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# THE Navy



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## THE NAVY

The magazine of the Navy League of Australia  
Registered for posting as a periodical — Category A

Vol 39

AUGUST-SEPTEMBER-OCTOBER, 1977

No 3

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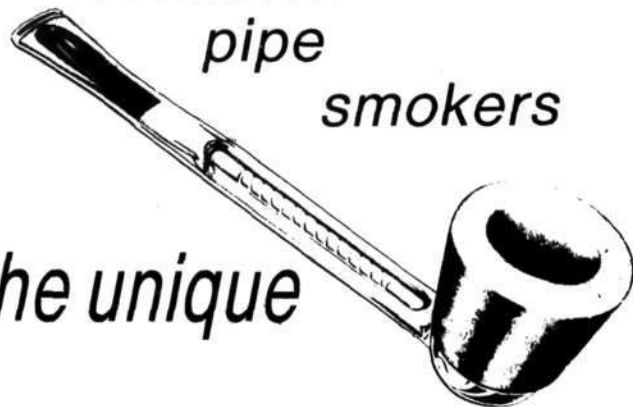
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Message from  
**THE MINISTER  
FOR DEFENCE**

*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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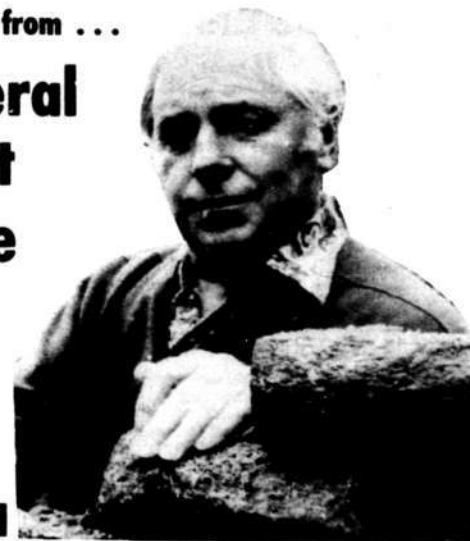


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Annual Message from ...

## 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 AMERICAN BATTLESHIP STORY

by ROSS GILLET

## PART II — 1923-1969

(Part I — 1782-1922, appeared in the May-June-July, 1977 Edition)

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 battleships 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 fourteen 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, 1923, 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 2 November, 1922, and *Saratoga* earlier on 30 October. Construction com-

menced 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 55 calibre guns in four twin mounts, two before the island and two aft of the massive funnel structure, supplemented by another twelve 5 inch 25 calibre guns in single mounts located along the ship's sides. Both vessels could carry some ninety aircraft, a significant number more than their contemporaries in other fleets.

A single aircraft catapult was fitted on the forward flight deck. The eight inch guns remained on board until the outbreak of war, but during 1942 were removed and re-sited on the Hawaiian island Oahu. In their place, four modern twin 5

inch 38 calibre guns were mounted, while eight single mounts replaced the twelve older 25 calibre guns. In addition another one hundred and thirty 40 mm and 20 mm anti-aircraft guns were added to the armament.

*Lexington* had not received her new guns before entering action and when lost on 8 May, 1942, was armed with twelve 5 inch and eighteen 20 mm guns.

The Washington Naval Treaty provided that modernisation of existing capital ships be limited to an increase in displacement of not more than 3,000 tons. Commencing in 1924, with the twelve year old *Florida*, some twelve other battleships were to be modernised 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 rebuildings were undertaken at the Boston Navy Yard, *Florida*, 1924 to 1926, and *Utah* 1926 to 1928. Each



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

work cost approximately \$6.5 million.

*Arkansas*, and her sistership *Wyoming*, were the second group to undergo rebuilding from 1925 to 1927. Changes included:

1. The addition of extra armour protection on both sides.
2. An aircraft platform, like *Florida* and *Utah*, fitted on top of "C" turret.
3. Oil fuel in lieu of coal.
4. Replacement of the cagemasts with tripod masts.

*Texas* and *New York* received similar conversions at the Norfolk Navy Yard from 1925 to 1927 and 1926 to 1927 respectively.

*Michigan*, the second U.S.N. dreadnought, was sold out of service in 1925 following her sistership *South Carolina* by six months. Also sold for scrapping were the pre-dreadnoughts *Kansas* and *Minnesota*.

During the same year, modernisation commenced on *Nevada* and *Oklahoma*. Within twenty-four months the two battleships had



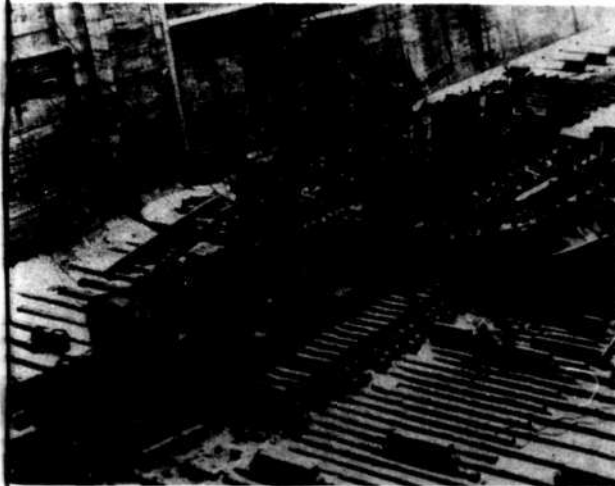
The USS WYOMING, one of the four dreadnoughts built in the 1908-1909 programme. She and her sister ship ARKANSAS had twelve 12 inch guns; the other two, FLORIDA and UTAH, had ten.

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 1929, eight battleships had received their second life and were serving together in the Pacific and Atlantic fleets. Occasionally the ships joined force for a massive show of strength and battle practice manoeuvres were held regularly.

In January, 1931, *Wyoming* was demilitarised and underwent conversion to a training ship. Speed was reduced to 18 knots, and three of her six twin 12 inch turrets removed. This move, which effectively ended her days as a front line unit, was similarly undertaken by the Royal Navy with HMS *Iron Duke* and on the *Hel*, a 25,000 ton battlecruiser of the Imperial Japanese Navy. In 1935 *Wyoming* commenced exercises carrying U.S. Marines in the first amphibious operations to be undertaken jointly by the two services.

During the years up to 1943,



By the end of the war, the U.S. Navy was overloaded with obsolete battleships. 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.



*HMS IRON DUKE, launched in 1912, was known as a super-dreadnought because her main armament included 13.5 inch guns. She was Jellicoe's flagship till after Jutland.*

Wyoming continued in a training role and in 1944 was defensively re-armed with fourteen 5 inch and seven 3 inch guns.

In comparison to Wyoming, the Japanese Hiei 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 and in that role served until 7 December, 1941, when she was sunk at Pearl Harbour by Japanese aircraft. Salvage was undertaken, but eventually abandoned, leaving Utah in her grave to this day.

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 allotted for these refits 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 were not content to risk having a sizeable proportion of their modern capital ships in dock and unable to be used against an enemy.

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, 1936, as replacements for Arkansas and New York which were in line for replacement after serving twenty years — a condition of the Washington Naval Agreement. In the event, 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 bat-

tleships 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 Puget Sound was Colorado, while New York was at Norfolk.

Of the eight ships moored at Pearl Harbour in Battleship Row only Maryland, Pennsylvania 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 Navy 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 Alabama. Measuring almost 50 feet less than their predecessors, the South Dakota class were renowned for their great manoeuvrability. A similar armament of 16 inch 45 calibre and 5 inch 38 calibre guns was carried. The South Dakotas also displaced 35,000 tons and possessed a top speed in the vicinity of 27 knots. Maximum armour protection was stated as 18 inches.

The four South Dakota ships were ordered in December, 1938 and April, 1939, as replacements for the Texas, Nevada, Oklahoma, and Pennsylvania. However, like the Arkansas and New York the four old dreadnoughts were retained in full commission.

The new year brought the navy into battle against the Japanese for the initial time. In August, 1942, the first amphibious landings of the war were undertaken at Guadalcanal in the Solomons. Present during these assaults were North Carolina, South Dakota, and Washington, providing the necessary cover for the carriers and other ships of the invasion fleet. North Carolina pro-



*USS WEST VIRGINIA, burning furiously and listing, and USS TENNESSEE (behind), at the height of the attack on Pearl Harbour, 7 December, 1941. Note the early type radar atop WEST VIRGINIA'S foremast.*

vided anti-aircraft fire at the Battle of the Eastern Solomons on 24 August, a defence which was credited as saving the aircraft carrier Enterprise, one of the few U.S.N. 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 twelve 14 inch and sixteen five 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 veterans New York and Texas, supported the North African landings. Attention switched to the Pacific on 12 November, when

Guadalcanal came under attack from Japanese forces. The naval battle which followed ended in the loss of the battlecruiser Hiei and battleship 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 11½ inches thick and armoured turrets 18 inches thick guaranteed protection. Four shaft geared turbines provided a speed of 33 knots. Range of action was 15,000 miles steaming at 12 knots.

