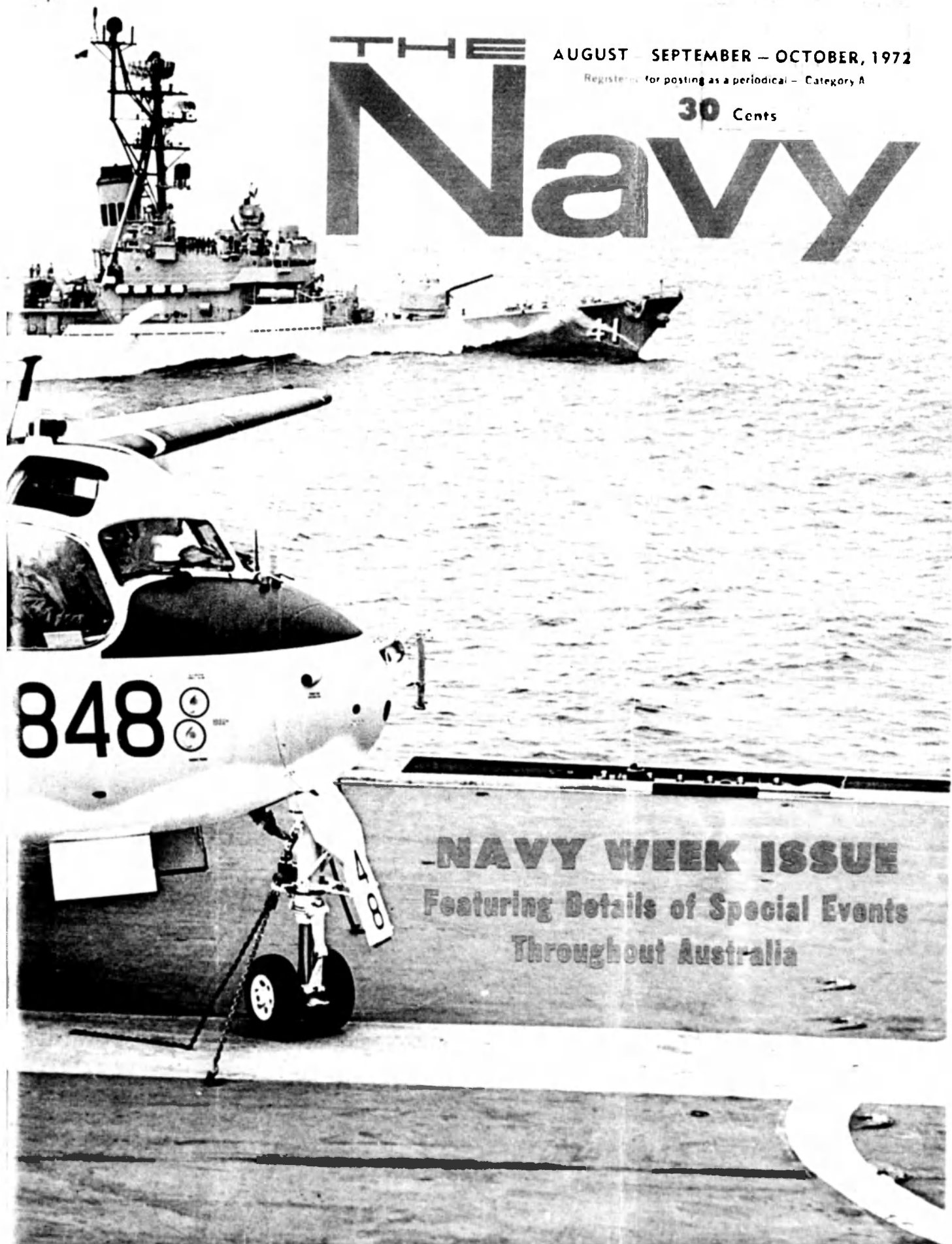


THE Navy

AUGUST - SEPTEMBER - OCTOBER, 1972

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The magazine of the Navy League of Australia
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Vol. 34

AUGUST-SEPTEMBER-OCTOBER, 1972

No. 3

A Special Edition for Navy Week in Australia — Featuring the
Royal Australian Navy

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PLUS SUNDRY STORIES AND PHOTOGRAPHS

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The Royal Australian Navy will see great change in the next 10 years

The Australian Fleet in the 1980's



H.M.A.S. Vampire showing its new silhouette after a recent half-life refit. H.M.A.S. Vendetta is currently undergoing refit at Williamstown Naval Dockyard.

R.A.N.'s first major support facility on the Indian Ocean, at Cockburn Sound, Western Australia, will be commissioned late in 1975 or early 1976.

And now the Navy is preparing for the most ambitious and exciting project it has undertaken — the building of its own light destroyer (DDL). This ship will be the first front-line ship to be entirely Australian designed and built. Its endurance, habitability, all-round armament for surface, anti-aircraft and anti-submarine warfare and its helicopters which will provide an air reconnaissance and attack potential will enable this type of ship to add further to the R.A.N.'s long-range independent fighting capability.

The light destroyer, more than any other type of ship, will determine the type of fleet the Navy has 10 and more years from now and will influence other development of the R.A.N.

With the withdrawal of the Royal Navy's Far East Fleet from Singapore and less U.S. interest in South-East Asia, the strength of the R.A.N. and its ability to operate within its own resources will become progressively more important.

Following the tendency of the last decade, the emphasis in R.A.N. planning will be towards enabling the fleet to operate with a high degree of independence in several different roles in its own area of operations, rather than just as an integral part of a larger Allied force.

Only three major ships which appear in the 1961/62 edition of Jane's Fighting Ships are still in service — the destroyer *Anzac*, now a training ship, the frigate *Diamantina*, now a survey ship, and *Sydney*, converted from an aircraft carrier to a fast troop transport.

The 1971/72 edition of Jane's shows the development of the submarine arm of the service, *Skyhawk* and *Trackers* and *Wessex* in Melbourne, *Ikara* in six Type 12s, three guided missile destroyers with surface, anti-air and anti-submarine primary armaments, 20 patrol boats, six minesweepers and minehunters and *Stalwart*, the escort maintenance ship.

The small hydrographic ship H.M.A.S. *Flinders* was launched by Mrs. Ruth Mackay, wife of the Minister for the Navy, Dr. Malcolm

Mackay, at Williamstown Naval Dockyard on 29 July, 1972.

Design of the fast fleet replenishment ship H.M.A.S. *Protector* is almost complete and planning of the oceanographic ship H.M.A.S. *Cook* is at an advanced stage. The expected delivery of two more *Oberon* submarines, *Orlon* and *Otama*, in 1975, will increase the capabilities of this arm of the service from one primarily of anti-submarine training to one which includes an attack capacity. Modified *Daring* Class destroyers *Vampire* and *Vendetta* will be the most modern gunships in the world. There is a good chance that the



H.M.A.S. Ovens, an Oberon class submarine. Two more Oberons are to join the Australian fleet (*Orlon* and *Otama*) in 1975.

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A Message from the Minister for the Navy

The Honourable
Malcolm Mackay, B.A., B.D., Ph.D., M.P.



Navy Week 1972 falls near the mid-point of the greatest period of progress and expansion the Royal Australian Navy has seen since the end of the Second World War.

The gains of the 1960s in terms of new equipment, purchases and successful operational experience in Malaysia, Vietnam and elsewhere with our allies, have been consolidated.

The Navy's task in the 70s and 80s is to build on this solid achievement and show its capability of adapting to further technological change and new strategic responsibilities ahead.

At a time when the defence emphasis is swinging further towards sea power, a demanding new set of challenges confronts the Royal Australian Navy.

In terms of naval air power, a current study is nearing completion which will help to decide the future as regards the replacement of H.M.A.S. *Melbourne*. This ship will almost certainly be beyond her present role by the end of the 1970s. The rapid advancement of V-STOL aircraft such as the *Hawker-Harrier* and the increasing capability of helicopters, brings new dimensions to our thinking in this region.

The R.A.N.'s growing all *Oberon* class submarine fleet, to which two more units will be added in the 70s, will continue to face a potent under-sea threat in the years ahead.

At the same time the anti-submarine capability of the Escorts will be increased in extended refits, which, with other important modifications, will keep these ships operationally effective well into the 1980s.

In addition, the acquisition of 10 Westland *Sea King* helicopters in 1975 will ensure an important branch of Australian Anti-Submarine Warfare forces retains its capability after the ageing *Wessex* helicopters have been phased out of service.

But perhaps the most interesting prospect the Royal Australian Navy looks forward to in the decade ahead is the design and construction in Australia of the new all-purpose destroyer — the DDL.

The decision to go ahead with this vessel which will take ship-building in this country into a new era, is right in line with the Government's aim for greater defence self-sufficiency.

The decision was only taken after exhaustive studies of alternative projects showed there was no better design or adaptation of a design offering overseas.

These then will be some of the important elements of the R.A.N. of the immediate future.

New front-line destroyers, new submarines, new aircraft, modernised Escorts, and an up-to-date support force, together making up a fleet which, ship for ship, is the equal, or better, of any non-nuclear Navy in the world.

The capital cost added to increased maintenance, better pay and allowances and vastly improved living conditions in the Service will not be a light burden.

But no lesser effort is required of Australia if we are to retain a sufficiently creditable Naval capacity in the future to deter aggression.

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A Message from the . . .

FIRST NAVAL MEMBER AND CHIEF OF NAVAL STAFF

Vice-Admiral Sir Richard Peek, K.B.E., C.B., D.S.C.

My belief stated in last year's Navy Week issue that thinking people are becoming increasingly aware of the significance of our geographical situation and that the Royal Australian Navy has a vital role in the defence of our island continent has been borne out by events in the last twelve months.

The Australian Defence Review issued by the Department of Defence in March 1972 "calls for military capability, evident to other countries, to project Australian strength beyond the continental boundaries". This call, which, to me, is a call for essentially maritime military capability, is expanded to include other Australian interests:

- the security of our neighbours in South East Asia and the South West Pacific;
- the security of our peacetime and wartime lines of communication through these areas;
- the security of our offshore resources;
- the security of the ocean areas generally from which direct threats to the security of Australia could be brought to bear in the longer term.

In addition to this statement of policy, the Defence Programme for 1972-73 approves four major naval projects, the DDL, the ASW Helicopters, the updating of the DDGs and the extended refits of the first four DEs. The project costs of these four items total close to \$500m. and represent nearly all of the total cost for approved new projects for all three Services. This allocation of the major share of new projects to the Royal Australian Navy is, I believe, an indication of the shape of things to come.

Elsewhere in this journal there are articles on the DDL and the new ASW Helicopters. I hope that these will give you sufficient background to support the wisdom of the Government's decision on these two major projects. We rely on the Navy League of Australia to educate the people of Australia about the need for strong maritime forces, as you have done so ably in the past.



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Approval of

DDL PROJECT

Government approval has been given to the DDL project for the design and construction of three light destroyers for the Royal Australian Navy.

The next stage — following the already completed preliminary design stage — will be the detailed design.

The vessels will be about 450 ft. long at the waterline with a beam of 48 ft., a maximum draught of about 20 ft. and displace 4,200 tons. They will be powered by Olympus and Tyne Rolls Royce gas turbines, the former giving a maximum speed of more than 30 knots and the latter a maximum cruising speed of more

than 20 knots. Endurance will be adequate at maximum cruising speed and will be up to 6,000 miles at economical speed which will be at least comparable with that of our most effective guided missile destroyers of the Charles F. Adams class (DDGs).

The armament will be a single 5" using the same ammunition as the DDGs with a gun control system developed from that already fitted in the later River Class destroyers of

the R.A.N. and recently fitted in the Darings.

The radars will be those about to enter service in the latest American destroyers. The sonar has yet to be decided upon and may be one of Australian manufacture and design.

Space will be provided for the fitting of six surface-to-surface missiles in what are called Coffin launchers.

Provision is being made for two radar controlled close range guns to be fitted amidships.

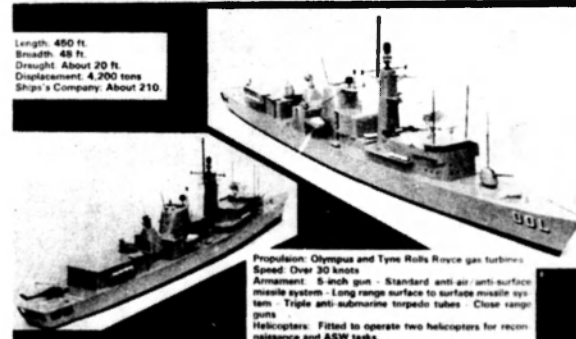
The missile launcher will be the same as that already fitted in the DDGs. The missile will be the Standard, a development of the Tartar now in service with the DDGs.

A set of triple Anti-Submarine Warfare (ASW) torpedo tubes will be fitted each side and space will be available in a magazine for additional torpedoes for two helicopters which could be stowed side by side in the hangar. The helicopters though possessing some ASW capability will be primarily for reconnaissance and, when armed with air to surface missiles will be able to deal with those missile firing patrol craft which lack an effective anti-aircraft armament. Ships' stabilisers will enable the helicopters to be operated in all save the worst weather. It will not be necessary to decide the make of helicopters for some time.

They will be the first Australian ships to be fitted with a computer-based command and control system which should ensure that the best use is made of the armament and which will enable the rapid reaction which is so necessary now in naval warfare.



Length: 450 ft.
Beam: 48 ft.
Draught: About 20 ft.
Displacement: 4,200 tons
Ship's Company: About 210



Propulsion: Olympus and Tyne Rolls Royce gas turbines
Speed: Over 30 knots
Armament: 5 inch gun - Standard anti-air anti-surface missile system - Long range surface to surface missile system - Triple anti-submarine torpedo tubes - Close range guns
Helicopters: Fitted to operate two helicopters for reconnaissance and ASW tasks

The Royal Australian Navy's new class of destroyer (DDL), construction of which is expected to begin in 1973.

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DDL PROJECT

The ship's complement will be the order of 210 officers and men and their accommodation will be of a higher standard than has ever before been achieved in any Australian destroyer. To improve arrangements for the individual's privacy maximum use is being made of cabins for Warrant Officers, Chief Petty Officers and Petty Officers and sailors' accommodation will be in four berth cubicles arranged in mess decks with a central recreation space in each. Recreational facilities will include closed circuit TV.

All this will be wrapped in a hull which will be in accordance with the latest naval standards and which has been specifically designed for high speed with good sea-keeping qualities and long endurance.

The three DDLs will be built in Australia — at Williamstown Naval Dockyard.

The lead ship will be commenced in March 1975, with the others following at about two year intervals. The first ship should be completed in early 1980 after a five-year construction period, and the third ship should commission in June, 1984.

The ships are estimated to cost \$73m. each at 1972 prices. Other costs associated with the project include design, initial stores and spares, ammunition, helicopters, shore-based spares, training, dockyard works, barracks accommodation and housing and establishment of Australian manufacturing and repair facilities, together amounting to \$135m. This makes a total project cost of \$355m. at 1972 prices.

OUR COVER

✱ Tracker anti-submarine aircraft ✱
 ✱ with guided missile destroyer ✱
 H.M.A.S. Brisbane in
 background.

(R.A.N. OFFICIAL PHOTOGRAPH)



An artist's drawing of the Australian designed new light destroyer class — DDL. The vessels will be capable of carrying two helicopters of a type yet to be decided.

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Brief History.

On 14 March, 1945, H.M.A.S. Watson was commissioned as a Radar Establishment having been known as H.M.A. Radar School from 1 June, 1942.

With the development of radar and plotting techniques H.M.A.S. Watson rapidly became an important training centre.

In May, 1952, the Action Information Training Centre came into operation and this gave officers and sailors training and experience under conditions as close as possible to those met at sea. By this time H.M.A.S. Watson had become firmly established as the Navigation Direction School.

In 1956, as a result of the growing complexity and importance of Anti-Submarine Warfare the Torpedo and Anti-Submarine School was moved from H.M.A.S. Rushcutter to its present site in H.M.A.S. Watson.

With the addition of the Torpedo Anti-Submarine Warfare School came the Administration, Accommodation and Amenities Blocks.

The name Watson was chosen for this establishment to indicate its location at Watson's Bay and also as a tribute to Sir Robert Watson-Watt the founder of Radio Location.

The device on the crest for H.M.A.S. Watson is Macquarie Lighthouse. Watson's Bay was named after Robert Watson, the Quartermaster of H.M.S. Sirius, the Flagship of the First Fleet. Robert Watson established the first lighthouse and signal station on South Head and was the superintendent of Macquarie Lighthouse in 1818.

The Schools.

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The entrance to H.M.A.S. Watson.

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T.A.S. School.

Our Torpedo Anti-Submarine Warfare School is situated on the shores of Sydney Harbour overlooking Lady Bay. It provides training in anti-submarine Warfare (A.S.W.) which involves the protection of convoys and the destruction of Submarines.

Officers are trained chiefly in the tactical aspect of A.S.W. and learn to employ ships, aircraft, weapons and other equipment to best advantage in any situation.

Seamen Sailors are given courses to advance in the specialised categories of Underwater Control (U.C.) and Underwater Weapons (U.W.).

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puters which process it for application to weapons which are manned by Underwater Weapons Sailors.

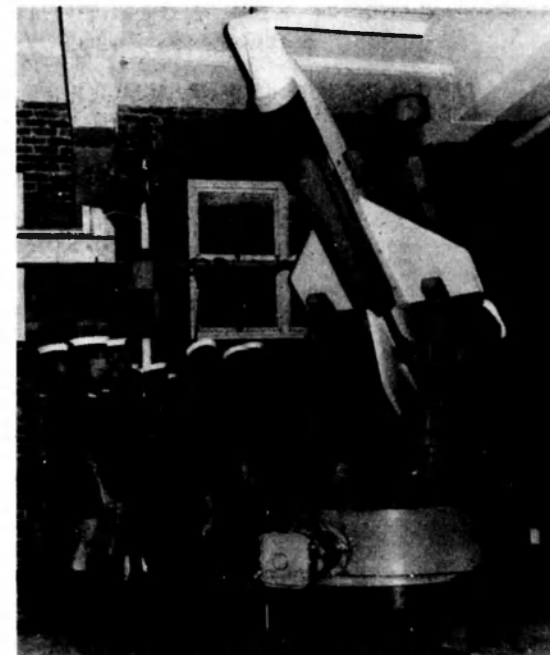
Anti-Submarine Weapons include mortars, and sophisticated homing torpedoes and Australia's own advanced A/S weapons system, the Ikara.

Navigation and Direction School.

Navigation is fundamental to the movement of ships across the oceans and it taught to officers in this school situated at the southern end of the establishment.

Direction is a naval art aimed at directing aircraft and surface forces to achieve the most effective use of sea and air power in naval operations. Greatest use of this art is made in aircraft carriers and is practised by Direction (D) officers and Radar Plot (RP) sailors. However, these officers and sailors are to be found in all major fleet units.

The school teaches Radar Plot sailors to operate radar sets and to plot all action information so that the command can readily appreciate a situation. Wran RP's are trained by and employed in the school.



Sailors specialising in underwater weapons receiving instruction on the operation of the Ikara anti-submarine missile.



A class of sailors undergoing training in the intricacies of surface-fired torpedoes.

Tactical School.

Officers and sailors comprising the Command teams of ships are trained in all tactical aspects. Other courses are conducted to ensure that all Officers remain current in tactical doctrine.

With the completion of the new Tactical Trainer building in 1973, a Tactical School equipped with the latest computerised training equipment will allow more personnel to be trained and ensure that the standards remain high.

Naval Reserve Training.

H.M.A.S. Watson is now the reserve training establishment for the Sydney Port Division of the Citizen Naval Forces.

The transfer of this training facility from H.M.A.S. Rushcutter took place on 19 August, 1966.

The main training periods occur every Thursday night with other training activities taking place on Tuesday Nights and Saturdays.

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3.00 p.m. — Helicopter winching demonstration.
3.15 p.m. — Diving and swimming display.
3.30 p.m. — Anti-Submarine mortar firing.
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(c) Anti-Submarine weapons.
(d) Mines.
(e) A Search and Rescue Helicopter.
Further attractions will consist of roundabouts and playground for children, food and soft drink stalls and performances by the Royal Australian Naval Reserve Band.

CONTRIBUTIONS INVITED

The editor invites persons to submit articles, photographs and drawings (black ink) for inclusion in the magazine, but regrets that no payment can be made for contributions submitted. Contributions should be addressed: The Editor, The Navy, Box C.178, Clarence Street Post Office, Sydney, N.S.W. 2000, Australia.

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Purchase of Ten Sea King ASW/Cargo Helicopters for The Royal Australian Navy

Recent studies within the Defence group have confirmed that the helicopter is an integral part of a modern balanced Anti-Submarine Warfare (A.S.W.) force, and is complementary to ships and fixed wing aircraft in A.S.W. operations.

The A.S.W. helicopter has a unique capability in that it can deploy an active sonar of similar capability to that fitted in destroyers whilst being able to move from one search position to another at a speed some four times faster than a nuclear submarine. All major navies, including that of the Soviet Union, now operate helicopters in the A.S.W. role.

The present A.S.W. helicopter, the Wessex, entered service in the Royal Australian Navy in 1962 and since that time has contributed very considerably to the fleet's A.S.W. capability. Because of ageing equipment, the Wessex will, by 1975, have reached the end of its life as an effective A.S.W. vehicle.

The acquisition of 10 Westland Sea Kings in 1975 will ensure that Australian A.S.W. forces retain the capability of the A.S.W. helicopter beyond the mid decade, and that the skills and expertise of operating and maintaining this arm of our A.S.W. forces will not be lost. The buy of 10 helicopters constitutes the first phase of an envisaged two phase project to replace the 20 Wessex which remain in service. A decision regarding the second phase of the project awaits the outcome of the Naval Air Power Studies currently being conducted within the Defence group of departments.

The Sea King is a large sophisticated machine with an advanced Automatic Flight Control System, radar, medium range sonar and an

integrated tactical display. The aircraft carries a crew of four as does the Wessex. Two pilots share the flying task while an observer and aircrewman in the rear cabin operate the sonar, radar and tactical display.

