Ships wishing to enter or leave the inshore route via Canal Trinidad will find a new ‘Racon’ at Puerto Henry. Further north, the main improvements are at Angostura Inglesa (Plan B), where all existing marks will be replaced by “Mallard” buoys or unlit beacon towers. Every light in Canal Messier will be replaced by ZP20s or Power Beam Beacons, and a 'Racon' will be established on Isla San Pedro, where the channel runs out into Golfo de Penas. Fig. 5 shows the British ice patrol ship, HMS Endurance, passing through Angostura Inglesa from south to north.

Finally, routes through the islands of Tierra del Fuego will be improved, with many new lights in Canales Whiteside, Magdalena, Cockburn, Occasion, Aguirre and Balbenero. In Canal Beagle, every light and mark on the Chilean (southern) shore will be changed, including one on Isla Nueva. Owing to the difficulty of reaching and landing on Cape Horn in any but the calmest weather, the existing light there will be replaced by a ZP20, which can be relied on to operate unattended for more than a year. Keys to Figs A & B

Light characteristics of the Power Beam Beacon, with the upper tier of panels offset by 15° or 30° from the lower tier, and colour filters or blanking screens added where shown:

(a) Single flash white or coloured
(b) Double flash white or coloured
(c) Triple flash white or coloured
(d) Quadruple flash white or coloured
(e) Rapid single flashing white or coloured
(f) Two-one flash white or coloured.
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THE "J" BOATS

Since the creation of the RAN in 1911 over five hundred ships of various types and sizes have served with the Australian fleet. Included in this total are sixteen submarines, the tiny "E" class boats AE1 and AE2, the six double hulled "J" class, OXLEY and OTWAY from the depression era, the K9 of Dutch descent and today's vessels OXLEY, OTWAY, ONSLOW and ORION. Another boat, OTAMA, is still under construction. This article is concerned with the "J" class and their service in the RAN.

The "J" boats' story begins during early World War One following an Admiralty requirement for an ocean going submarine capable of operating with the British Grand Fleet. Seven boats were constructed between 1915 and 1917, named simply J1, J2, J3, J4, J5, J6 and J7. In service the boats proved a great disappointment, being unsuitable for fleet operations, and instead were employed on patrol duties. J6 was accidentally sunk by the British "O" ship Cymric on 15 October 1918 after being mistaken for a German U-boat.

The "J" boats were armed with six 18 inch torpedo tubes, four in the bow and one on each beam. Top speed was 19½ knots surfaced and 9½ knots submerged. The normal operating range was 5000 miles at 12 knots surfaced. J7 was the last boat to be completed and differed in several respects from her sisters. She displaced 80 tons less, her gun was mounted lower to the deck and her conning tower was set further aft. J1 could also be distinguished from the other vessels in that her gun platform extended over the sides of the bridge structure, the platform being held up by four supports, two either side.

Following the end of the war the remaining boats were earmarked for transfer to Australia and in early April, 1919, all six were commissioned as HMA submarines. On 9 April, 1919, the flotilla sailed from Portsmouth accompanied by the depot ship Platypus and light cruiser Sydney. Gibraltor was reached on Sunday 13 April. During passage to the "rock" rough weather plagued the boats. At noon on 16 April J3, J4 and Platypus set out for Malta, the remaining boats and Sydney following later in the day. In Malta the flotilla anchored in Valetta Harbour. Hands were employed topping up the boats batteries and painting the hulls. The battlecruiser Australia arrived on 28 April and the next day the ships (excluding Australia) left for Port Said. Acdn was reached on 5 May. Columbo 14 May and Singapore 6 June (these dates apply only to J1). The other five vessels followed a similar timetable but due to mechanical failures, arrival and departure times varied.

In Columbo J7 was taken in hand for repairs to her port engine clutch. J1 and J5 left Aden on 15 May, the latter in tow of the cruiser Brisbane. On 31 May Sydney sailed from Colombo with J1, J2, J4 and J7. Platypus and J3 left several days later. J5 was still under tow.

Most of the boats reached Thursday Island on 29 June and remained in the area until 1 July when steam was raised. After a short stopover in Brisbane from 10 to 13 July the flotilla proceeded onward to Sydney, entering the Heads at 10:10 am on 15 July. The following week several of the boats, including J7, were open to visitors for inspection.

From August, 1919 J1 was laid up, but in January, 1920, she was towed to Cockatoo Island for a complete overhaul. She remained alongside the wharf up to November and then spent the next month in dry dock. The long refit was finally completed in June, 1922, and shortly afterwards she journeyed to the Flinders Naval Depot at Westerlooin, Victoria, and was paid off with the other boats. J1, J2, J3, J4 and J5 were retained until late 1921 and early 1922. The career of HMAS J1 is representative of her five sisters. She was launched in November, 1919, and completed in 1921. During World War I J1 served from Birty attached to the 11th Submarine Flotilla. Following arrival in Sydney on 15 July, 1919, she spent the ensuing months inactive at Garden Island. On 17 November, 1919, she was towed to Cockatoo Island and placed in dock for an extensive refit. By early New Year J1 was again ready for sea. Engine trials were run on 18 and 22 January, 1920, and diving exercises on 27th. On 16 February she left for Victoria in company with Platypus.