First of the class to commission was Iowa on 22 February, 1943,



*USS COLORADO in February, 1942. This photograph was taken prior to her modernisation. Note the cage masts and catapult atop No. 3 turret.*

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 return. In January, 1944, both ships joined Washington, Indiana, Massachusetts, Idaho, Mississippi, New Mexico and Pennsylvania for the initial bombardments at Kwayalein, 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 Arkansas, Nevada and Texas bombarded the French coastal areas around Normandy immediately prior to and during the massive D-Day amphibious assaults on the continent. In retaliation the German shore batteries replied, but inflicted no damage. During August, 1944, the same three ships joined the Southern France invasion, shattering enemy positions and troop concentrations with their combined firepower of thirty-two 12 and 14 inch guns.

Sixteen battleships, including the new Iowa, New Jersey and Wisconsin, were present during the return of General Douglas MacArthur to the Philippines during October, 1944. The battleships supported the carriers and provided bombardment and cover for the invasion forces.

The year 1945 saw further action at two Jima, Okinawa and Wake Island. During the massive Okinawa amphibious landings, some 1,500 warships, including nine fast battleships and ten slower veterans, provided the necessary escort and fire support duties.

South Dakota, Indiana and Massachusetts bombarded the ironworks at Kamaishi on the Japanese home islands on 14 July, 1945, and again on 9 August.

In early August, 1945, the atomic bombs were dropped and on the 14th surrender was announced. Shortly afterwards the large allied fleet proceeded to Tokyo Bay and on 2 September an unconditional surrender was signed onboard Missouri.

Construction of the fifth and sixth Iowa class battleships Illinois and Kentucky, was suspended on 12





USS SOUTH DAKOTA photographed during 1943. Note the ridge in the hull amidships and the four, 5 inch turrets a side.

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 target ships at Bikini.

Both the Tennessee and Colorado class vessels decommissioned for the last time from January to April, 1947.

Texas received a reprieve from the breakers torch when she was handed over to the State of Texas on 21 April, 1948, for preservation as a memorial, adjoining San Jacinto Park, Houston. She rests embedded in concrete and attracts thousands of visitors annually.

With the exception of Missouri, the remaining fast battleships were paid off and placed into reserve from September, 1946, to March, 1949. Missouri continued in service with the fleet operating initially in the Mediterranean Sea. In August, 1947, she visited Rio de Janeiro and in the following year called into Lisbon, Villefranche and Algiers. During late 1948, Missouri exercised around Newfoundland.

The outbreak of war on the Korean peninsula again brought forth the need for more fire support ships and accordingly the three remaining Iowa class dreadnoughts were recommissioned. New Jersey on 21 November, 1950, Wisconsin on 3 March, 1951, and Iowa on 24 August, 1951. Missouri entered Korean operational waters for the first time in mid September, 1950.

Following the Korean war

Missouri received a comprehensive overhaul to prepare her for the inactive fleet at the Puget Sound naval shipyard. She paid off in February, 1955, 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, 1946. 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, 1956, 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, 1968, 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 5,688 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.



The Japanese battleship KIRISHIMA

After a very successful commission New Jersey paid off for the third and last time on 17 December, 1969, to rejoin her sister ships in the mothball fleet.

In all, some 59 battleships were

built for the U.S.N. including 27 from 1895 to 1908, and 32 dreadnoughts from 1910 to 1944. Only the four Iowa class remain in Navy hands. Another 14 vessels were planned for service but were never commissioned.

## OUR COVER

The Battleship USS NEW JERSEY underway for sea trials following her overhaul for reactivation in 1968 to permit her participation in the Vietnam war. Refer article "The American Battleship Story" on page 3

Class or Ship	Displacement (tons)	Designed Speed (knots)	Max. Armour Protection	Armament
Texas	6,315	17	12 inches	2 x 12", 6 x 6", 12 x 6 pdr.
Maine	6,682	17	12 inches	4 x 10", 6 x 6", 7 x 6 pdr.
Indiana class (BB1-3)	10,288	15	18 inches	4 x 13", 8 x 8", 4 x 6", 20 x 6 pdr.
Iowa (4)	11,410	15	15 inches	4 x 12", 8 x 8", 6 x 4", 20 x 6 pdr.
Kearsage class (5-6)	11,540	15	17 inches	4 x 13", 4 x 8", 14 x 5", 20 x 6 pdr.
Illinois class (7-9)	11,565	15	16 1/2 inches	4 x 13", 15 x 6", 16 x 6 pdr.
Maine class (10-12)	12,846	18	12 inches	4 x 12", 16 x 6", 6 x 3"
Virginia class (13-17)	14,948	19	12 inches	4 x 12", 8 x 8" 12 x 6", 12 x 3"
Connecticut class (18-22,25)	16,000	18	12 inches	4 x 12", 8 x 8", 12 x 7", 20 x 3"
Mississippi class (23-24)	13,000	17	12 inches	4 x 12", 8 x 8", 8 x 7", 12 x 3"
South Carolina class (26-27)	16,000	18 1/2	12 inches	8 x 12", 22 x 3"
Delaware class (28-29)	20,380	21	12 inches	10 x 12", 14 x 5"
Florida class (30-31)	21,825	20 1/2	12 inches	10 x 12", 16 x 5"
Wyoming class (32-33)	26,000	20 1/2	12 inches	12 x 12", 21 x 5"
New York class (34-35)	27,000	21	14 inches	10 x 14", 21 x 5"
Nevada class (36-37)	27,500	20 1/2	20 inches	10 x 14", 21 x 5"
Pennsylvania class (38-39)	31,400	21	20 inches	12 x 14", 22 x 5", 4 x 3"
New Mexico class (40-42)	32,000	21	20 inches	12 x 14", 14 x 5", 2-4 x 3"
Tennessee class (43-44)	32,300	21	20 inches	12 x 14", 14 x 5", 4 x 3"
Colorado class (45-48)	32,600	21	20 inches	8 x 16", 12 x 5", 8 x 3"
South Dakota class (49-54) (cancelled)	43,200	23	—	12 x 16", 14 x 6", 8 x 3"
North Carolina class (55-56)	35,000	27	18 inches	9 x 16", 20 x 5", 4 x 1.1"
South Dakota class (57-60)	35,000	27	18 inches	9 x 16", 16 x 5", 7 x 1.1"
Iowa class (61-66)	45,000	33	17 inches	9 x 16", 20 x 5", 60-80 x 40 mm
Montana class (67-71) (cancelled)	58,000	33	—	12 x 16", 20 x 5", 32 x 40 mm

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# Navy Week In Australia

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 rededicate 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.

The Squadron comprised the Battle Cruiser *Australia*; Light Cruisers *Encounter*, *Sydney*, *Melbourne* and the Torpedo Boat Destroyers *Warrego*, *Parramatta* and *Yarra*.

It is appropriate at this time to recall the words expressed by the then Prime Minister of Australia. The Honourable Sir Joseph Cook:

"Since Captain Cook's arrival, no more memorable event has happened than the advent of the Australian Fleet. As the former marked the birth of Australia, so the latter announces its coming of age, its recognition of the growing responsibilities of nationhood, and its resolve to accept and discharge them as a duty both to itself and to the Empire. The Australian Fleet is not merely the embodiment of force. It is the expression of Australia's resolve to pursue, in freedom, its national ideals, and to hand down unimpaired and unsullied the heritage it has received and which it holds and cherishes as an inviolable trust. It is in this spirit that Australia welcomes its Fleet, not as an instrument of war, but as the harbinger of peace."



# 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-Navalmen's Association.

## VICTORIA

### Saturday, 1

Navy Week Race Day, Flemington Racecourse. R.A.N. Band to play.

### Sunday, 2

Naval Association Church Services —

9.30 a.m. St Augustine's, Bourke Street (West) Melbourne.

11.00 a.m. St Luke's Church of England, South 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

Navy Golf Day, Waverley Golf Club

### Tuesday, 4

6.30 p.m. H.M.A.S. Lonsdale, Navy Day Reception (by invitation).

8.00 p.m. H.M.A.S. Lonsdale, Beat Retreat by the Guard and Band from H.M.A.S. Cerberus (visitors welcome)

### Wednesday, 5

Annual Bowls Day at Hampton Bowling Club.

### Thursday, 6

7.30 p.m. Greyhound Race Meeting, Sandown Park, Springvale. Band from H.M.A.S. CERBERUS will play.

### Friday, 7

8.00 p.m. Navy Week Ball, H.M.A.S. LONSDALE.

### Saturday, 8

7.30 p.m. Trotting Race meeting, Moonee Valley Track.

### Sunday, 9

10.30 a.m. Seafarer's Service, St Paul's Cathedral, Melbourne (Naval Reserve Cadets will carry Shipping, organisational and National flags).

2.30 p.m. Commemoration Service, Shrine of Remembrance — re-assemble at H.M.A.S. LONSDALE 4.00 p.m.

### Monday 3-Friday 7

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

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## 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. Owens (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 TRESKO (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. Parramatta, Ella Street, Rydalmere.

