JANUARY–FEBRUARY 1961

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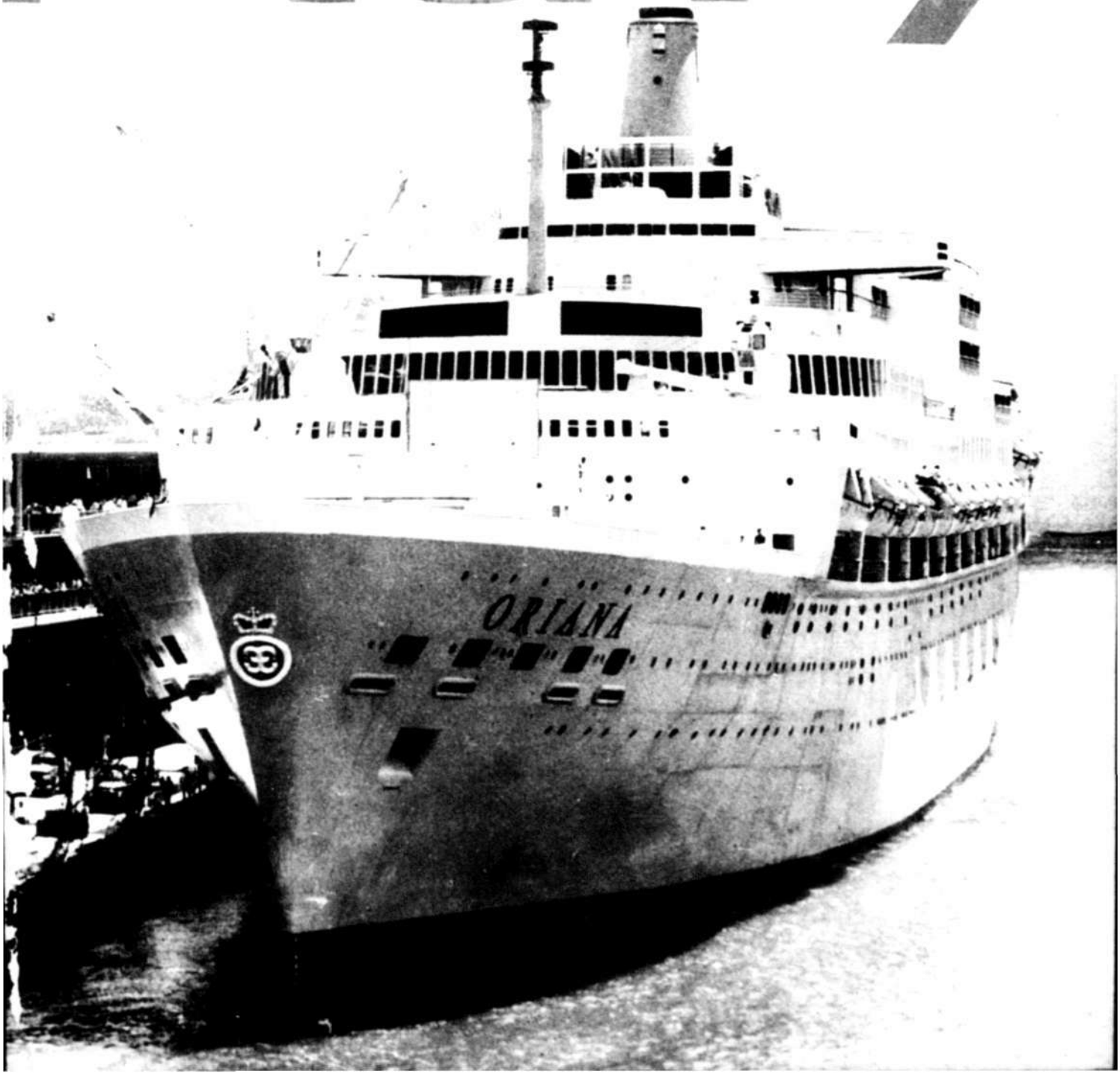
# THE Navy



# THE NAVY

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# NAVY APPRENTICES— CAN THEY EAT!!

In one term of just over 5 months, the 350 apprentices under training at H.M.A.S. NIRIMBA consumed 21 pigs, 25½ oxen, 75 lambs, 77 sheep and many tons of chicken.

They also consumed 32,000 loaves of bread, over 5 tons of butter, 36,000 pounds of potatoes, 380,000 eggs and drank 9,800 gallons of milk.

The cost of victuals for these young men is estimated to be about £14,000 a term.







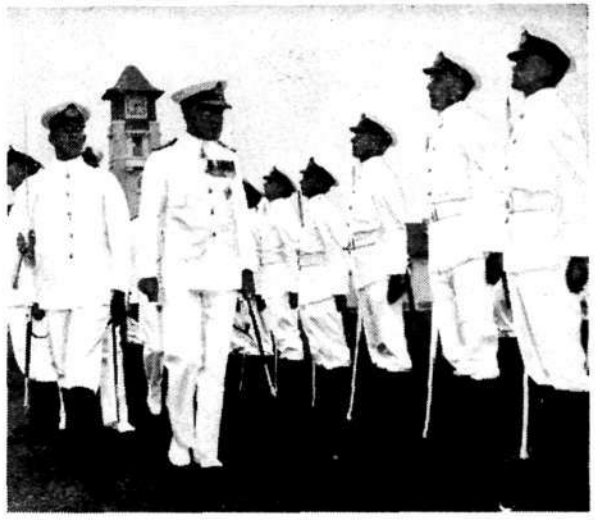


# GRADUATION CEREMONY AT R.A.N. COLLEGE

☆

*A new era— last Graduation Parade under present system of training*

☆



**Vice-Admiral Sir Henry Burrell, K.B.E., C.B., Chief of Naval Staff, inspects the Guard of Honour.**

ON the 15th December, 28 young men, including three from New Zealand, graduated from the Royal Australian Naval College at Jervis Bay.

They were the last to graduate under the present method of training, for, on the first of January, 1961, a new system for the training of Junior Officers of the Royal Australian Navy will come into force.

The new system has been dovetailed to fit in with the new training schedule introduced in the Royal Navy.

It varies from the present scheme in two principal features:

These are:

(1) The introduction of 12 months' sea time, as midshipmen in the fleet, after graduation from the Royal Australian Naval College, and before proceeding for advanced training at B.R.N.C. Dartmouth and R.N.E.C. Manadon.

(2) An extension of the college course by eight months, to permit a higher degree of academic training essential as a basis for subsequent advanced courses and also, to provide sufficient professional training to ensure that the young officers will derive full benefits from their time at sea as midshipmen in the fleet.

### Entry

The new scheme is:

There will continue to be an annual entry in January each year for "normal entry" and "matriculation entry" cadets. For the present there will be no variation in the conditions of entry.

### Training

(1) At R.A.N.C. — Cadets will undergo a course of three years and eight months (normal entry) or one year and eight months (matriculation entry) at the Naval Colege to introduce them to the ways of the Navy and to prepare them for further professional and academic training.

This course will be common to all specialisations, and will include short periods at sea in the training ship.

(2) In the Fleet — On graduation from the Royal Australian Naval College, cadets will be appointed as midshipmen in H.M.A. Fleet for 12 months where they will live in the wardroom.

They will be expected to play their full part in the life of the ship.