The Sea King Mk 50, to be built to R.A.N. specifications, is based on the Royal Navy Mk 1 version but will have an improved sonar, more powerful engines, an uprated gearbox to absorb the additional power, and a redesigned tail rotor to improve directional control. Overall it would be superior to the present

By Captain N. E. Lee,
R.A.N.
Director of Naval Aviation
Policy.

Royal Navy model and will be more suited to Australian conditions particularly in the warmer waters to our North. The Mk 50 will also be capable of being fitted with the Australian BARRA submarine detection system if the latter is introduced into operational service.

The Sea King has a substantial lifting capability and will be well able to fulfil the vertical replenishment role for the new Fast Replenishment ship, H.M.A.S. Protector, due to



The British version of the Sea King helicopter. Ten modified versions of this chopper are to be acquired for the Royal Australian Navy.

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SEA KING HELICOPTERS

enter service in 1976. Additionally, the A.S.W. equipment can be removed and seats fitted for a trooping role. This role change can be effected reasonably quickly.

The *Sea King*, which is manufactured by Westland Helicopters Limited of Yeovil, England, entered service in the Royal Navy in August, 1969. *Sea Kings* are also in service in, or on order for, the Federal German Navy, the Indian Navy and the Royal Norwegian Air Force. They are expected to remain in production in Britain into the late 1970's.

Two other aircraft, the French *SNIAS Super Frelon* and the American *Sikorsky SH3H* were evaluated by the Navy. After a detailed and lengthy investigation the *Sea King* was determined to be the aircraft which most closely and economically meets the R.A.N.'s requirements.

The total project cost for the 10 aircraft will be \$43.1 million. In addition to the aircraft, this will provide spares, training for aircrew



Currently in production for Britain's Royal Navy is *Sea King*, a twin-engined helicopter intended primarily for all-weather anti-submarine operations from ship or shore bases. Powered by two Rolls-Royce Gnome gas turbine engines, *Sea King*, a modified version of which is to be acquired by the R.A.N., has an automatic flight control system and advanced capability anti-submarine weapon system that enables the aircraft to operate as a completely self-contained unit capable of detecting, classifying and destroying modern, high speed submarines. Its adaptability enables it to operate in a variety of roles including air/sea rescue, troop transport (up to 20 fully equipped troops can be carried), minesweeping, logistic support and surface search and strike. A further feature of the helicopter is the fitting of a powerful folding system for its five bladed main and tail rotors which facilitate stowage when shipborne. The British *Sea King* has a maximum speed of 140 knots, a range of 650 nautical miles and an all-up weight of 20,500 lbs.

and maintenance personnel, and a weapons system trainer. The latter will greatly reduce the need to use aircraft for training purposes and enable better supervision of crews in their initial A.S.W. training.

Arrangements are being made with Westland Helicopters Limited for offset production in Australia of aircraft components to the value of over 30 per cent of the cost of the aircraft. This level of offsets will be achieved within 5 to 7 years of our placing the order.

In summary, the *Sea King* has a considerable A.S.W. capability and the potential for further development of this capability. The acquisition of ten *Sea Kings* will ensure that the R.A.N. maintains its expertise and capability in this important field of anti-submarine operations.

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H.M.A.S. NIRIMBA

(Situated at Quakers Hill, N.S.W. WILL BE OPEN FOR PUBLIC INSPECTION on Sunday, 8 October, 1972, 12.30 p.m.-5.30 p.m.)

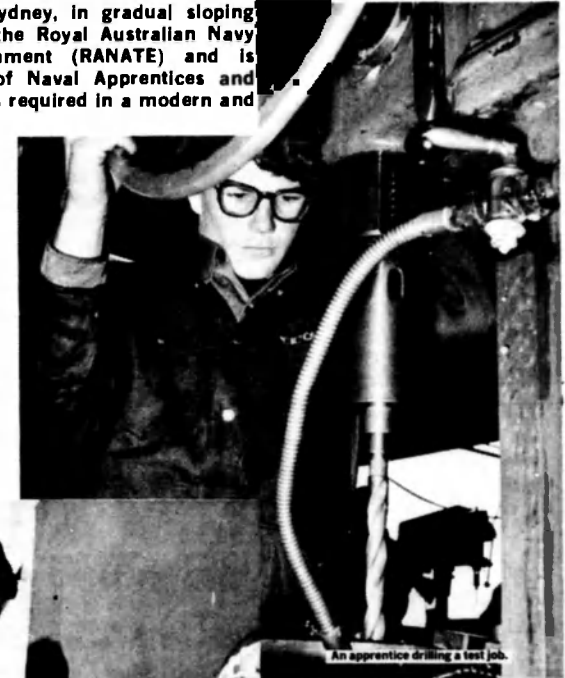
Refer Programme of Events at conclusion of this article

Situated 25 miles from Sydney, in gradual sloping country, H.M.A.S. Nirimba is the Royal Australian Navy Apprentice Training Establishment (RANATE) and is responsible for the training of Naval Apprentices and Mechanics in the various trades required in a modern and highly technical Navy.

Until June 1972, a Naval Apprentice entered the Navy for a period of twelve years. The first three and one-half years were spent at Nirimba followed by 18 months with the Fleet gaining experience at sea. This completed their apprenticeship.

In June 1972 the new four year system was introduced. The present First Term lads are the initial entry under this scheme. These apprentices now spend two years at Nirimba learning the basic skills and then go to sea for two years to complete the practical section of their trade.

During working hours they are engaged in working on lathes, shapers, computers and many other



An apprentice drilling a test job.



Apprentice Connell executing fine work on Nirimba crests.

up-to-date machinery, in one of the three branches available to them.

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academic ability to cope with the particular training, and subject to the Navy's requirements for numbers in each category.

The apprentices are required to undertake regular **Private Study** and qualified instructors are available for tutorial assistance. Those who have not made satisfactory progress receive additional obligatory instruction.

In their free time, the apprentices have a large number of activities available to them. Theatre parties enable apprentices to visit most of the live theatres in Sydney for about 50 cents, and the film theatres for about \$1. Also films are shown at Nirimba three nights a week.

A library, games room, T.V. rooms and cinemas are provided. There is also a canteen in which parents and friends may be entertained as well as specially decorated guest rooms in each Divisional Block.

Nirimba has facilities for most popular sports. Rugby, Australian Football, Soccer, Hockey, Athletics, Tennis, Basketball, Baseball, etc. There are clubs for those interested in Car Rallies, Water Skiing (there are two boats), Rifle Shooting, Trap Shooting and Boxing.

In all, Nirimba provides a young lad with practically every opportunity, both with an apprenticeship and the pursuit of most sports or hobbies available.

H.M.A.S. NIRIMBA Programme of Events

Sunday, 8 October, 1972, 11.00 a.m.-5.30 p.m.

(MEMBERS OF THE PUBLIC INVITED TO VISIT)

Time	Programme of Events	Duration
11.00 a.m.	Catholic and Protestant Church Services.	60 min.
12.30 p.m.	NIRIMBA "Open" — Field Gun.	
12.30 p.m.	Soccer — Invitation "Six-a-Side"	
	Knockout Competition	Continuous
12.30 p.m.	Steam and tractor train rides for children.	Continuous
	Slot car racing.	Continuous
	Band recital.	15-30 min.
1.00 p.m.	Assault course "run"	15 min.
1.30 p.m.	WESSEX Helicopter winning drill.	15-20 min.
2.15 p.m.	Sky-Divers display.	
2.30 p.m.	Gymnastics display.	20 min.
2.30 p.m.	Gliding Club display.	
3.00 p.m.	Band recital.	30 min.
3.10 p.m.	Assault course "run"	15 min.
3.20 p.m.	WESSEX Helicopter winning drill.	
3.45 p.m.	Final Judging of Poster Competition.	
4.15 p.m.	Band marching display — to include	
5.00 p.m.	BEAT RETREAT, culminating in ceremony of Sunset with Guard.	
to	Evening Gun — Field Gun.	
5.30 p.m.		



Apprentices working on a new water ski boat.



Apprentice Baker on "way down" during an assault course.

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Annual Message from the Federal President of the Navy League of Australia



**Commander F. G. Evans, M.B.E.,
V.R.D., R.A.N.V.R.**

One of the most interesting developments in the defence area in recent times has been the increasing attention given to the Navy and naval defence. It indicates I believe a growing awareness in the community at large that Australia, after all, is essentially a maritime nation, and that all events related to the sea concern us in one way or another.

A few years ago many Australians were questioning the future of navies, but events abroad — not least those famous **Russian ships in the Indian Ocean** and realistic staff-work at home, have done much to change the situation.

In the political sphere the importance of maritime defence does not appear to be doubted by either Government or Opposition parties; such differences as exist relate in the main to the best methods of achieving the desired goals of effectiveness and self-sufficiency. This approach reflects credit on those especially concerned with defence, on both sides of the Parliament.

We in the Navy League are taking an increasing part in these developments: Several **study groups** have been established with the object of making League members familiar with the various problems facing the Royal Australian Navy — and the other Services — and the search for information has already brought us into contact with a good many people involved in defence matters: We are not neglecting our association with the Navy Leagues in other countries as a source of information.

In short, we are actively pursuing the objects for which the League was established so far as they relate to Naval defence. Our other prime object, the maintenance of the Australian Sea Cadet Corps, at the time of writing continues to be a major task imposing a considerable strain on our slender resources, both in terms of **manpower** and finance. The Federal Council seeks your continued support in both spheres.

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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 re-dedicate 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 167th 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.

Fifty-nine years ago, on 4 October, 1913, the Australian Fleet steamed into Sydney Harbour. Navy Week, 1972, 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."

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PROGRAMME OF EVENTS *arranged for* NAVY WEEK, 1972

NEW SOUTH WALES

TUESDAY, 3 OCTOBER	12.30-1.30 p.m.	Navy Band recital at West Circular Quay.
WEDNESDAY, 4 OCTOBER	Afternoon	Navy Band to play at Randwick Spring Carnival Race Meeting.
THURSDAY, 5 OCTOBER	12.30-1.30 p.m.	Navy Band recital in Fitzroy Gardens (bounded by Macleay Street, Elizabeth Bay Road and Greenknowe Avenue, Kings Cross).
	All Day	Navy static display including IKARA missile — Grace Bros. Department Store, Bondi Junction.
	Night	Navy Band recital — Grace Bros. Department Store, Bondi Junction.
FRIDAY, 6 OCTOBER	Morning	Navy static display — Grace Bros. Department Store, Bondi Junction.
	12.30-1.30 p.m.	Navy Band recital, Wynyard Park, Carrington, York and Margaret Streets, Sydney.
SATURDAY, 7 OCTOBER	Midday	Navy Band will lead Waratah Spring Festival Pageant through the streets of Sydney.
SUNDAY, 8 OCTOBER	10.30 a.m.	Ecumenical Church Service, Garden Island Dockyard Church (refer to separate article) — R.A.N. Band to participate.
	1.00 p.m.	H.M.A.S. Watson open for Public Inspection (refer separate article).
		H.M.A.S. Nirimba open for Public Inspection (refer separate article).
	to	H.M.A.S. Platypus open for Public Inspection (refer separate article).
		H.M.A.S. Penguin open for Public Inspection (refer separate article).
	5.00 p.m.	

VICTORIA

FRIDAY, 29 SEPTEMBER

SUNDAY, 1 OCTOBER 11.00 a.m. to 4.30 p.m.
11.00 a.m.

MONDAY, 2 OCTOBER

TUESDAY, 3 OCTOBER 12 Noon to
2.00 p.m.

WEDNESDAY, 4 OCTOBER

THURSDAY, 5 OCTOBER

FRIDAY, 6 OCTOBER 8.30 p.m.

SATURDAY, 7 OCTOBER 9.30 a.m. to 4.30 p.m.

2.00 p.m.
to

4.00 p.m.
10.30 a.m.

SUNDAY, 8 OCTOBER

3.00 p.m.

Navy Week Annual Reunion, Footscray Naval Centre.

H.M.A.S. **Cerberus** OPEN DAY.

Navy Week Service, Christ Church, South Yarra.

Navy Week Golf and Lawn Bowls Tournaments, Waverley Golf Club.

Navy display opens at SOUTHLANDS Shopping Centre, Nepean Highway, Cheltenham.

Navy Band and Physical Training display at Melbourne City Square, Swanston Street.

R.A.N. Band Ensemble at SUTTONS Music Store, 105 Elizabeth Street, Melbourne.

R.A.N. Band Ensemble at ALLANS Music Store, 276 Collins Street, Melbourne.

Navy Week Ball, H.M.A.S. **LONSDALE**, Port Melbourne.

Williamstown Naval Dockyard OPEN DAY.

Navy Week Service, Melbourne Synagogue, South Yarra.

Sea Cadet Units open for Public Inspection — T.S. **VOYAGER** (Williamstown), T.S. **BARWON** (Geelong), T.S. **HENTY** (Portland), T.S. **MILDURA** (Mildura), T.S. **BENDIGO** (Bendigo).

St. Paul's Cathedral Seafarers' Service in the presence of H.E. the Governor of Victoria, Sir Rohan Delacombe and Lady Delacombe.

St. Patrick's Cathedral Mass.

Memorial Service at the Shrine of Remembrance (Sea Cadets will form guard of honour with other Naval personnel).

TASMANIA

SATURDAY, 30 SEPTEMBER

SUNDAY, 1 OCTOBER

FRIDAY, 6 OCTOBER

SATURDAY, 7 OCTOBER

Hobart Sub-branch of the Navy League Cocktail Party at Naval Memorial House.

Wreath Laying at Hobart Cenotaph.

Mariners Service St. George's Church, Hobart.

Navy Week Ceremony in Launceston.

Navy Week Ball, Devonport.

Navy Week Cabaret, Launceston.

Navy Ball, Hobart.

An Ex-Navalmen's Dinner will be held at the Naval Memorial House, Davey Street, Hobart, during the week, and also throughout Navy Week commercial interests in a number of Tasmanian centres will publicise the R.A.N.

QUEENSLAND

FRIDAY, 29 SEPTEMBER

SATURDAY, 30 SEPTEMBER

SUNDAY, 1 OCTOBER

TUESDAY, 3 OCTOBER

WEDNESDAY, 4 OCTOBER

THURSDAY, 5 OCTOBER

FRIDAY, 6 OCTOBER

SATURDAY, 7 OCTOBER

SUNDAY, 8 OCTOBER

Sea Cadet Training Ship **PALUMA** open to public at Cadet Headquarters Gibson Park, Stafford.

Naval Association Ball at Ipswich.

"Old Ship's Reunion" at Naval Memorial Club, ESCA House, Brisbane.

March and commemorative service at Central Park, Gladstone.

Navy Day Dinner at United Service Club, Brisbane.

Navy Day talks at selected Secondary Schools throughout Queensland.

H.M.A.S. **KIMBLA** to arrive at Brisbane.

H.M.A.S. **BARBETTE** to arrive Mackay.

H.M.A.S. **BARRICADE** to arrive Townsville.

H.M.A.S. **BAYONET** to arrive Bundaberg.

Navy Golf Day at Nudgee Golf Club, Brisbane.

Navy Week Dinner at R.S.L. Club, Cairns.

Maritime Supper Dance at H.M.A.S. **MORETON**.

Navy Golf Day at Collioep Golf Club, Gladstone.

Navy Week Flying Handicap at Eagle Farm.

Band Concert at Queens Park, Toowoomba.

Naval Association Ball at Toowoomba.

Naval Memorial Service, Anzac Square, Brisbane. March from Anzac Square to St. John's Cathedral. R.A.N., R.A.N.R., Cadets, Ex-Navalmen and Women headed by R.A.N.R. Band will march. Seafarers' Service at St. John's Cathedral. Church Parade at St. Saviour's, Gladstone. Luncheon available at new Naval Memorial Club.

Navy Bowls Day at Wavell Heights Bowling Club.

WESTERN AUSTRALIA

SUNDAY, 1 OCTOBER

TUESDAY, 3 OCTOBER

WEDNESDAY, 4 OCTOBER

FRIDAY, 6 OCTOBER

SATURDAY, 7 OCTOBER

SUNDAY, 8 OCTOBER

H.M.A.S. **LEEUWIN** Open Day.

Naval Officers' Wives group luncheon for sponsors.

Dress Ship for Navy Day Junior Recruit Training Establishment. March through City of Perth.

Navy Week Trotting Richmond Raceway.

Ascot Navy Week Race Meeting.

Navy Week Commemoration Service St. John's Church, Fremantle.

SOUTH AUSTRALIA

SUNDAY, 1 OCTOBER

THURSDAY, 5 OCTOBER

FRIDAY, 6 OCTOBER

SATURDAY, 7 OCTOBER

Special Mass at St. Francis Xavier Cathedral. Special Evensong at Holy Trinity, North Terrace.

Naval Officers Club Dinner at Naval and Military Club, Adelaide.

Wreath Laying Service at State War Memorial North Terrace.

Navy named races at South Australian Jockey Club meeting, Morphett Vale Racecourse.

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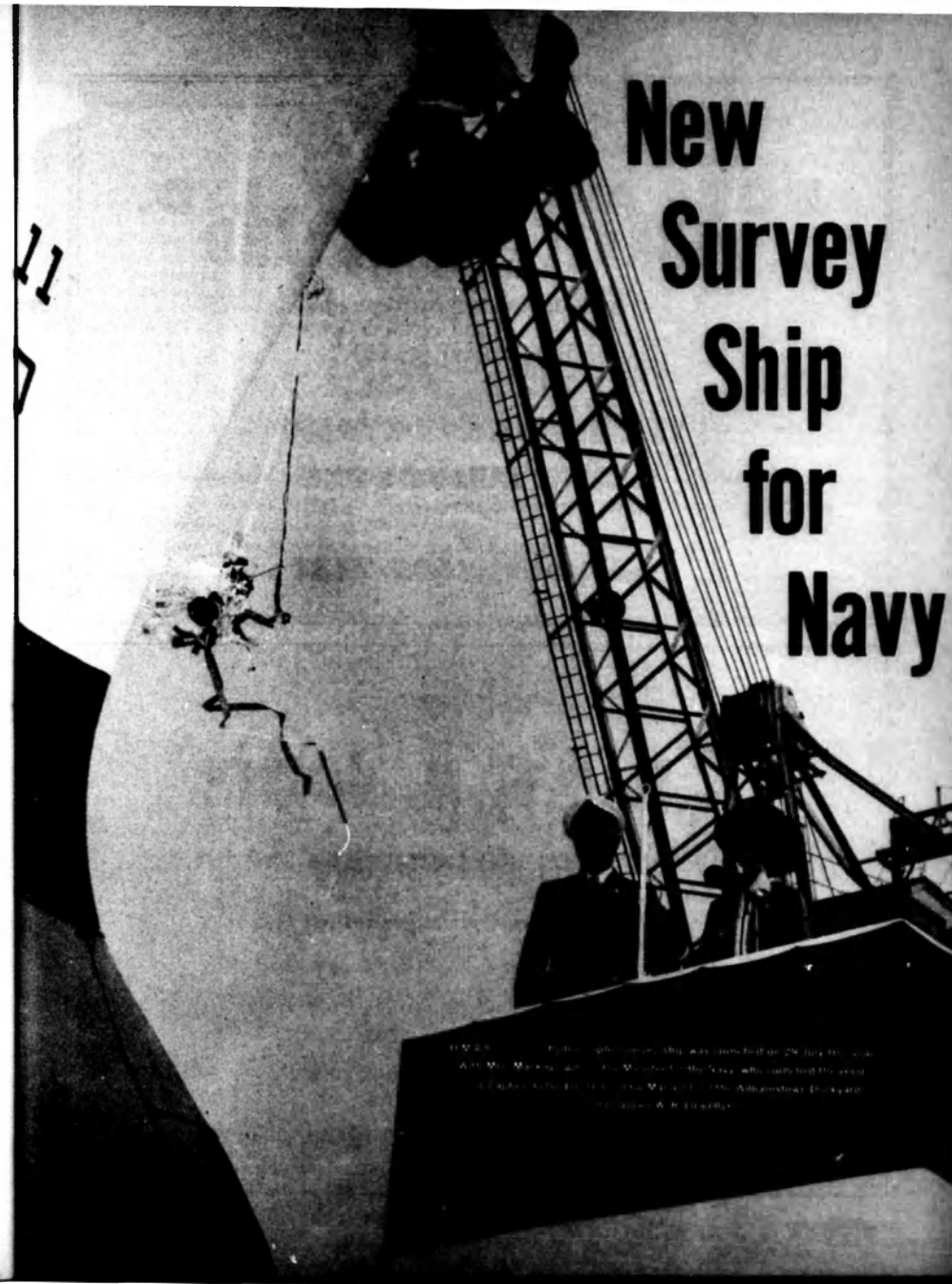
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NEW SURVEY SHIP

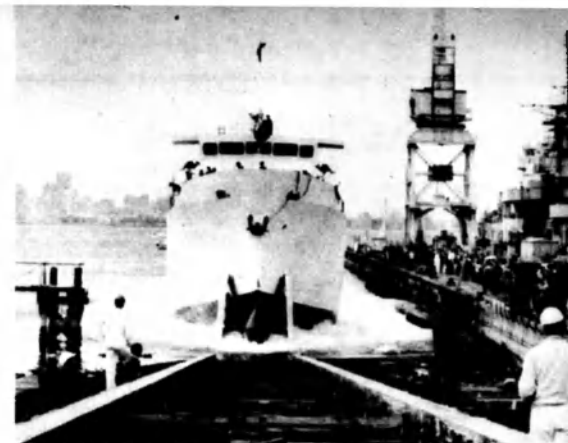
After sea trials, scheduled for the first quarter of 1973, *Flinders* will replace the 26-year-old, 336-ton H.M.A.S. *Paluma*.

Flinders' first task will be in the Barrier Reef area and waters around Papua New Guinea.

Flinders' keel was laid in February, 1971. She is powered by two Paxman Ventura diesels, giving her a cruising speed of around 13 knots and a cruising range of more than 5,000 nautical miles.