T.S. Albatross, Army Drill Hall, Harbour Street, Wollongong.

T.S. Hawkesbury, Welwyn Grove, Point Clare.

T.S. Tobruk, R.A.N. Drill Hall, Wharf Road, Newcastle.

T.S. Campbelltown, Ingleburn R.S.L. Club, Chester Road, Ingleburn.

T.S. Vendetta, Army Reserve Building, Duke Street, Coffs Harbour.

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## COMINGS AND GOINGS

### 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 deck ship *Australian Trader* was handed over. Made redundant on the Sydney-Tasmania route, the *Trader* had become uneconomic to operate and so prematurely 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 A.N.L. service she carried 172 passengers and 50 cars. She displaced 7,005 tons net, measuring 447 1/2 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 *Tobruk*.

Following conversion *Jervis Bay* will be the only training ship, taking over from the *Daring* class destroyer *Duchess*, herself, converted to the training role in 1973.

*Jervis Bay* should prove a successful buy for the Navy and provide a modern training ship for at least another fifteen years.

HMAS *Jervis Bay* was commissioned into the fleet on 25 August, 1977 and her first training cruise is scheduled for January, 1978.

### THE FAREWELL

As *Jervis Bay* was preparing to join the fleet, the old medium harbour tug *Bronzewing* slipped quietly from the Sydney scene. Sold to Mr J. A. Hursey of Tasmania, *Bronzewing* left harbour on 17 June, 1977, to commence her new role as a fishing vessel.

*Bronzewing* was launched on 2 February, 1946, and was the last of three diesel tugs built immediately after World War II. The majority of her career was spent on Sydney harbour including some time in reserve during the fifties and sixties. She originally carried a crew of sixteen, but in later years was manned by only four.

*Bronzewing* paid off for the last time in June, 1974, and remained laid up until her sale. Tenders for

### THE NAVY LEAGUE OF AUSTRALIA

Notice is hereby given that the Annual General Meeting of the Navy League of Australia will be held in the Assembly Hall of the Priory of St John of Jerusalem, Canberra Avenue, Forrest, A.C.T., at 4.30 p.m., on Saturday, 26 November, 1977.

### BUSINESS

- To receive the Report of the Federal Council and to consider matters arising therefrom.
- To receive the Financial Statement for the year ended 30 June, 1977.
- To elect office bearers for 1977-1978 —
  - (a) Federal President
  - (b) Federal Vice-Presidents (2)
  - (c) Federal Council
  - (d) Federal Secretary and Federal Treasurer
  - (e) Honorary Auditor
- General Business

1 September, 1977  
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O. V. Dimmitt,  
Lieutenant Commander,  
Federal Secretary.

the tug were invited including a spare engine, two spare propellers, one spare propeller shaft and 352 other spare parts.

*Bronzewing* was the largest tug operated by the R.A.N. after 1970. Her top speed was 9 1/4 knots and normal range over 2800 miles.

With the sale completed *Bronzewing* joined her two sister ships *Emu* and *Mollyhawk* which remain active under private ownership. *Emu*, renamed *Tenax*, was sold out of service in the late sixties and *Mollyhawk* renamed *Kallista*, is currently owned by the Hobart Tug & Lighterage Co. Ltd.

## Letter To The Editor



28 Bridge Road,  
Nowra  
15 July, 1977.

WHITE ENSIGN CLUB (NOWRA) LTD

The Honorary Editor,  
"The Navy" Magazine

Dear Sir,

The Certificate of Incorporation of this Company is dated 18th August, 1953 so that in a few weeks' time we commence our 25th year of the Club's activity.

The Club was formed as a non profit Company of 30 members to provide amenities for Her Majesty's Forces and, of course, in particular the Royal Australian Navy because of the happy relationship of the citizens of Nowra with HMAS ALBATROSS and HMAS CRESWELL.

We are looking forward to the return of those members who have in HMAS MELBOURNE taken part in the Silver Jubilee Fleet Review, and we would also welcome readers of your excellent publication to enjoy the fellowship of our Club in its Silver Jubilee Year should they be visiting the Nowra area.

For the information of old friends within the Service who are no longer in the area, I would mention that a Billiard Room is being added to the excellent facilities of the Club to mark this important anniversary year.

Yours sincerely,  
ANDREW WALTON,  
Chairman

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## ADMIRAL CRITICISES AUSTRALIA'S DEFENCE PRIORITIES



Vice Admiral Sir Richard Peek

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.

(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

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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 its 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 capacity."

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 neighbourhood 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-shiping 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:

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"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."

presume 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 armour, engineer, terminal and airfield construction units" without recourse to established port facilities.

I can see many uses for a heavy lift ship but find it difficult to see its role in the defence of Australia. If we have control of our maritime environment the ship can transport these heavy cargoes anywhere in Australia, although it seems unlikely that a reasonably competent enemy would land even a raiding party where we had landed our equipment. If an enemy can land anything larger than a lightly equipped raiding party, it follows that he must have gained control of the maritime environment. Any thought that we could use such a ship to land behind an enemy having maritime control is irrational.



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• 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 \$88.9 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 Ikara is used to illustrate the scientists' work, one has a nagging suspicion there may be some fat in the organisation because the main work on Ikara was done ten or more years ago!

I could go on with other examples in the White Paper and Defence Report which seem to me to indicate that all is not well in the forward thinking and the logical thinking of the Defence Department, but perhaps enough has been said.

Having made the first half-step towards a rational policy for defending our country (I refer again to the assessment "Any confrontation or conflict would be, initially at least, maritime in character") is it too much to ask that the enormous number of highly paid persons, both Service and civilian, who work at Russell Hill in Canberra, should produce the paper demanded by Mr Barnard as Minister for Defence about three years ago outlining the real requirements for defending Australia?

It is easy enough to be critical but any critic should be prepared to put forward his own ideas for examination.

In brief then, I believe that should Australia ever be involved in "confrontation or conflict" requiring the actual defence of the country.

- (a) We, like every other country in the world, will have no defence against nuclear missile attack.
- (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 repel a major landing or landings.

I also believe that Australians are wise enough, if they are given the facts, to see that we cannot defend ourselves by an army based on a divisional structure and all the trappings of World War II land campaigns, by air superiority fighters for use against a non-existent potential threat and by maritime forces with insufficient equipment and personnel because they consistently receive too small a share of the defence appropriations.

If my very brief analysis is valid it seems to me im-

portant that we should do all in our power to correct the present situation which is, I reiterate, that in the 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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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 published on Wednesday, 23 November, 1977.

It is anticipated that this special edition will contain a feature article on the fighting forces of Japan, particularly the Maritime Self Defence Fleet.

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# Safer Sea Routes through Magellan Straits and the Patagonian Islands

by Captain de Fragata (I.E.) Gonzalo Ruiz, Jefe Servicio Senalizacion  
Maritima del Instituto Hidrografico de la Armada de Chile

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 the map of Norway in reverse, with fringing islands backed by snow-capped mountains, and fjords 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 into 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 dis-

tance of more than 1,200 km — contained only one city and two small towns. A total population for the area of only 85,000 suggested that maintenance teams would be difficult to find, and most of the remoter 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 passes, meant that materials used must stand up to ceaseless buffeting.

### Glassfibre buoys

To meet these conditions, Stone Platt "Mallard" and "Osprey" buoys and beacon towers, all made of glass-reinforced plastic, are being manufactured under licence by Industrias 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 with a height of 3.7 m; their central battery pocket can house up to twelve 2-volt cells — enough for more than a year's continuous operation. Beacon towers made from hollow white and red or black GRP cylinders, each 2 m in diameter and 1 m high (Fig. 3), can be built up to heights between 5 m and 10 m. This method of construction ensures good stability; it also provides storage for batteries in the tower base and sheltered access to the light by internal climbing rungs. The towers are designed to withstand winds of over 100 knots.



Fig 1

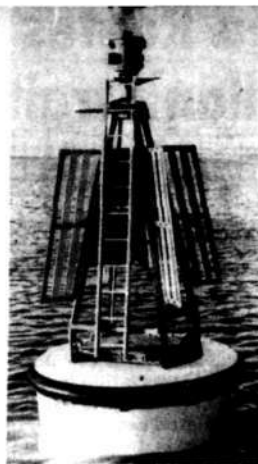


Fig 2



Fig 3

### 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 stabilised 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, Zenon 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 Baxa.

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 shoal 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 Bahía Gente Grande will be improved, for the convenience of ships wishing to reach the oil terminals at night.

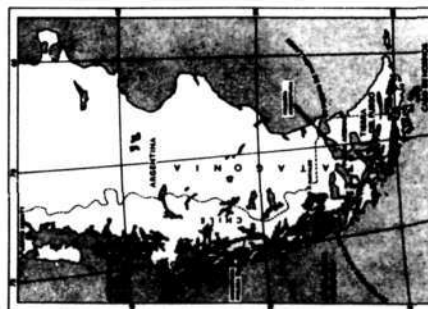
A GRP tower carrying a ZP20 lantern will be erected at C. Holland on the north shore of Paso Froward, and all existing lights in Paso Froward, Paso Ingles, Paso Largo and Paso del Mar will be changed. In Paso Tortuoso, where tides from the Atlantic and Pacific Oceans meet, a new ZP20 light and tower 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 Jeronimo will make it possible for ships to enter Seno Otway by night, in spite of strong and irregular tides.