At the end of this year there will be Fleet Boards for examinations in seamanship and for certificates of competence which officers of all specialisations must take.

**United Kingdom Training**

Training in the United Kingdom:

(A) Seamen and Supply Officers — On leaving the Fleet, seamen and supply officers will go to Dartmouth and begin a year of academic study with special attention to mathematics and physics.

In the following year, seamen officers will be given professional courses and will then return to Australia for appointment to the Feet to gain their watchkeeping certificates.

Supply Officers, after a short course on naval equipment and a course in supply duties, will return to Australia for appointment to the Fleet in complement billets.

(B) Engineer and Electrical Officers — On leaving the Fleet, *Engineer and Electrical* Officers will go to Manadon, where, if qualified, they will start a three-year degree course in engineering.

If not qualified for a degree course, they will start a three-year course leading to graduate membership of one of the professional institutions.

These three-year courses will probably be followed by a year's application course in naval equipment, after which officers will return to Australia for appointment to the Fleet.

The practicability of selected seamen and supply officers completing a degree at an Australian University at a later date is under investigation by the Naval Board.

**Ranks During Training**

At R.A.N.C.: Cadet Midshipmen.

*In the Fleet: Midshipmen.*

Courses in U.K. (first two years): Acting Sub-Lieutenant.

# JERVIS BAY CEREMONY

**Midshipman Adrian Needham of Barcaldine, Queensland, shown with friend after the passing out ceremony.**

Parents and friends of the graduates came from all over Australia, including the Northern Territory and Western Australia, to witness the ceremony.

*Three families also came from New Zealand.*

Among the official guests were the High Commissioner for New Zealand and the Naval Attaches from the United States, Indonesia and New Zealand.

After the prizegiving the guests were entertained to afternoon tea.



# *Prize presentation at Royal Australian Naval College*

**ADDRESS BY THE CHIEF OF THE AUSTRALIAN NAVAL STAFF, VICE ADMIRAL SIR HENRY BURRELL, K.B.E., C.B.**

ON the conclusion of the Graduation ceremony, at which the salute was taken by the Chief of Naval Staff, because of the unavoidable absence of the Governor-General, His Excellency the Right Honourable Viscount Dunrossil, P.C., G.C.M.G., M.C., K.St.J., Q.C., Vice Admiral Sir Henry Burrell presented the prizes to the successful midshipmen.

At the conclusion he addressed these words to the young officers, their relatives and friends who were present:

I congratulate the Captain on his annual report and the ceremonial of today. To those who have won prizes — I say "well done" — if it is any satisfaction to the losers, I *didn't win a prize* — but caught up later on.

**Queen's Medallist**

To the Queen's Medallist — Cadet Mid. M. B. Forrest — I congratulate him — he is entitled to feel proud of his high achievement.

We all regret the indisposition which prevented His Excellency the Governor-General from attending this Graduation. Graduation is a major event in College life — a milestone. Since 1916 a succession of Governors-General and distinguished men have taken the salute and made the Graduation Address. Occasionally the honour has fallen to a Naval Officer. This year the honour and privilege is mine. It is a very proud moment for me. When in January, 1918, as a very shy boy with short trousers and an Eton collar I stepped out of a decrepit bus here, I had no thoughts that such a day as this could be anything but a miracle.

I must comment on the expression on the face of your Captain. He goes to sea next year — and deserts his family. I'm sure Mrs. Ramsay is an understanding wife — my wife used to say: "Don't pretend to look miserable — look pleased — we'll make out."

**Nelson Relics for College**

The Royal Australian Navy has been singularly fortunate. The Royal Navy greatly assisted our birth and over the years has helped us, without many "thank you." in innumerable ways. But from them we inherited the great traditions of the Royal Navy — which includes that of the immortal Lord Nelson. He was THE master — from grand strategy to tactics down to man management. The day after I was deposited here in all my ignorance and in a black shirt and a new smelly pair of "jeans" we were hailed before our Captain — Captain Duncan Grant, Royal Navy. A few years ago, the widow and sons of this same Captain Grant presented to the Royal Australian Navy two very interesting and invaluable relics of Lord Nelson.

The first — this Navy List of 1796, in which Nelson's name appears as the Captain of AGAMEMNON and later in the List as a Captain of

the Navy and Colonel of Marines, was the property of Captain Grant's uncle, the late Admiral Sir Percy Grant, K.C.V.O., C.B., who was the First Naval Member of the Commonwealth Naval Board from 1919 to 1922.

The second item, which belonged to Captain Grant, is this Pendant Board — issued for the identification of ships at the Battle of Trafalgar. It is addressed to Edward D. King, Esq., Captain of Her Majesty's Ship ENDYMION, and is signed "Nelson and Bronte — given under my hand on board the VICTORY off Cadiz 1st October, 1805."

When these relics were presented to the R.A.N., arrangements were made for them to be displayed temporarily in the Museum of the Australian National War Memorial in Canberra. I now feel, and the Director of the War Memorial has agreed, that the time has come when these two articles of such great naval interest should be entrusted to the care of the College.

I have great pleasure now, on behalf of Mrs. Duncan Grant and her sons, in handing these articles to your Captain, and I am sure they will be a source of great interest to you and to future generations of cadets — guard them well, Captain — perhaps the guests may have an opportunity to see them at close quarters after the prizegiving.

My remarks which follow are addressed to you young gentlemen who have graduated today. You might think it easy for me to tell you the secrets of success. I did not consciously use a set formula — on the other hand I'm not prepared to say it was all good luck. My advice would be — get on with the job you are given, perform it to the best of your ability and let the future look after itself. You will forgive me, I trust, if I use the first personal pronoun from time to time. I can only hope that some odd remark of mine might help you on your way — perhaps in one of the many moments of decision which are before you.

Our last Governor-General used as his theme at a graduation at Flinders Naval Depot — "speak up," "own up" and "shut up" — an excellent piece of advice and core for a graduation speech. My theme will be even simpler — I think the greatest factor required by a naval officer is simply COMMONSENSE. You may possess it — if you do — keep applying it. Anyway, let it take an important part in your consideration — before coming to a decision or giving an order. What is seamanship?—nothing but COMMONSENSE applied to the ways of the sea.

### Need for a Navy

I haven't time to give you a long discourse on the Navy and sea power. That there will be a need for a Navy for generations is obvious. It is sound strategy to meet an enemy as far from Australia as possible — that means long lines of sea communications. As an island, our economy depends on sea transport. I need not develop that further. Nor is it appropriate for me to tell you of all the Naval planning for the future. Suffice for me to say that you will take your place in a Navy with a future — it will become more technical every year — but the training throughout the Navy will be adjusted to keep pace. I've often said to myself — this is beyond me — then I have thought, other B.F.'s have managed to do it — why shouldn't I? In the event my initial appreciation had been wrong. You do not know your powers until you try. I'll shoot a line for a moment — I wanted to be a navigator — so obviously a first-class pass during Sub's courses was essential. In my spare time, I went through the last 12 examination papers and went into the exam. confident. I came top of the class — the others may have had more grey matter — but I worked harder. COMMONSENSE.





Before very long, you will find yourself Midshipmen in Her Majesty's Forces.