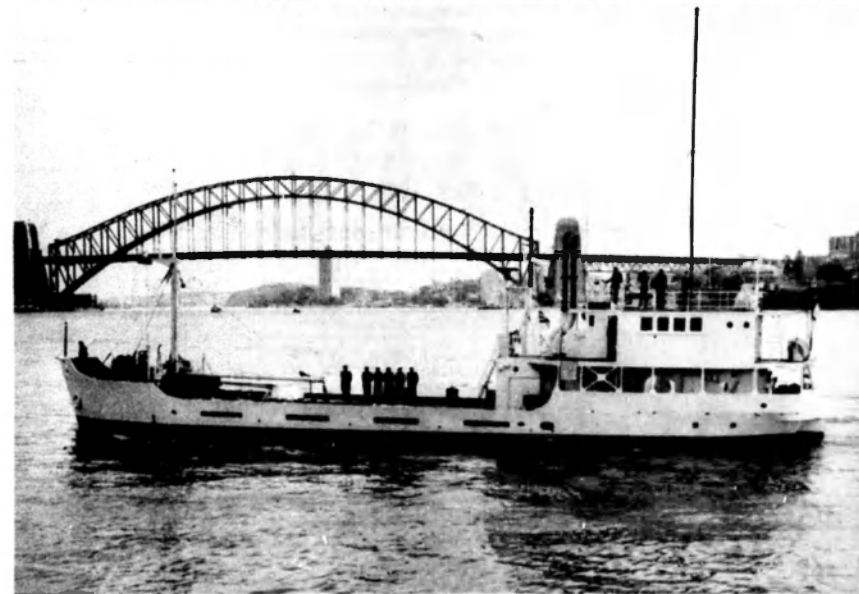
The 150-foot ship will have a displacement of 800 tons, and will carry a ship's company of 37 men.

Flinders will be fitted with various electronic aids to assist in her survey mission. She will be per-



The new hydrographic ship H.M.A.S. *Flinders* moves down the slipway after being launched on 29 July by Mrs. Ruth Mackay

H.M.A.S. *Flinders*, the Navy's new hydrographic survey ship, was launched on 29 July, at Williamstown Naval Dockyard, Victoria, by Mrs. Ruth Mackay, wife of the Minister for the Navy, Dr. Malcolm Mackay.



H.M.A.S. *Paluma*. Originally a motor stores lighter of war construction she was converted for surveying in 1956. She will be replaced in 1973 by the new hydrographic ship H.M.A.S. *Flinders*



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manently fitted with distance-measuring equipment, deep echo and normal echo depth sounders, radar and sonar.

She will also be fitted for satellite navigating equipment for special duties. This unit will be in component form so it can be transferred from *Flinders* to the Navy's major hydrographic ship H.M.A.S. *Moresby*, depending on the ships' tasks.

New precision radar will allow *Flinders*' position to be calculated accurately to within 10 yards at 20-30 miles. Another radar set will be accurate to within a few feet at a distance of up to 50 miles.

She will also be fitted to work with

helicopters although she will not herself carry one.

The new hydrographic ship will carry small craft for work away from the parent ship. *Flinders* will have one 34-foot aluminium survey boat (this craft will probably be water-jet propelled instead of the conventional propeller driven type now in service) and two 17-foot aluminium "runabouts" for shore party use.

Flinders is designed to set up and maintain three shore camps and one tide reading camp while still being able to carry out normal everyday running of the ship.

She will be air-conditioned throughout. Not only will this mean more comfort to the sailors in hot

and humid weather, but electronic gear will give better service and have a longer life.

Heavy seas will not bother *Flinders* as much as another light ship, for she is being fitted with stabiliser fins to reduce roll and pitch.

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The vast areas to be surveyed by the Royal Australian Navy Hydrographic Service include some 6,500 miles of coastline and a continental



An artist's impression of the appearance on completion of the new hydrographic ship *Flinders*.



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NEW SURVEY SHIP

shelf that extends on the average,
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Charting Australian waters is a
large responsibility with the Gulf of
Carpentaria alone approximately
the same size as the North Sea, and
much greater in area than the Baltic
Sea.

About one-third of Australia's area
of responsibility has been charted
by modern survey methods, while

the remaining parts are still based
on old surveys.

A recent study found that, with the
present resources of the R.A.N.
Hydrographic Service, it will take
more than 25 years to produce up-to-
date accurate Australian charts.

Flinders will play a large part in the
coming years in these surveys. Her
output will far exceed that of the
ageing *Paluma*, and in addition her
superior sea-keeping qualities will
enable her to work in more remote
and exposed areas.

Of the two survey ships now in

commission with the R.A.N. the
larger H.M.A.S. *Moresby*, is a modern
specially designed vessel completed
in 1964 while H.M.A.S. *Paluma*, was
built as a motor stores lighter in
1945-46 and converted to a hydro-
graphic vessel in 1957.

A new oceanographic ship,
H.M.A.S. *Cook*, now being designed
by the Navy, will be 315 feet long, 44
feet wide, and will displace about
2,300 tons. She will have a platform
and hangar for a helicopter which
will be carried when the ship is used
in a hydrographic role.

CHANGE OF ADDRESS

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ECUMENICAL CHURCH SERVICE

Interested Members
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Garden Island Dockyard Church showing the altar and stained glass memorial windows.

The Ecumenical Service for Navy Day, 1972 will be held at 10.30 a.m.
Sunday, 8 October, in the Garden Island Dockyard Church.

We will meet to worship together as an outward demonstration of our essential unity as Christians. Together we shall thank God for those who have given so much in securing the protection and safety of our Country, and pray that we may be responsive to His will and guidance in the years to come.

We are grateful that leaders in the Churches in Sydney have agreed to share in this Service and bring the distinction of their presence to this occasion.

By THE CHAPLAIN

The Right Reverend F. O. Hulme-Moir, Bishop Coadjutor, Diocese of Sydney and Anglican Bishop of the Forces will preach the occasional sermon.

Participating clergy will include His Grace, the Most Reverend James Freeman, Roman Catholic Archbishop of Sydney, the Reverend E. A. Bennett, President of the New South

Wales Methodist Conference and the Reverend M. A. Spence representing the Moderator of the New South Wales General Assembly of the Presbyterian Church of Australia.

So far as is known, the first Service to be held in this Church was in 1902, and was a thanksgiving Service for peace at the end of the South African War.

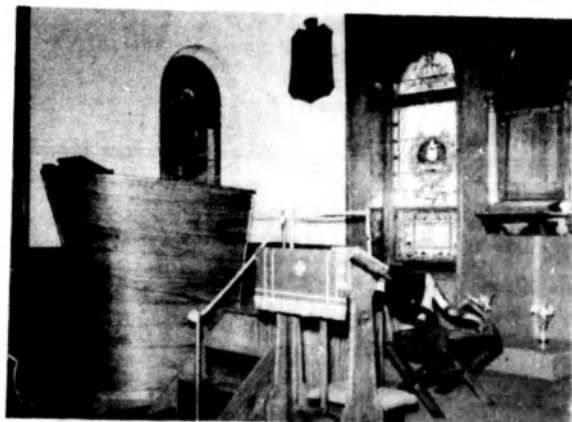
The first stained glass windows were installed in 1904. Since then the Church has been beautified by many Memorials, all of which tell their own poignant story.

For many years the Church has been used for all Church Services held in Garden Island. Protestants and Roman Catholics have come to feel that it is their Church.

An ecumenical spirit has always existed in the working relationships between serving Chaplains. But this has grown in the new atmosphere of unity and trust which we believe is God's will for His Church. It is appropriate therefore that we should together thank God for His grace and pray for His guidance in the future.

There are a number of groups which hold their Annual Church Services here — amongst them are Sydney Legacy, the Naval Association of Australia, The Australian Sea Cadet Corps, Sea Scouts and Sea Rangers.

We hope that some from these organisations as well as interested members of the public will join with us in this Service.



The pulpit, shaped in the form of a ship's bow is one of the prominent furnishings in the Garden Island Dockyard Church.



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1.00 p.m.-5.00 p.m.

H.M.A.S. Penguin is situated at Balmoral, Sydney, with access via Middle Head Road.
H.M.A.S. Penguin comprises the Naval Hospital and a Specialist Training Establishment
covering an area of 43 acres.

PROGRAMME OF EVENTS

Sunday, 8 October, 1972 — 1.00 p.m.-5.00 p.m.

- 1.00 p.m. to 4.00 p.m. — Fishing Competition (a trophy will be presented).
- 2.00 p.m. — Diving display including helicopter drop and recovery
- 2.30 p.m. to 3.30 p.m. — Band concert.
- 3.30 p.m. — Diving display including helicopter drop and recovery.
- 4.30 p.m. — Band marching display.

Throughout the afternoon there will be entertainment provided especially for children and
will include boat trips and films.

A number of Static Displays and Demonstrations have been scheduled and will include —
Cookery Display — manned and demonstrated by Navy Cooks.
Hydrographic and Seamanship Schools demonstration.
School of Underwater Medicine display.
Refreshments will be available.

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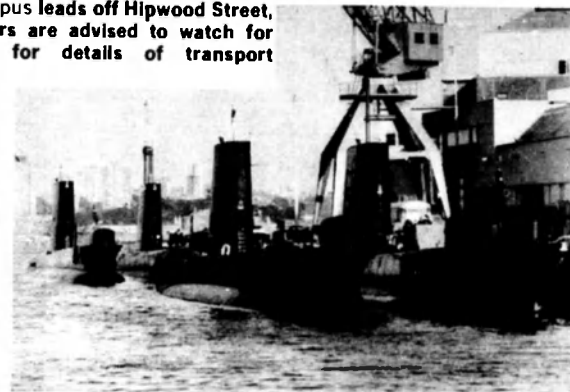
H.M.A.S. PLATYPUS

(Situated at Neutral Bay, Sydney, will be open for inspection by members of the public during Navy Day, Sunday, 8 October, 1972, between 1.00 p.m. and 5.00 p.m.)

The road to H.M.A.S. Platypus leads off Hipwood Street, Neutral Bay; intending visitors are advised to watch for newspaper announcements for details of transport arrangements.

H.M.A.S. Platypus is the base for four Oberon Class Submarines operated by the Royal Australian Navy. Once before, in 1919, the name *Platypus* had naval connections. This was the Submarine Depot Ship, H.M.A.S. *Platypus*, commissioned for the six "J" Class Submarines of the Royal Australian Navy. The present holder of the name once more "cares" for submarines.

Located at Neutral Bay in Sydney, *Platypus*, with modern machinery shops and clean dust-free rooms for the repair of delicate instruments, provides full maintenance and repair facilities and safe alongside berths for the submarines. The



Australia's four Oberon class submarines moored at the submarine base H.M.A.S. Platypus

SCHEDULE OF EVENTS FOR OPEN DAY

Sunday, 8 October, 1972 — 1.00 p.m.-5.00 p.m.

1.00 p.m. — H.M.A.S. *Platypus* open for public inspection

1.00 p.m. to 5.00 p.m. — Submarine H.M.A.S. *Ovens* open for inspection.

2.00 p.m. — Swordsmanship display.

3.00 p.m. — Helicopter rescue display

4.00 p.m. — Swordsmanship display.

During the afternoon visitors may inspect the facilities at the submarine base; an historical display will be mounted.

wharf is equipped with servicing points from which submarines alongside may charge their batteries, operate normal power supplies, take on lubricating oil, fresh and distilled water, and receive high pressure air.

Platypus provides the administrative backup for the submarines, fighting the paper war on their behalf; for example arranging travel tickets for sailors going on leave, processing welfare matters, main-



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taining pay records and personal documents for the submarine crews. Provisions are ordered and accounted for in the base. The Naval Store holds a range of 25,000 items to assist in the never-ending task of maintenance.

Accommodation for off-duty personnel is provided in H.M.A.S. *Penguin*. The complement of the base includes a spare crew to keep submarines manned fully when crew members are on course, sick, or on leave.

Apart from Promotion Training which is a normal function in all H.M.A. Ships and Establishments, *Platypus* conducts Continuation and Part III Training. With Continuation Training, Sonar and Radar operators are taught and maintain a very high standard of skill and efficiency in their respective fields, factors essential to a submarine's operational readiness. During Part III Training Officers and sailors who have completed their initial sub-



H.M.A.S. *Ovens* proceeds to sea (this submarine will be open for public inspection at H.M.A.S. *Platypus* during Navy Day).

marine training in the United Kingdom proceed to become fully qualified submarine personnel. The Captain of H.M.A.S. *Platypus*, Commander G. R. Dalrymple, Royal Australian Navy, is also Commander of the First Australian Submarine Squadron.

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R.A.N.'s New Oceanographic Ship

Major Australian dockyards are expected to be invited to tender in October, 1972 for construction of the new oceanographic ship H.M.A.S. Cook.

The ship will replace the frigate H.M.A.S. *Diamantina* which was completed in 1945 and has been employed full-time on oceanographic work since conversion to its oceanographic role in 1959-60.

H.M.A.S. *Cook* will be similar in design to H.M.A.S. *Moresby*, the R.A.N.'s large hydrographic ship built in Australia and commissioned in 1964.

It will accommodate 13 scientists — compared with six in *Diamantina* and, as it will have greatly improved research facilities, H.M.A.S. *Cook* is expected to double the effectiveness of civil and military research programmes.

Designed by the Navy, the new ship will be 315 feet long, 44 feet wide and will displace about 2,300 tons. She will have a platform and hangar for a helicopter which will be carried when the ship is converted to a hydrographic role. Total cost is expected to be about \$17 million.

The advance in oceanographic

studies, expected with the use of H.M.A.S. *Cook*, will increase substantially the Royal Australian Navy's anti-submarine capability through a greater knowledge of the ocean environment.

Also it will provide more information for testing R.A.N. equipment at sea, for the investigation of the economic potential of the seabed and waters, and for scientific research projects.



H.M.A.S. *Diamantina*, a converted River class frigate built in 1945. She will be replaced by H.M.A.S. *Cook*.



An artist's impression of the new oceanographic ship H.M.A.S. *Cook* which is expected to enter service with the Royal Australian Navy about 1975.

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The League, in conjunction with the Commonwealth Naval Board, administers the Australian Sea Cadet Corps, by providing finance and technical sea training for boys who intend to serve in the Naval or Merchant Services, also to those sea-minded boys, who do not intend to follow a sea career, but who given this knowledge will form a valuable reserve for the Naval Service.

We invite you to swell our ranks and so keep up to date with Maritime Affairs to help to build an ever-increasing weight of informed public opinion. The Navy League will then become widely known and exercise an important influence in the life of the Australian Nation.

The League consists of Fellows and Associates. All British subjects who support the objectives of the League are eligible for membership. Members receive copies of the League's magazine "The Navy".

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SEA CADET CORPS NEWS

NEW SOUTH WALES

QUARTERLY REPORT OF PROCEEDINGS

This report is for the period 1 April to 30 June, 1972 and covers Continuous Training, Weekend Training and other activities carried out by the Naval Reserve Cadets in New South Wales.

Continuous Training was carried out in H.M.A. Ships Melbourne, Brisbane and Bandoller for 47 Cadets who were completing promotion courses for Cadet Petty Officer and Cadet Leading Seaman from 7 to 14 May, 1972. Eight Cadets took part in the Cadet Physical Trainer's Course and 22 Cadets in the Cadet Mechanical Engineer's Course conducted in H.M.A.S. Nirimba from 7 to 14 May, 1972. In addition, Continuous Training for 30 Cadets was held in H.M.A.S. Albatross from 7 to 14 May, 1972 for the Cadet Naval Airman's Badge. Eight Cadets attended the Army Adventure Training Course from 11 to 20 May held at Singleton, N.S.W.

Sea training in H.M.A.S. Parramatta was held from 8 to 15 May for 8 Cadets.

Weekend Training took place in the following H.M.A. Ships:—

H.M.A. SHIP	DATES	No. OF PERSONNEL
Perth	7-9 April	23
Perth	21-23 April	23
Sydney	28-30 April	37
Swan	19-21 May	24
Swan	26-28 May	23
Brisbane	2-4 June	15

Commander R. J. Rust, R.A.N., representing the Flag Officer Commanding East Australia Area inspected the following units:—

UNIT	DATE OF INSPECTION
T.S. Shropshire	8 April
T.S. Condamine	6 May
T.S. Tobruk	27 May
T.S. Sydney	3 June

On Saturday, 22 April, His Excellency the Governor of New South Wales, Sir Roden Cutler, V.C., K.C.M.G.,

K.C.V.O., C.B.E., K.S.I.J. presented Cadet Forces Medals and Clasps to the Medal to 11 members and former members of the Naval Reserve Cadets.

The Senior Officer and members of his Staff attended T.S. Albatross on Saturday, 29 April for celebrations marking the 25th Anniversary of the commencement of Cadet Training in the Wollongong area.

On Sunday, 30 April, the Senior Officer was present at the Scots College Memorial Day Parade.

During the period under review all Units completed at least one miniature rifle shoot.

The strength of the New South Wales Division is at present:—

Staff Officers	4
Officers	27
Instructors	31
Cadets	427
TOTAL	489

Commander R. J. Rust, R.A.N., Staff Officer Reserves, representing the Flag Officer Commanding, East Australia Area, inspected the following Units:—

UNIT	DATE OF INSPECTION
Sydney Grammar School	9 June
T.S. Warrego	17 June
The Scots College	23 June
T.S. Parramatta	24 June

The Cadet Liaison Officer, Lieutenant N. A. McPherson, R.A.N.V.R., representing the Senior Officer, Naval Reserve Cadets, visited Coffs Harbour 19-22 June to confer with the Coffs Harbour Naval Association on the formation of a Naval Reserve Cadet Unit. He also attended a public meeting chaired by the President of the Coffs Harbour Shire Council seeking public support for the proposed Cadet Unit.

(Sgd.) L. MACKAY-CRUISE,
Commander, R.A.N.R.,
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ARLH TIMES NEWS

VICTORIA

T. S. BENDIGO

Earlier this year T.S. Bendigo Cadets started working out with the local Coastguard patrolling the 93 odd miles of Lake Eppalock, twenty miles from Bendigo. The lake is the site of the new Adventure Camp for this inland Sea Cadet Unit. It is also hoped that Cadets from other centres of Victoria will be able to make use of the Camp.

The site is a seven-and-a-half acre area on the shores of the lake, and building started about four years ago. One building is 60' x 18', used by cadets for sleeping on weekends. There is also a galley and toilet block. About \$6,000 has been spent since work started, most of this



Manning the base radio is Sea Cadet A. Taylor.



Combined Sea Cadet and Coastguard exercise on Lake Eppalock.



Pinpointing the route is Lt. L. Schillings and LSMM I. Williams.

money being raised by the small but very active local committee. On weekends about 20 cadets can now be accommodated.

The Cadets join the Coastguard on Saturday and Sunday going out on patrol with the flotilla and manning the radio at the base station. The Cadets are learning a lot from working alongside men who know boats and the lake itself. They log every radio call. Something like 332 calls each day.

This type of work is a far cry from the normal sailing on Lake Weeroona. T.S. Bendigo's official headquarters, where a gale is needed for a day's sailing.

Photographs reproduced are by courtesy of The Bendigo Advertiser.

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CADET CORPS NEWS



Earlier this year a party of Cadets from T.S. Voyager, Williamstown, spent a week in camp on
Snapper Island, Sydney. Here P/O H. Ellis and L/S G. Murray sail aboard one of the Snapper Island
boats.



"Hands to clean ship".

TASMANIA

On 8 May, 22 Officers — 19 Instructors and two Emergency Reserves
plus 146 cadets of the Tasmanian Division, Australian Sea Cadet Corps
entered Fort Direction near Hobart for seven days' continuous training.
The camp was under the command of the Senior Officer Tasmania,
Lt. Cmdr. B. J. B. Morris R.A.N.R. The cadets came from all six units of the
Division, T.S.'s Derwent, Tamar, Emu, Leven, Mersey and York.



Signal Class under instruction.

Boatwork was provided by two
whalers, a motor boat and three 14
foot R.N.S.A.'s from T.S. Derwent.
H.M.A.S. Bass in one day took four
parties of 30 cadets for a short trip to
sea. Small bore shooting was
conducted on an outdoor range. Many
cadets used the camp to qualify for
petty officer and leading seamen.
Highlight of the camp came on
Sunday 14, when after Church, the
State Colour was paraded and then
the whole division marched past —
the salute being taken by the Naval
Officer in Charge, Tasmania, Com-
mander Morrell, R.A.N.

During the camp several com-
petitions were held, and the results:

The Senior Officers' Trophy for the
Unit with the highest shooting aggre-
gate — T.S. Mersey (Lt. Ashton).

Best Part-of-Ship during the camp
Maintop — Lt. Bates. Runners-up —
Quarterdeck Lt. McMeekin.

The A. J. Williams sailing trophy —
T.S. York (Sub./Lt. Coleman). Second
— T.S. Tamar (Lt. Cleaver).

Whaler pulling — Maintop Division.
The cross-country was won by A/B
Broomhall of T.S. Derwent.

A large number of cadets
requalified as marksmen.

Annual Inspection of Tasmanian Sea Cadets

Annual inspections of Tasmanian
Sea Cadet Units by the Naval Officer-
in-Charge, Tasmania (Com-
mander F. G. Morrell) were held at
the end of May and early in June.

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The training ship **Mersey**, at Devonport, was inspected on 31 May, then **T.S. Leven**, at Ulverstone, on 1 June, **T.S. Emu** at Burnie on 2 June, and **T.S. York**, George Town and **T.S. Tamar**, Launceston, on 3 June. The Hobart Unit, **T.S. Derwent**, had their inspection on 16 June.

New Sea Cadet Unit
For Queenstown

The newly formed Queenstown Branch of the Navy League has obtained the old railway station at Regatta Point, Strahan, as headquarters for their planned sea cadet unit.

Strahan, a fishing port on Macquarie Harbour, is on the West Coast of Tasmania.

The League is now negotiating to buy a suitable boat.

Officers elected at the inaugural meeting held early in June are: President, Mr. L. Jacobs; Secretary, Mr. D. Hickson; Treasurer, Mr. V. Stevens.

Navy League Branch
Gets Training Ship

The newly formed Navy League Branch at Queenstown, on Tasmania's West Coast, has recently bought the former Mt. Lyell Co.'s 87 ft. explosives carrier **Reginald M.** for use as a training ship for a Sea Cadet Unit which it is in the process of forming.

President of the Queenstown Branch (Mr. L. Jacobs) said the sea cadet unit would be the most fortunate in Tasmania, and possibly Australia.