Based at Geelong, J1 exercised with the other submarines, river class torpedo boat and "S" class destroyers and occasionally embarked training classes. She returned to Sydney in June, 1920, for revision of the port main motor at Cockatoo Island. Work was completed in early August and she sailed south once more. During the remainder of 1920 J1 exercised frequently with the destroyer Swordsman. On 13 January, 1921, she sailed from Geelong for Tasmania with J2, J4 and Platypus. Hobart was reached on 17 January, the boats remaining in the area until 21 February when they made for Sydney. In March J1 exercised with J4, Platypus and the cruisers Melbourne and Sydney. The remainder of her career was spent around Geelong.

She was disarmed in November, 1921, when her 4 inch gun and torpedoes were removed and transferred to the collier Biloela. In 1924 J1 was sold, subsequently scrapped and on 26 May, 1926 her hull was scuttled off Barwon Heads. J2, J4 and J5 were also scuttled at sea, while J3 and J7 were sunk to serve as breakwaters at Swan Island and Hampton in Port Phillip respectively. The remains of both these submarines are still visible.
Greetings to RAN

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DIVER HELPED SOLVE THE PERTH MYSTERY

One morning in 1967 a one-legged diver from Adelaide slipped into the fast running waters of Sunda Strait. He swam hand over hand down a rope to the wreck of a warship which had been lost a quarter of a century before.

Two hundred feet down the water cleared and there, separated from him only a pack of inquisitive sharks, was the wreck. The diver was David Burchell and the ship was HMAS Perth.

The 6000 ton cruiser was resting on her portside. Her after funnel and lattice seaplane catapult were half buried in the sand alongside. The six inch turrets which had roared with anger in the Mediterranean and the Far East were still trained. On the starboard side just below A turret a forty-foot hole bore stark evidence of the destructive force of the Japanese long lance torpedo which had spelt the ship's doom.

Burchell failed in his quest — the recovery of the ship's bell — but his daring dives answered the many questions which had baffled historians since the ship made its last gallant fight on the night of 29 February-1 March, 1942.

HMAS Perth began her service in the Royal Navy as HMS Amphion in 1936, a 6800 ton modified Leander Class cruiser laid down in 1934. The 555 foot ship spent almost three years in the West Indies before returning to England in June 1938 to be commissioned HMAS Perth. Her sister ships Sydney and Hobart were already units of the Australian Squadron.

When the war commenced in September 1939 Perth was in the Caribbean. Early in 1940 she visited Australia for the first time and spent eight months in convoy duties in the Pacific. In December she proceeded to the Mediterranean to relieve her already famous sister, Sydney.

Commanded by Captain Sir Phillip Bowyer Smith, RN, Perth joined the famous 7th Cruiser Squadron of Rear-Admiral Pridham Wippell. The ship's first operation was the escort of a two-way convoy, one from the east and the other from the west, through the Mediterranean.

Events moved with disconcerting speed in the Middle East. While Wavell's land forces were sweeping the Italians back to Tripoli the Navy commenced Operation Lustre, supplying Greece with troops and arms to repel a two-prong attack by Italian and German armies.

Perth was soon involved in the shuttle service. She had a brief respite in March escorting convoy MC9 from Alexandria to Malta. Towards the end of the month the cruiser participated in her first surface action — the Battle of Matapan.

As April drew to a close the British Expeditionary Force in Greece was facing evacuation. Perth joined the armada of ships which lifted the Army from the beaches.

Three short weeks later Perth joined other units of the Fleet in support of the Army in Crete. Early on the morning of 22 May she was with Admiral King's Squadron when a German sea-borne force was sighted. The cruiser led the attack and sunk a caque loaded with troops and damaged a destroyer.

Another evacuation was soon necessary and Perth was in the midst of it. On the morning of 30 April with her decks packed with troops she was heavily attacked by Stuka dive bombers. A bomb struck behind the bridge and penetrated to the boiler room before exploding. Four of the ship's company and nine soldiers were killed.

HMAS PERTH taken from HMAS ADELAIDE. IS February, 1942.
At the end of July, Perth was relieved by Hobart and returned to Australia for repairs. Soon after the war damage was repaired Captain Hec Waller assumed command. The legendary commander of the Scrap Iron Flotilla, the winner of two DSO’s in destroyers in less than a year was now to win equal fame in Perth.

In Early 1942 the cruiser was a unit of the Far East Fleet which with United States and Dutch ships was the allies' shield against Japan's drive to the south. However, it was a doomed fleet. The ships were naked under overwhelming enemy air superiority and outnumbered 10 t 1 by the Japanese Fleet.

With the fall of Singapore the remnants of the Allied forces were concentrated on Java, particularly in the area of the Sunda Strait. By the end of February the Japanese Fleet harrying a huge fleet of transports escorting a huge fleet of transports was closing in on Java.

The Allied ships were divided into two fleets. Eastern Striking Force commanded by the Dutch Admiral Doorman and comprised of the cruisers De Ruyter, Java, Exeter, Hec Waller, Electra. Australian 21st Minesweeping Flotilla. Perth and the other ships of Eastern Striking Force sighted an enemy surface force in the Java SEA. Two cruisers of the Eastern Striking Force, as the two cruisers slipped out of harbour, told their crew that they were sailing for Sunda Strait.