You will be in a delicate and interesting state and receive your first tests in responsibility — you will be an officer yet still learning your profession — the ways of the sea, the intricacies of ships of war and the ways of ratings — but your career will not be ruined due to lapses in your snotty's time. You will be sent away in charge of a boat with a Petty Officer who knows more than you do. This will test your tact and commonsense. You recall the story of the Snotty in charge of a motor boat who rammed and smashed the flagship's ladder. The Captain received a message from the Admiral — "Your Mid lost his head and smashed my ladder." The Captain replied: "Am sending three shipwrights to mend the ladder — please return my Midshipman's head."

By the time you are Sub-Lieutenants and receive the Queen's Commission you will be on your own, fully responsible for your actions — technically you will know a lot — at long last becoming the master of material things — but the real strength of material things lies in the men who bring them to life: their loyalty, their initiative, their courage, their devotion to duty, their enthusiasm, their self-discipline and their leadership. The degree to which you develop these characteristics in your men and yourself is the real test of an officer — it is from them — or lack of them — that your associates will estimate you and your seniors mark you, and on them your career depends. They were good in Robin Hood's day — in Nelson's day — and will be good in your day. I'm trying to say — it is character which counts.

There is no such thing as a bad ship's company, unless the officers are bad. The Australian rating is the finest in the world — but you must get to know him if you are to know how best to lead him.

I can but hope you will all develop into good leaders — but you'll need to think about it — and remember that leadership must go hand in hand with knowledge.

The tone of any Navy is taken from its officers.

Your men will look to you for leadership from the moment you step over the side.

There is no royal road to leadership. You must set the example — learn by living with your men, thinking with them and if the occasion should demand, fighting with them.

As you get older and more experienced you will lead: a boat's crew; a gun's crew; a division; a ship's company; or a fleet.

Becoming a leader is the work of a lifetime. If acquiring the art is postponed until great responsibilities come to you, then it will be too late and you will be found wanting.

I was put in charge of the turret's crew in a new 8 in. cruiser — I was given a Drill Book, an ordnance and an (L) artificer and 80 men — I studied the turret, the drill book, the hydraulics, the fire control arrangements and so on and in a few days started training the crew — first one part at a time till we were ready to try out the complete outfit — it then dawned on me that I was the officer of the Turret — not because I had two stripes on my arm — but because my accumulated knowledge was more than any other individual in the Turret.

Come Admiral's inspection, I talked my gun's crew into being the best in the ship. There were a lot of oil leaks, but we decided to enamel the inside of the turret. How could we get the enamel to dry? We kept mopping up the oil while the enamel was put on — and

**Midshipmen who graduated from the R.A.N. College last December will, like the midshipmen depicted above, have to learn every job in the ship before their four months' training cruise is completed.**

kept watches at night to keep the oil under control until the enamel set. I joined in and with two other ratings mopped from midnight to 4 a.m. — others joined in, and on inspection day there was no doubt we won handsomely. That gun's crew never looked back.

### The R.A.N. of the Future is in your Hands

Once when a Lieutenant, on leaving a ship, I was criticised by a senior officer for being too familiar with the ratings. Stated like that, I should have amended my ways. I didn't. I was quite happy in my own mind that "familiar" was not the right word. I was sure I knew more about the ratings in my part of the ship (and they knew more about me) than any other divisional officer. You cannot attempt to be a leader if you don't know how your ratings think — what problems they have — how best you can help them.

Another occasion when I had four stripes and was in command of a big ship, we had been refitting and my ship was due to sail on a certain day. My Commander was very able and enthusiastic — but in my judgment he was working the ship's company too hard. I sent for him and said: "Give a make and mend tomorrow, Commander." He replied: "But, sir, the ship has to be ready to sail next Monday." I said: "Maybe, but give a make and mend tomorrow." That unexpected make and mend did the ship more good than I can tell you — by the harder work of the ratings, the ship was ready to sail. COMMONSENSE, if you like. Remember in your man management that ratings are intelligent, normal human beings living in cramped quarters and many of them working at irregular times. If your men only work because of the threat of punishment, you are not a good leader. When it comes to punishments, the entire ship's company knows whether a man is guilty or not — you musn't make a mistake. There are always some so-called "bad hats," but don't be misled — in an emergency you will find it is often the "bad hats" who are the source of your greatest strength.

I make two personal pleas: one — write home as frequently as you can — parents deserve to share in the interesting life you will lead. I was not very good in my early years and I now regret it. The other is matrimony — don't rush into it. When you do decide to get down on your knee and say your piece, don't paint too rosy a future to your prospective wife; include something about a Naval husband being away for months on end and his wife pushing a pram with one hand and a mower with the other.

Remember, the Royal Australian Navy is but one of our Defence Services — get to know the Army and the Air Force — they are full of good chaps — we are but one side of the triangle.

My time has long run out and I could go on talking to you for hours. My advice to you is to let COMMONSENSE prevail — whether it is handling a ship in a gale or handling a ship's company.

Realise, too, that wherever you or your ship goes you represent Australia and the Australian way of life. Be proud of your country. You have joined a wonderful profession — you won't die rich in worldly goods but you will have a full life, full of riches which money could not buy. Mix your work and your fun in the right proportion.

The Royal Australian Navy has been waiting for you.

On many a quarterdeck of Her Majesty's ships is enscrolled: "Fear God, Honour the Queen" — ponder over it — it means much.

I can but conclude: Good luck and God bless you.





# *Prize Winners at the R.A.N.C. Graduation*

**Cadet Captain P. T. Purcell, R.A.N.**
Dux of 1958 Normal Entry; First Prize in Chemistry; Second Prizes in Mechanics, Physics, Navigation and English Literature.

**Cadet Midshipman M. G. Harvey, R.A.N.**
Dux of 1960 Matriculation Entry; First Prize Mathematics for Matriculation Entry.

**Cadet Midshipman D. J. Thornton, R.A.N.**
First Prizes in Mechanics, Physics and English Literature; Second Prize in Mathematics.

**Cadet Captain I. E. Pfennigwerth, R.A.N.**
First Prizes in English Expression and Current Affairs; Second Prize in Seamanship.

**Cadet Midshipman T. B. Wise, R.A.N.**
First Prizes in Science and Naval History for Matriculation Entry; First Prize in Navigation (New Zealand Naval Board Prize).

**Cadet Captain K. R. Moen, R.N.Z.N.**
First Prize in French; Second Prize in Engineering.

Cadet Midshipman R. A. Howland, R.A.N.
First Prize in Mathematics.

**Cadet Midshipman J. M. Halliday, R.N.Z.N.**
First Prize in Seamanship (Otto Albert Memorial Prize).

**Cadet Midshipman J. A. Bate, R.A.N.**
First Prize in Engineering.

**Cadet Midshipman B. G. Draper, R.A.N.**
First Prize in History.

**Cadet Midshipman A. Needham, R.A.N.**
Second Prize in English Expression.

**Cadet Midshipman C. J. Skinner, R.A.N.**
Dux of Second Year (Eric Elton Mayo Memorial Prize).

**Cadet Midshipman J. Staples, R.A.N.**
Dux of First Year.

**SPORTING AWARDS**

**Governor General's Cup** (Best All-round Athlete):
**Cadet Captain R. D. Lamb, R.A.N.**

Burnett Cup (Rugby):
**Chief Cadet Captain M. B. Forrest, R.A.N.**

Farncomb Cup (Cricket):
Cadet Midshipman D. J. Thornton, R.A.N.