He said the Navy League had already acquired the old railway shed building at Regatta Point for use as unit headquarters and that most cadet units had to wait a couple of years to obtain a headquarters building, let alone a vessel such as the **Reginald M.**

Until purchased it seemed that the **Reginald M.** was destined to rot at its moorings at Regatta Point Wharf, Strahan. Now the vessel is being given a new lease of life. But there is one drawback. Since the ships of the Union Steamship Company ceased using the Strahan Wharf a year or so ago due to the Mt. Lyell Co. sending their cargoes overland by road and rail to Burnie, it has fallen into

disrepair, and is in danger of being declared unsafe.

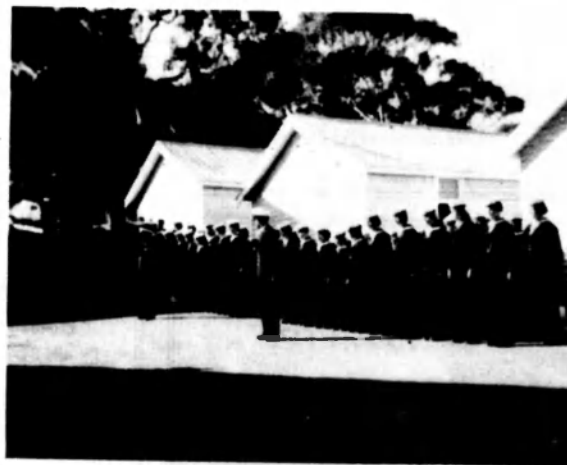
And no organisation or Government department will accept responsibility for its maintenance. The wharf is now used largely by fishing vessels — for mooring and unloading catches. As many as 20 boats use it during the height of the fishing season.

If repaired it would be the ideal spot for mooring the **Reginald M.** The cadet unit's headquarters in the old railway station building also fronts on the wharf.

Parents of the cadets have added their support to those of fishermen in moves to have the wharf made safe for use again.



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The aim of the Australian Sea Cadet Corps is to provide for the spiritual, social and educational welfare of boys and to develop in them character, a sense of patriotism, self-reliance, citizenship and discipline.

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 afternoons 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 Sea Cadets in Naval Establishments, 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 Divisional Senior Officer in your State, using the form provided below.

Senior Officers, Australian Sea Cadet Corps

NEW SOUTH WALES: Staff Office Cadets, H.M.A.S. Watson, Watsons Bay, N.S.W., 3030.

QUEENSLAND: C/- 39 Pinecroft Street, Camp Hill, Queensland, 4152.

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SOUTH AUSTRALIA: C/- Box 1529M, G.P.O., Adelaide, 5001.

VICTORIA: C/- Room 6, 2nd Floor, 528 Collins St., Melbourne, 3030.

TASMANIA: C/- 3 Winmarleigh Street, Taroona, 7006.

AUSTRALIAN CAPITAL TERRITORY: Industry House, National Circuit, Barton, 2630.

NORTHERN TERRITORY: Mrs. V. M. Slide, 12 Allen Street, Fannie Bay, 5700.

TO: The Senior Officer
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THE NAVY LEAGUE OF AUSTRALIA
QUEENSLAND DIVISION

Annual Report

Presented by the President, Surgeon Commander A. H. Robertson, R.A.N.V.R.,
on 25 August, 1972.

His Excellency the Governor of Queensland, Air Marshal Sir Colin Hannah, K.B.E., C.B., has consented to become Patron of the Queensland Division of the Navy League of Australia. He has indicated that he will attend the Navy Day Dinner in Brisbane on 3 October, 1972.

During this financial year the protracted rationalisation process has entered a decisive phase. In May, 1972, the President and the Honorary Secretary, Colonel P. V. O. Fleming, met the Chief Property Officer of the Department of the Interior to initiate the process of leasing Navy League properties for Naval Reserve Cadet training.

To simplify subsequent rental payments, the Committee controlling T.S. Paluma agreed to receive their rents through the Navy League, thus enabling future payments to be administered by one authority in Brisbane.

Mr. Huxham and his Officers have speedily implemented their survey of properties and freely advised the Executive in all matters of procedure so that it is probable that the first rent will be received before the end of 1972.

When the quarterly flow of income actually commences Branches should formulate a policy for its

use. Certain recurring outlays must be provided for but the disposal of the residue will require a balance between the creation of Navy League assets, such as building additions and gifts to the Navy in the form of equipment for the training of Naval Reserve Cadets.

Rent will not continue indefinitely and some Branches with short leases should prepare for eventual acquisition by the Navy. The overall policy for Queensland would be an excellent subject for a Divisional Convention which could be hosted north of Brisbane in 1973.

The Navy Day Dinner was held in Brisbane during October, 1971 and among the guests were Rear Admiral Stevenson, the Second Naval Member, and Mr. K. G. Day, the dynamic secretary of the Bundaberg Branch, which seems to be

composed of men and women of action.

The opening of the Headquarters of T.S. Bundaberg in November, 1971 was one of the most impressive events in the nineteen years' history of the Queensland Division. Every aspect of ceremony, public relations and fund raising was effectively covered. The basic organisation came from the Branch Executive but the operation was a combined effort by members, interested citizens, and many wives who provided secretarial and logistic support.

The Federal Council met in Melbourne in December, 1971, and delegates from every Division except the Northern Territory were present despite the travel costs involved. Full discussion occurred but no significant policy changes developed.

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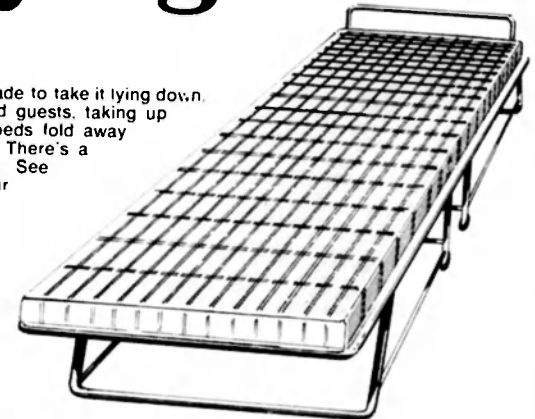
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PLUS SUNDRY STORIES AND PHOTOGRAPHS

The views expressed in articles appearing in this publication are those of the authors concerned. They do not necessarily represent the views of the editor, the Navy League, or official opinions or policy

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Nov./Dec./Jan., 1972-73

THE NAVY

Page One

Season's Greetings to all Naval Personnel ...

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STRENGTH OF ARMED FORCES

The strength of the Permanent Forces as at 30 September, 1972, totalled 81,393 — Navy 17,155; Army 41,536; RAAF 22,702. The figures for the Navy represent an increase of 21, in total strength over the June, 1972, figures.

HMAS DUCHESS PURCHASED FROM UK

The Daring-class destroyer HMAS

Duchess, originally loaned to the RAN by the Royal Navy, has been purchased by Australia from the United Kingdom for 150,000 pounds Sterling.

Duchess is to work in a role as a training ship and refitting and conversion is scheduled to begin late this year.

BRITAIN'S FIRST SEA LORD

The First Sea Lord, Admiral Sir

Michael Pollock, GCB, MVO, DSC, visited Australia last September for discussions with Australian defence officials, including members of the Chiefs of Staff Committee and the Naval Board.

During his visit he called at HMAS Platypus and later flew to New Zealand.

ROYAL COLLEGE OF DEFENCE STUDIES

Five Senior Service and civilian officers will attend the 1973 course at the Royal College of Defence Studies, London.

The Australian students at the course:

Captain B. H. Loxton, RAN; Brigadier D. R. Begg, OBE; Colonel D. F. W. Engel, OBE; Group Captain G. G. Michael, OBE, AFC; Group Captain H. A. Hughes, DFC; Mr G. Adamson, Department of the Army.

During the course representatives of Commonwealth and other countries receive training in the broadest aspects of strategy and study the organisation and direction of the resources of the Commonwealth for war.

NEW SUBMARINE

The keel of the Royal Australian Navy's fifth Oberon-class submarine, HMAS Orion, was laid in the United Kingdom on Friday, 6 October.

Construction of the \$15 million submarine at the yard of Scott Lithgow Ltd is expected to take three years, followed by trials with the Royal Navy before Orion arrives in Australia late in 1975. The sixth Oberon, HMAS Otama is due for delivery in 1976.

Both submarines will be up-dated versions of the four Oberons now in service with the RAN, being equipped with sophisticated sonar, an advanced Snort system for recharging batteries while submerged, and improved communications.



HMAS DUCHESS was originally loaned to the RAN to replace HMAS VOYAGER and has now been purchased by the RAN for use as a training ship.

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HMAS OTWAY, one of the four submarines of the OBERON class in the Royal Australian Navy.

JOINT EXERCISE WITH INDONESIAN NAVY

The first joint exercise between the RAN and the Indonesian Navy was held from 13-20 November.

The exercise was designed to establish mutually acceptable training procedures and to test these procedures in a combined sea passage.

Australian vessels that participated were the guided missile destroyer HMAS Brisbane and the destroyer escort Derwent.

The exercise was another step forward in the growing co-operation between the two countries' Navies and a welcome addition to Australia's defence co-operation programme with Indonesia.

CHAIRMAN, CHIEFS OF STAFF COMMITTEE

The appointment of Admiral Sir Victor Smith, KBE, CB, DSC, as Chairman, Chiefs of Staff Committee, has been extended to 8 May, 1975.



Vice-Admiral Sir Victor Smith, KBE, CB, DSC.

SEATO EXERCISE

Eleven ships of the RAN (HMA Ships Melbourne, Perth, Brisbane, Supply, Stalwart, Onslow, Vampire, Derwent, Teal, Curlew and Snipe) participated in a major SEATO exercise held in the South China Sea from 16-29 October.

Ships and aircraft from New Zealand, the Philippines, Thailand, United Kingdom and the United States were involved in the exercise named SEA SCORPION.

The main phase of the exercise was designed to test convoy protection from submarine and air attack.

Naval personnel at major ports of SEATO members' countries in the area also conducted a "paper exercise" on the control of shipping in the South China Sea.

TURANA ACCEPTANCE TRIALS

The Turana target aircraft, being developed by the Department of Supply for the Royal Australian Navy, completed a first series of acceptance trials at sea off Jervis Bay last August.

The radio-controlled drones were launched and recovered from HMAS Swan, using part of the existing Ikara installation on the ship.

During the flights the aircraft were engaged by the ship's 4.5-inch guns using non-explosive practice projectiles.

The eleven-foot-long Turana travels at speeds up to 500 knots and is thus extremely difficult to hit at long range. Scoring information is provided to the ship by a locally developed miss-distance recorder which detects the shock wave of the passing shell and transmits the information to a display unit in the ship's operation room.

Two aircraft were used in the three flights, one being flown a second time after recovery from the sea. The flights took place at distances of up to 20 miles from the ship, and the aircraft flew between heights of 200 and 15,000 feet. High-speed dive and low altitude attacks were effectively simulated.

Turana is primarily designed as a Service target, but it has substantial payload capacity and can also be used for battlefield reconnaissance and similar purposes.

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HMAS BUCCANEER, one of twenty patrol boats operated by the RAN and its Papua-New Guinea squadron.

PATROL BOATS REGROUPED

The First Australian Patrol Boat Squadron was reorganised into three squadrons from 1 September.

Permanent Naval Force vessels based in Sydney now form the First Australian Patrol Boat Squadron and vessels based in Cairns and Darwin are known as the Second and Third Squadrons respectively.

The new squadrons will be under the command of the senior patrol boat officer afloat in each of the areas.

Three boats are based in Cairns, three in Darwin and two, with one in operational reserve, in Sydney.

The existing Papua/New Guinea Patrol Boat Squadron retains its identity.

Other Permanent Naval Force patrol boats are based at Jervis Bay and at HMAS Cerberus. Patrol boats used by the Naval Reserve are still based at Brisbane, Sydney, Melbourne and Fremantle.

TARGETS FOR RAN

A contract has been let with Perihelion Pty Ltd of Jindalee, Queensland, for the design and construction of radio-controlled surface targets for the Royal Australian Navy.

The cost of the contract is \$70,000. The total cost of the project, including Navy supplied items, will be approximately \$120,000.

For use in gunnery exercises, the craft will be capable of simulating evasive manoeuvres like those of a fast patrol boat. They will be controllable from a shore base, vessel or helicopter.

It is planned that the first of the targets will undergo initial Navy trials in December, 1972, and that the other craft will be delivered in 1973.

The Navy will supply the radio-control equipment. ESW Engineering Pty Ltd of Brisbane will design and install an electronics system to control the throttle and steering.

A Perihelion-designed radar reflector fitted to the 7½-foot mast will simulate reflections made by much larger craft.

The hull, based on the commercial Haines Hunter V1600 hull, will be of glass reinforced plastic. The craft will be fitted with plastic foam buoyancy blocks to prevent it sinking if it is holed by solid practice shot.

A Volvo/Penta 115/100 petrol engine will power each craft.

CONTRIBUTIONS INVITED

The editor invites persons to submit articles, photographs and drawings (black ink) for inclusion in the magazine, but regrets that no payment can be made for contributions submitted. Contributions should be addressed: The Editor, The Navy, Box C 173, Clarence Street Post Office, Sydney, N.S.W. 2000, Australia.

The Editor does not hold himself responsible for manuscript, though every effort will be made to return those with which a stamped and addressed envelope is enclosed.

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Nautical Notes from all Compass Points

By "Sonar"

BRAZIL

Ikara for Brazilian Navy

As first reported in these Notes in an earlier edition of "The Navy", Ikara, the Australian-developed anti-submarine guided-weapon system is to be fitted to ships of the Brazilian Navy.

The launcher, missiles and associated equipment will be worth approximately \$20 million, representing the largest single sale of defence equipment designed and produced in Australia.

The Ikara system for Brazil, including missiles and support equipment, will be supplied under a contract between the Australian Department of Supply and its overseas sales representative Hawker Siddeley Dynamics Ltd, UK, who will provide the equipment to the British shipbuilding firm Vosper Thornycroft Ltd and will be responsible for its installation, with support from the Department of Supply.

The Ikara weapon system is already at sea in ships of the RAN and is to be fitted to further units of the Australian Fleet. A modified version of the system to the requirements of the Royal Navy, known as RN Ikara, is incorporated in HMS Bristol, the type 82 destroyer. Ikara is also fitted to Leander-class frigates of the RN.

Strenuous efforts are being made to sell Ikara to other countries, and the prospects appear to be good.

CANADA

Polar Cap III

An \$8 million joint Canada/USA evaluation of Over-the-Horizon (OTH) radar in the Canadian Arctic's Auroral Belt has commenced at Hall Beach on Melville Peninsula.

Called Polar Cap III, the project will be conducted by the Defence Research Board in collaboration with the United States Air Force. Installation of both the USAF radar and its associate receiver at Hall Beach began in June, 1972. At the same time, the Defence Research

Board (DRB) established a second radar receiver system at Cambridge Bay, on Victoria Island, about 550 miles to the west. Actual experiments began in October following testing of both facilities, and are scheduled to conclude in August, 1973.

Conventional radar is limited by line-of-sight restrictions. One way to extend the range is to use OTH radar.

OTH radar detects airborne objects beyond the horizon by bouncing radar waves off the ionosphere 60-160 miles above the earth's surface. As the fluctuating nature of the ionosphere sometimes reduces the radar's effectiveness, additional data is needed to evaluate the operational and cost effectiveness of OTH radar in polar latitudes.

Remote control radio beacons may be established at several sites in the high Arctic to simulate targets for testing the radar.

GERMANY

Deep Mobile Targets

Recording Designs (EMI) Ltd, is to supply the German Research Establishment for Underwater Weapon Systems with a number of its deep mobile targets — torpedo-shaped programmable submersibles employed for torpedo evaluation and as low-cost submarine simulators for anti-submarine exercises by surface vessels. The German contract also includes an amount of acoustic underwater tracking equipment.

This 10.5ft-long unmanned submersible has been developed to provide a realistic target for training sonar operators at a fraction of the cost of using training submarines. The DMT is also employed to investigate the efficiency of both active homing torpedoes and passive ones which rely on the noise from a submarine underway.

Controlled by a punched-tape programme, it can be made to alter

course, speed and depth and it can take evasive action when under attack. The DMT can operate at depths down to 1,200ft (360m) and stay submerged for almost two hours. Powered by a silver zinc battery, it has a maximum speed of 26 knots.

Although minute in size compared with a submarine, the target is equipped with electronic devices to simulate the dynamic and acoustic characteristics of a full-sized submarine.

One of the DMT's most important facilities is a miss-distance indicator which computes and records the performance of attacking weapons up to 350 yards (320m) away from the target. On recovery, these records enable the evaluator to tell not only how close the weapon passed to the target but whether it missed ahead or astern, to port or to starboard. The torpedo-shaped deep mobile target is 12.75in (32.3cm) in diameter and weighs about 500lb (230kg). It can be launched from a ship, either by tube or chute, and from an aircraft. On hitting the water it sinks to a programmed initial depth before starting off on its run. For recovery purposes, the target is fitted with a 9.5 kHz sonar "beeper" which automatically emits a homing signal when the DMT surfaces after its run.

ITALY

Acoustic Underwater Tracking Range

Recording Designs (EMI) Ltd, of the United Kingdom, is to supply the Italian Navy with an acoustic underwater tracking range which will be used to evaluate torpedo performance and other underwater weaponry currently being developed by Italy.

The acoustic tracking system comprises hydrophone assemblies suspended from three moored buoys and a transportable control cabin containing three-dimensional plotting facilities and computer-

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NAUTICAL NOTES

controlled analysis equipment. Equipped with its own diesel-powered generator, the air-conditioned cabin can be based on land or on board ship.

During exercise operations, the progress of underwater vehicles or weapons such as submarines and torpedoes is tracked by the hydrophones which transmit the information to the control station by a UHF radio link. In the shore or ship-based control centre, the speed and direction of the underwater vehicles are displayed on an X-Y plotting system with a depth display unit providing a real-time indication of the depth of each vehicle being tracked. A comprehensive computer system ensures accurate and rapid analysis of the performance of each vehicle after the exercise.

The Recording Designs transportable tracking system has a number of advantages compared with alternative designs of ranges employing either hydrophones located permanently on the seabed or fitted to booms carried by surface vessels.

Unlike a permanent seabed tracking range, the EMI range can be used in a variety of locations and is easily air-freighted between sites. It achieves a high degree of tracking capability and the system can be easily extended or modified to meet future requirements.

NEW ZEALAND

Fishery Protection Vessels

New Zealand is to buy four fisheries protection patrol boats from British yards to replace its aging navy fleet.

They will cost about \$1.5 million each and be delivered in about two years.

The vessels are 107ft long and capable of 18 knots and will be armed with cannon, mortars and machine guns.

Some of the New Zealand Navy's existing patrol boats are unfit for offshore duties and are unable to match modern fishing trawlers for speed.

SOUTH AFRICA

New Corvettes

South Africa is to acquire six

corvettes armed with guided missiles.

It has been provisionally decided to build a number of the vessels overseas and to investigate the possibility of building others in South Africa.

Already negotiations with Portuguese governmental agencies and industrial concerns to build the hulls of the vessels in Portugal have reached an advanced stage.

UNITED KINGDOM

Hydroplot Makes Charts

The RN has specifically stipulated that its latest "H" class ocean surveying ship, currently under construction, be fitted with the computer-based hydrographic system developed by Marconi Space and Defence Systems Limited. Called HYDROLOT, this will be the first such system to be installed during the building of a vessel.

Based on the 900 series of computers, Hydroplot is used to correlate data from any number of seabed and navigational sources. By processing this information in real time, the system can rapidly produce a plot of the measured parameters and ship's position as the work progresses, with an accuracy well within the Admiralty's renowned standards.

BRITISH HOVERCRAFT

More Orders from Iran

The Imperial Iranian Navy has placed the largest contract ever received for hovercraft, worth five million pounds Sterling. The contract is with the British Hovercraft Corporation for the supply of four 60-knot Wellington (BH7) class hovercraft.

Already the Imperial Iranian Navy is the largest hovercraft operator in the world with eight 10-ton SR-N6 and two 50-ton BH7 Mk 4 craft in service on a fully operational basis.

The craft to be supplied are of the BH7 Mk 5 type — the latest variant of BH7 — which has been designed as a multi-role craft.

In external appearance, it differs mainly from the existing BH7 Mk 4 in that it features wide flat side decks instead of troop cabins adjacent to the main central cabin.

For logistic support and re-entry operations, the bow door is retained to enable vehicles and weapons to be

loaded into the central cabin. Bulky stores are carried externally on the side decks. In this role, a payload of 14 tons, comprising mixed loads of ½ ton trucks, scout cars, howitzers and anti-tank guns may be carried.

For combat missions, the side decks can be used to carry surface/surface or surface/air missile systems, such as Exocet, See Sparrow or See Killer and the central cabin can be adapted for use as an operations and fire-control centre.

HOVER VEHICLE

FOR WAR

A British company has designed a revolutionary warship — a hovercraft that packs all the armament punch of a small frigate.

Vosper Thornycroft, which specialises in making small warships, says although only still at the "paperwork" stage, the hovercraft is based on the company's VT-1 Hoverferry.

By using the hovercraft technique, the company claims it will have certain advantages over conventional craft.

The hover patrol boat will have a speed of 46 knots.

Its weapon-load will be equivalent to that of a small frigate.

Its speed and shallow draught will make it virtually immune to torpedo attack and very difficult to see.

HIGH SPEED

A company spokesman said, "We have found over extensive trials that the hovercraft offers very good load-carrying, is most economical, has very high speeds and excellent seakeeping."

Another advantage is that it can be beached for repairs on any hard, sloping surface, and yet can be tied up to a jetty like any other boat.

Converted Hovercraft for British Army

Two SR-N6 Mk 5 hovercraft built by the British Hovercraft Corporation have been handed over for service with the British Army.

These new craft are based on two 7 ton SR-N5 hovercraft, and their conversion to the SR-N6 Mk 5 standard involved substantial modification and new construction.

Radically different in appearance from previous craft, the SR-N6 Mk 5 is 53 feet in length, some 5 feet

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NAUTICAL NOTES

longer than the standard craft, and features an open well-deck, flat side-decks and twin control-passenger cabins.

The craft were built to meet a vehicle-carrying requirement, and are capable of accepting a disposable load of 14,000 pounds. Typical cargoes include Land Rovers, tracked snow vehicles, and 105mm howitzers, but troops and other equipment can also be carried should the need arise.