At 7 pm the cruisers were zigzagging at 22 knots. The sea was calm and moonlight allowed visibility of six miles. The ships were closed up at action stations.

At 11.36 pm Waller sighted a ship close inshore off St Nicholas Point. The Aids lamp blanked a challenge. A pale green light replied from the other ship. "Repeat the Challenge" ordered the Captain but before the message was transmitted the other vessel turned hard away making smoke.

The alarm rattles echoed through the ship. Perth and Houston retired at speed. Ammunition in both ships almost exhausted. They arrived back at their base at Tanjon Priok at 6.16 pm. The following day Captain Waller was informed of the enemy sightings. Two salvos from Perth hit the enemy cruiser but De Ruyter was badly hit and blew up shortly afterwards. Meanwhile Java was struck by a torpedo and later sunk.

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Perth hit an enemy cruiser but De Ruyter was badly hit and blew up shortly afterwards. Waller manoeuvred Perth around to protect the Australian cruiser from a torpedo attack on her unprotected stern.

The Japanese ships were soon closing in on Java. The Allied fleet was firing over their own destroyers. Ripples of blinking flashes pinpointed their positions. Shells roared over the ship like locomotives hurling out of a tunnel.

Suddenly Houston blazed a canyon of light through the night with her searchlight. The blue light swept swiftly along a line of transports close to shore. Both ships opened fire momentarily the new target and eruptions of flame bore testimony to the accuracy of their fire. Two transports were badly hit.

Fifteen minutes after the action opened a shell ploughed into Perth's forward funnel bursting a steam line. Six minutes later she opened a second shell in the bridge and the men were knocked to the deck. Another torpedo crashed into her port side. The explosion ripped the ship, but only for minutes, slowly she began to heel.

The last sight of Captain Waller was the familiar figure leaving on the bridge rail looking down on the crew. The last sight of Captain Waller was the familiar figure leaving on the bridge rail looking down on the crew. The last sight of Captain Waller was the familiar figure leaving on the bridge rail looking down on the crew. The last sight of Captain Waller was the familiar figure leaving on the bridge rail looking down on the crew.

At 12.25 am on 1 March, HMAS Perth dropped quietly beneath the dark waters of Sunda Strait. Perth burning fiercely and ripped open by torpedoes joined the list of the fallen.

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Page Eight THE NAVY Nov/Dec/Jan, 1977/78

One of the most outstanding feats of engineering to emerge from World War II was the artificial harbour system used in the 1944 invasion of Normandy. Code-named "Mulberry", the artificial harbour was invaluable in allowing the Allies to supply their invading forces as they pushed across France in the months immediately after D-Day. Guy Hartcup's book describes the technical problems involved in designing and building the artificial harbours (there were more than one) and shows how the idea was put into practice.

The need for a project of this kind was amply shown by the disastrous raid on Dieppe in August, 1942 when a largely Canadian allied force lost 900 officers and men killed and another 2000 captured. The Dieppe fiasco made it quite clear that the Germans were determined to defend the French ports vigorously and any further attempt to capture a port would be extremely costly.

The breakwaters used were of two different types. For the more permanent type, there was developed a floating steel breakwater called a Bombardan and several types of floating concrete caissons. Experiments with breakwaters of bubbles, made by releasing compressed air through pipes under the ocean, were unsuccessful, much to the regret of Prime Minister Churchill. There was also a need to provide shelter for smaller vessels as soon as the landing had started and for this a breakwater known as "Gooseberry" was set up by sinking blockships.

The breakwaters. The harbours had to be capable of being towed across the channel and large enough to accommodate ten Liberty ships anchored in their shelter. The pierheads posed a problem. The beaches involved were very shallow and stretched far out into the Channel at low tide. Most ships would not be able to approach within a mile of the shore. The difference between the rise and fall of the tides was as much as twenty feet during spring tides. There was evolved a floating pierhead with spud legs, similar to platforms commonly used today for offshore oil drilling, connected to the shore by a flexible floating roadway.

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Hartcup's book describes the planning and construction of the equipment. The design and building were entrusted to the British and there were, unfortunately, many examples of bickering and lack of co-ordination between the Admiralty and the War Office. Later, problems arose due to misunder­standings between the British and the Americans. The differences between the Allies were largely responsible for the fact that the American Mulberry A was not as successful as Mulberry B and was not completed.

The months following D-Day, with the delays in capturing the major part of Antwerp, and the failure of the attack on Arnhem, showed to the Allies the value of the Normandy harbours. "Mulberry" said Eisenhower, "exceeded our best hopes."

This book deals with the story in a detailed manner, at times almost too detailed for the average reader. In fairness, however, it is hard to describe an engineering feat without going into detail. There are many photographs, and, surprisingly, there is no current photograph of the caissons still to be seen from the cliffs above Arromanches. This is a book recommended for the reader with an interest in military engineering.
Oceanographic Research

The RAN’s first ship designed and built specifically to carry out oceanographic research was launched on 27 August. Although the $27 million ship, named HMAS COOK, will be made available to civilian research organisations from time to time, the Navy will be to gather information to assist in improving its anti-submarine warfare capability. This article examines the importance of oceanography to the Royal Australian Navy.