Plan B



Plan A



PATAGONIA and TIERRA DEL FUEGO

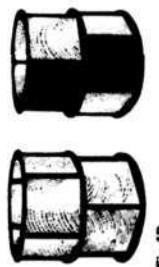
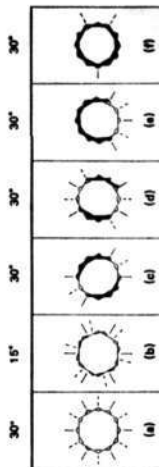


Fig 4B

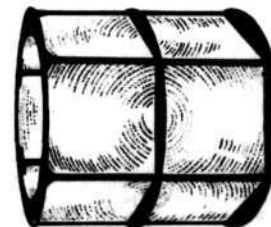
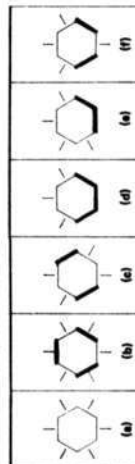


Fig 4A

## 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 Angosturas Kirke or White.

Canal Sarmiento is without dangers for most if 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 unit 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 Ballenero. 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.

## Key to Figs 4 A & B

Fig. 4A

Light characteristics of the Power Beam Beacon (on Tower in Fig. 3), with the panels set one immediately above the other and colour filters added where shown:



FIG 5

- |   |  |
|---|--|
| (a) Single flash white or coloured        | panels offset by 15° or 30° from the lower tier, and colour filters or blanking screens added where shown: |
| (b) Alternate flashing white and coloured | (a) Rapid single flashing white or coloured  |
| (c) Double flash white or coloured        | (b) Double flash white or coloured   |
| (d) Triple flash white or coloured        | (c) Triple flash white or coloured   |
| (e) Quadruple flash white or coloured     | (d) Quadruple flash white or coloured  |
| (f) Three-one flash white or coloured     | (e) Quintuple flash white or coloured  |
|   | (f) Two-one flash white or coloured.   |

Fig. 4B

Light characteristics of the Power Beam Beacon, with the upper tier of

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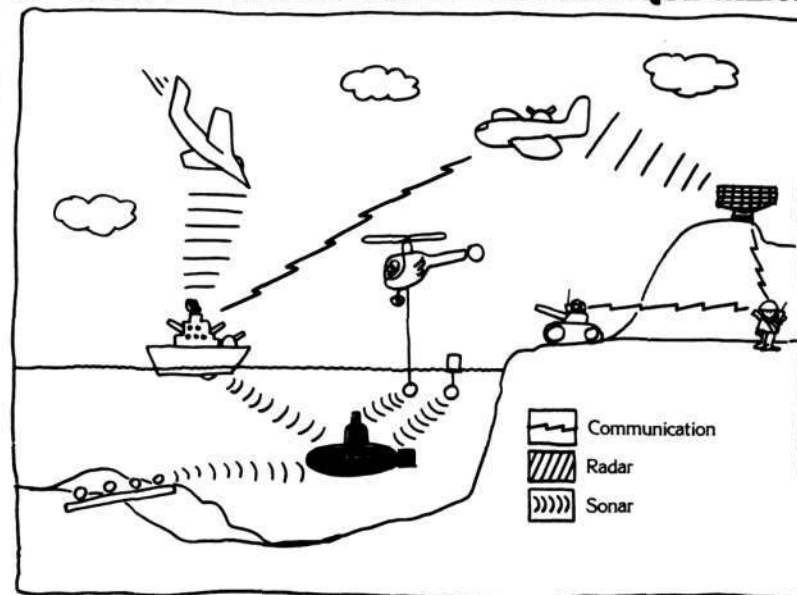
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No 4

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# THE "J" BOATS

Since the creation of the RAN in 1911 over five hundred ships of numerous 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, OVENS, 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 "Q" 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 side 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

by ROSS GILFILL

cruiser Sydney. Gibraltar was reached on Sunday 13 April. During passage to the "rock" rough weather plagued the boats. At noon on 16 April J3, J4, J7 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 their boats' batteries and painting the hulls. The battlecruiser Australia arrived on 25 April and the next day the ships (excluding Australia) left for Port Said. Aden was reached on 5 May, Colombo 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 Colombo J7 was taken in hand for repairs to her port engine clutch. J1 and J5 left Aden on 18 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 5 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 J7 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 Westernport, Victoria, and was paid off with the other boats.

J1, J2, J3, J4 and J5 served until late 1921 and early 1922. The career



The submarine J3 as she now lies off Swan Island in Port Phillip.

of HMAS J1 is representative of her five sisters. She was launched in November, 1915 and completed in 1916. During World War I J1 served from Blyth 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 rewiring 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, J5 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, 1928 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.

## Letter To The Editor



PO Box 74,  
Parkes 2870.  
12 October, 1977

The Editor,  
"The Navy"  
Dear Sir,

I was interested to read the letter by Vice-Admiral Sir Richard Peek in the most recent issue of "The Navy" on the subject of the Government's lack of realism in establishing priorities in Defence spending.

I notice that Admiral Peek appears to be particularly critical of the Army being "based on a divisional structure and all the trappings of World War II land campaigns". Again, Admiral Peek makes the statement that the divisional structure "does not seem to bear any resemblance to a readily transportable and mobile land force".

Whilst it is admitted that the Army has acquired most of its recent experience in operating at a Task Force level, it would surely seem appropriate that an Army whose main task is Continental Defence should operate on the divisional level.

I would be interested to hear Admiral Peek's views on the structure and roles which he considers appropriate for the Army in the late 1970s.

Yours faithfully,  
S. H. SCARLETT,  
Captain.

## OUR COVER

### HMAS JERVIS BAY GOES TO SEA

The Navy's latest ship, HMAS JERVIS BAY, went to sea during late September, for the first time as a unit of the Australian Fleet. Commanded by Commander Joe Morrice, HMAS JERVIS BAY was formerly the roll-on-roll-off passenger/cargo ship AUSTRALIAN TRADER, which was re-named and commissioned into the Navy on 25 August, 1977.

During the three days at sea, HMAS JERVIS BAY carried out engine and machinery trials off Sydney Heads following work carried out at Sydney's Garden Island Naval Dockyard which included painting the ship in Navy colours and a period in the dry dock. The ship has yet to undergo a 14 week dockyard conversion and is expected to make its first cruise as a RAN training ship about the end of January, 1978.



HMAS PLATYPUS, a submarine mother ship, with from left to right, submarines J1, J2, J4, J5, taken during the 1920s.

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 6800 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 1939 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.

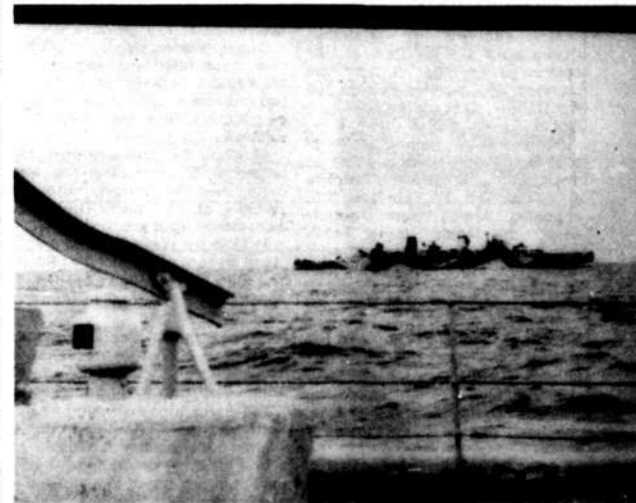
Events moved with disconcerting speed in the Middle East. While Wavell's land forces were sweeping the Italians back to Tripoli the Navy commenced Operation Lustre, supplying Greece with troops and arms to repel a two prong attack by Italian and German armies.

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 calque 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, 15 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.

Early in 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 to 1 by the Japanese Fleet.

With the fall of Singapore the remnants of the Allied Fleet concentrated on Java, particularly in the area of the Sunda Strait. By the end of February the Japanese Fleet 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, Houston, Perth and destroyers Electra, Encounter, Jupiter, Kortenaer, Witte De Witt, Edwards, Alden, Ford and Paul Jones was the stronger fleet.

Western Striking Force, commanded by the Australian Commodore J. A. Collins was comprised of older British light cruisers and destroyers and the Australian 21st Minesweeping Flotilla.

Perth and the other ships of Eastern Striking Force sighted an enemy surface force in the Java Sea at 4.14 pm on 27 February. The opposing forces were roughly equal, the Allies, three 8-inch cruisers, two 6-inch cruisers and 9 destroyers; the enemy, two 8-inch cruisers, two 6-inch cruisers and 13 destroyers.