Although heavier than the SR-N6 Mk 2, these craft possess a comparable performance with additional power for lift and propulsion coming from 1000 shp Rolls Royce Marine Gnome 1201 gas turbine engine.

RADOT TRAINER GOES INTO OPERATION AT HMS DRYAD

An \$160,000 Ferranti Radar Operator Training Equipment (RADOT), has recently become fully operational at the Royal Navy's shore training establishment, HMS Dryad. The equipment was installed in November 1971.

RADOT provides facilities to train personnel in the recognition of different types of echo and the many forms of radar clutter, interference and jamming. It also enables the operators to familiarise themselves with the use of their display controls, reporting procedures and with radar plotting. The equipment, which is completely portable, can be used to feed live radar video to the display system of an operations room in a ship or at the shore trainer, so that a crew may be trained in their respective responsibilities, when no other source of live radar is available.

The equipment supplied to Dryad consists of four Ferranti radar recorders each comprising a video tape deck and an interface unit. The recorder can be coupled with radar receivers to record live data, or to a display system for playback. Operators under training, either at sea or ashore, will thus see radar in exactly the same form as they would in real conditions at sea. The system at Dryad is currently feeding up to 40 displays, but has sufficient capacity to feed a much larger number if



Photos show the British SR-N6 Mk 2 hovercraft, recently acquired by the British Army to meet a vehicle-carrying requirement.



so desired. The system includes a facility whereby any selected group of displays can be switched to any of the four recorders, thus giving complete flexibility to the training programme.

The radar recorders may be used in conjunction with any standard surveillance radar currently in service. It is designed so that it can be plugged directly into the video distribution system, and no modification of the radar is required. Similarly, the recorder may be interfaced to any type of display, and to any number of different displays.

In addition to its training function, RADOT has operational uses in recording exercise data from sea operations for later evaluation.

Night Operation Lamps for Navy

Crompton Parkinson Ltd., a Hawker Siddeley Electric company, is to supply special ruby glass lamps

worth \$140,000 to the Ministry of Defence (Navy). The lamps are for use on ships engaged in night operations.

The colour of the lamps is critical, and is pitched at a point of the spectrum which enables personnel using them to see without upsetting their night vision.

The lamps, rated at 40W and 60W in four voltages, are made to a rigid MOD (Navy) specification and have specially-designed caps and filaments to withstand the shock and vibration of a ship in action.

Radar Beacon for Marine Navigation Buoys

Positive identification of marine buoys and markers on a ship's radar screen is made possible with a new pulse-coded radar beacon, or Racon, introduced by EMI Electronics and Industrial Operations. Fitted to a navigational buoy, this solid-state transponder transmits a coded

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signal which results in an enhanced echo on a ship's radar.

The battery-powered Racon costs under \$2,000, and is one of the cheapest high performance devices of its type available. It is effective at ranges up to eight nautical miles depending upon marine traffic conditions. A range of seven different five-bit codes is available for the beacon's RF transmissions.



Positive identification of marine buoys and markers on a ship's radar screen is made possible with a new pulse-coded radar beacon, or Racon. Fitted to a navigational buoy, this solid-state transponder transmits a coded signal which results in an enhanced echo on a ship's radar.

The coded transmission is triggered off by the scanning signals of a ship's radar — these signals being picked up in the Racon by an RF receiver via a slotted wave-guide aerial. Transmitted every 40 seconds, the RF output of the transponder is slowly swept over the marine frequency band with a fast amplitude-modulated waveform superimposed on it to broaden effectively the bandwidth of the ship's radar.

On the ship's PPI display, the beacon's signal pinpoints the



position of the navigational marker by appearing as a line of "dashes" commencing from the buoy's position. This line of radar echoes measures about 3,000 yards long on the PPI range scale and can be identified by the Racon's preset code.

Cylindrical in appearance, the EMI Racon is lighter and more compact than most competitive devices. It weighs about 20lb and is 9in high and has a diameter of 8in.

USA

The Virginian Goes Navy

Actor James Drury, well known for his TV roles in "The Virginian" and "Man From Shiloh", was recently commissioned a Naval Reserve officer on Universal Studio's back lot in Universal City, California.

Mr Drury, who received a direct commission as a lieutenant-commander, was sworn in by Captain L. V. Alitz, commanding officer of the Los Angeles Navy Recruiting District. The special ceremony was staged on the western set where "The Virginian" television series was filmed.

Lieutenant-Commander Drury, who was designated a public affairs officer, will assist the Navy in its information programme. He is to be attached to the Navy Public Affairs Office, West Coast.

Litton Awards \$39.3 Million Multi-Year Sub-Contract to Univac for US Navy Destroyer Computer Systems

Litton Industries has awarded to the Univac Division of Sperry Rand Corporation a multi-year sub-contract with a potential value of \$39.3 million to produce basic shipset electronic computer systems for 30 US Navy Spruance-class (DD-963) destroyers.

The initial award is for \$28.1 million. This covers the production of computer systems for a shore station and the sixteen ships funded by Congress.

Design, production, integration and test of the destroyer's electronics system will be conducted by Litton's Data Systems division, Van Nuys, California.

Each of the basic shipset systems to be manufactured by Univac's

NAUTICAL NOTES

Defence Systems Division plants in St Paul, Minnesota, and Salt Lake City, Utah, will consist of a three processor AN/UUK-7 computer system and supporting equipment. The AN/UUK-7, which will be wired for future expansion, is a general purpose high performance computer adaptable to a wide variety of real-time data processing applications. It will be utilised as part of the command and decision subsystem aboard the US Navy Spruance-class destroyers. This computer system combines the advantages of modular building block construction and micro-electronic integrated circuits to provide high reliability and fast processing speeds.

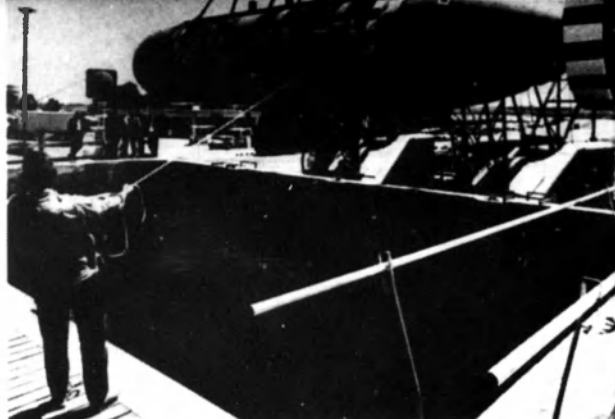
The Spruance-class, the first general purpose destroyer production programme since the late 1950s, will be the backbone of the US Navy's destroyer forces in the 1970s and beyond. The primary mission of these ships is anti-submarine warfare, including operations as an integral part of carrier task forces. The destroyers were designed by Litton Ship Systems, Culver City, California. Using modular techniques, they will be series-produced in Litton Ship Systems' new ship production facility at Pascagoula, Mississippi.

Litton was awarded the prime multi-year contract from the US Navy with a potential ceiling price of \$2.14 billion for the production of 30 Spruance-class (DD-963) destroyers in June, 1970. The three increments funded so far in this planned five consecutive fiscal year procurement programme are \$214 million in FY 1970 three ships, \$357.8 million in FY 1971 for six ships and \$417.4 million in FY 1972 for seven ships.

The contract to Univac is one in a continuing series of significant major sub-contracts that are being awarded on this important national defence effort to produce a fleet of these advanced multi-mission destroyers for the US Navy.

Rescue Sub Dives 5,000 Feet

The US Navy's second rescue submarine has completed its first deep dive to 5,000 feet, 35 miles south-west of San Diego.



For training — this full-scale "bottleplate" model of the deep submergence rescue vehicle (DSRV), which the US Navy will use to rescue crewmen from sunken submarines, is shown prior to tests in a "wet tank". The model was used to train the handling crew.

The 50-foot, torpedo-shaped Deep Submergence Rescue Vehicle (DSRV) passed 5,000 feet an hour after submerging and sat briefly on the bottom at 5,128 feet.

Developed for the Navy by Lockheed Missiles and Space Co., DSRV's 1 and 2 are the major elements in a prospective rescue system for saving the lives of submarine crewmen whose vessels are stranded on the ocean floor.

The highly manoeuvrable rescue subs can seal themselves to the escape hatch of a stricken vessel and take aboard as many as 24 rescues on each dive.

The DSRV system is designed to be highly mobile to provide quick, worldwide response to submarine disasters. The goal of the system is to place a DSRV on the site of an accident within 24 hours of its occurrence.

The rescue subs can be transported on their own specially designed trucks, and the complete system can be airlifted aboard three C-141 jet transports. DSRV can be carried to the accident site on a surface submarine rescue ship, or it can ride piggyback aboard a submerged nuclear attack submarine.

Contract to Power New Navy Craft

An initial \$669,892 contract for gas turbine engines and spares from the Tacoma Boatbuilding Corporation, has been awarded to Avco Lycoming Division, Stratford,

Connecticut, to provide the propulsive power plants for a new type of naval vessel called the Coastal Patrol Interdiction Craft (CPIC).

Each CPIC will require three turbines and the engine model chosen is the Avco Lycoming TF25, one of a family of Lycoming engines which have been marinised for sea use applications.

US Navy officials report that the new CPIC boat, with its tri-turbine power train, will be capable of attaining very high speeds. Each of the boat's three Lycoming engines is rated at 2,250 shaft horsepower (59 degree day) and they will drive three propellers.

Delivery of the first engines to Tacoma Boatbuilding Inc was made during August of this year.

Avco Lycoming also has sold its marinised gas turbine engines for use in powering some of the Navy's Riverine-type boats, as well as in three different commercial ferry hovercraft, soon to be operating in both Europe and Japan.

More powerful versions also have been selected for the four-engine power plants of two Amphibious Assault Landing Craft prototypes in the Navy's AALC programme, and for one of the Navy's two 80-knot Surface Effect Ship testcraft prototypes which is already undergoing sea trials.

NAUTICAL NOTES



New Ship Class

The patrol frigate (PF), a new class of ship, will have both AAW and ASW capabilities, for use as an ocean escort. Presently in the Ship System Design Phase, contract award for the lead ship is expected in April, 1973. The 420-foot, 3,400-ton ships will have a single shaft, controllable-reversible pitch propeller, powered by two 20,000-shp gas turbine engines. Each PF will have a hull-mounted sonar, over-the-side torpedoes, LAMPS helicopters with torpedo-delivery capability, standard surface-to-air and surface-to-surface missiles, and a point defence gun. About 50 ships may be built with deliveries expected between 1977 and 1982.

VENEZUELA Fast Patrol Boats

A contract valued at over \$12 million has been signed between the Ministry of Defence of Venezuela and Vosper Thornycroft Limited of Portsmouth, England, for the

supply of six fast patrol boats for the Venezuelan Navy.

Armed with modern fire controlled guns and missiles, these fast craft, 37 metres in length, have been designed by Vosper Thornycroft especially to meet the requirements of the Venezuelan Navy.

Delivery of the first patrol craft will take place in the autumn of 1974.

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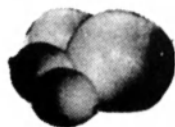
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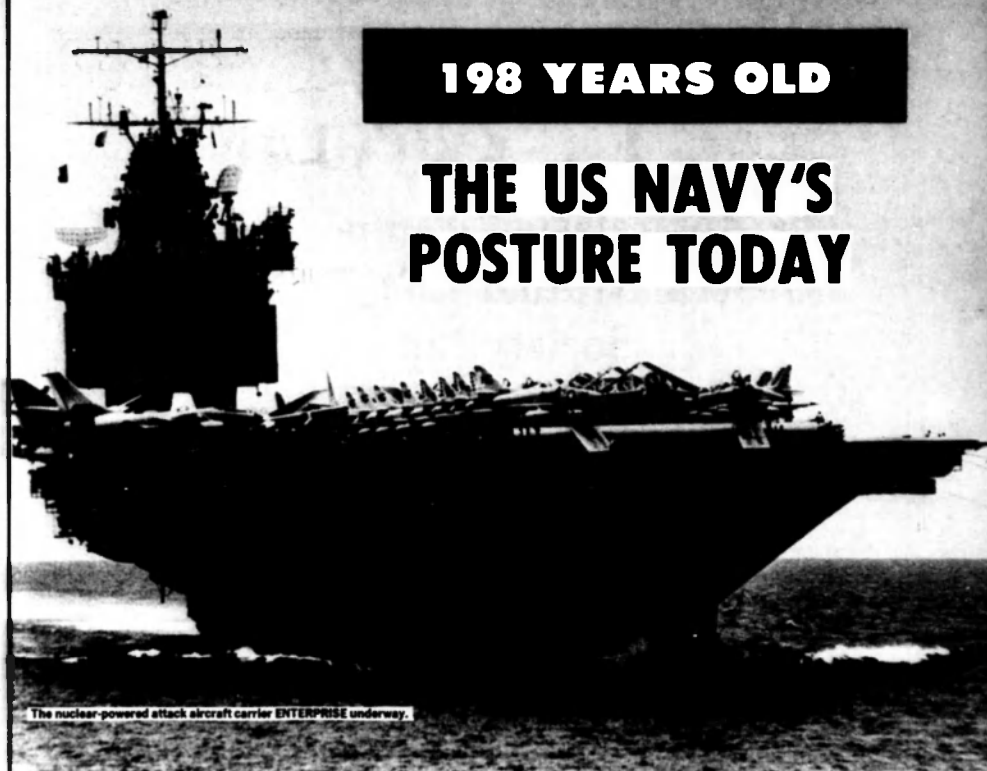
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THE US NAVY'S POSTURE TODAY



The nuclear-powered attack aircraft carrier ENTERPRISE underway.

—by JOC Byron S. Whitehead Jnr, US Navy—

This article was especially prepared for "The Navy" magazine by the US Department of the Navy

In the 1970s the United States maritime force, which has enjoyed a position of superiority on the high seas in recent history, is finding itself face to face with a formidable foe.

The preceding statement, in its briefest language, is the US Navy's "tit for tat" posture today.

The challenge affects the well-being of all Americans, as well as their allies. But while the military has an insight into the adversity of the many current challenges the US faces, many people are toying with the old cliché of overlooking threats they cannot see or do not understand. For too long now much of the American public has been

lulled by a false sense of security bred from victories in past wars.

The US Navy's primary strategic mission is to provide a mobile shield with enough retaliatory power to ensure adversaries will not be tempted to strike first; in a word, deterrence. Freedom of the seas is another Navy role which provides peaceful commerce and communications essential to US national interests.

There are no less than 72 raw materials and commodities that the US cannot do without if its present economy is to be maintained — an economy and nation that consumes 30 per cent of the world's energy.

The Office of Emergency Preparedness (OEP) in Washington not only confirmed this figure but provided additional emphasis: "Of the 72 raw materials, 60 must be imported in whole or in part".

In other words the US is a raw materials-deficient nation, dependent upon waterborne commerce for imports from all corners of the earth. To cite a few, according to OEP reports:

The US must have manganese to make steel — 85% of this material is imported. It must have columbite, a stabiliser in stainless steel — the US imports 90%; also 86% of bauxite requirements, the ore from which

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aluminium is refined. Chromite imports, used to toughen steel, come to 90%. And, remarkably, more than 99% of the tin and one-third of the entire world supply of crude and refined oil is imported by the US. Due to increasing reliance on oil in the US, by 1980 this nation may have an oil deficit of one million barrels a day for the West Coast alone.

These raw materials are not everyday household words, but the products manufactured by the US from these resources are, eg. braces for children's teeth, gas for automobiles, washing machines and dryers, TV sets, drilling rigs, earth-moving equipment, aircraft, telephones, and many more.

In 1961 the US developed a technique to cool natural gas to 260 degrees below zero so it could be liquefied and hauled in ships. This was a big technological breakthrough considering that US industry, offices and homes burn 32 trillion cubic feet of natural gas

every year, and that figure is increasing each year by six per cent. By 1980 the US will require 60 to 80 tankers to import its requirements of this valuable fuel. Today the US has only one such specialised "freezer" tanker.

There are some 9,000 free world and Communist merchant ships moving commerce across the seas daily. Of this number, only five per cent are American.

In other words, the 200 million American people, six per cent of the world's population who enjoy the world's richest economy, rely on foreign merchant ships to bring 95% of US trade to its shores.

The US took delivery of 22 merchant ships in 1969. That figure may seem like a lot. Compare it, however, to the 79 ships of the same size or larger the Russians commissioned during the same period!

Between 1958 and 1968 Soviet worldwide seaborne trade increased from 26 to 114 million long tons (one long ton is 2,240 pounds). In 1969 Russia had 170

passenger-carrying ships on 150 regular routes.

This fast-growing mercantile capability is centrally controlled and co-ordinated by the Soviet Government, and available for integrated operations with the Soviet Navy.

The para-military nature of the Russian maritime fleet and its growing Navy are in sharp contrast to the decline of US commercial flag vessels and warships. The increasing reliance on foreign flag vessels to transport US ocean cargo presents a new vulnerability to foreign political and military influence. In times of general or regional crisis, it is not difficult to envisage the pressures and intimidation that a capable adversary might direct towards foreign governments and their flag carriers to bring US commerce to a standstill.

What does this mean to Americans?

Take Texas as an example. The last Bureau of Census survey available (1969) shows the state exported 1½ billion dollars worth of overseas shipments. This translates into 150,000 jobs. As a portion of this, Corpus Christi (Texas) exported almost \$50 million in goods, which equates to 5,000 jobs.

It takes little imagination to see that, if the Soviet Union should ever dominate the sea lanes and ocean trade, US maritime interests could become dependent upon Soviet will.

What Russia needs in terms of military preparedness is different from US needs. Russia is primarily a land power with a great potential enemy to its East. With extensive coast lines, the US, of course, is a maritime nation and thus US national security



Crewmen ready a SH-2D SEASPRITE helicopter for operations from the guided missile frigate USS WAINWRIGHT. The Seasprite is equipped with the light airborne multi-purpose system (LAMPS).

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A Soviet Navy task group lies at anchor about 25 miles south of Honolulu 13 September, 1972. In the foreground is one of two F-type conventional submarines in the force. In background a KOTLIN-class destroyer takes on fuel from the Soviet merchant tanker ZHITOMIR. Slightly ahead is a destroyer of the modern KRUPNY class. The force lay at anchor here the night of 13-14 September, and refuelled the next morning before steaming away.

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needs are different, but this is only part of the picture. It is the contrasting developments in overall maritime activity — seapower in its broadest sense — that reveals the alarming nature of Soviet growth.

It would be helpful here to realise the doctrine of the seas, a doctrine built by the nations of the world to establish coastal boundaries and to establish international laws for free use of the international sea lanes.

Whatever the law of the sea, however, when nations fight they cross the sea at their own risk. The forces of each will do their utmost to deny passage of military and oftentimes commercial shipping to the other(s). Throughout history, the great and powerful nations were usually those able to maintain control of the seas. From ancient Persia to World War II, empires fell when they lost their influence on the sea. Even the land- and ice-locked Soviet Union had to rely heavily on US seaborne support to resist the Nazi onslaught.

At the end of World War II the US Navy was supreme, numbering in the order of 5,000 ships. Through subsequent years these numbers were severely reduced through post-war economics, although a peak force of about 1,000 ships was reached during the Vietnam conflict. Fiscal restraints, beginning in 1969, necessitated new reductions. On 1 July, 1972, the US Navy numbered 658 active ships.

While the US has been steadily decreasing its fleet, the Soviets embarked on a programme in the late 1950s which reveals a singular awareness of the importance of sea power and an unmistakable resolve to become a powerful maritime force.

The Soviets have projected their presence throughout the oceans of the world with increasing visibility in the 1960s, and in the 1970s in particular. This expanded presence has had a profound political effect in many areas. Their optimisation of air, surface and submarine forces has given them a capability to deal a damaging blow should a naval conflict take place.

Soviet naval deployments to the Indian Ocean commenced in 1968. They have maintained a continuous combatant naval presence there since May, 1969. Soviet naval units have made numerous goodwill visits to the nations of the Indian Ocean littoral and have sought to broaden their influence through assistance to these nations.

In April, 1970, the Soviets conducted a worldwide command, control and operations exercise which is noteworthy. It was the widest in scope conducted by any post World War II navy. It lasted three weeks and involved over 200 ships with heavy air activity. It included simultaneous operations in the Atlantic and Pacific Oceans, the seas

of Okhotsk and Japan, the Barents, Norwegian, North, Philippine, Mediterranean, Black and Baltic seas. To US observers it was a positive indication of a growing Soviet sophistication in naval planning and conduct of worldwide operations, and demonstrated the existence of a capable command and control organisation.

So many people in America do not understand the seriousness of the Soviet Navy threat; a threat being designed to deny the US the use of the seas to support itself and its allies overseas.

Furthermore, the people's distrust for the war in Asia is such that they do not even want to talk about means of preventing such an eventuality. In such a climate, the desire is to put one's own head in the sand and hope the whole affair will disappear.

In the long view of history, Russia's current drive for maritime dominance may well become the most important development of the latter half of this century. The ambitious maritime policy of the USSR is sup-



A Soviet KRESTA class guided missile armed destroyer leader.

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Pacific Ocean — A Soviet KOTLIN SAM class guided missile armed destroyer (No 448), A Soviet KRUPNY class guided missile armed destroyer (No 984) and a Soviet F-class large attack type fleet submarine off the coast of Hawaii.



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ported by a number of major programmes, unmatched so far, in the West, in size or scope.

In simple terms, Russia is attempting to do these things: acquire the largest merchant fleet in the world; operate the largest and most modern fishing fleet in the world; and strengthen materially the deep-sea elements of the Soviet Navy. It already has the world's second largest fleet. It appears that Russia recognises the significance of developing the means to control or neutralise the narrow sea bottlenecks of global shipping.

In short, a recent article by Senator Margaret Chase Smith of Maine is similar to the preceding paragraph. "... we are on the threshold of a world that will be unimaginably different from any that Americans have ever known — a world in which our President will not be able confidently to demand, for example, that the Kremlin remove its nuclear missiles from Cuba. Or that Russia refrain from establishing air bases there for its strategic bombers. Nor will the President be able to press credibly for equitable resolutions of problems in other

areas of vital interest, such as the Middle East or Berlin. Our President, whoever he is, would have to negotiate as best he can from a position of weakness, if he gets a chance to negotiate at all".