**Prize-winning cadets of the Royal Australian Naval College look pleased with themselves. The cadets are: Cadet Midshipman D. J. Thornton, Chief Cadet Captain M. B. Forrest, the College Dux, who won the Queen's Medal and Burnett Cup and Cadet Captain P. T. Purcell.**

# MONTHLY LIST OF INTERESTING HISTORICAL DATES

*Every month this year "The Navy" will publish a similar list of important actions of the Second World War.*

## JANUARY

### 1st

**1941** H.M.A.S. VOYAGER assists in bombardment of Sollum.

### 2nd

**1942** First large-scale reinforcements to New Guinea Convoy escorted by AUSTRALIA, CANBERRA, PERTH. H.M.S. ACHILLES arrives safely at Port Moresby
Manila and Cavite fall (Manila occupied).

**1943** Buna Government Station captured by 127th Inf. Allies occupy Buna.

**1944** Landing at Saidor. H.M.A.S. ARUNTA and WARRAMUNGA in covering force.

### 3rd

**1941** H.M.A.S. VOYAGER assists in bombardment of Bardia.

**1945** Occupation of Akyab Island. H.M.A.S. NAPIER and NEPAL present.

3rd Fleet strikes on Nansei Shoto, Formosa and Luzon.

Marinduque Island landing by elements 21st Inf.

Bombardment of Lingayen Gulf. H.M.A.S. SHROPSHIRE, ARUNTA, WARRAMUNGA, AUSTRALIA, MANOORA, KANIMBLA, WESTRALIA, survey ships and minesweepers of R.A.N. take part.

H.M.A.S. AUSTRALIA damaged by aircraft.

### 4th

**1945** 3rd Fleet strikes on Nansei Shoto, Formosa and Luzon.

Bombardment of Lingayen Gulf. H.M.A.S. SHROPSHIRE, ARUNTA, WARRAMUNGA, AUSTRALIA, MANOORA, KANIMBLA, WESTRALIA, survey ships and minesweepers of R.A.N. take part. H.M.A.S. AUSTRALIA damaged.

### 5th

**1942** U.S.F.I.A. became U.S.A.F.I.A.

**1945** 3rd Fleet strikes on Nansei Shoto, Formosa and Luzon.
Bombardment of Lingayen Gulf. H.M.A.S. SHROPSHIRE, ARUNTA, WARRAMUNGA, AUSTRALIA, MANOORA, KANIMBLA, WESTRALIA, survey ships and minesweepers of R.A.N. take part.

### 6th

**1942** Invasion of Borneo.

**1945** Bombardment of Lingayen Gulf. H.M.A.S. SHROPSHIRE, ARUNTA, WARRAMUNGA, AUSTRALIA, MANOORA, KANIMBLA, WESTRALIA, survey ships and minesweepers of R.A.N. take part.

### 7th

**1942** HOBART joins R.A.N. Force at Batavia.

**1945** 3rd Fleet strikes on Nansei Shoto, Formosa and Luzon.

### 8th

**1945** 3rd Fleet strikes on Nansei Shoto, Formosa and Luzon.

### 9th

**1945** H.M.A.S. VENDETTA bombards Danmap River (Aitape Area).
3rd Fleet strikes on Nansei Shoto, Formosa and Luzon.
6th Army invaded Luzon, U.S. Forces land on Luzon.

### 10th

**1942** Invasion of Celebes.

### 12th

**1945** 3rd Fleet struck Indo-China and China Coasts, Formosa and Nansei Shoto.

### 13th

**1941** H.M.A.S. STUART among destroyers in carrier screen in air search of coast of Cyrenaica.

**1945** 3rd Fleet struck Indo-China and China Coasts, Formosa and Nansei Shoto.



### 14th

**1945** 3rd Fleet struck Indo-China and China Coasts, Formosa and Nansei Shoto.

### 14th-24th

**1943** Casablanca Conference. Conference named "The Unconditional Surrender."

**1945** Carrier-borne attacks on oil refineries at Palembang, Sumatra, carried out by British East Indies Fleet.

### 15th

**1945** 3rd Fleet struck Indo-China and China Coasts, Formosa and Nansei Shoto.

Camotes Islands cleared by elements 7th Inf. Div.

### 16th

**1944** Sio on Huon Peninsula captured by elements 9th Aust. Division.

**1945** 3rd Fleet struck Indo-China and China Coasts, Formosa and Nansei Shoto.

Camotes Islands cleared by elements 7th Inf. Div.

### 17th

**1945** 3rd Fleet struck Indo-China and China Coasts, Formosa and Nansei Shoto.

Camotes Islands cleared by elements 7th Inf. Div.

Fall of Warsaw.

### 18th

**1943** Sanananda captured by 18th Aust. Bde. (7th Div.).

**1945** 3rd Fleet struck Indo-China and China Coasts, Formosa and Nansei Shoto.

Camotes Islands cleared by elements 7th Inf. Div.

### 19th

**1945** 3rd Fleet struck Indo-China and China Coasts, Formosa and Nansei Shoto.

Camotes Islands cleared by elements 7th Inf. Div.

### 20th

**1942** Arrival at Singapore — BALLARAT, TOOWOOMBA and WOLLONGONG.

**1945** 3rd Fleet struck Indo-China and China Coasts, Formosa and Nansei Shoto.

Camotes Islands cleared by elements 7th Inf. Div.

### 21st

**1941** H.M.A.S. STUART and VAMPIRE patrolling off Tobruk intercept Italian schooner SAN DIEGO, which was sunk by VAMPIRE'S gunfire.

**1945** H.M.A.S. NAPIER with 7th Destroyer Flotilla takes part in engagement off Burma Coast.

3rd Fleet struck Indo-China and China Coasts, Formosa and Nansei Shoto.

Camotes Islands cleared by elements 7th Inf. Div.

Tarlac captured by 40th Inf. Div.

### 22nd

**1941** Tobruk captured.

**1942** Battle of Macassar Straits.

**1943** H.M.A.S. PATRICIA CAM bombed and sunk, Wessel Isl.

Last organised Jap resistance Buna-Gona area ended.

**1945** 3rd Fleet struck Indo-China and China Coasts, Formosa and Nansei Shoto.
Camotes Islands cleared by elements 7th Inf. Div.

### 23rd

**1941** Tobruk captured by British. All Australian destroyers have been prominent in the Tobruk Ferry Service, including H.M.A.S. WATERHEN, STUART, VOYAGER, VAMPIRE, VENDETTA, NAPIER, NORMAN, NESTOR, NIZAM and PARRAMATTA.

**1942** Rabaul seized.
Japanese landings in the Solomon Islands.

**1943** British capture Tripoli.

**1944** Shaggy Ridge in Finisterre Range N. of Dumpu cleared by 18th Aust. Bde. (7th Div.).

**1945** Camotes Islands cleared by elements 7th Inf. Div.

### 24th

**1942** Japanese landings at Lae in New Guinea. Balikpapan (Borneo) occupied.

**1943** Land fighting in Papua ceases.
New Guinea Campaign — 24th January, 1943-31st December, 1944.

**1944** Port of Anzio captured.

**1945** Carrier-borne attacks on oil refineries at Palembang, Sumatra, carried out by British East Indies Fleet.

**25th**

**1942** Japanese landings at Lae in New Guinea.

**1945** Camotes Islands cleared by elements 7th Inf. Div.

**26th**

**1942** Japanese landings at Lae in New Guinea.

**1945** Camotes Islands cleared by elements 7th Inf. Div.

**27th**

**1942** Japanese landings at Lae in New Guinea. H.M.A.S. VAMPIRE and H.M.S. THANET attack Japanese force off Endau. H.M.S. THANET lost.
Mr. Churchill announces:

1. Combined Chiefs of Staff Committee to be set up in Washington.
2. Pacific War Council to be set up.
3. U.S. Land and Air Forces to join British Forces in United Kingdom.