However, it soon became apparent to Captain Waller and the English and US Captains that Admiral Doorman's tactics lacked skill. Strung out in line ahead the cruisers could not bring their combined gunfire to bear on the enemy.

During the first two hours of battle the 8-inch cruiser Exeter was seriously damaged and the destroyers Kortenaer and Electra

were sunk. On the credit side Perth claimed to have damaged a destroyer and several hits were made on two of the enemy cruisers.

After an hour's respite the action was resumed at 7.27 pm. Both sides opened up at close range but at 9 pm disaster struck, Jupiter hit a Dutch mine and sank four hours later. At 11.30 pm cruisers from both sides engaged. Two salvos from Perth hit an enemy cruiser but De Ruyter was badly hit and blew up shortly afterwards. Meanwhile Java was struck by a torpedo and later sank.

Perth and Houston retired at speed. Ammunition in both ships was almost exhausted. They arrived back at their base at Tanjung Priok at 2.30 pm in the afternoon and immediately commenced oiling and taking on the meagre supply of ammunition available.

There were no 6-inch or 8-inch shells available and when the ships sailed at 7 pm Perth had twenty rounds for each of her 6-inch guns and Houston less than fifty rounds for each of her 8-inch. To add to this the ships could obtain only half of their fuel capacity.

Just prior to sailing Commander Martin ordered 24 life rafts to be loaded in Perth. These rafts, intended for pilgrims to Mecca, were to save many lives in the next twelve hours.

Captain Waller, as senior officer, now commanded what remained of the Eastern Striking Force. As the two cruisers slipped out of harbour he told his crew that they were sailing for Sunda Strait.

At 8 pm the cruisers were zig zaging at 22 knots. The sea was calm and moonlight allowed visibility of six miles. The ships were closed up at action stations.

At 11.06 pm Waller sighted a ship close inshore off St Nicholas Point. The Aldis lamp blinked 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 Perth and the ship altered course slightly to bring her broadside to bear. A sheet of orange flame rippled the length of the ship and a hail of six inch shells screamed towards the Japanese destroyer.

On the bridge Waller and his officers were sighting ship after ship. Below in the plot, the ship's schoolmaster, Instructor Lieutenant-Commander N. E. Lyons, plotted in the enemy sightings. There were four to starboard — five to port. Captain Waller quickly calculated he was in the middle of an enemy fleet of at least two cruisers and thirteen destroyers. The order divided control was followed by independent control.

Houston's after turrets had been damaged in a previous action and could not be used. Waller manoeuvred Perth around to protect the American cruiser from a torpedo attack on her undefended stern.

The Japanese ships were so closely packed that the cruisers were firing over their own destroyers. Ripples of blinking flashes pin-pointed their positions. Shells roared over the ship like locomotives hurtling 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 swung their guns momentarily on 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 another exploded near the flag deck.

Captain Waller fired all torpedo tubes in a full speed run through the enemy warships. The four starboard tubes fired on three cruisers and port four hissed through the water in the direction of twelve destroyers. Torpedo Gunner L. C. Smith reported two hits.

The minutes ticking by were Perth's life. The ammunition was being expended at an alarming rate. When it was the ship would die.

Towards midnight the enemy destroyers were using their searchlights to illuminate the cruisers. Suddenly Perth leapt bodily out of the water as a torpedo struck her starboard side near the boiler room.

The ship listed and lost way but she was still steaming. She was also still fighting back. However, it could not last. The reports coming in from the guns indicated ammuni-

tion was almost exhausted. Perth's 4-inch guns were firing practice rounds.

An enemy searchlight suddenly held the ship in a brilliant blue light. A gun barked and the light went out.

A heavy shell exploded between the funnels and the Walrus amphibian and its catapult disintegrated.

A second torpedo ripped into Perth's hull right under the bridge and the men were knocked to the deck by the explosion. The cruiser was dying, crawling painfully through the water with a list to starboard. The Captain ordered abandon ship and this was relayed through the ship.

A turret fired and drowned out the order. It was the cruiser's last defiant blow. The men were already hurling rafts into the sea. Others were leaping overboard fearing the vessel would turn turtle and take them with her.

Another torpedo crashed into her port side. The explosion righted the list, but only for minutes, slowly she began to heel.

The last sight of Captain Waller was the familiar figure leaning on the bridge rail looking down on the silent turrets. A salvo of shells crashed into the bridge and a curtain of flame blocked out the vision of Perth's Captain.

At 12.25 am on 1 March, HMAS Perth slipped quietly beneath the dark waters of Sunda Strait. Houston burning fiercely and ripped open by torpedoes joined her shortly afterwards.



## ARNOLD'S SNACK BAR

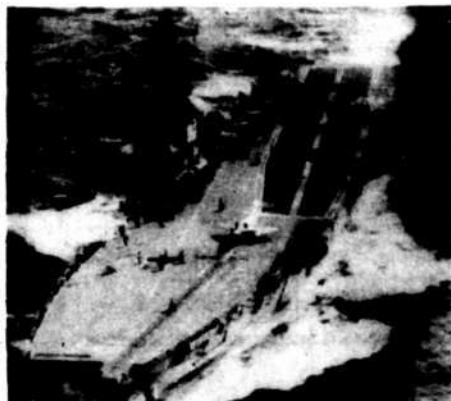
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## book review

### CODE NAME MULBERRY

*The Planning, Building and Operation of the  
Normandy Harbours*

**By GUY HARTCUP**

Published by David & Charles, London/Vancouver  
1977. Our copy supplied by Australia and New Zealand  
Book Co Pty Ltd, Brookvale, NSW.

160 pages including Index, References, Appendix,  
Select Bibliography and Glossary.

Reviewed by CAPTAIN S. H. SCARLETT

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.

It was obvious that the invasion force would have to be landed over open beaches and that the build-up of forces and supplies after D-Day would have to continue over the same beaches for several months. The problem with this lay in the notoriously unpredictable weather of the English Channel. A sheltered harbour was almost essential, and if one was not available on arrival, the Allies decided that the solution lay in building one and taking it to where it was needed.

There were to be two harbours, one for the Americans and one for the British. Mulberry A, the American harbour, was planned to have the capacity to unload 5000 tons a day whilst Mulberry B, the British harbour, was to have the capacity to unload 7000 tons. The basic arrangement was that several pierheads should be built, protected by either floating or sunken

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.

The breakwaters used were of two different types. For the more permanent type, there was developed a floating steel breakwater called a Bombardier 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.

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 Mulberry 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, but, 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, its prime task will be to gather information to assist the RAN in improving its anti-submarine warfare capability. This article examines the importance of oceanography to the Royal Australian Navy.

Despite a technological revolution which has provided the world's navies with improved anti-submarine warfare equipment, the submarine is more a threat today than it has ever been.

Even conventional submarines can dive deep, operate for long 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 a submerged submarine) 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.

Admirals the world over need to know more about the physical properties of the ocean in order to improve the performance of submarine detection systems.

Sonar performs differently from place to place due to differences in surface water temperatures, currents, the composition of the ocean floor and other factors. This means that a sort of oceanographic "weather forecast" will play an important role in any future maritime conflict.

Research and practical experience showed that temperature differences between layers of water can provide submarines with safe hide-aways because sound waves generated by searching sonars tend to travel within temperature layers. A submarine captain who found a



The RAN's oceanographer ship, **HMAS COOK**, after her launching at Williamstown Naval Dockyard, Victoria, on Saturday, 27 August, 1977.

convenient layer could remain safe from detection by a surface ship searching only a couple of kilometres away.

However, in other circumstances, it was found that sound could travel a long way through the water. One experiment in which Australia participated involved the detonation of a charge of TNT weighing about 135kg off the West Australian coast near Fremantle. The sound was detected by geophones 12,000 nautical miles away near Bermuda.

Oceanographers have now established many principles governing the propagation of sound in water, and this knowledge is being used by other scientists to devise submarine detection systems.

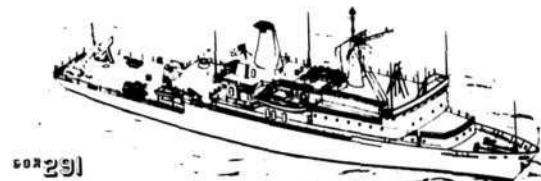
Australia has for many years had a close interest in anti-submarine warfare technology, partly because sonar conditions in our areas of interest are among the most difficult in the world.

To support this programme the

RAN operates **HMAS Diamantina** from Fremantle, and **HMAS Kimbla** 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; **Kimbla**, 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, electro-magnetic and acoustic propagation characteristics; magnetism and gravity; water motion; and the distribution and behaviour of marine life.

With such a large number of statistics to gather over such a large area of ocean it is hardly surprising that these two old ships have made only limited progress. Despite co-operation with the Royal Navy and



An artist's drawing of the RAN's new oceanographic ship.

the United States Navy, it is estimated that of all oceanographic data collected only three per cent comes from 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 — ie 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 Barra and Mulloka projects have used some basic research information gathered by the RAN's oceanographic ships. Barra is an advanced system using a sonar buoy which is dropped from maritime patrol aircraft such as the RAAF's P3 Orions.