Despite a technological revolution which boosts the world’s navies with improved anti-submarine warfare equipment, the submarine still poses a threat today than it has ever been.

Even conventional submarines can operate for periods without surfacing, and carry torpedoes and missiles of formidable capacity. The reason why the modern submarine, either nuclear or conventionally propelled, is such a threat is that there is no way of detecting its presence with absolute certainty. This is because sonar (which is the prime method of detecting an underwater vessel) is still, after more than 30 years of development, more a black art than a science.

Sonar works by listening to the underwater noise made by ships and submarines, or by generating sound waves which can be heard when they echo off an underwater object. Sonar devices can detect a submerged submarine (although not always with absolute certainty. This is because sonar has its limitations) and can determine its location and size.

Oceanographers have now discovered that sound travels through water at about 1500 metres per second. For instance, a pulse sent out by a sonar buoy which is dropped from a ship into the water will travel 4.5 nautical miles (8.3 km) in one second. Sonar thus has a range of about 8 nautical miles (15 km).

Oscillations in the ocean floor and other factors. This is because the ocean is a dynamic and complex system, with many processes occurring simultaneously. The ocean is also a vast and unexplored area, with many unknowns.

The RAN operates HMAS Diamantina, and HMAS Kimble from Sydney, Diamantina, an anti-submarine frigate commissioned in the dying days of the Second World War, was converted for oceanographic research in 1959-60. Kimbala, a much smaller vessel, was originally a boom defence vessel, and was converted in 1959.

These ships are charged with gathering oceanographic “vital statistics” in the oceans surrounding Australia and along the trade routes to and from Australia. These include depth of water and ocean floor contours; temperature; salinity; electromagnetic and acoustic propagation characteristics; magnetism and gravity; water motion, and the distribution and behaviour of marine life.

With such a large number of scientists to gather over such a large area of ocean it is hardly surprising that these two old ships have made only limited progress. Despite cooperation with the Royal Navy and the United States Navy, it is estimated that of all oceanographic data collected by manganese nodules in the South Pacific Ocean and three per cent from the Indian Ocean.

Consequently, despite much hard and patient work, only minimal progress has been made towards the RAN’s primary aim in the field of oceanography — that is providing an oceanographic forecasting service to assist in anti-submarine warfare operations. The second aim of the oceanographic research programme is to assist in the design, selection and tactical use of anti-submarine warfare equipment for the RAN.

Both the Barras and Mulloka projects have used some basic research information gathered by the RAN’s oceanographic ships. Barras is an advanced system using a sonar buoy which is dropped from maritime patrol aircraft to assist in anti-submarine warfare research. Mulloka is a shipborne active sonar system capable of being deployed in the deep ocean.

Research also carried out is to assist in other areas of interest to the RAN. For instance, a recent expedition to the Indian Ocean near Yarra, development work has not yet been completed.

Sonar research is now extending into areas other than submarine detection. For instance, it has been discovered that the exchange of energy between the air and the ocean is limited to a depth of 200 metres. This has an effect on radio transmission systems. This could be important in the future in detecting supersonic anti-ship missiles which fly only a few metres above the ocean surface.

Another of the ship’s prospecting programmes is to assist in finding manganese nodules. These nodules are composed of manganese, iron and nickel and are valuable in the mining industry. It has been discovered that the manganese nodules in the Pacific Ocean can be found at depths of up to 5000 metres. The nodules are discovered using a submersible which is dropped from the ship into the water.

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Naval Reserve Cadet News

CANADA

For over 18,000 sea, army and air cadets July and August proved to be both interesting and engaging.

Drawn from 1000 units across Canada, the cadets spent the summer months developing citizenship qualities, physical fitness and interests in the Canadian Armed Forces through courses and first hand exposure to military life.

For some it meant jumping out of aircraft, pilot training, mountain climbing, or riding the waves in Canada's naval ships.

Courses included leadership training, diving, sailing, communications, parachuting, flying and gliding. About one-quarter of the cadets this year were female.

Sea cadets took naval training programmes ashore and afloat. Activities included seamanship, diving, navigation, sail-making, cooking, and boatswain training for the 3100 members involved.

Exchange visits to Great Britain, Belgium, Germany, Sweden, The Netherlands and the USA involved 75 sea cadets while others were part of ships crews sponsored by the Ministry of Transport and the Department of the Environment.

Other sea cadets trained as shipwrights, stewards, clerks, bandmen, communicators and physical training instructors.

There are currently 60,200 sea, army and air cadets enrolled in 1010 corps and squadrons across Canada. There are 11,480 sea cadets in 183 corps, 24,295 army cadets in 423 corps and 24,425 air cadets in 394 squadrons.

JAPAN

Invasion! Japanese sea scouts boarded the bridge of the Australian destroyer HMAS Vendetta by the dozens when the ship visited Kogoshima, Japan. Able Seaman A. G. Barker had the job of showing the cadets over the ship.