**1945** Camotes Islands cleared by elements 7th Inf. Div.

**28th**

**1945** Camotes Islands cleared by elements 7th Inf. Div.

**29th**

**1945** Camotes Islands cleared by elements 7th Inf. Div.

**30th**

**1943** Japs repulsed at Wau by 17th Aust. Bde.

**1945** Camotes Islands cleared by elements 7th Inf. Div.

**31st**

**1942** Japanese capture Moulmein.

**1944** U.S. landings at Rio in the Marshall Islands.

**1945** Camotes Islands cleared by elements 7th Inf. Div.

Mindoro operation terminated.

**EDITOR'S NOTE:**

**The above information was prepared by the War Memorial.**

**Information which readers may be able to add to this list, particularly in respect of the small ships of the Royal Australian Navy, would be very much appreciated.**

# FLAG OFFICER SUBMARINES

Rear-Admiral A. R. Hezlet, D.S.O. and Bar, D.S.C., Royal Navy, Flag Officer Submarines, has had a remarkable rise in the Service.

He is photographed while going on board H.M.A.S. Melbourne for discussions with the Flag Officer Commanding H.M.A. Fleet, Rear-Admiral W. H. Harrington.



# Flag Officer Submarines on inspection visit to Sydney

**REAR-ADMIRAL A. R. HEZLET,** D.S.O. and Bar, D.S.C., arrived in Sydney on the 3rd December to carry out an inspection of the 4th Submarine Squadron and for talks with Senior Naval Officers in Canberra.

At a Press conference on his arrival, Rear-Admiral Hezlet said that "he considered that there was still a big future for the conventional submarine."

Commenting on the DREADNOUGHT, Britain's first nuclear submarine, he said that "the building of the sub was well up to schedule — it had a hull of purely British design, but would be fitted with an atomic power plant from America. The second submarine which had been ordered would be powered with a reactor built in Britain."

### Refit of British Submarines in Sydney

Referring to the refit of submarines in Australia, the first, H.M.S. TABARD, started her refit at Cockatoo Dock on the 8th December. Rear-Admiral Hezlet said "that it was very hard to estimate the cost of such a refit, but he considered that it would be in the vicinity of £750,000 and that it would take about a year."

He has previously visited Australia, having commanded the Submarine TRENCHANT when she was operating out of Fremantle during the latter part of the last war. While in command of this submarine he was responsible for the sinking of the 10,000-ton Japanese cruiser ASIGARA. He was also responsible for the sinking of the German U.859 and a number of other coastal vessels and submarine chasers.

### Joined Submarines in 1935

Rear-Admiral Hezlet joined the submarine branch of the Royal Navy in 1935 and at the outbreak of World War II he was appointed First Lieutenant of the submarine TRIDENT, which gained a number of successes off Norway. After having command of a number of other submarines, he returned to the TRIDENT in 1942 as her Commanding Officer and added further to the record of her wartime sinkings, a large German supply ship being numbered among her "kills."

His first operational command was H.M.S. URSULA in 1941. He was awarded the D.S.C. whilst serving temporarily in H.M.S. UNIQUE for an attack against a fast convoy in the Mediterranean. His attack against this convoy was described as culminating in "a record water carnival for the enemy's military force." The following year he operated in northern waters and was Mentioned in Despatches for escorting a convoy to Murmansk and again for towing X5 to North Norway for the attack on the Tirpitz.

### Youngest Commander in Submarine Service

When promoted Commander in 1944 he was the youngest submarine officer to hold that rank.

Whilst on the staff of the Director of Torpedo and Anti-submarine Warfare at Admiralty, he was one of the British Service Observers at the Bikini Atom bomb trials. He was appointed as Commanding Officer of H.M.S. SCORPION, a destroyer, in March, 1949. While serving in this ship he was promoted Captain in June, 1950, at the age of 36 years.

In the autumn of 1950 he returned to Admiralty for duty first as Assistant and later as Deputy Director of The Torpedo, Anti-submarine and Mine Warfare Division of the Naval Staff, and afterwards went to H.M.S. DOLPHIN, headquarters of the submarine branch, as Chief Staff Officer to Flag Officer, Submarines.

He was appointed to H.M.S. BATTLEAXE in command and as Captain (D) of the 6th Destroyer Squadron in May, 1955, and held that post until August, 1956, when he became Director of the R.N. Staff College, Greenwich.

In January, 1958, he went to H.M.S. NEWFOUNDLAND as Commanding Officer and remained in that ship until June, 1959.

He was promoted Rear-Admiral on 7th July, 1959, and took up his present appointment as Flag Officer Submarines in November of the same year.

Rear-Admiral Hezlet left Sydney on the 10th December for England.

He was to carry out an inspection of British submarines at Singapore while en route.

# Sea Cadet Corps National Award

## T.S. MAGNUS, Unit of the Church of England Grammar School, Brisbane is chosen

The result of a nation-wide inspection to select Australia's most efficient Sea Cadet unit was announced recently by the Minister for the Navy, Senator Gorton.

Senator Gorton said the Efficiency Trophy, presented by the Navy League of Australia, had been awarded to Training Ship MAGNUS, which was the unit of the Church of England Grammar School in Brisbane.

He said that during the past twelve months the Director of Naval Reserves, Captain W. B. M. Marks, C.B.E., D.S.C., had visited each of Australia's thirty-four Sea Cadet units in all States. Captain Marks had selected the Brisbane Church of England Grammar School as the outstanding unit, while other close contenders for the trophy were units at Wollongong, Snapper Island and Woolwich (New South Wales), Portland, Geelong and Williamstown (Victoria) Launceston and Ulverstone (Tasmania), Rockingham (Western Australia), and Brisbane (Training Ship GAYUNDAH).

Senator Gorton said this was only the second year that the national efficiency trophy had been awarded. Last year it went to Training Ship BARWON at Geelong.

The Sea Cadet Corps is run jointly by the Navy League and the Royal Australian Navy. The cadets are aged between thirteen and nineteen. The Corps teaches them basic points of seamanship, and also encourages character development and community spirit.

New South Wales has eight Sea Cadet units, Victoria seven, Queensland six, Western Australia five, Tasmania four, South Australia two, Australian Capital Territory and Northern Territory one each.





# H.M.A.S. WARREGO— *21st Birthday*

Officers of H.M.A.S. WARREGO recently held a cocktail party to celebrate the ship's coming of age.

Dame Pattie Menzies, who launched the ship, attended the party and was presented with the ship's crest as a memento of the visit. The Prime Minister accompanied her to the party.

Earlier in the day Dame Pattie paid a visit to H.M.A.S. VOYAGER, which she also launched.