Comparison of major combatant forces, US versus Russia, in terms of modernity shows more than 37% of all US surface combatant ships are over 20 years old while almost all those of the Soviet Navy have been commissioned within the past 20 years.

The USSR Navy has become the world's most modern large fleet, surpassing that of the United States in

this respect. Russia is going ahead with its submarine-launched ballistic missile development and nuclear submarine programme — building ballistic missile submarines at a rate of nine to ten a year. From 1966 to 1971 the Soviets built over 200 general purpose combatant and amphibious ships as compared to 88 built in that period by the US.

Unfortunately, all this comes at a time when demands for funds for domestic programmes, coupled with inflation, are forcing reductions in all the US armed forces.



Gulf of Tonkin — A catapult crewman aboard the carrier USS AMERICA watches as a bomb-laden A-7A CORSAIR II attack aircraft heads out to sea following its launch from the flight deck.

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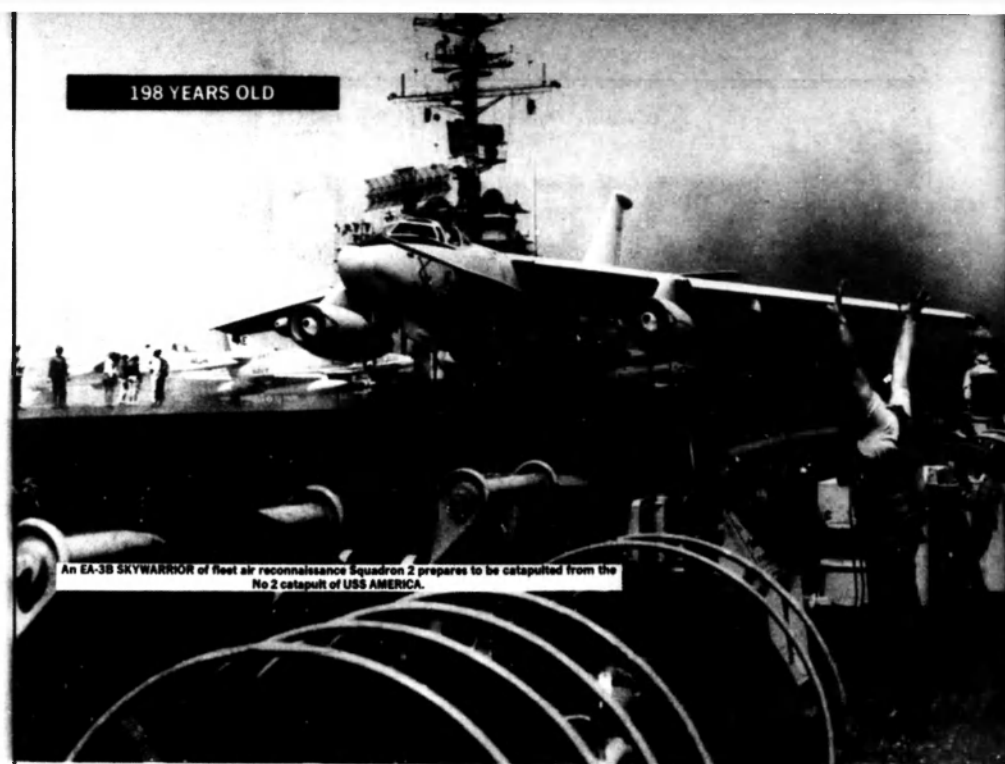
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An EA-3B SKYWARRIOR of fleet air reconnaissance Squadron 2 prepares to be catapulted from the No 2 catapult of USS AMERICA.



The hydrofoil patrol gunboat USS YUCUMCARI makes a high-speed turn.

In the Navy, limited dollars mean limited numbers of ships and men. As mentioned earlier, the Navy has only 658 active fleet ships. This is a reduction of almost one-third in just four years.

With regard to active duty personnel, the US has 602,000 in Navy uniforms as of 1 July, 1972, a reduction of almost 25%.

On a broader scope, between 1952 and 1971 there has been an increase of \$130 billion in overall Federal expenditure. Nearly two-thirds of this increase has gone to domestic programmes, and only one-fifth has gone to defence spending. These figures spell the US Navy's "sailing orders" for the present and the foreseeable future. Those orders read: "Do more with less".

Everything Admiral Elmo R. Zumwalt Jr., Chief of Naval Operations, has done since taking the Navy's helm has been pointed towards doing more with less. He (Zumwalt)

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is guiding the development of the US Navy of the future, a smaller Navy, but at the same time a Navy with the most advanced and versatile ships, and the best aircraft and weapons that US research and technology can offer with the amounts of money allotted from defence spending.

Several new weapons systems are being procured or requested for the US Navy. These include fast attack nuclear submarines, F-14 fighter



The submarine rescue ship USS PIGEON underway.

planes, new gas-turbine-powered Spruance-class destroyers, two new nuclear-powered aircraft carriers, sea control ships and surface-to-surface missiles.

Not by priority, other recent and current programmes being researched and developed by the US Navy include:

- a A Joint study with the US Maritime Administration to examine emergency uses in wartime of merchant ships in underway replenishment and for rapid deployment;

- a Encouragement of US allies to build up their own sea control forces and to accept responsibility for control of sea lines of communication contiguous to their shores. The US ship loan programme is important to this effort;

- e Increasing the readiness of existing US Naval Reserve ships and squadrons;

- a Light Airborne Multi-Purpose System (LAMPS) helicopter to operate from surface escort ships and provide anti-air, anti-submarine and anti-ship capability;

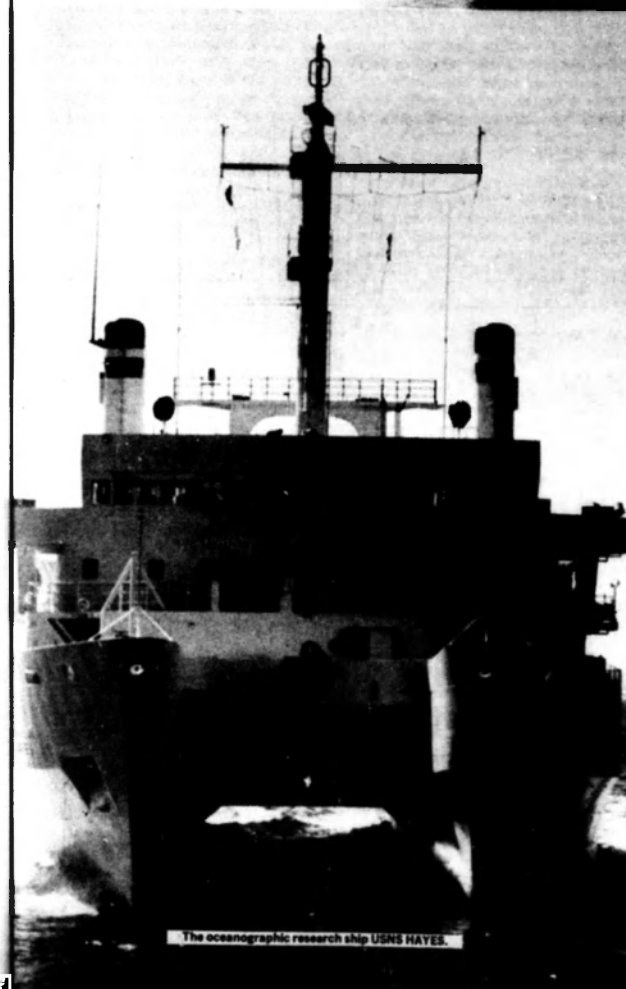
- a Anti-ship missile defence systems, including point defence and advance defence systems;

- e Procurement of secure communications equipment and the development of fleet satellite communications;

- e Development of an ocean surveillance system;

- a Development of increasingly effective electronic warfare capabilities;

- e Development of a more efficient, survivable, sea-based strategic offensive system — the Undersea Long Range Missile System, nicknamed "Trident" by the Navy, capable of launching



The oceanographic research ship USNS HAYES.

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longer range ballistic missiles from improved, quieter submarines;

• New or improved aircraft: the E-2C *Hawkeye* will have improved detection and classification equipment; the EA-6B *Prowler* is to accompany strike aircraft to their targets and provide greater protection against air strikes; the S-3A *Viking*, an all-weather, long-range carrier-based jet anti-submarine aircraft; the P-3C *Orion*, capable of delivering a combination of homing torpedoes, depth bombs and mines; and the F-14 *Tom Cat*, which will provide needed air superiority and air defence for US forces at sea.

The existence of these new systems is not just a happenstance, but is the result of dynamic research and development — an expensive effort, one that is essential if the US wishes to maintain its influence at sea.

The Navy is not concerned only with developing better hardware. It is finding ways of acquiring and retaining Navy people with higher degrees of professionalism, more skills and better motivation than ever before in US history.

The recruiting slogan, "Join the Navy and see the world" still attracts the young and adventurous, and life at sea and elsewhere in the Navy still attracts many career men. But even in normal times the Navy generally makes extremely heavy demands upon its families. Adventure and travel are often not enough for the family-minded individual who comprises 74% of the career-enlisted men and 77% of the officers.

Criteria upon which the Navy determines the manning of its ships call



for 70 hours of work per week per man at sea and 42 hours on the same scale in port. Actually, many men work in excess of these hours because of Navy exigencies. Many ships are deployed a third of the time. Even in home waters they spend a third or more of their time training at sea. In port, the men spend a fourth of their time in a duty status in their ships. The arithmetic of this is that out of 18 months it is normal for a sea-going Navyman to be separated from his family for 12 months.

But the US Navy has not operated in a normal fashion for years. With few exceptions its combatant and replenishment ships in both fleets, Pacific and Atlantic, have spent less than 50 per cent of 1969 through 1971 operating from home ports where the men's families are settled.

To relieve the family separation problem, the US Navy recently requested and received approval to homeport a carrier task group staff of 55 Navy personnel and 20 dependent families in Greece, starting 1 July, 1972. The US Government is discussing with the Government of Greece the possibility of homeporting other Navy units in Greece. Also, other foreign homeporting of US Navy ships with their crews' dependants is being considered by the Navy.

Added to family separation is the insecurity caused by personnel turbulence which has characterised the past three years. Between 1969 and 1972 the Navy has had to cut its personnel strength by 172,000 people. This necessitated rapid inactivations of many ships and aircraft units and was implemented in part by "early out" programmes. The adverse effects on fleet readiness and on the morale of Navy men and their families have been incalculable.

The US Navy's programmes and material initiatives will not suffice to improve its exercise of power at sea unless it is able to make service more attractive to the people it needs.

Measures to improve the attractiveness of Navy life offer the greater single potential payoff in increased combat readiness and, accordingly, are receiving high priority by the Bureau of Naval Personnel.

The efforts include reduced family separations; pay levels raised to reflect the professionalism and the unique problems associated with a naval career; improvement of personnel support facilities; and restoration of the zest of a naval career.

On the latter point, "zest of a naval career", new measures are being designed to delegate increased

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authority at all levels; to foster better lines of communications between personnel and commands; and to improve the mode of daily life where consistent with good order and discipline.

"In seeking to attract officer and enlisted candidates to join the Navy and Naval Reserve, we must ensure that quality standards are maintained," said Admiral Zumwalt. "If there must be a compromise I will accept fewer people to meet those standards rather than achieving manpower goals at the expense of quality and future potential. However, I believe we can do both, and we must strive to do so."

To lend added emphasis to the quality aspects of naval service, Admiral Zumwalt has established "Pride and Professionalism" as the Navy's theme during 1972.

To this end, Navy men are committed to the concept that responsibility, authority and opportunity belong equally to everyone in the



Atlantic Ocean -- A 105 minesweeping unit with the hydrofolks in the downward position is pulled through the water by a CH-53 SEA STALLION helicopter

Navy, regardless of their origin or beliefs, so long as they are loyal to their trust and capable of performing their duty.

In summation, the political, economic and military influences at work in the world, together with the US social and economic situation, and the broad areas in which the Soviet Union seeks political influence, all suggest that in the future wellbeing; for its ability to meet treaty commitments in concert with its allies; to provide a credible deterrent to both nuclear and conventional war; and to help counter the spread of Soviet influence in foreign lands.





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Honourable David Fairbairn, DFC, MP

DEFENCE REPORT 1972

The Royal Australian Navy

A high state of operational readiness is being maintained by ships and aircraft of the Royal Australian Navy.

This has been demonstrated by performances in a continuing intensive series of international and local exercises involving all types of Fleet units.

The exercises have improved the RAN's ability to undertake its roles, which are:

- To organise, train and equip Naval forces, including Naval aircraft, for timely and sustained combat operations at sea:

- to detect and destroy enemy Naval forces and sea commerce;

- to establish and maintain superiority in areas as

necessary for Naval operations, including the protection of sea lines of communication;

- to conduct Naval offensive operations against enemy forces and installations;

- to conduct Naval reconnaissance and surveillance; anti-submarine warfare, the protection of shipping and hydrographic and oceanographic surveys;

- To provide Naval support for land operations;
- To provide military sea transport support for the Australian Services; and
- To provide seaward defence of ports and anchorages.



The destroyer escort HMAS DERWENT.

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DEFENCE REPORT 1972

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3 Guided Missile Destroyers:		
HMAS PERTH	DDG38	First Australian
HMAS HOBART	DDG39	Destroyer Squadron
HMAS BRISBANE	DDG41	
3 Daring-class Destroyers:		
HMAS VAMPIRE	DD11	Second Australian
HMAS VENDETTA	DD08	Destroyer Squadron
HMAS DUCHESS	DD154	
6 River-class Destroyer Escorts:		
HMAS YARRA	DE45	Third Australian
HMAS PARRAMATTA	DE46	Destroyer Squadron
HMAS STUART	DE48	
HMAS DERWENT	DE49	
HMAS SWAN	DE50	
HMAS TORRENS	DE53	
4 Oberon-class Submarines		
HMAS OXLEY	SS57	First Australian
HMAS OTWAY	SS59	Submarine Squadron
HMAS OVENS	SS70	
HMAS ONSLOW	SS60	
4 Coastal Minesweepers:		
HMAS HAWK (O)	MSC1139	First Australian Mine
HMAS TEAL	MSC1152	Countermeasures
HMAS GULL (O)	MSC1185	Squadron
HMAS IBIS (O)	MSC1183	
2 Minehunters:		
HMAS CURLEW	MSH1121	
HMAS SNIPE	MSH1102	
20 Patrol Boats:		
HMAS ADVANCE	PTF83	First Australian
HMAS ASSAIL	PTF89	Patrol Boat Squadron
HMAS ATTACK	PTF90	
HMAS BARBETTE	PTF97	
HMAS BARRICADE	PTF98	
HMAS BAYONET	PTF101	

HMAS AITAPE*	PTF84
HMAS LADAVA*	PTF92
HMAS LAE*	PTF93
HMAS MADANG*	PTF94
HMAS SAMARAI*	PTF85
HMAS AWARE	PTF91
HMAS ARDENT	PTF87
HMAS BOMBARD	PTF99
HMAS BUCCANEER	PTF100
HMAS ARCHER (R)	PTF86
HMAS ADROIT (R)	PTF82
HMAS ARROW (R)	PTF88
HMAS ACUTE (R)	PTF81
HMAS BANDOLIER (O)	PTF95

* Papua/New Guinea Division
(R) — Naval Reserve Training
(O) — Operational Reserve at 30 June, 1972.

Training Ships

1 Transport:		
HMAS SYDNEY	AP214	First Australian
1 Destroyer:		
HMAS ANZAC	DD59	Training Squadron

Support Ships

1 Destroyer Tender:		
HMAS STALWART	AD215	
1 Oiler:		
HMAS SUPPLY	AO195	
1 Surveying Ship:		
HMAS MORESBY	AGS573	
1 Coastal Surveying Ship:		
HMAS PALUMA	AGS337	
1 Oceanographic Research Ship:		
HMAS DIAMANTINA	AGOR266	
1 Trials and Oceanographic Ship:		
HMAS KIMBLA	AGOR314	
2 Reserve Training Ships:		
HMAS BASS	GS247	
HMAS BANKS	GS244	

Fleet Air Arm

Squadrons		
HT 723:	Helicopter aircrew training and pilot continuation training	Iroquois & Scout helicopters
	Fleet support and search and rescue duties	
VC 724:	Fixed-wing strike lighter pilot training and Fleet requirement flying and trials	Macchi jet trainers, TA4G Skyhawk trainers and A4G Skyhawks
HT 725:	Anti-submarine helicopter operational training and Fleet requirement duties	Wessex 31B helicopter
VF 805:	Front-line strike fighter squadron	A4G Skyhawks
VS 816:	Front-line fixed wing anti-submarine squadron	S2E Trackers
HS 817:	Front-line helicopter anti-submarine squadron	Wessex 31B helicopters
VC 851:	Training squadron for pilots, observers and aircrewmembers	S2E Trackers and Dakotas
	Twin-engine conversion, communication and Fleet requirement flying	

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DEFENCE REPORT 1972

OPERATIONAL ACTIVITIES

Five Power Arrangements

The RAN's commitment to the Five Power Arrangements is to maintain one destroyer or destroyer escort continually in the area and for a submarine to make two visits of 15 weeks each year. In addition an RAN task group is to make occasional visits.

The last ship to serve in the old Commonwealth Strategic Reserve, HMAS SWAN, took part in a farewell exercise with the Royal Navy ships in October, 1971. The exercise was named Curtain Call. On 1 November operational control transferred to the ANZUK Force Commander.

In February HMAS SWAN escorted the Royal Yacht Britannia, in which Her Majesty the Queen, His Royal Highness the Duke of Edinburgh and Her Royal Highness the Princess Anne visited Thailand and later Singapore and Malaysia.

In March SWAN was relieved by HMAS TORRENS, a sister ship, which in turn was relieved in May by HMAS STUART.

The submarine HMAS OVENS was based in Singapore from February to the end of April. Later this year HMAS ONSLOW will serve with the ANZUK Force for 15 weeks.

Exercises

The first ANZUK maritime exercise, named *Genesis*, was the last of three major international exercises in which a task group of RAN ships and aircraft took part between November, 1971, and March, 1972.

The Flagship HMAS MELBOURNE, with aircraft embarked, the guided missile destroyer HMAS HOBART, the destroyer escorts HMA Ships TORRENS and YARRA, and the submarine ONSLOW took part in a thorough trial of the Ikara missile system at the US Navy's Barking Sands Tactical Underwater Range off the island of Kauai, Hawaii, in November.

The Ikara trial was held in conjunction with US Navy's Rimpac 71 exercise.

During February eight RAN units took part in the SEATO exercise Sea Hawk. Ships were HMA Ships MELBOURNE, HOBART, STALWART, SUPPLY, DUCHESS, TORRENS, SWAN and OVENS.

This exercise was directed for SEATO by Australia and Australian officers filled all major posts on the exercise staff. Naval units from the United States, Britain, New Zealand, Thailand and the Philippines took part.

Exercise SEA HAWK was conducted in the South China Sea off Manila and it placed greater emphasis on anti-submarine warfare than previous similar exercises. The realism of this training was improved by the inclusion of a nuclear submarine, USS SEADRAGON, among the USN units taking part.

After a visit to Hong Kong the RAN task group visited Singapore before taking part in the ANZUK exercise *Genesis*.

MELBOURNE, DUCHESS and SUPPLY paid a visit to Indonesia during their return passages to Australia.

Vietnam

HMAS SYDNEY has returned to full-time duty as senior ship of the RAN's First Australian Training Squadron after making 23 return voyages to South Vietnam since



HMAS ANZAC, a training destroyer.

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DEFENCE REPORT 1972

1965. The last voyage was made in March, the same month in which HMAS JAPARIT was decommissioned and returned to the Australian National Line at the end of her 43rd trip to Vietnam.

HMAS BRISBANE returned to Australia in October. The final deployment of BRISBANE was the ninth by an Australian destroyer to the gunline off Vietnam with ships of the US Navy's Seventh Fleet. HMA Ships HOBART and PERTH were deployed to Vietnam three times, BRISBANE twice and HMAS VENETTA once.

Patrol Boats

Patrol boats from the First Australian Patrol Boat Squadron and the Papua/New Guinea Division of the RAN took part in an exercise, Planti Manua (Many Warships), in the Milne Bay area of Papua in March. The training destroyer HMAS ANZAC operated as command, communications and maintenance ship.

Other activities have included fisheries protection patrols, while HMA Ships LADAVA, AITAPE, SAMARAI and BARRICADE have all been involved in search and rescue operations this year.

RN Submarine

The Royal Navy Oberon-class submarine HMS ODIN will join the First Australian Submarine Squadron in December. She will be manned by a Royal Navy crew and will remain an RN vessel during her deployment.

Her presence will facilitate maritime anti-submarine training, and she will be programmed with the RAN's four Oberon-class submarines in meeting the joint Australian/United Kingdom submarine contribution to the Five Power Arrangements based in Singapore.

Fleet Air Arm

The Fleet Air Arm of the RAN has seven squadrons in service, three of which embark in HMAS MELBOURNE. The others provide training and fleet support.

Front-line squadrons have been particularly active. Following a period of deck landing practice, the squadrons embarked in HMAS MELBOURNE in September and after further working up from the carrier participated in Exercise RIMPAC 71 in Hawaiian waters. After their return to Australia in early December, they re-embarked in MELBOURNE for the latter part of January, 1972, when she sailed for the Far East. Squadrons participated in the major SEATO exercise SEA HAWK, in exercise TransTex while on passage from Hong Kong to Singapore and in the ANZUK exercise Genesis.

The front-line squadrons are programmed to embark in HMAS MELBOURNE for a further two major exercises later this year.

The last of 10 Macchi jet trainers for pilot training and fleet training exercises have been delivered. Two Hawker Siddeley 748 aircraft for training, trials and electronic warfare exercises, are on order in the UK.

SHIP CONSTRUCTION AND MODERNISATION

Proposed new construction, modernisation and new purchases include three light destroyers (DDLs) to be built in Australia to enter service in the 1980s.



HMAS VENETTA in dry-dock at Williamstown Naval Dockyard, where she is undergoing a \$10 million refit.

modernisation of the four older River-class destroyer escorts, modernisation of the surface-to-air missile system, installation of computer-based command and control systems in the DDGs and the purchase of 10 Westland Sea King helicopters.