VICTORIA

1977 AWARDS

All seven Units in Victoria were inspected earlier this year by the Commanding Officer, HMAS Launaea, Commander K. H. MacGowan, RAN, and the winners of the various awards were as follows:

Best Unit In Victoria — TS Bendigo, located in Bendigo, won the Navy League Colour.

Most Improved Unit — TS Voyager, which is based in Williamstown, was awarded the Lonsdale Trophy.

Best Guard — TS Melbourne, for the second successive year, was judged as having paraded the best guard at the annual inspection. TS Melbourne therefore retains the Gocked Hat and Epaulettes Trophy.

In many aspects there was little to choose between some Units when the final assessments were made for selection of the winners. All Units therefore deserve much credit for the efforts their officers, instructors and cadets made in providing a close and spirited display of competitiveness. Warm congratulations of course are extended to the three units who were awarded trophies.

On Saturday night, 4 June the Australian Red Cross Society — Victorian Division — held their Final Gala Function for the 1977 Red Cross Appeal. The dinner was held at the Southern Cross Hotel, Melbourne and took the form of a "Nautical Night" to say "farewell and good luck" to skippers and crews of Australia's challenging yachts in four International sailing competitions. These were — The America's Cup, The Admiral's Cup, The Little America's Cup and the International Catamaran Challenge Trophy.

The Naval Reserve Cadets were invited to provide a Guard of Honour for this sparkling function and a contingent from TS Melbourne made quite a significant contribution, particularly in helping create a nautical atmosphere. Excellent publicity was gained for the Naval Reserve Cadet organisation through being present at this function with its attendant credits and the cadets attending drew many favourable comment for their general appearance, dress and demeanour.

This was a most enjoyable and interesting event for the cadets of TS Melbourne, and rewarding also in being asked to support such a deserving charity as the Australian Red Cross Society in a convivial atmosphere.
The lifeboats from PS O's Commander Geoll Currans ceremony when Lieutenant Boats lor TS PERTH and ANZAC.


Two navy cadet units were presented with lifeboats by P and O Australia Limited. The boats are from ocean-going craft supplied to a local unit.

Girls' Australian Sea Cadet Corps By Second Officer C. A. Vickridge

In Western Australia the Navy League sponsors girl cadets known as the Girls' Australian Sea Cadet Corps. There are at present two Units in Western Australia, TS Swan at Fremantle (which I command) and TS Donnington at Rockingham (which is commanded by Second Officer M. Kelly). This organisation was formed in 1967 by the Western Australian Division of the Navy League to provide a unique form of activity for girls in the 12-18 years age group, and trains them in a variety of subjects — namely: boatwork (sail, oars and power); bends and hitches and parade training; and develops self discipline, leadership and companionship. Its aims are very similar to those formulated by the Navy League for the Australian Sea Cadet Corps (now the Naval Reserve Cadets). The Girls' Australian Sea Cadet Corps in Western Australia (GASC) also performs community service functions by assisting several ex-service men's organisations at their annual commemoration services.

A round the Western Australian Division

Commissioning the Brig AMITY, welcoming TS GASCOYNE to the Naval Reserve Corps, a visit by Western Australian contingent to Tasmanian Cadet Camp, the Cockburn Sound Regatta, DNRCA visit and setting up our first ACT Camp at Rottnest Island, have been highlights of Cadet activities in the West for the past twelve months.

On the 27 November, 1976 TS Gascoyne, situated at Carnamah, a thousand kilometres north of Perth, held a commissioning parade to commemorate official recognition as a NRC Unit. The Commanding Officer, Lieutenant Richard Bridge, in his welcoming address, mentioned it was only the beginning of the road ahead for the local unit, after a two year struggle to become recognised. Only those associated with the unit at the beginning of a unit would know just how much effort goes into keeping a unit going in its formative years. That the struggle continues as the unit progresses is only part of the challenge that Cadet work has to offer. If the keenness, and attention to the hospitality of guests, and the logistics at the commissioning guard were inspected by the Premier, Sir Charles Court, before he went on board to survey the fine craftsmanship of the new AMITY. The Brig certainly looked a splendid sight as TS Vancouver Cadets from the Training Ship SWAN, march past in a parade, being part of the Rats of Tobruk Annual Service of Remembrance at Kings Park, Perth.

The Brig certainly looked a splendid sight as TS Vancouver Cadets from the Training Ship SWAN, march past in a parade, being part of the Rats of Tobruk Annual Service of Remembrance at Kings Park, Perth.
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A Cadet from TS Mersey being examined for his coxswain's ticket on the River Mersey. In the background a unit skiff prepares to come about. TS Mersey's Unit Headquaters is on the foreshore.
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SOUTH AUSTRALIA: Staff Office Cadets, HMAS Encounter, PO Box 117, Port Adelaide, 5015.

WESTERN AUSTRALIA: Staff Office Cadets, HMAS Leeuwin, PO Box 58, Fremantle, 6160.

VICTORIA: Staff Office Cadets, HMAS Lonsdale, Rouse Street, Port Melbourne, 3207.