**At left: Dame Pattie Menzies with Commander N. Sanderson, Captain of the WARREGO which is at present employed on surveying duties.**

**The six-man Australian Red Cross team, led by Surgeon Commander Haughton, who was given leave by the Royal Australian Navy, were recently complimented by U.N.O. for their work. The photograph above was taken just before the team left for the Congo. Left to right: Dr. B. W. Fox, Dr. Haughton, Mr. J. Acol, Mr. A. Thompson, Dr. F. Wills and Dr. F. M. Dwyer.**

# ◆ ORIANA ◆

**Confidence in the future of ocean going liners as a means of attracting passenger trade, and increasing trade, is reflected in the decision of the P. & O.-Orient Lines to outlay £30,000,000 on the construction of two huge liners for trade between the United Kingdom and Australia and other ports.**

Here are details about the Oriana:

| | |
|---|---|
| Length overall | 804ft. |
| Length between perpendiculars | 740ft. |
| Beam moulded | 97ft. |
| Beam extreme | 106ft. |
| Load draught | 31ft. 6in. |
| Gross Tonnage (British) | 41,922.94 (22,272.93 net) |

Machinery

Main engines: Double reduction turbine.

Boilers: Foster Wheeler external superheat type.

Generators: Four 220 volt D.C. 1750 KW each; three 230 volt A.C., 250 KW each.

Emergency generators (diesel), two 220 volt D.C., 200 KW each.

Propellers: Two of 28 tons weight each, with a maximum thrust of 160 tons each.

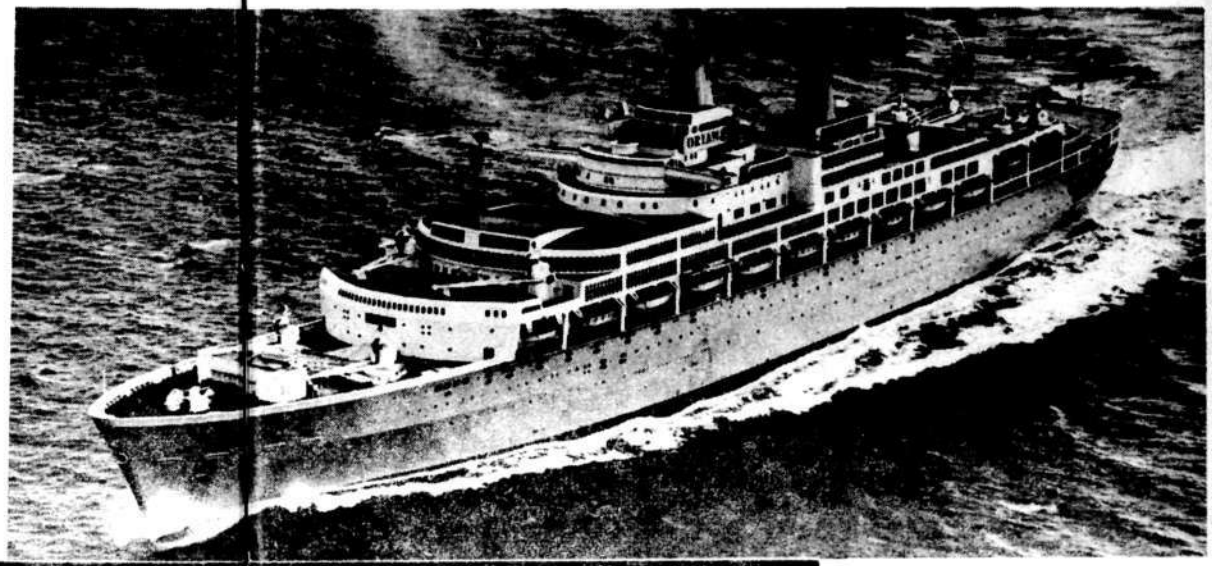
Shaft horsepower: 65,000 at 147 r.p.m. service, 85,000 at 159 r.p.m. maximum.

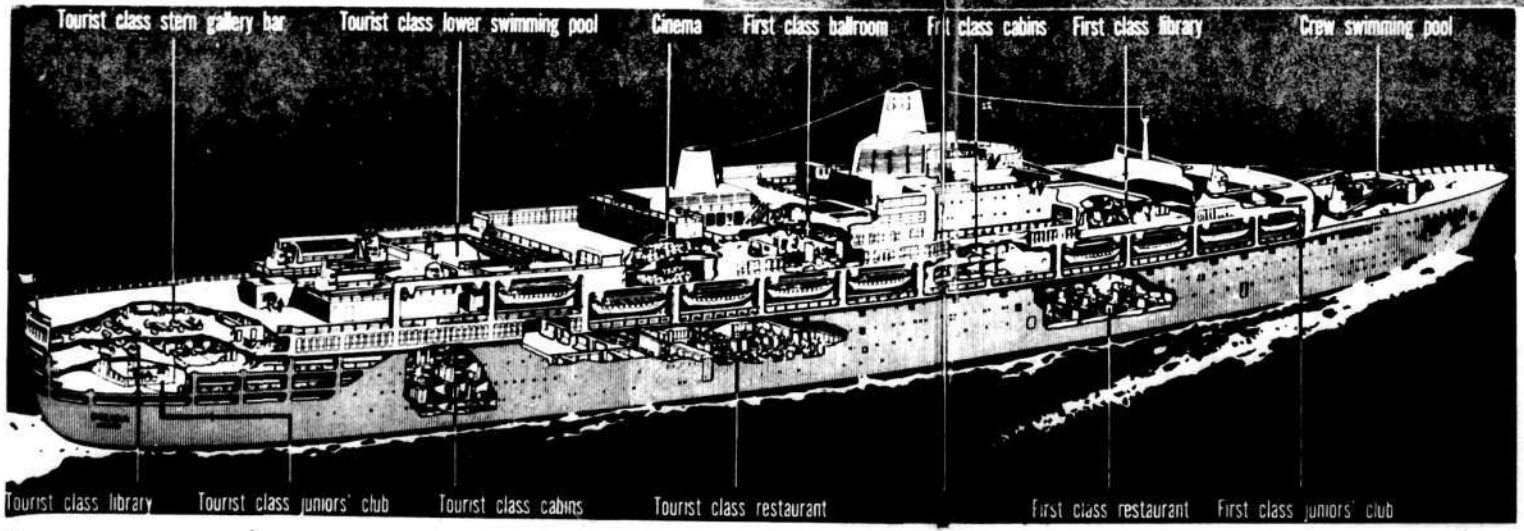
Service speed: 27½ knots.

Trial speed: 30 knots (approx.).

Oil fuel consumption: 415 tons per d. for all purposes.

## FIRST VOYAGE TO AUSTRALIA






Capt. Clifford Edgecumbe, R.D., R.N.R. — the first Commander.



FADED TYPE

## APPRENTICES AT SCHOOL AT H.M.A.S. NIRIMBA

**Apart from their technical training, apprentices at H.M.A.S. NIRIMBA receive a secondary school education. Here some of them are seen being given a lesson in grammar. A revised syllabus, as required by the N.S.W. Department of Education, was recently introduced.**





# APPRENTICES "PASS OUT" AT H.M.A.S. NIRIMBA

THE second "Passing Out" of Apprentices from the Navy's training Establishment, H.M.A.S. NIRIMBA took pla e on the 14th December.