Mulloka is a shipborne active sonar using new technologies developed in Australia and overseas in recent years. While a prototype has been tested in **HMAS Yarra**, development work has not yet been completed.

Oceanographic research is now extending into areas other than submarine hunting. For instance, it has been discovered that the exchange of energy between the top of the ocean and the first few metres of the atmosphere has an effect on radar transmissions. This could be important in the future in detecting supersonic anti-shiping missiles which fly only a few metres above the surface.

Research also is carried out for civilian organisations by RAN oceanographic ships, and the applications of this research could prove even more important than naval oceanography.

**Diamantina** has discovered an area south-west of Fremantle rich in nodules of manganese the size of cricket balls. Working at depths of 3000m to 5000m the ship has been able to recover samples for analysis in the laboratories of the Bureau of Mineral Resources in Canberra.

The nodules have proved to be rich in minerals such as copper, nickel and other valuable metals. Although the manganese itself may never be worth mining, the other metals may become an economic proposition if the vast technical problems of "mining" at these depths can be overcome.

Another of the ship's prospecting expeditions involved an unsuccessful search for phosphate deposits off Christmas Island. **Diamantina** also has studied the distribution and breeding habits of the West Australian rock lobster for the fishing industry, and discovered previously unknown marine animals in the deep ocean on cruises for the West Australian museum.

The ship has had her name entered onto the charts of the world's oceans as a result of discovering one of the deepest parts of the Indian Ocean — the **Diamantina Trench** — which, at 7012 metres, is three times as deep as Mt Kosciuszko is high.

**Kimbla** has discovered sea mounts (extinct submarine volcanoes), and investigated gigantic swirls of slowly rotating warm water off the east coast. These swirls, known as ocean eddies, are of interest to fishermen (because fish are attracted to them), to meteorologists (because of the effects that higher ocean temperatures may have on our weather), and the RAN (because eddies appear to have a focusing effect on sonar beams).

The resources of the oceans are known to be vast and many scientists believe that man will have

to find ways of exploiting them in the years ahead if economic growth is to continue. Civil oceanographic research, often from naval vessels, will be a vital prerequisite for this.

**HMAS Cook**, which will replace **Diamantina**, will have all the facilities necessary for modern oceanographic research, and should double the output of present programmes because of the increased accommodation which will be available for scientists.

Special equipment will include oceanographic winches which can lower dredges into the deep ocean to retrieve objects such as manganese nodules, expendable bathythermographs which signal back details of water temperature profiles as they descend over the ship's side on the end of a wire; a data logger; a magnetometer to measure the earth's magnetic field; a gravimeter to measure the gravitational pull at various points on the ocean's surface; and wet and dry laboratories.

**Cook** will have a "bow thruster" to enable her to maintain a correct heading at the low speeds required in oceanographic research; conventional ships lose steerage way at these speeds. She will also have a particularly quiet electrical generating plant to facilitate experiments in underwater sound propagation.

The ship will be fitted out at the Williamstown Naval Dockyard near Melbourne, and is scheduled to join the Fleet in 1979.

## Seawolf to Replace Seacat

The British naval missile defence system, **Seawolf**, recorded good results in salvo firing, aboard the frigate **HMS Penelope** against a supersonic **Petrel** rocket flying at more than Mach 2. It was on target at the first attempt. A variety of targets was used, getting down to a towed Rushton only 2.25 metres long by 13 centimetres diameter. This followed successful land firings at Woomera and in Wales. Sea trials will end this year and **Seawolf** will be installed on Type 22 anti-sub frigates, Leander-class frigates and possibly some Type-21 frigates. It replaces **Seacat**.

Seasonal Greetings to the RAN

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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, bandsmen, 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 11,490 sea cadets in 193 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 Kagoshima, 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 Lonsdale, 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 Cocked Hat and Epulettes 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 the 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 seafaring 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 a 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.







Cadets from TS MELBOURNE form a guard-of honour for the guests entering the Gala Function Dinner held by the Australian Red Cross Society. The guests from l to r: Mrs Fesq, Mr Bill Fesq, Commodore, Royal Sydney Yacht Squadron, Miss Norma Grier, Mr Sid Fisher, Captain — Admiral's Cup Team, 1977, Mr Barry Scott, Past President, Victorian Yachting Council, Mrs Scott.

## WESTERN AUSTRALIA

Two navy cadet units were presented with lifeboats by P and O Australia Limited.

Four boats — with a replacement value of \$20,000 — were presented on a permanent loan basis to TS Anzac, which is based at Point Peron, and TS Perth, which operates from a Swan River base (near HMAS Leeuwin).

P and O State manager Jim Wilson handed over the boats at the BP refinery jetty in Kwinana.

About 70 cadets and an equal number of parents were at the handover.

The boats are from ocean-going tugs operated by the line.

### SIZE

They are over six metres long, just over two metres wide, and come complete with masts, stays, main and jib sails.

"The lifeboats are virtually unsinkable," said TS Anzac's commanding officer, Lieutenant Trevor Pink.

"They can carry 23 people and can be used with sails or oars, or

can be motorised. They are ideal training boats."

The two boats for the 50 naval reserve cadets will be added to the small fleet based at Pt Peron.

There is a motorised rescue boat (which is used on all occasions that any competitive sailing is done) and a bosun's dinghy, which is used for training of the 13 to 18-year-old cadets.

## The "Hungli" in Geraldton

By Simen Keys

On the weekend of 28 August and 29 August, 1976, TS Morrow of Geraldton had kindly invited TS Perth of Fremantle and TS Anzac of Rockingham to help them in providing a float for the annual "Sunshine Festival".

After the opening of the festival, the father of a TS Morrow cadet prepared for us and other people a meal called a "Hungli" which is one of New Zealand's national dishes.

To keep the people happy, TS Morrow had set up a display of cadet activities which included: all the different types of diving equipment from the past and present; a firearms display; a communications display; the food provided in a ration pack; a boat safety display, and various others.

After the people had viewed the displays it was time for the "Hungli" which turned out to be delicious.

On the whole, the evening was a roaring success and we were very grateful for the meal, and pleased for the father who had prepared it for the cadets, that such a large number of people attended the night.

## 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 Challenger at Rockingham 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 (GASCC) also performs community service functions by assisting several ex-servicemen's organisations at their annual commemoration services.

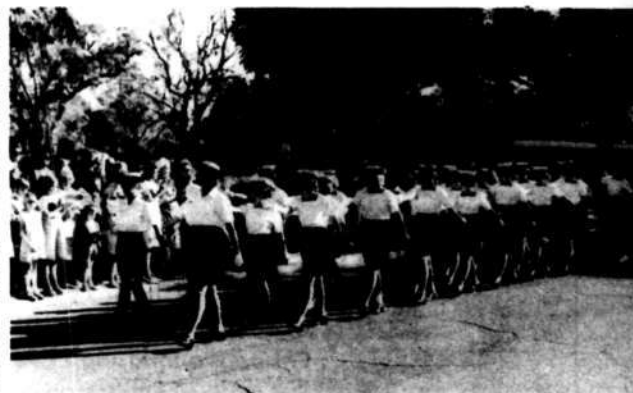
The GASCC is now spreading to other parts of Australia, in fact a new Unit, TS Donnington, was recently formed in Port Lincoln, South Australia.

## Around the Western Australian Division

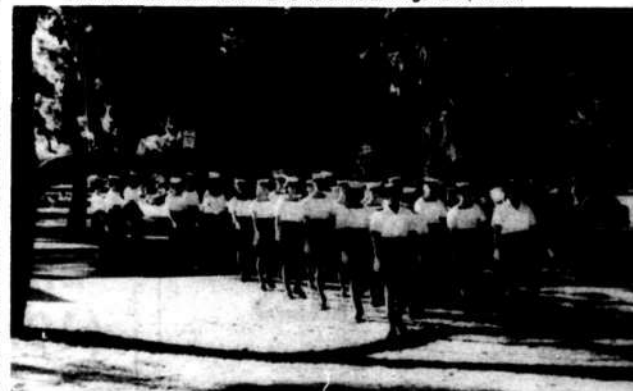
Commissioning the Brig AMITY, welcoming TS GASCOYNE to the Naval Reserve Corps, a visit by a Western Australian contingent to Tasmanian Cadet Camp, the Cockburn Sound Regatta, DNRC visit and setting up our first ACT Camp at Rottnest Island, have been highlights of Cadet activities in the West for the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

On the 27 November, 1976 TS Gascoyne, situated at Carnarvon, 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 early beginnings 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 is concerned, TS Gascoyne has acquired some complimentary characteristics to help it on its way. A visit to this unit is recommended as a good start to a North West tour.