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DE UPDATE

In May this year, HMAS PARRAMATTA arrived at
HMA Naval Dockyard, Williamstown, to begin her half life
modernisation. She is the first of three early RIVER Class
Destroyer Escorts to begin a modernisation that is
designed to ensure the ships' effectiveness as combat
fleet units until the late 1980s.

Parramatta’s sister ship HMAS
Yarra is undergoing a refit at
Cockatoo Island — the condition of
Yarra’s hull and machinery is not
good enough to justify the expense
involved in a full modernisation.

Two much younger half sisters —
HMA ships Swan and Torrens —
are expected to undergo modernisation
later.

Parramatta’s contemporaries —
sisters and half-sisters — in other
navies are also now undergoing
half life modernisations. There are
difficulties in the ways different
navies are modernising ships
of the same basic design, as a look
at the plans of the British,
Dutch, South African and In-
dian navies shows.

During their modernisation,
Parramatta, Stuart and Derwent
are expected to undergo the following changes:
- Removal of the LIMBO close
range anti-submarine mortar.
- Installation of two triple Mark 3
anti-submarine torpedo tubes. The
type of torpedo to be carried has
not yet been announced,
although it is likely to be either
the British Mark 24 (Tigerfish) or
the US made Mark 48. It is report-
ted that there will be no on-board
replacements — once Parramatta
has fired her outfit of torpedoes
in the tubes, she will have to ob-
tain re-loads in harbour or from
an underway replenishment ship.
- An amidships fitting for later in-
stallation of two banks of four
HARPOON surface-to-surface
guided weapon “coffin
launchers”.
- Updating of the twin 4.5inch gun-
nery installation, including
replacement of the MR3 Gun Fire
Control System Director with the
Dutch HSA M22 control system.
This will bring the early River
Class gunnery systems up to the
standard already proven in the
RAN’s Daring Class destroyers
and the latter River Class ships
Swan and Torrens.
- Subject to satisfactory comple-
tion of trials, installation of the
Australian made Mulloks active
medium range A/S sonar set.
- Updating of the Ikara anti-
submarine missile system.
- Installation of a sewage treatment
plant.
- Re-siting of the ships’ LW02
rader aerial will reduce topweight
and improve the effectiveness of
the system.

Remodelling of masts and funnel,
in some cases accompanied by a

HMAS PARRAMATTA — EXISTING

AFTER EXTENDED REFIT

by A. W. GRAZEBROOK

HARPOON surface-to-surface
guided weapon “coffin
launchers”.

UPDATE

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- Re-siting of the ships’ LW02
rader aerial will reduce topweight
and improve the effectiveness of
the system.

Remodelling of masts and funnel,
in some cases accompanied by a
change in material of construction to light weight materials.
- Conversion to burn diesel fuel - involving improved fuel availability, sources and permitting improved stability as a result of water compensation in fuel storage.
- A general improvement in habitability.

These improvements will be accompanied by a general improvement in maintenance facilities and monitoring devices. The net effects of the modernisation will result in a significant saving in manpower. A target of 5% was set when the programme was first established in 1972. On a published complement of 250, the manpower saving would be some twenty-seven personnel.

The ships' silhouettes (See drawings) will change substantially, to the point where their similarity to the original Type 12 silhouette will be recognisable primarily by the prominent bow construction.

Parramatta is starting her half life modernisation somewhat later than the British contemporary, HMAS Ajax (which visited Australia late in 1976) was completed in 1965, and began her extended refit at Devonport on 19 October, completing in September 1973. Parramatta was completed in 1981.

The RAN's modernisation programme has taken some time to get underway. Although the McMahon Government in August, 1972, it was revealed that Mr Barnard, then Minister for Defence and it took nearly five years between its announcement and approval and the commencement of work on the first ships.

**BRITISH PLANS**

Modernisation of the British Improved Type 12 frigates has been underway for several years. Ten of the 26 ships involved have already completed their modernisation.

The 4.5inch gun mounting and attendant control equipment is being removed from all ships and has been selected for ASW specialisation. In some ships the 4.5inch gun mounting is being replaced by an IKARA launcher and missile handling room.

The sixteen remaining ships are receiving four EXOCET MM38 surface-to-air missiles for use against first class combat aircraft.

The differences in Australia's strategic and tactical circumstances are reflected in the choices of weapons systems for installation in the modernised early River Class ships. Most observers regard it as most unlikely that we would ever have enough ships to provide squadrons of escorts, of varying specialisations, for our merchant shipping. Our merchant shipping is much too thinly spread over a very large area than is the case in North Atlantic possible three circumstances.

**DUTCH SHIPS DIFFERENT**

The first of the six Dutch improved Type 12 frigates, Evertsen, has recently begun her major modernisation. Like the British, the Dutch plan to remove the twin 4.5inch gunnery system.

Some reports say the turret will be replaced with HARPOON SSGW launchers, whilst others say that the HARPOON missiles will be in coffin launchers amidships. As the Evertsen 4.5inch turret will be replaced with a 76 mm (3 inch) OTO-Melara gun system, the gun system to be fitted in HMA ships Adelaide and Canberra (now on order from the United States).

Reports say the Dutch envisage carrying the 76 mm 86 rounds per minute gunnery system as more effective in the anti-aircraft role than the 20 rounds per minute 4.5 inch system. There is a manpower saving involved in the 76 mm OTO-Melara system.