The salute was taken by Rear Admiral G. C. Oldham, D.S.O., Flag Officer in Charge, East Australia Area, and the parade was witnessed by many parents and friends of the apprentices.

Some of the points made by the Captain of NIRIMBA, Captain B. W. Mussared, in his address were:—

In June we held our first Passing Out Ceremony, marking the end of the first 4 year cycle of training.

In the light of the experience gained we have since been able to review our training policy and administration, and a certain amount of streamlining has been found possible.

This latter is very important as Apprentices will gain certain exemptions which could be of considerable use in their post-Naval life.

In brief, the more important changes have been:—

### IN SCHOOL

● A revised syllabus, on similar lines to that required by the N.S.W. Department of Technical Education has been accepted by A.C.N.B.

● In future, the Basic Phase Examination will correspond to their Certificate Entrance (External Intermediate), and will allow our advanced education in the Intermediate Phase to qualify individuals for exemptions in certain Certificate courses (corresponding to the old Diploma).

**Best all round apprentice of H.M.A.S. NIRIMBA, E.R.A. V. J. Fanker, of Durl, New South Wales, is congratulated by Rear-Admiral G. C. Oldham, D.S.C., Flag Officer - in - Charge, East Australia Area, for winning the Governor-General's prizes.**

### IN TECHNICAL

● **Electrical**—The E.A. syllabus is now exactly the same as that of the N.S.W. Department of Technical Education.

● More emphasis has thereby been placed on basic electrical theory, and on the use of laboratory and demonstration equipment.

### E.R.A. Bm/W.

● No more E.R.A. Bm/W's will be trained in NIRIMBA. The plate work and skilled welding will in future be handled by the Naval Shipwrights, and the general welding and boiler maintenance by the E.R.A. (F. & T.).

● All Bm/W's under training will complete their course, and I can confidently assure them that their career prospects will be in no way affected.

### IN CRAFT

There has been no necessity for change, we are continually searching for more interesting practice jobs which will have some end use, and maintain a consistently high standard in all trades.

During this term, the new entries have been treated as a separate training division in the charge of the Training Officer.

It has been possible to give them a far fuller indoctrination into Service ways and requirements, and has enabled us to weld them into a well integrated group.

We have extended the authority of the Senior Term Apprentices, who now play a larger part in the "silent hours" administration.

In the social and recreation field the use of apprentice committees is being extended to cover more activities, under the guidance of officers and senior ratings.

### COSTS OF TRAINING

It is a matter of general interest that I have recently tried to access the overall cost per head of training one Apprentice.

This training embraces the four distinct fields of Craft, Technical, School and Leadership.

I have had to make many guesses, but the cost is considerably greater than that which any parent would have to pay for education at one of our Greater Public Schools.

Our task is not only to train superior tradesmen, but also to prepare the Apprentice for the responsibility which he must be ready to assume at sea. The Naval training is just as important as the technical.

There is a difference between being just a Tradesman and being a Petty or Chief Petty Officer—and in some cases an Officer.

The difference can be expressed in three words—"Sense of responsibility."

I like to stress this point, what we do here does not benefit the Navy alone.

We are in the long run, a much needed natural asset in these days of increasing technical demand.

Captain B. W. Mussared

## SOME OF THE APPRENTICES

A Navy photographer took this picture of the 7th Term Apprentices at the passing-out parade and prize-giving ceremony at H.M.A.S. NIRIMBA last month.

## PROUD PARENTS SAW THEIR SONS "PASS OUT"

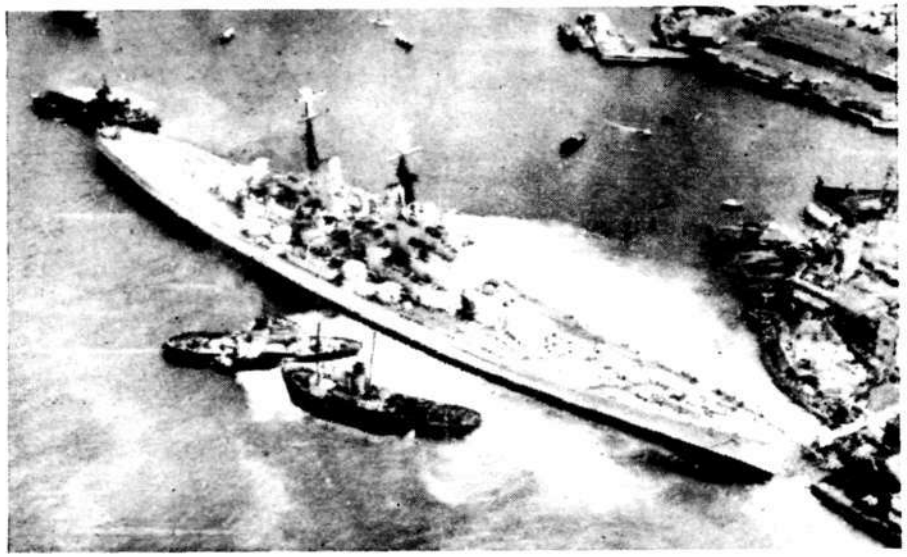
*NIRIMBA* passing-out — Apprentice Alan Nuttal, who was one of the apprentices who passed-out at H.M.A.S. NIRIMBA last month, is shown with his parents and sisters and Apprentice Robert Lewis of Western Australia. Nuttal passed out as a 5th Class Artificer preparatory to undergoing a further 12 months' training at sea.



# *Shipping Reserve Officers' Conference*

Reserve Officers who will be responsible for the control of merchant shipping, recently conferred in Canberra. Officers who attended were Commander B. L. Dechaineux (Tasmania), Commander E. B. Hopkins (South Australia), Commander O. M. May (Queensland), Lieutenant-Commander R. G. Harris (Western Australia), Lieutenant-Commander A. G. Bayly (New South Wales), and Lieutenant-Commander B. H. Dick (Victoria).

# MORE BATTLESHIPS "PASS ON"



**H.M.S. VANGUARD, the last British battleship, on her way to be broken up. The ship ran aground while under tow but was soon pulled off, and her breaking up is now well under way.**



A new list of ships which have been condemned has been issued by the United States Navy.

It includes the battleships NORTH CAROLINA and WASHINGTON; the battle-cruisers ALASKA and GUAM and the cruiser MANCHESTER.

Twelve submarines, 15 landing ships, 5 patrol boats, 7 sweepers and 56 auxiliaries, amongst which are 10 ex-escort carriers and 22 fast transports, are also included in the list.

### Canadian Cruisers also sold

The Royal Canadian cruisers QUEBEC and ONTARIO have also been sold to Japan for scrap. They were sold for less than 400,000 dollars each.



# AIRCRAFT CARRIERS TODAY and TOMORROW

*By "REACTOR"*

NO review of naval aviation would be complete without some reference to the great ships which give the Fleet Air Arm its "raison d'être", those floating bases and operational headquarters of the front-line squadrons, which now form the largest and most powerful units of the 1960 fleet. Already in the opening year of the new decade two naval events have taken place, both of which are major landmarks in the history of the aircraft carrier. On a summer evening at Portsmouth in June "Sunset" was sounded for the last time on board Britain's sole remaining battleship, and with the scrapping of H.M.S. VANGUARD the claim of the aircraft carrier to be the capital ship of to-day is finally established. Earlier in the year the commissioning of H.M.S. BULWARK as the first Commando carrier marked the first attempt to adapt an aircraft carrier to the role of a mobile base for a self-contained military unit complete with its own means of aerial transport. Nevertheless, in this age of missilry, and nuclear deterrents, the future of the aircraft carrier and its ability to retain its claim to be the modern capital ship are both under discussion and a look at the present situation will not be out of place.