Probably an activity that most cadet units would dream about,



Officers and Cadets of the Girls' Australian Sea Cadet Corps 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.



happened to TS Vancouver at Albany, when on 26 December, 1976, the Unit complement dressed in period costume of 150 years ago, complete with straw boaters and brass buttoned jackets, officiated at the commissioning of the Brig Amity, a replica of the 30 metre vessel which brought Western Australia's first European settlers to this land. The Unit's 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 under

the command of Lieutenant Gavin Reeves, manned the spars and ratlines, to cheer the Premier as he proceeded ashore. To the large crowd who had gathered in Albany on this occasion, the opening of the Town's sesqui-centenary celebrations, it was a time of appreciation for a gratifying job done by the Town of Albany for Western Australia. Amity Day came to a fitting conclusion with the performance of a "son et lumiere", depicting the historic highlights of first settlement in the Western part of our continent. Unit members in the colour of period costume



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manned the unit's whaler to enact  
the first landing and possession.

Whilst this colourful ceremony  
was in progress, TS Perth and TS  
Anzac were completing  
arrangements for a joint effort as  
starting officials, ferry service and  
back up to the large and busy  
Cockburn Sound Regatta, then later  
for the National Soling Class  
Championships. This has been an  
annual activity for these two units,  
who, make a very seamanlike show,  
and draw much credit to Naval  
Reserve Cadets, at this Regatta  
which is the premier yachting event  
in the West.

After this torrid time, Lieutenant  
Hawkes switched helms to the  
driving position of his car and with  
eight cadets representing all  
Western Australia Units joined the  
Senior Officer, Lieutenant  
Commander Geoff Curran, on a visit  
to Tasmania. The visit included a  
stop-over in Adelaide to take part in  
that fair city's impromptu  
celebrations on New Year's Eve,  
then on to Melbourne where the  
Senior Officer Victoria, Commander  
Alan Burrows, and Mrs Burrows,  
made the contingent most  
welcome. TS Melbourne kindly  
offered their headquarters as a  
temporary home, where Lieutenant  
Commander Curran had many  
reminiscences of past days when  
the unit's two Whalers plied  
adjoining Albert Park Lake. The  
travellers, some by air, and others  
by the Empress of Australia, then  
made for Tasmania. Those who  
were lucky to travel by the ferry  
were invited by its master to visit  
the bridge on leaving Port  
Melbourne and again on entering  
Devonport. Joining TS Combine,  
the NRC Tasmania's annual camp at  
Fort Direction, was a big occasion  
for the Western Australian  
contingent, in fact it was the first  
time an interstate visit had been  
made by Cadets to Tasmania. After  
a week of the warm Tasmanian  
hospitality, it was pack your kit for  
the return journey. This was not as  
a result of a certain misfiring of a  
Swan/Emu connection, but more of  
a necessity to return to Perth in time  
for school. Our appreciation to  
Lieutenant Commander Heath and  
the Tasmanian Division, TS  
Derwent, Tamar and Mersey and all  
those Tasmanian personnel who

extended friendship and hospitality  
to us.

Next event was the annual  
inspections and visit by the Director  
of Naval Reserves and Cadets. It  
was pleasing to note that the effort  
put into Naval Cadets during 1976/77  
has brought about a commendable  
standard in NRCWA activities.

Finally, the annual ACT camp was  
held at Kingstown Barracks,  
Rottneet Island during the May  
school holidays. Mild weather  
hampered some of the activities of  
the camp, but it did not dampen the  
enthusiasm of staff and cadets who  
made the occasion a success. The  
ACT concluded with a  
commendable ceremonial display  
for the Cadet Colour and witnessed  
by a larger attendance.  
Congratulations are in order to TS  
Anzac, this year's winner of the  
State Colours.

## TASMANIA

On 24 June the first round of the  
annual coastal rifle shoot was held  
at Emu. The home team attained the  
highest aggregate. The second  
round has had to be postponed  
pending examination of all rifles  
due to a suspected failure in certain  
weapons.

Training camps have been held at  
Mersey (combined with York),  
Derwent, Leven and Tamar.

During July all units were  
inspected by the Senior Officer  
(Tas), Lieutenant Commander  
Heath. Following this a conference

of unit COs was held at Ulverstone  
RSL Club.

Mersey was attended by Captain  
Pinkster, RN, the Royal Navy  
Liaison Officer on a private visit to  
this State. He appeared to be  
impressed by the unit facilities.

Tamar has been fortunate to  
acquire the services of an ex-RAN  
bandsman who is working very hard  
with the unit's band. The  
Navalmen's Assoc has purchased a  
bass and two side drums for the  
band.

Three local camps have been  
held, two for three days and one at  
Easter for four days. These camps  
give the unit the chance to take the  
boats some twenty miles down  
river, some under sail and the  
others under power.

The Port of Launceston Authority  
made a gift of a 24ft work boat  
(diesel motor) to the unit, which is  
used as a mother ship, staying in  
radio contact with the unit HQ, and  
which also carries all the equipment  
for the expedition.

A three day officers' and  
instructors' camp was given in rigging,  
sailing, power of command and rifle  
range drill as instructors are  
inclined to get rusty on subjects  
they rarely do.

Tamar has 46 cadets with an  
average attendance of 36 and  
training is carried out for 2½ hours  
on Friday nights and all day every  
second Sunday. Voluntary parades  
and work parties are held every  
Saturday.



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 Headquarters is on the foreshore.



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Uniforms are supplied free of charge.

Cadets are required to produce a certificate from their doctor to confirm they are capable of carrying out

the normal duties and activities of the Cadet Corps. If injured while on duty, Cadets are considered for payment of compensation.

**Parades are held on Saturday afternoon and certain Units hold an additional parade one night a week.**

The interesting syllabus of training covers a wide sphere and includes seamanship, handling of boats under sail and power, navigation, physical training, rifle shooting, signalling, splicing of wire and ropes.

general sporting activities and other varied subjects.

Instructional camps are arranged for Cadets and they are also given opportunities, whenever possible to undertake training at sea in ships of the Royal Australian Navy.

Cadets, if considering a sea career, are given every assistance to join the Royal Australian Navy, the Mercantile Marine or the Royal Australian Naval Reserve, but there is no compulsion to join these Services.

For further information, please contact the Senior Officer in your State, using the form provided below.

**SENIOR OFFICERS, NAVAL RESERVE CADETS:**  
**NEW SOUTH WALES:** Staff Office Cadets, HMAS Watson, Watsons Bay, NSW, 2030.

**QUEENSLAND:** Staff Office Cadets, HMAS Morton, Box 1416T, GPO Brisbane, 4001.

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

**SOUTH AUSTRALIA:** Staff Office Cadets, HMAS Encounter, PO Box 117, Port Adelaide, 5015.

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

**TASMANIA:** Staff Office Cadets, HMAS Huon, Hobart, 7000.

**AUSTRALIAN CAPITAL TERRITORY:** Staff Office Cadets, HMAS Watson, Watsons Bay, NSW, 2030.

TO: The Senior Officer,  
Naval Reserve Cadets,  
I am interested in joining the Naval Reserve Cadets and would be pleased to receive further information.

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# DE UPDATE

by A. W. GRAZEBROOK

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 major differences in the ways different navies are modernising ships of the same basic design, as a look at the plans of the British, Netherlands, South African and Indian 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 antisubmarine 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 reported that there will be no on-board replacements — once Parramatta has fired her outfit of torpedoes in the tubes, she will have to obtain re-loads in harbour or from an underway replenishment ship.
- An amidships fitting for later installation of two banks of four

HARPOON surface-to-surface guided weapon "coffin launchers".

- Updating of the twin 4.5inch gunnery 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 later River Class ships Swan and Torrens.
- Subject to satisfactory completion of trials, installation of the Australian built Muloke active medium range A/S sonar set.
- Updating of the Ikars anti-submarine missile system.
- Installation of a sewage treatment plant.
- Re-siting of the ships' LW02 radar aerial will reduce topweight and improve the effectiveness of the system.
- Remodelling of masts and funnel, in some cases accompanied by a



H.M.A.S. PARRAMATTA

— EXISTING



AFTER EXTENDED REFIT



change in material of construction to light weight materials.

- Conversion to burn diesel fuel — involving improved fuel availability from Australian sources and permitting improved stability as a result of water compensation in fuel storage for diesel fuel used.
- 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 15% 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.

**Paramatta** is starting her half life modernisation somewhat later than her British contemporaries. **HMS Ajax** (which visited Australia late in 1975) was completed in 1963, and began her modernisation at Devonport on 19 October 1970, completing in September 1973. **Paramatta** was completed in 1961.

The RAN's modernisation programme has taken some time to get under way. Although approved by the McMahon Government in August, 1972, it was reviewed whilst Mr Bernard was Minister for Defence and it took nearly five years between initial Government approval and the commencement of work on the first ship.

### 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. Eight ships have been selected for ASW specialisation. In these 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



*H.M.A.S. STUART is one of the destroyer escorts to be modernised in an extended refit. The refit will improve operational effectiveness, reduce weight and improve stability, reduce manpower requirements and ensure another ten years of operational life.*

surface-to-surface guided missile launchers. The EXOCET installation will permit reloading from on board handling rooms.