Like their British half-sisters, the Dutch ships will retain the LIMBO ASW system. However, the RAN have been modernised Type 12 new construction programme to handle the larger type ASW helicopters that are available, whilst it is reported that there is a waiting list for HARPOON. If this report is correct, it adds further weight to the case of those who advocate local production of HARPOON.

**INDIANS FIT SSGW**

The Indian Navy's Type 12 ship Talwar has three STYX Russian made SS2-2 coffin launchers fitted in place of the ship's 4.5inch gunnery system. It is not known what other changes, if any, were made to Talwar at the time of fitting SSGW launchers.

The Indian Navy has begun (as has the RAN) the major modernisations of their GABRIEL SSGW to South Africans.

**SOUTH AFRICAN TYPE TWELVES**

South Africa's three Type Twelve frigates were commissioned in 1982-84, and were modernised during the period 1983-1974. The modernisations were staggered to minimise the reduction in South Africa's active ships whilst the modernisations were underway.

One of the ship's two LIMO anti-submarine gunports was removed to make room for a helicopter landing platform. The South African vessels, although not having new KORTENAAR class frigates will carry HARPOON. Of European NATO Nations, only the Dutch and Turks have opted for the US developed and manufactured HARPOON. The British, Belgians, Germans, Greeks and, of course, the French, have all chosen the French EXOCET.

EXOCET is reportedly readily available, whilst it is reported that there is a waiting list for HARPOON. If this report is correct, it adds further weight to the case of those who advocate local production of HARPOON.

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Top speed of 23.6 knots ... Endurance of 790 nautical miles at 18 knots in fishery protection role

The first of a new class of five 17 m (56 ft) fast patrol boats being built by Cheverton Workboats, of Cowes, England, for fishery protection duties with the Sri Lanka Navy, completed her trials during April, 1977. She has a top speed of 23.6 knots and an endurance of 790 nautical miles at her maximum continuous cruising speed of 18 knots.

With a fuel capacity of 4950 litres (1100 British gallons or 4.2 tons) she can cover 1000 nautical miles at 12.2 knots in 82 hours.

The boat (see photograph) has a loaded draught of 1.24 m (4 ft 1 in), a loaded displacement of 22 tons, a beam of 4.47 m (14 ft 8 in) and is powered by twin General Motors 8V71T two-stroke turbo-charged marine diesels. The engines are fresh-water-cooled by heat-exchanger and drive outward-turning propellers through Allison hydraulically-operated 2:1 reverse/reduction gearboxes. Twin rudders are controlled by a Wills Ridley hand-hydraulic steering gear.

SOUND-INSULATED Accommodation is provided for one officer, one petty officer and five seamen, in two cabins aft and a messroom forward. 1130 litres (250 British gallons) of fresh water are carried. To keep noise levels at a minimum, the engines are installed on flexible mountings and the whole engine room is sound-insulated with acoustic foam protected by an oil-resistant coating. The engine room is ventilated by four high-capacity 24V electric fans, with ten 4 in (102 mm) fans in the accommodation spaces. A freon 1301 fire-extinguishing system is controlled from the wheelhouse.

Navigation equipment includes Decca 110 radar with a range of 24 miles. There are mountings on deck for three machine guns — one forward and one on either side of the wheelhouse amidships; an intercommunication system links the wheelhouse, the gun positions and the C.O.'s berth. The boat's 12 ft (3.66 m) GRP dinghy has built-in buoyancy and a 6 h.p. Johnson outboard motor as well as sails and oars.

Lloyd's supervision, using Scott Bader 821 resin with fibre-glass chopped-strand mat and woven roving. The deck and superstructure are of seawater-resistant aluminium alloy, the deck being bolted to the hull through an all-round Neoprene gasket. Watertight bulkheads are of % in (19 mm) marine plywood. A stainless steel shoe protects the lower part of the stem from floating debris.

The main engines are started from two banks of 260 amp/hour heavy-duty lead/acid accumulators; each bank is charged by its own 60 amp 24V CAV AC7 alternator driven off a main engine. A 1½ in (38 mm) Jabeco bilge, fire and deckwash pump is driven off the port engine. There is also a Whale Gusher 15 general-purpose hand pump and a stand-by electrical bilge pump. A separate 3 kW 24V D.C. generator, powered by a single-cylinder water-cooled diesel, is capable of running all electrics — including radar, radio, a Tamco loud-hailer, all the fans, a 9 in (23 cm) diameter searchlight and the bilge pump — when the main engines are stopped.

THE NAVY
Nov/Dec/Jan, 1977/78

ONE-PIECE MOLDING
The hull is a one-piece moulding in heavy-duty GRP, moulded under Lloyd’s supervision, using Scott Bader 821 resin with fibre-glass chopped-strand mat and woven roving. The deck and superstructure are of seawater-resistant aluminium alloy, the deck being bolted to the hull through an all-round Neoprene gasket. Watertight bulkheads are of % in (19 mm) marine plywood. A stainless steel shoe protects the lower part of the stem from floating debris.