HMAS VAMPIRE has returned to the Fleet after completing an extended refit at Williamstown Naval Dockyard. Changes to the superstructure have altered the ship's silhouette. The refit has updated this specialised gun ship which will increase the Navy's capacity for naval gunfire support of troops — a role which the RAN undertook with great success in Vietnam.

VENETTA is undergoing a similar modernisation in which the fire control systems will be renewed, new air warning and navigation radars fitted, three twin turrets replaced with updated versions, the operation room modernised and enclosed bridge fitted. VENETTA should rejoin the Fleet at the end of the year.

HMAS HOBART, the first of Australia's three guided missile destroyers to undergo gun mount modernisation, is to have the work carried out at the Hunters Point Naval Shipyard, near San Francisco. The two five-inch gun mounts of the ship will be updated to the latest US Navy standards. The mountings of HOBART's sister ships, HMA Ships PERTH and BRISBANE, also will be modernised.

HMAS FLINDERS, a hydrographic ship of 750 tons, has



The Fleetship HMAS MELBOURNE

been launched at Williamstown Naval Dockyard and will replace HMAS PALUMA early in 1973.

Because of the higher priority of other work, the design for the large oceanographic ship (HMAS COOK) which will replace HMAS DIAMANTINA has been delayed, and it is now expected that tenders will be called late this year with construction beginning in mid-1973 and completion early in 1976.

The detailed design of the fast combat support ship, which is to be named HMAS PROTECTOR, has been completed, while in Scotland at Scotts Shipbuilding Company, Greenock, two further Oberon submarines (HMA Ships ORION and OTAMA), which will increase the RAN's strength to six, are under construction with delivery scheduled for 1975.

Disposal of Ships

The training destroyer escort HMAS QUEENBOROUGH has been paid off into reserve pending disposal, having reached the end of her life. QUEENBOROUGH is the last of five former RN ships of the class which have served in the RAN.

HMAS DIAMANTINA is now the only ship to have served in World War II remaining in service. An era ended for the RAN this year when the World War II veterans QUIBERON, QUICKMATCH, WARREGO, C-JLGOA, GASCOYNE, BARCOO, the ferry KARA KARA and the Korean veteran TOBRUK were sold.

HYDROGRAPHIC AND SCIENTIFIC SERVICES

Hydrographic Service

New work undertaken included surveying the western approaches to Thevenard and Ceduna (South Australia) which was carried out by HMAS MORESBY. Earlier, MORESBY, assisted by patrol boats, undertook a harbour approach survey in the Cape Bougainville area of north west Australia for the proposed bauxite complex at Port Warrender.

HMAS PALUMA spent five weeks working in Paia Inlet in the Gulf of Papua surveying approaches for shallow draught vessels. PALUMA also continued work begun in 1971 between Booby Island to Goode Island proving routes for deep draught passage through Torres Strait, and finished a survey of the approaches to Hay Point, near Mackay, for a bulk loading coal terminal.

Survey work in Endeavour Strait for alternate routes through Torres Strait and proving routes for small coastal vessels in the Crab Island area, west of Torres Strait were other tasks undertaken by PALUMA.

During the 12 months to 30 June, MORESBY covered 29,704 miles on surveying duties, PALUMA 4,176 miles and ACUTE 950 miles.

Scientific Service

The naval Scientific Service continues research and development studies in a wide range of naval activities.



HMAS ONSLOW pictured on exercises off the New South Wales coast.

The Service undertook an extensive series of mathematical studies of weapons effectiveness in comparing destroyers with alternatives in meeting the tasks foreseen for the 1980s. Other mathematical studies which have been performed included a number to assist decisions on the most effective method of providing afloat support.

Useful progress has been made in the area of military oceanography and work in this area has been extended to include the Indian Ocean.

HMAS DIAMANTINA and HMAS KIMBLA have also continued to provide assistance for oceanographic research, to civilian authorities, including the CSIRO and universities.

A fruitful outcome of the RAN Research Laboratory's work in underwater acoustics and sonar signal processing has been the specification for a new, greatly improved sonar to replace that currently fitted to the River-class destroyers.

Investigations into causes of nitrogen narcosis (the bends) are being undertaken at the School of Underwater Medicine in association with the University of NSW. If the research is successful, it will lead to a reduction of hazards in deep sea diving.

PERSONNEL

Manpower

Personnel serving full-time as at 30 June, 1972, comprised the following:

	Officers	Other ranks	Total
Permanent Naval Forces	2,163	13,593	15,756
WRANS	35	710	745
RANNS	24	0	24
PNG Division	12	232	244
Naval Dockyard Police	10	342	352
Personnel on Loan	5	8	13
	2,249	14,885	17,134

Naval Reserve Forces

Naval Reserve personnel serving part time at 30 June, 1972, were:

	Officers	Other ranks	Total
RAN Emergency Reserve	67	854	921
Citizen Naval Forces	1,336	3,708	5,044
WRANS Reserve	5	329	334
	1,408	4,891	6,299

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The guided missile destroyer, HMAS BRISBANE.

DEFENCE REPORT 1972

Civil Personnel

Civilian personnel employed by the Department of the Navy numbered 12,748 employed full time and 56 employed part time as at 30 June, 1972. The full-time employment figure included 20 locally engaged staff employed in the United Kingdom and 338 locally engaged indigenous staff in PNG.

Of the total civil personnel strength at 30 June, 1972, 6,400 were employed on work associated with the design construction, repair and maintenance of naval ships, submarines, aircraft and equipment. A further 2,520 were employed directly on the logistic support of the Fleet.

Elective Discharge

An elective discharge scheme for RAN sailors was introduced in June. Under certain conditions sailors will be able to leave the service before their initial engagement period of 9 or 12 years expires.

New Rank

The new sailor rank of Warrant Officer has been introduced to all branches of the Navy. The rank is equivalent to the Army rank of Warrant Officer 1st Class.

Personal Services

During the first half of 1972 personal services organisations were established in Sydney and Canberra to deal with expanded assistance programmes for members of the RAN and their families. Similar organisations in Victoria and Western Australia are envisaged. The additional services, mainly advisory, include the reception of families, assistance in obtaining accommodation, improved legal advice facilities, welfare advice and information about the education of children.

TRAINING

Because of changes to the sailor structure of the RAN during 1972 many training courses have been redesigned.

Courses have been based on objectively determined standards from job analysis. The transition from the old courses to the new will be without interruption to training or reduction in the flow of trained officers and

sailors. Many new courses will be shorter than those they replace.

Sailors

About 2,000 sailors commence initial training each year as junior recruits, adult recruits or apprentices. This training is followed by more sharply focused training designed to fit them for particular areas of Navy employment. Apprentices' training will continue to be directed towards full civil recognition of a trade. The training of non-apprentices will, wherever possible, cover the first stage of an adult apprenticeship. Further training will continue to be available at later stages to those sailors and WRANS who can benefit from it. Wherever possible service skills are related to civil employment with a view to making the transition from service to civil life less difficult than it has been in the past.

Officers

Degree training for about one-third of officer entrants to the RAN College is continuing. An additional degree in surveying has now been included to augment the arts, science and engineering degree courses available at the University of New South Wales, and selected officers are also studying for diplomas at the Royal Melbourne Institute of Technology.

In 1971, four officers gained degrees (1 BSc, 2 BE(Elc), 1 BE(Mech)), and two officers gained diplomas (1 Dip Elc Eng and 1 Dip Mech Eng). These officers are now under training in the Fleet where they will remain until posted to the United Kingdom for specialisation training later in 1972.

The results of a junior officer job analysis will be finalised by the end of 1972. This is expected to introduce new training criteria and improved training in the future.

Efforts to encourage sailors to become officers in the RAN continue and each year up to 100 sailors commence full-time courses to achieve the necessary prerequisites for officer rank.

Overseas Personnel

During 1971, 26 officers and 118 sailors from Asian countries were trained at Royal Australian Navy training establishments. Students were from Malaysia, Singapore, Indonesia and Brunei. The range of courses taken is increasing and this trend is expected to continue and develop in the future. During 1972 South Vietnam and the Khmer Republic started sending students to RAN schools.

BUILDINGS, WORKS AND HOUSING

Expenditure on buildings and works during 1971-72 was \$14.773 million, in addition \$3.559 million was advanced to the States under the Commonwealth/States housing arrangements towards houses under construction and the cost of a further 217 houses and flats for married Navy personnel.

Construction of the causeway between Point Peron and Garden Island, WA, estimated to cost \$9.500 million, is progressing according to schedule. It is due for completion mid-June, 1973, and will give road access to the Island for the construction and operation of the Naval Support Facility.

Major works projects in progress during 1971-72 included the tactical trainer building at South Head, Sydney (HMAS WATSON). This project is due for completion in May, 1973. Three instructional buildings at the Naval training establishment, HMAS CERBERUS, Westernport, Vic, are due to be occupied by September, 1972.

Other major works projects let to contract during 1971-72 included a new Radio Receiving Station at Shoal Bay, NT. Contracts were also let for new accommodation blocks for senior sailors and junior officers at the Naval Air Station, Nowra (HMAS ALBATROSS); for cadet officers at the Naval Cadet College, Jervis Bay, NSW (HMAS CRESWELL), for sailors at the Naval Apprentices' School, Quakers Hill, NSW (HMAS NIRIMBA) and for senior sailors at HMAS CERBERUS.

Provision is made in the 1972-73 programme for an expenditure of \$17 million on buildings and works. Construction will commence on new living-in accommodation, a wardroom mess and reconstruction of No 4 Taxiway at Nowra (HMAS ALBATROSS); a new caisson at Sutherland Dock, Cockatoo Island, NSW, new messes and accommodation and provision of water supply at Quakers Hill, NSW (HMAS NIRIMBA), additional sleeping accommodation, a new senior sailors' mess, a new administration block and extensions to canteen and recreation facilities at Coonawarra, Darwin, NT. Provision has been made in the 1972-73 new works programme for construction of base facilities including wharves and service area, workshops and stores buildings, engineering services, etc., at the Naval Support Facility, WA, at an estimated cost of \$15.500 million. The balance of the project (\$14 million) will be programmed in 1973-74.

As at 30 June, 3,257 houses had either been obtained, were under construction, or on approved programmes under the Commonwealth/States housing arrangements.

In addition, as at the end of June, 1972, 988 Service-owned married quarters had been obtained, or were under construction. There are also 61 houses for Naval personnel in Papua/New Guinea and 40 houses for locally enlisted personnel.

Provision has been made for a further 137 houses to be programmed from advances to the States amounting to \$2.807 million during 1972-73. A further six are programmed for construction by the Commonwealth in Australia and 10 houses for Australian servicemen at Manus Island (HMAS TARANGAU).

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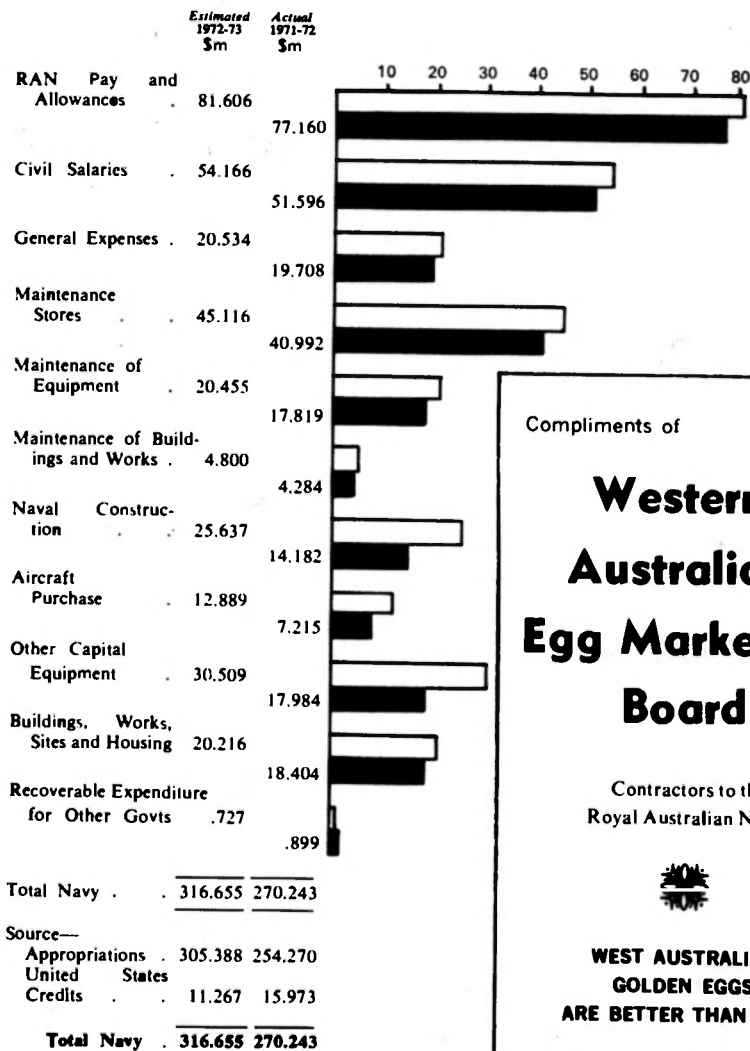
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BOOK REVIEW

GREY WOLF, GREY SEA

Aboard the German Submarine U 124 in World War II

by E. B. Gaseaway

Published by Arthur Barker Limited, London; 245 pages, 14 photographs
Price \$5. Copy supplied by Hicks Smith & Sons Pty Ltd, Sydney

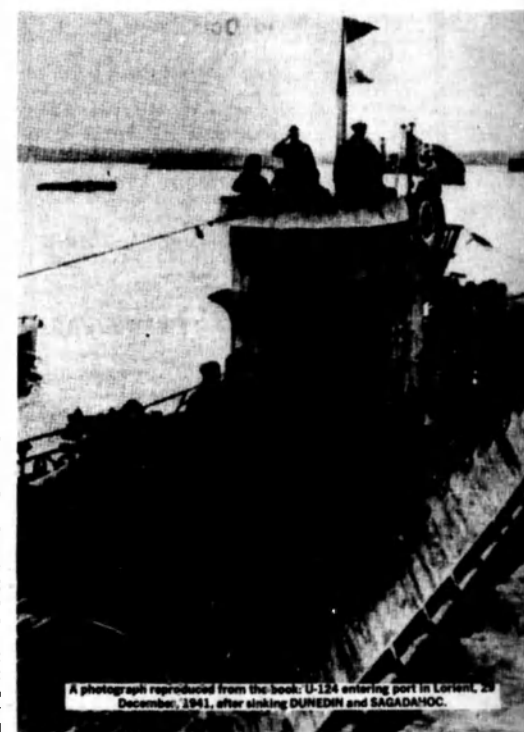
Reviewed by
GALATEA

In May, 1938, with Britain now assessed as a possible enemy, Hitler and his naval staff formulated Plan "Z", which was intended to ensure that sixteen capital ships (including Tirpitz, Scharnhorst), two aircraft-carriers, several heavy and light cruisers and more destroyers together with one hundred and twenty-six modern ocean-going U-boats would be available for deployment by 1944-45. A supplementary programme called for additional heavy units and U-boats to be completed by 1948.

Admiral Karl Doenitz had calculated prewar that three hundred U-boats would be needed to bring the British convoy system to its knees. Plan "Z" and its supplement would, therefore, enable this goal to be attained. As it happened, Hitler's precipitate committal in September, 1939, of the Wehrmacht and Luftwaffe to a land war in Central Europe caught the Kriegsmarine flat-footed and, by 10 June, 1940, there were barely 20-25 U-boats operational and at sea in any one period.

The aforementioned date was the commissioning day of U-124, a Type IX B craft and the heroine of this fascinating true story. She and her corsair sisters wrought fearful havoc out of all proportion to their numbers amongst the plodding merchant vessels in the crowded Atlantic Ocean sea-lanes. Like so many of her kind, she perished violently as a result of the simultaneous assaults made upon her by two British escort vessels on the night of 2 April, 1943. She carried to her grave off the coast of Portugal her entire complement of forty-eight officers and men.

U-124 was longer-lived than many of her contemporaries; however, she had only two Commanding Officers: Wilhelm Schulz and Jochen Mohr, both excellent men of high calibre, and this book is as much their story as that of U-124. Schulz, the surviving CO, assisted the author in making his work the fine piece it undoubtedly is with its smooth narrative style spiced at intervals with highly entertaining incidents and facts in addition to personal glimpses of her crew and their efficient easy-going relationships with their officers and



A photograph reproduced from the book: U-124 entering port in Lorient, 28 December, 1941, after sinking DUNEDIN and SAGADAHOC.

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each other. The image of the mindless, blindly obedient Teuton, so often encountered in puerile fiction, dies swiftly in this tale.

The lives led by the crew of U-124 were rarely, if ever, monotonous or dull; their days being marked by events which ranged from being quite hilarious to those that brought the chill odour of fear and death. For too long U-boat crews have been depicted as soulless beasts of destruction, gaining nothing but pleasure from the horrifying sight of their victims succumbing to death in a welter of foam and blood. It is a matter of record that, on two occasions, Mohr surfaced and gave medical aid, provisions and directions to the survivors of his torpedo attacks. Not only did he place his own crew and ship in grave danger from patrolling allied aircraft but actions such as these were strictly forbidden by authority. It is also worth noting that severe space limitations prevented him from actually taking survivors aboard.

The U-boat branch of the Kriegsmarine, as a whole, was exonerated of war crimes charges at Nuremberg. Only one instance of a U-boat firing on survivors was substantiated. Complex excuses notwithstanding, her captain was executed by hanging.

The bitter wartime political partition of France between the Vichy adherents, Free French and Communists is brought into sharp focus when one reads of the pro-German feelings shown to U-boat crews by a fair percentage of the Lorient citizenry, whose town was a main base for U-boat operations.

There is a plethora of technical and environmental detail which should hold the interest of most readers. Items like the use of potassium cartridges placed in the mouth to cleanse inhaled air of carbon dioxide during prolonged dives. U-boat crews held some firmly entrenched superstitions that would make the average British matelot green with envy!

The book, however, was not without its faults. Crew members present in one chapter are inexplicably absent in the next. The post of Chief Engineer is a prime example; the identity of that gentleman changing from Steinmetz to Brinker between chapters two and three.

When an emergency dive was necessary, the depth order "2A plus 60" was issued. We are informed that A equals 80 metres; thus "2A plus 60" equals 220 metres. What the reader is not told is why such a curiously constructed order existed, apparently as a matter of course, instead of simply ordering a dive to 200 (or 220) metres.

On page 137, Brinker is awarded the "Gold Cross" for heroism. On page 184 he is decorated with the "German Cross in Gold" for further sterling behaviour. Is this the same award? The wording appears to be deliberate. There were further inconsistencies which tended to irritate me; however I will not enlarge upon them beyond the comment that they tended to slow my reading pace pending their clarification.

In the performance of their duty, the U-boat arm of the Kriegsmarine suffered appalling losses because of the ever-widening use (amongst other items) of radar and escort carriers. Of the 842 U-boats that saw action, only 68 remained by 6 June, 1944, and only three of these were afloat at war's end. This represented over 90% material loss. Seagoing personnel fared no better. Out of a total strength of 39,000 officers and other ranks, 32,000 were lost. These figures (bear in mind there were no wounded) represent the worst defeat suffered by any service in any war in history. Incredible but true.

This book is a magnificent tribute to brave men and their ship U-124 which, by the time she died, had become the third most successful submarine, all nations included, of the Second World War. I thoroughly recommend it as a work to be enjoyed. There are too few good books in or out of print on this subject; especially so in the case of German submarine activities. This book makes an interesting comparison with *HMS Thule Intercepts*, by Lieutenant-Commander Alistair Mars, DSO, DSC and Bar, which deals with British submarine warfare against the Japanese.

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Model of a very large tanker being prepared for towing tests in the 400 metres long tank of the Ship Division of the National Physical Laboratory at Feltham, near London.

by CLARE DOVER Assistant science correspondent of "The Daily Telegraph", London

They Smooth the Troubled Waters of Ship Design

Whenever a naval architect runs into difficulties or needs advice on an advanced project, the Ship Division of Britain's National Physical Laboratory is always available to help. The division is a source of information on ship design for both government and private shipping.

It aims at increasing ship efficiency and safety and helps to raise the profitability of the British marine industries by assisting ship-owners and shipbuilders in improving the hydrodynamic design of ships and other marine vehicles.

Background Information

The division's primary function, however, is to serve the government

by furnishing scientific background information necessary for framing legislation and by providing information on ship hydrodynamics and other factors affecting marine safety.

The work for the government is primarily directed towards increasing safety, that for industry concentrates on optimising a ship's performance.

The division's research programme into the basic principles of ship behavior for the shipbuilding and shipping industries is formulated in close collaboration with industry.

A careful balance is struck between orientating the research to

cope with the problems that will arise from future shipping trends and conducting pure research to build up the bank of basic knowledge.

Contract Research

The division also conducts contract research. A firm of naval architects will bring the lines of a proposed vessel for an estimate of the power needed to reach a certain speed. A scale model of the hull may be made and put through trials in simulated sea conditions. The company will pay for research conducted on its behalf and the results are treated as confidential.

Problems concerning offshore

drilling rigs, floating breakwaters and fishing nets are handled at the Ship Division, alongside the bread and butter work of testing super-tankers, trawlers and ferry-boats in model and mathematical form.

The total income for contract research is about \$240,000 a year, which absorbs about one-third of the available effort within the division, the remainder being financed by the government. The result of this form of financing gives a healthy balance between government and industry-sponsored research.

Rotating Cylinder

The advent of the supertanker has brought its crop of special problems such as manoeuvrability and keel clearance which will multiply when the million-ton supertankers take over from the 250,000-ton giants of today. The trend towards ever-larger vessels is keeping the research teams well occupied.

Among several major projects concerned with improving the safety and performance of supertankers is the rotating cylinder rudder. Conventional rudders are satisfactory for steering in open sea but as the number and size of ships increases, waters become relatively confined.

Normally a rudder cannot be turned through more than 35 degrees and still retain its effectiveness, a factor which militates against making really sharp turns. The addition of a rotatable cylinder at the leading edge of the rudder avoids stalling of the rudder and thus maintains its effectiveness at high angles.