The SEACAT point defence anti-aircraft missile launchers will be increased to three, with one launcher being fitted forward (both the existing launchers being aft on top of the hangar).

The triple anti-submarine torpedo tubes are being fitted to those ships which are not receiving IKARA.

Compared with **HMAS Paramatta**, the British ships will have three SEACAT launchers (as against one), and the ability to reload the EXOCET surface-to-surface guided missile launchers at sea.

The RAN's ships will have HARPOON — widely regarded as a superior missile to EXOCET MM38. The improved 4.5inch gunnery system will offer enhanced anti-aircraft capability and a degree of fire support for troops ashore should this be necessary.

By sacrificing the gunnery system, the British have made available a space forward for IKARA or EXOCET SSGW. This has allowed the retention of the LIMBO ASW

mortar (for short range work) and the ASW helicopter. The need for LIMBO is manifest in the confined European waters in which the British LEANDERS are likely to operate. The need is less manifest in Australian circumstances, although some RAN Officers believe LIMBO should be retained.

It is reported that the removal of the gunnery system from the British ships, with attendant redistribution of weight, has permitted an increase in fuel carriage and therefore an increase in range.

There is no doubt that the eight British LEANDERS modernised for the ASW specialist role will be very effective ASW ships. One LYNX WG13 anti-submarine helicopter for long range work, IKARA for medium range work and LIMBO for short ranges, will all be carried by a ship of only 2,500 tons.

However, the British modernised ASW LEANDERS are designed to operate as part of an Escort Squadron with other types of ship (perhaps Type 42 anti-aircraft destroyers, or the larger guided missile light cruisers of the COUNTY Class) providing area defence

surface-to-air missiles for use against first class combat aircraft.

The differences in Australia's strategic and tactical circumstances are reflected in the choice 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 more thinly spread over a very large area than is the case in North Atlantic possible threat circumstances.

### DUTCH SHIPS DIFFERENT

The first of the six Dutch improved Type 12 frigates 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, whilst the 4.5inch turret will be replaced with a 76 mm (3 inch) OTO-Melara gunnery system. This last is the system to be fitted in HMA ships **Adelaide** and **Canberra** (now on order from the United States).

Reports say the Dutch envisage the 76 mm 85 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 their LIMBO close range anti-submarine mortar. The Dutch WASP helicopters will be

replaced by the newer larger LYNX WG13.

The Dutch choice of HARPOON is of interest, although to be expected as the new Dutch DLGs **Tromp** and **De Ruyter** are fitted with this missile and the thirteen new KORTENAER 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 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.

### INDIANS FIT SSGW

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

However, the Indians have modified later units in their improved Type 12 new construction programme to handle the larger SEA KING ASW helicopters in place of the ALOUETTE type carried in the early ships.

### SOUTH AFRICAN TYPE TWELVES

South Africa's three Type Twelve frigates were completed in 1962-64, and were modernised during the period 1969-1974. 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 LIMBO anti-submarine mortars was removed to make room for a helicopter landing platform and hangar, whence a WASP ASW helicopter now operates. Six anti-submarine torpedo tubes were fitted to the South African ships.

Perhaps because they were unable to obtain supplies of surface to surface guided missiles, the South African fitted no SSGW to their Type Twelves during modernisation. However, the Israelis are selling their GABRIEL SSGW to South Africa for the Fast Attack Craft under construction at Durban. It will be interesting to see whether the South Africans fit GABRIEL to their Type Twelves, or whether they use EXOCET MM38, to which they will have access as a result of their purchase of two A69 small frigates from France.

### RAN'S PLANS

Three of the four early River Class are to be modernised, a process which is starting somewhat later in Australia than it has for contemporary ships in other navies.

Whilst comparisons between the plans of different navies are of interest, it must be recognised that the armament and other capabilities of ships will differ according to the strategic and tactical needs of their navies. In the case of the RAN's three early RIVER's, the major features of improvement are the installation of MULLOKA and HARPOON and there are Service Officers who feel that, without those features, the modernisations would not be worth while.

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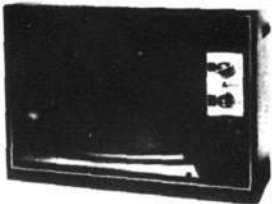
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## NEW FAST PATROL BOATS FOR SRI LANKA NAVY



### 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 draft 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.

#### ONE-PIECE MOULDING

The hull is a one-piece moulding in heavy-duty GRP, moulded under

Lloyds supervision, using Scott Bader 821 resin with fibre-glass chopped-strand mat and woven rovings. 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 ¾ 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) Jabcoco bilge, fire and deck-wash 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 Tannoy loud-hailer, all the fans, a 9 in (23 cm) diameter searchlight and the bilge pump — when the main engines are stopped.

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## VERTICAL-PLANE ROTATING BOW-FENDERS FOR MANOEUVRING LARGE TANKERS AND OIL RIGS IN OPEN WATERS

Pusher tug's stem is  
designed to roll up and  
down the ship's side  
without damage in  
waves 3 m high  
(see Fig. 1).

The positioning of oil rigs and the berthing or unberthing of large tankers at exposed pipeline terminals can now be carried out in rough weather, with waves more than 3 m high, by tugs fitted with the new vertical-plane rotating bow-fenders developed jointly by Consulting Naval Architect C. R. Horton Jnr. of Wilton, Connecticut, U.S.A. and Firestone Burleigh Marine Pneumatic Fendering Co. Ltd., England. Without rotating fenders such operations are normally discontinued when wave heights exceed 1.5 m.

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 berths at Aruba, N.W.I. The tug, capable of a 70 ton bollard pull, has been given twin fender units consisting of 3 m diameter tyres on steel rims with self-lubricating bronze bushes. The rims are free to rotate about a transverse horizontal steel axle secured into the hull, which also acts as a stiffening tie. The assembly is designed to withstand longitudinal thrusts up to 80,000 kg and lateral thrusts of half that amount, as the bows lift and fall and are carried from side to side in a figure-of-eight motion by passing seas.

During trials in October, 1976, the ESSO SANTA CRUZ successfully pushed a 25,000 d.w.t. tanker in 2 m seas on the lee side and 3.3 m seas on the weather side.

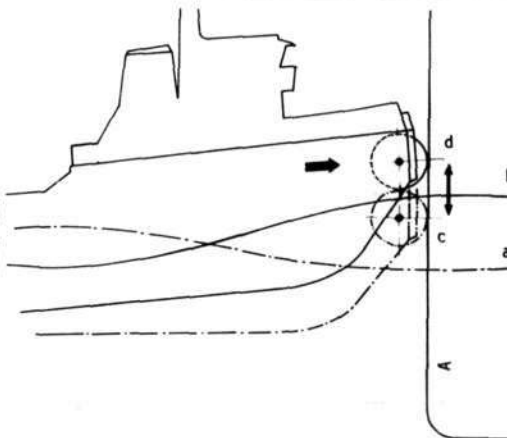


Fig 1



Fig 2

Seasonal Greetings from

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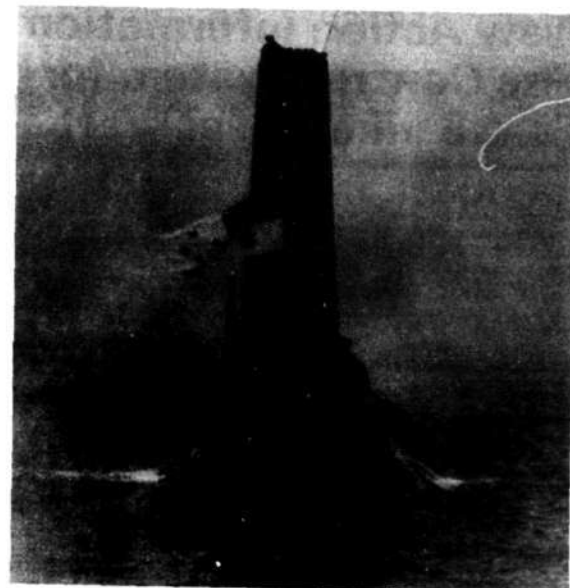
## NEW AUSTRALIAN WARSHIP

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 frigate, to be named HMAS  
Adelaide on launching, was laid at  
Todd's Shipyard, Seattle, USA, on  
29 July, 1977.

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.



H.M.A.S. ORION

### 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 (A\$85 million) at current  
price levels.

The diesel-powered vessels,  
more than 90 metres long with a  
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OCTOBER (sub for 1½ years) \$3.75.



## New Action Information and Fire Control System for Fast Strike Naval Craft

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

WSA 420 incorporates major features, already proven in service, derived from the Ferranti CAAIS (Computer Assisted CAAIS 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 as 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 interlaced 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 two-man operation when in action, but only requires one at other times.

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 systems is reduced to a minimum.

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.

## 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 Warship 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 — electro-optics and armament, including an-

ti-submarine 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 Kiver Communications S.A. (U.K. Branch Office) Millbank House, 171/185 Ewell Road, Surbiton, Surrey KT6 6AX, England.

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