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Pusher tug's stem is designed to roll up and
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without damage in
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rough weather, with waves more
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ders such operations are normally
discontinued when wave heights
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First to be equipped is the 120 ft,
5700 h.p. ESSO SANTA CRUZ (see
Fig. 2), whose main duty is to
manoeuvre VLCCs up to 500,000
tons d.w.t. to and from open-sea
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sisting of 3 m diameter tyres on
steel rims with self-lubricating
bronze bushes. The rims are free to
rotate about a transverse horizontal
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The assembly is designed to
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The Navy's newest warship, the
submarine HMAS Orion, is spend­
ing six months in British waters
before its delivery to Australia. The
Orion, with a crew of 62, com­
missioned into the RAN during June,
1977. She is the fifth submarine of
the Oberon class in the Australian
Fleet.

KEEL LAYING FOR HMAS
ADELAIDE
The keel for the first Royal
Australian Navy FFG-7 class guided
missile frigates, to be named HMAS
Adelaide on launching, was laid at
Todd's Shipyard, Seattle, USA, on
HMAS Adelaide, the first of the
two FFGs planned for the RAN (the
second would be named HMAS
Canberra), is expected to be ready
for handing over to the Navy about
August, 1980. The keel for HMAS
Canberra should be laid at the
same shipyard early next year.

Big Iranian Order
Britain is to build four advanced
support ships for the Imperial
Iranian Navy.
The contract has been placed
with the Clyde, western Scotland,
yard of Yarrow (Shipbuilders) Ltd
and is estimated to be worth around
£55 million (AS185 million) at current
price levels.
The diesel-powered vessels,
more than 90 metres long with a
displacement of 2500 tonnes, are
designed for multi-purpose roles
including disaster relief and general
cargo transportation, as well as
military duties.
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technically among the finest of their
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naval communications systems of
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OCTOBER (sub for 1½ years) $3.75.

THE NAVY
Nov/Dec/Jan, 1977/78
Page Thirty-One
New Action Information and Fire Control System for Fast Strike Naval Craft

WSA 420 is the latest version of the Ferranti weapon system automation (WSA) systems. It is specifically designed to provide fast strike craft with the operational benefits of an integrated digital computer-based fire control system.

WSA 420 incorporates major features, already proven in service, derived from the Ferranti CAAS (Computer Assisted Action Information System) and Ferranti WSA 4 systems. WSA 420 compiles and displays the surface tactical situation in the immediate vicinity of the craft and, via ship-to-ship data links, can rapidly exchange tactical information with sister ships in a task force. Targets shown on the WSA 420 action information display can be nominated to be attacked by any of the craft's weapons.

Essential features of the WSA 420 design to ensure its suitability for installation in fast strike craft are: compact, lightweight and robust construction; simple to use by a minimum number of operators; easy to maintain; and capable of expansion or adaption throughout its service life.

WSA 420 is capable of controlling the weapons and sensors of any fast strike craft. Today such equipment is envisaged comprising a suitable mix of: surface-to-surface missiles; a medium calibre gun (57 or 76 mm); a secondary gun (30 or 40 mm); as well as X-band and S-band surveillance radars; plus a tracker radar. Depending upon the attributes of the particular fast strike craft in which the system is to be installed, WSA 420 would include one operator position with an interfaced radar display for surveillance and target identification together with a second position and displays for controlling the tracker radar and the weapons. WSA 420 is designed for a two-man operation when in action, but only requires one at other times.

WSA 420 operates in real-time and the computer has adequate reserve information handling and storage capacity to enable it to cope with additional tasks that might be specified later in its service life. A basic computer software library is being prepared with the intention that only further limited software need be written to suit the particular sensor and weapon-fit of a specific class of craft.

A high-speed digital data link for the interchange of tactical information with other ships may be specified as an option.

The displays are of the interactive type which are simple to use as the computer leads the operators through the necessary sequences presenting them, at each stage, with a series of operational options from which they make their choices. Interactive control means the training required to use such a system is reduced to a minimum.

World's First Complete International Naval Technology Exhibition

The first ever international exhibition covering the full range of unclassified naval requirements will take place in The Netherlands next year, on 6-8 June at the Ahoy Centre, Rotterdam.

This exhibition will display Ship Systems, Equipment, Naval Armament, Electronics, Naval Aviation and the latest developments in Weaponship Design.

The International Naval Technology Exposition and Conference '78 will feature advances in worldwide naval technology in prime areas such as electronic warfare — power and propulsion — communications and navigation — naval ship design and construction — command and control — electronics and armament, including antisubmarine and mini warfare — environmental systems and Navy related equipment.

Supporting the exhibition will be an intensive technical conference programme covering: Warship Design and Utilisation — Advances in Naval Armament — Fire Control Electronics — Command and Control — and Training and Simulation emphasising the use of such equipment in naval operations. Papers on these and other subjects will be presented by specialists who have distinguished themselves in various areas of naval technology.

The conference programme for this major event is being organised by International Defence Review. Additional information may be obtained from Mr Geoff Dubbins — Press Officer River Communications S.A. (U.K. Branch Office) Millbank House, 171/178 Ewell Road, Surbiton, Surrey KT6 6AX, England.

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