In Emergencies

Trials on models at the Ship Division have shown that rudders fitted with this device can be effective when turned through 90 degrees. To achieve the best effect the device, driven by its own motor, is rotated at a speed greater than the water flow velocity. The assembly can be fitted to existing ships as well as new vessels.

The manoeuvrability of any ship is at its worst at low speeds but with large vessels particular problems are presented. As speed drops and manoeuvrability deteriorates — as in docking — the rotating cylinder can be switched on. It could also be used in emergencies at sea, such as when two ships are on a collision course and the situation has come to light almost too late.

There is every indication that a ship fitted with the device could practically turn in its own length.

The Ship Division's research vessel, the VIC 62, has been fitted with a rotating cylinder rudder and is undergoing trials near Southampton. Tables of cylinder sizes and rotation speeds are being worked out, so the shipbuilding industry can be advised on how to install it.

Ducted Propellers

Ducted propellers, another device, may be used to improve the propulsive efficiency of very large slow ships such as tankers and bulk carriers. Propellers of this type have been used on smaller vessels but the engineering uncertainties associated with very large units involved have delayed their introduction until recently.

The largest fixed unit afloat at present has a diameter of 9.4m and is fitted on a 251,000 deadweight ton tanker.

With the ducted propeller, there is no need for a rudder and it is possible to steer the ship by swivelling the duct. The ship can be steered with the screw running astern, an important safety feature not enjoyed by ships with conventional screws and rudders.

The design of ducted propeller units for large vessels is complicated by the irregular flow conditions at the stern of these ships. Work at the Ship Division is intended to shed light on this and on the propeller-hull interaction problem.

Cushion of Air

Plans are also afoot to fit the VIC 62 with a pneumatic device to blow air from underwater pipes. The technique will have application as a cushioning device to fend a ship off a quay while docking.

It may prove a practical proposition at busy quaysides to fit the device to the quay rather than the ships, so that all vessels tying up benefit from it.

When installed aboard ship, the air jets can also be used as manoeuvring devices. By venting at the stern on one side and forward on the other, the ship can be induced to turn. The effects of air jets have been demonstrated by Waertsila in Finland on the cargo ship Finncarrier built in 1969 on which an air injection system was installed to assist icebreaking.

To provide sufficient volume to carry the vast loads transported by bulk carriers and oil tankers, the principal dimensions of the ship must naturally be increased. Because of this, waterways in many parts of the world once considered deep in relation to the draught of ships are now considered shallow.

"Squatting" Problem

The problem is complicated by "squat", the tendency of a ship to sink deeper when underway in shallow water, reducing still further the clearance beneath the keel. Grounding can occur when the water depth exceeds the "at rest" draught of the ship.

Experimental and theoretical investigations at the Ship Division have been aimed at the prediction of squat of large full ships in order to provide information for ship's officers, naval architects and designers of ports and harbours and a method has been developed by which the underkeel clearance can be deduced with reasonable accuracy.

The Division's research is conducted in some of the best and most modern ship-model facilities in the world. At the main base at Feltham, near London, it has a 400-metre towing tank with a wavemaker and towing carriage capable of speeds of up to 15 metres per second.

Testing Models

The tank is used for testing models of all ship types, including high-speed craft such as fast patrol boats; and hydrofoils and hovercraft are also put through their paces to find their characteristics of resistance and propulsion.

At nearby Teddington, two older towing tanks are also in regular use. Until it outgrew its premises and moved to Feltham, the Ship Division was housed at Teddington. It was here that Sir Barnes Wallis did his dam-busting experiments and invented the bouncing bomb.

Other facilities include a square tank for seakeeping and manoeuvring experiments, two variable pressure water tunnels, a circulating water channel equipped for detailed flow and pressure measurements and a variety of smaller test rigs.

If there is a problem concerning hull resistance in either calm or troubled seas, propulsion devices, propeller vibration or manoeuvring, the Ship Division will try to solve it.

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SEA CADET CORPS NEWS

UNITED STATES OF AMERICA

Naval Sea Cadet Corps Observes 10th Birthday

The Naval Sea Cadet Corps (NSCC), an all-volunteer, youth-training organisation of young men 14 through 17, will observe its tenth anniversary this fall. Federally chartered in September, 1962, the Naval Sea Cadet Corps is jointly sponsored and administered by the Navy League and the US Department of the Navy.

After rigid mental and physical requirements have been met, the Sea Cadet recruits are given an opportunity to learn the ways of the Navy and Marine Corps. But they are in no way obligated to any of the Services. The Corps is not a recruiting programme. (If a Sea Cadet develops a true interest in the Navy, however, he can enlist as an E-3.) Patriotism, courage, self-reliance, and confidence are qualities which the Naval Sea Cadet programme develops. While some Cadets go on to lifetime careers in the Navy, others are sparked to scientific and scholarly pursuits fostering oceanic advancement.

The Naval Sea Cadet's training includes classroom training, a two-week summer programme, shipboard training and, on occasion, exchange programmes with allied countries. Sea Cadets are afforded the opportunity to study in various disciplines, including oceanography, construction, medicine, naval officers' preparatory courses, engineering aspects of avionics and nucleonics. In addition to the classroom and advancement-in-training programmes, extensive instruction is provided in water safety, military bearing, and Navy history customs and traditions. Cadets are also given presentations explaining both civilian and military career opportunities during special career counselling periods.

The activities and accomplishments of the Sea Cadets are varied and worthwhile. Indeed, the Navy League and the Navy share a deep pride in their Sea Cadets. In this, the tenth year of the NSCC, opportunities for advancement are unprecedented. The Corps has grown to 300 units with nearly 10,000 cadets and officers participating. It is an unusual opportunity to both educate and learn. For science, exploration, technology, jobs and adventure, the seas are a new frontier. Those who seek to join will be those who meet the challenge of sailing far into the future.

NEW SOUTH WALES

QUARTERLY REPORT OF PROCEEDINGS

This report is for the period 1 July to 30 September, 1972, and covers Continuous Training, Weekend Training and other activities carried out by the Naval Reserve Cadets in New South Wales.

Continuous Training was carried out at Snapper Island for 3 officers, 2 instructors and 50 cadets from the Sydney Grammar School Cadet Unit from 10 to 19 August.

Weekend training took place in the following HMA Ships:

HMA SHIP	DATES	NO OF PERSONNEL
BRISBANE	7-9 July	13
CRESWELL	7-9 July	25
SYDNEY	7-9 July	38
SYDNEY	14-16 July	38
BRISBANE	14-16 July	22
STALWART	14-16 July	35
STALWART	21-23 July	35
BRISBANE	21-23 July	13
VAMPIRE	21-23 July	9
SYDNEY	21-23 July	39
SYDNEY	28-30 July	50
VAMPIRE	4-6 August	9
BRISBANE	4-6 August	13
VAMPIRE	11-13 August	9
MELBOURNE	11-13 August	15
SYDNEY	11-13 August	38
BRISBANE	11-13 August	13
ANZAC	18-20 August	12*
ALBATROSS	1-3 September	34
CRESWELL	1-3 September	25
CRESWELL	8-10 September	25
SYDNEY	16-17 September	68

* All Cadet MEs who assisted with engine room maintenance.

TS PARRAMATTA was adjudged the Most Efficient Unit in New South Wales and was subsequently inspected by the Flag Officer Commanding East Australia Area, Rear Admiral W. D. H. Graham, CBE, on Saturday, 19 August.

The Senior Officer was a guest at a Mess Dinner given by the Air Training Corps on 1 July.

The Naval Reserve Cadet Force was represented by the Senior Officer at a Farewell accorded the Commander, 2nd Cadet Brigade upon his retirement. This function was held at Victoria Barracks on 3 July.

The Senior Officer attended the Education Week March of Cadets on 15 August.

Rear Admiral and Mrs Graham were Guests of Honour at a buffet dinner given by the Senior Officer and Officers held in HMAS WATSON on 19 August.

A meeting of all Chief Petty Officer Instructors and their Commanding Officers was held on 21 August to discuss the recent Navy Office letter which indicated that the rank of Chief Petty Officer Instructor was to be phased out from 1 January, 1973.

Cadets from TS WARREGO and TS PARRAMATTA formed a Guard at Garden Island on the occasion of Legacy Sunday, 27 August. The Guard was inspected by

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CADET CORPS NEWS

the Flag Officer Commanding East Australia Area. Rear Admiral W. D. H. Graham, CBE.

Over 200 officers, instructors and cadets attended the Annual Church Parade held at the Dockyard Chapel, Garden Island on Sunday, 17 September. Prior to the Church Service, a Guard and Divisions were inspected by Commodore H. J. Bodman. On completion of the Service, Commodore Bodman took the salute as the Parade marched past.

At the Annual General Meeting of the New South Wales Division of the Navy League of Australia, held on the 29 August, the Senior Officer was elected to the Executive Committee. The Senior Officer was elected State President of the Navy League of Australia on 19 September.

During the period under review Boards were convened, in HMAS WATSON, on five occasions to determine the suitability of candidates for either appointment or promotion.

The strength of the New South Wales Division is at present:

Staff Officers	4
Officers	25
Instructors	32
Cadets	417

TOTAL 478

L. MACKAY-CRUISE,
Commander, RANR,
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TASMANIA

STORMY FOR SEA CADETS

Are the men and equipment on TS MACQUARIE good enough?

The organisers of this sea cadet unit were stirred recently by suggestions that neither instructors nor their 87ft ex-Mt Lyell ketch, Reginald M, matches up to required standards.

There has also been doubt thrown on the railway station as a headquarters because of the lack of indoor parade facilities.

However, the unit's commanding officer, Mr R. C. Boyd, said the unit was unrecognised and his men would be out to prove their worth.

Mr Boyd had extensive service in three wartime navies and had the rank of able seaman.

Mr R. R. Wells, a first lieutenant, also had extensive war service and has extensive knowledge of the waters of Macquarie Harbour.

Mr W. Black, a chief bosun's mate, also had extensive wartime naval experience.

Mr R. J. Smyth, a petty officer, has 23 years' sailing experience, including a national title, served in the RAN, and spent eight months on the CSIRO research vessel Derwent Hunter.

Mr M. Ross, a coxswain, has years of sailing experience and Mr M. Finlater, an engineer, has extensive naval experience and is a marine engine expert.

Swimming instructor will be Mr P. Devine, a former Australian champion.

The Rev L. Farrier, one of the appointed chaplains, has 26 years' experience as a master fisherman.

Mr M. Minchin, an accountant at Zeehan, has been appointed sailing master.

He has sailed a cutter from England to Australia with a stopover in the West Indies, where he crewed on a 200ft schooner.

He has sailed since he was a boy, taught himself navigation and has his own 30ft yacht in Hobart.

Mr Boyd considers his officers' qualifications to be equal to the task of training the 50 sea cadets now signed up.

He also considers the boat and headquarters to be the finest anywhere although months of hard work are needed to renovate the ship.

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JOIN THE AUSTRALIAN SEA CADET CORPS

If you are between the ages of 13 and 18 years

The Australian Sea Cadet Corps is a
voluntary organisation administered
by the Commonwealth Naval Board
and The Navy League of Australia.

The aim of the Australian Sea Cadet
Corps is to provide for the spiritual,
social and educational welfare of boys
and to develop in them character, a
sense of patriotism, self-reliance,
citizenship and discipline.

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
afternoons 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
Sea Cadets in Naval Establishments,
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 Divisional Senior Officer in your State, using the
Form provided below.

Senior Officers, Australian Sea Cadet Corps

NEW SOUTH WALES: Staff Office Cadets, H.M.A.S.
Watson, Watsons Bay, N.S.W., 2030.

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WESTERN AUSTRALIA: C/- 182 Coode St., Como, 6152.

SOUTH AUSTRALIA: C/- Box 1529M, G.P.O., Adelaide,
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NORTHERN TERRITORY: Mrs. V. M. Slide, 12 Allen
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TO: The Senior Officer.
Australian Sea Cadet Corps

I am interested in joining the Australian Sea Cadet Corps and would be
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Please address your envelope to the Senior Officer in your State or Territory
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The two Mark 3 corvettes designed and built by Vosper Thornycroft Limited for the Nigerian Navy have been completed and the first, **NNS Dorina** handed over. The second vessel, **NNS Ootoba**, is due to be handed over later in 1972 followed by a dual commissioning. **Dorina** has completed her trials programme, which included functional testing of the armament and weapon control system, and **Ootoba** is at present carrying out a similar programme. The order for these two ships, which was placed with Vosper Thornycroft in 1969, was then valued at about \$8 million.

The two ships are the first to be built to the Vosper Thornycroft Mark 3 design for a 600-ton corvette. The layout and armament, which are the same in each of the two vessels, has been designed to the specific requirements of the Nigerian Navy. These were for practical sea-going corvettes with a good top speed and cruising radius, capable of engaging air and surface targets. There was to be provision for fitting anti-submarine weapons and detection equipment later if required. Account was to be taken of the conditions imposed by the ships being based in Lagos, and operating in the long Atlantic swells as well as the tropical environment of Nigerian coastal waters.

As completed for the Nigerian Navy these two ships displace 650 tons each, with a length of 202ft overall, and draught of 11ft. The propulsion machinery consists of two MAN diesel engines driving twin screws to give a top speed of 23 knots and a cruising range of 3,500 nautical miles at 14 knots.

Armament

The main gun armament of the new Nigerian corvettes is a MOD(N) Mark 19 twin 4in mounting forward, directed by a Hollandse Signaalapparaten M22 fire control system giving automatic direction against either air or surface targets. The successful marriage of this advanced control system with the well tried and readily available Mark 19 manually loaded gun is one of the most interesting features of the new corvettes. The HSA fire control system incorporates both search and target tracking radars, with stabilised aerials enclosed in a radome at the mainmast head.

Corvettes for Nigeria

The remaining guns are two 40mm L/60 Bofors mountings aft, and two MOD(N) Mark 7A 20mm cannon, one on either beam. Two Mark 5 2in rocket flare launchers for target illumination are also fitted.

Long range air and surface warning is by a Plessey Type AWS1 radar. An optical sight on the open bridge provides visual target information to the fire-control system, or alternatively can be used to aim the 4in mounting by remote control.

The corvettes' design allows the retrospective fitting of sonar and anti-submarine weapons should a requirement for ASW capability arise later.

Operations room

The operations room, which is housed in the port side of the superstructure below the bridge, next to the Admiral's and Commanding Officer's living quarters, accommodates the radar displays and plotting equipment for target acquisition and tracking, and is the centre for operation of the ship's armament in action.

Navigation and communication

Decca TM626 true-motion radar is fitted, with duplicate displays in the chartroom and operations room. There is also a Marconi Lodestar direction finder, Kelvin Hughes MS 32 F echo sounder, AGI electro-magnetic log, and Arma-Brown gyro compass with repeaters.

The radio room accommodates transmitters and receivers for ship-to-ship, ship-to-shore and ship-to-air W/T and voice communications, and a teleprinter. There is provision for some of the equipment to be controlled from a communication position on the bridge when necessary.

Main and auxiliary machinery

The two main propulsion engines are MAN Type V8V 24/30B diesels driving twin fixed pitch propellers, and are rated at 3,940 bhp (maximum continuous) at 950 rev/min with a sprint rating of 4,430 bhp at 988 rev/min for 30 minutes.

There is general access space around the engines in the main machinery space. Each engine has a pneumatically controlled hydraulic clutch connecting it to its own gearbox which incorporates a reverse drive at a ratio of 2.64:1.

The engines are air-starting and there is a donkey engine with its own compressor which can provide starting air if the main supply fails. Electrical power is supplied by three 176-kW MAN R8V 16/18T diesel alternator sets, which are accommodated in a separate generator room. There are three supply voltages: 440v 60Hz 3-phase ac, 115v 60Hz 3-phase, and 24v dc, the last being mainly for electrical control circuits and instrumentation throughout the ship. Two of the diesel alternator sets also drive air compressors which serve the air conditioning, engine starting and other pneumatic systems. A 2kW air-cooled diesel generator set produces a 115v single-phase emergency supply for the radio equipment.

Main engine and generator spaces are laid out for unmanned operation, starting, stopping and monitoring of the operation of propulsion and generating plants being carried out from the ship's control centre, which is on the main deck aft. Bridge orders are communicated to the control centre by push-button telegraph, and emergency control of the main engines is from positions in the engine room, commands coming through the internal communications system.

Evaporators for a daily output of 12 tons of fresh water are installed and there is storage capacity for 20 tons. Fuel tanks can hold a total of 68 tons, with provision for refuelling at sea.

A Vosper electro-hydraulic steering system is fitted, with twin rudders linked mechanically. Duplicated electric motor-driven pumps provide hydraulic power for the rudder actuators, and there is an emergency hand pump for manual steering. The electrical control system provides for steering by autopilot, or by a bang-bang wheel control.

Vosper non-retracting fin stabilisers are fitted to reduce rolling in the interests of providing a stable weapon platform, improved performance in a seaway, and greater

CORVETTES FOR NIGERIA

comfort for the crew. Two electric hull and fire pumps, one each in the main and generating machinery spaces, supply a fire main with hose coupling points throughout the ship. Magazines have seawater spraying and quick-flooding valves.

A planned maintenance scheme has been prepared for the two corvettes by the Vosper Thornycroft Support Services department. This provides for the regular servicing and maintenance of all machinery and equipment. The ship's engineering office has a progress board showing the maintenance status of major items, and the maintenance files are also kept there. There is a workshop aft, on No 2 deck.

Accommodation

The ship is divided into 12 watertight compartments.

Air-conditioned accommodation is provided for an Admiral (so either corvette can act as flagship), Captain, six officers, 13 senior and 46 junior ratings. Working spaces also are air conditioned. Generous head-

room has been provided throughout the living and working spaces.

The Captain has a day cabin, sleeping cabin and toilet, separate from the Admiral's combined sleeping and day cabin with its own toilet. Officers are accommodated in two single cabins and one four-berth cabin and share a large wardroom. Ratings sleep in bunks on their messdecks, adjacent to the galley, and each has his own locker.

The coxswain's office also acts as a sickbay and contains the switchboard for the shore telephone equipment. The ship's office controls the sound reproduction equipment for ship's entertainment and public address system. There is also an Engineer's office and a separate Damage Control HQ.

The two Nigerian corvettes are good examples of a type of warship which combines an effective armament under modern automatic fire control, with robust simplicity in operation and maintenance. Costing about a quarter of the price of a modern frigate, they can carry out many of the frigate's duties, ranging from the fully operational role to training and ceremonial functions.

NNS DORINA AND NNS OTOBO

Dimensions

Length overall — 202ft
Length between perpendiculars — 185ft
Beam moulded — 31ft
Depth moulded — 18ft 6in
Draught over propellers — 11ft

Performance

Maximum continuous speed — 22 knots
Sprint rating (1/2 hour) — 23 knots
Range at 14 knots — 3,500 nautical miles

Armament

MOD(N) Mk 19 twin 4in gun mounting — 1
Bofors L/60 40mm gun — 2
MOD(N) Type Mk 7A 20mm gun — 2
2in Mk 5 rocket illumination launcher — 2

Target identification and tracking equipment and radars

Hollandse Signaalapparaten M22 fire-control system; Plessey Type AWS1 long-range air and surface warning radar; Decca Type TM626 true-motion radar.





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The principal objective of the Navy League of Australia is to stress the vital importance of Sea Power to the Commonwealth of Nations and the important role played by the Royal Australian Navy.

The League, in conjunction with the Commonwealth Naval Board, administers the Australian Sea Cadet Corps, by providing finance and technical sea training for boys who intend to serve in the Naval or Merchant Services, also to those sea-minded boys, who do not intend to follow a sea career, but who given this knowledge will form a valuable reserve for the Naval Service.

We invite you to swell our ranks and so keep up to date with Maritime Affairs to help to build an ever-increasing weight of informed public opinion. The Navy League will then become widely known and exercise an important influence in the life of the Australian Nation.

The League consists of Fellows and Associates. All British subjects who support the objectives of the League are eligible for membership. Members receive copies of the League's magazine "The Navy".

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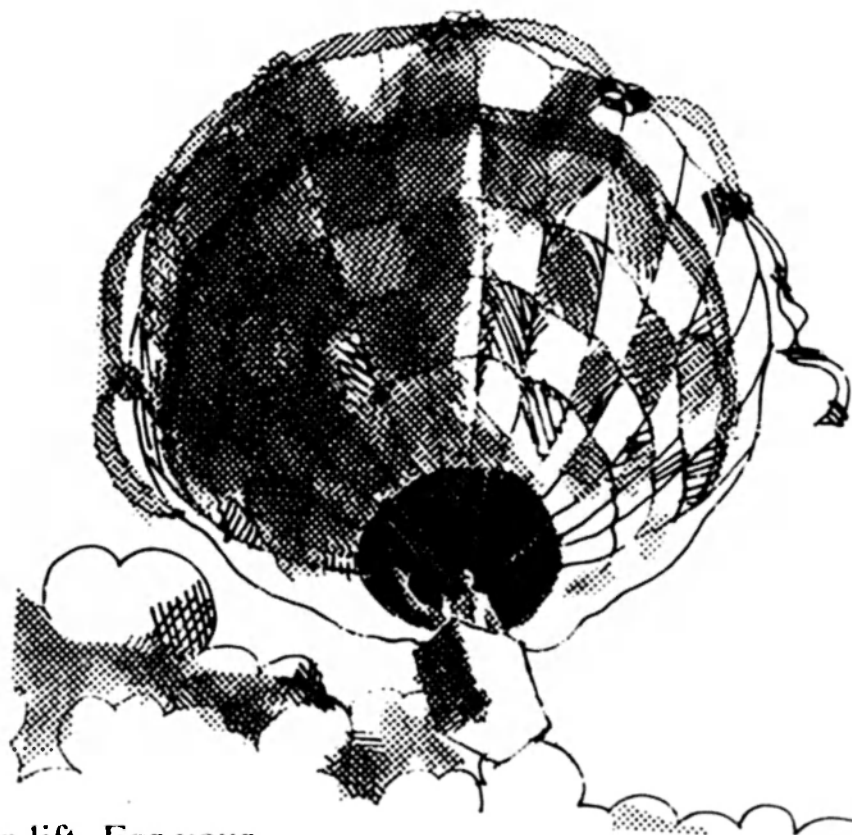
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