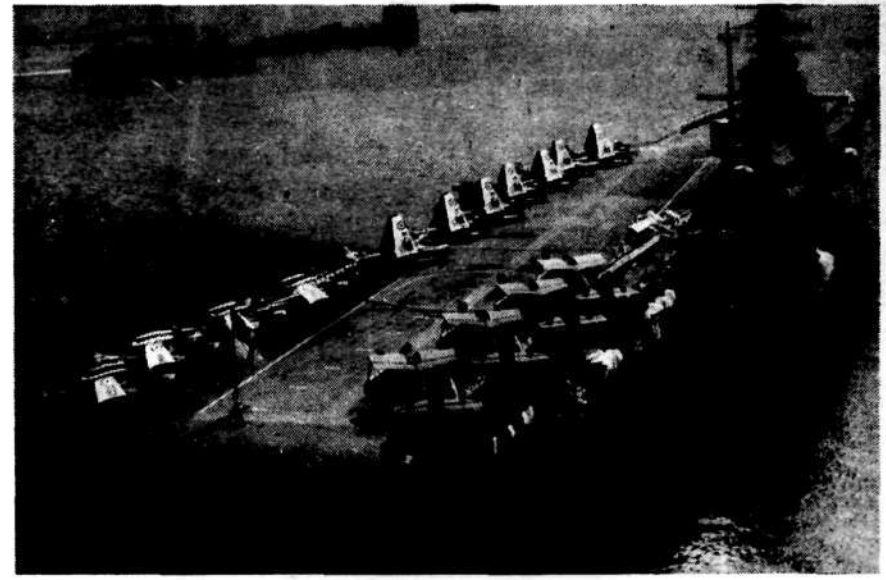
Britain now possesses eight aircraft carriers, of which one is unlikely to see further active service. Although an extensive modernisation programme has been carried out on most of them, by 1965 they will all be between 10 and 20 years old and their hulls are unlikely to be fit for the further improvements which will then be necessary to keep them efficient Assuming two years are necessary to complete plans for a new class of ship and five more years to build each one of such a class, it can be seen how urgent the question of new aircraft carriers for the Royal Navy has become. Unless work on the first ship is begun this year, about 1966 there is likely to be a period when our existing carriers will be beyond economical maintenance, whilst their replacements will still be in the builders' yards. There is no margin to work on, for development of new types of aircraft is proceeding all the time and by the mid-sixties we may find ourselves not only with no new aircraft carriers, but with new naval aircraft unable to operate from the carriers of to-day. We cannot assume that the SEA VIXEN, the SCIMITAR and the N.A. 39 represent the ultimate in the development of naval aircraft. Their successors are likely to be even larger, heavier and more complex, and in the next few years the tendency will be for fewer, larger aircraft instead of the numbers of smaller aircraft now carried. The cost of a new aircraft carrier is formidable: a replacement for the ARK ROYAL might cost £40 million in 1965, a smaller Commando or helicopter carrier might be built for about £20 million. With the Chancellor of the Exchequer struggling to maintain public spending at its current level and our balance of payments always under review, we need hardly wonder at the apparent reluctance of the Government to start work on a new ship. Would this expense be justified? Will aircraft carriers still have a worthwhile task to perform in the military plans of the seventies?

### Aircraft Carriers in Future Nuclear War

A few years ago the carrier-borne aircraft was seen as the only likely means of continuing nuclear attacks on the Soviet land mass after the first exchange of atomic bombs had destroyed the less mobile bomber bases and missile sites. But this idea of "broken-backed" warfare is now discredited. In the present age of nuclear stalemate the provision of a mobile deterrent force at instant readiness to deliver a decisive counter-blow to any surprise nuclear attack on the West is now the lynch-pin of allied military plans. Although the United States Navy still retains a powerful carrier task force in the Mediterranean, its continued presence in this area is dictated more by political

**conditions than by military expediency. The United States Strategic Air Command, with some assistance from our small force of V-Bombers, is currently the major agency charged with the task of maintaining the Western deterrent in constant readiness.**

Even as this article is being written, however, the tremendous success of the United States Navy in successfully launching a Polaris missile for 1,100 miles from a submerged submarine has completely changed the future picture. *For some time naval enthusiasts* have been claiming that the nuclear submarine, armed with long range ballistic missiles, represents the most efficient mobile deterrent; and these claims now seem to be justified. The advantages of this deterrent method are so great that they easily outweigh any other systems, despite the enormous cost. Once the submarines are at sea within their operational area they will need no replenishment for long periods, and they will be continuously ready to deliver their missiles on receipt of the necessary instructions. Whilst awaiting this fatal message they are invisible and undetectable, except by naval forces which would have to search the whole of the wide oceans to find them and would thus expose themselves to counter-attack. Of all the possible methods of launching the deterrent the nuclear submarine represents the most invulnerable and the most secure and it is for just these reasons that the United States Navy plans to build no less than 45 missile-carrying submarines and to maintain about a quarter of these on constant deterrent patrol.



**H.M.S. CENTAUR during a recent visit to Sydney.**

**BRITAIN'S AIRCRAFT CARRIERS, 1960**

| Ship | Deep Displac. | Launched | Last Modnztn. | Aircraft Complmt. | Remarks |
|---|---|---|---|---|---|
| VICTORIOUS | 35,500 | 1939 | 1951-8 | 54 | |
| EAGLE | 53,000 | 1946 | In hand now | 50 | |
| ARK ROYAL | 53,340 | 1950 | 1959 | 50+ | |
| MAGNIFICENT | 19,550 | 1944 | — | 34 | |
| CENTAUR | 27,000 | 1947 | 1957 | 45 | |
| ALBION | 27,000 | 1947 | — | 45 | To become second Commando Carrier |
| HERMES | 27,500 | 1953 | Completed 1959 | 45 | |
| BULWARK | 27,000 | 1948 | 1959 | 20(a) | Commando Carrier |

(a) Helicopters.

**AIRCRAFT CARRIER REPLACEMENT PROGRAMME**

| Type | To be Laid Down | To be Completed | Likely Cost | To Replace |
|---|---|---|---|---|
| 45,000 ton Fleet Carrier | 1960 | 1967 | £40 million | VICTORIOUS |
| 45,000 ton Fleet Carrier | 1962 | 1969 | £40 million | EAGLE |
| 25,000 ton Commando or Helicopter Carrier | 1964 | 1969 | £20 million | BULWARK |
| 25,000 ton Commando or Helicopter Carrier | 1966 | 1971 | £20 million | ALBION |

What has all this got to do with Britain's new aircraft carriers? By the time the first of these ships could be operational the United States Navy will have a large proportion of this projected nuclear submarine strength deployed on station at immediate readiness, and it is reasonable to suppose that by 1970 manned aircraft will have ceased to be the principal deterrent agent. These developments are also likely to mean the end of the concept of nuclear strikes on land targets by carrier-borne aircraft, and so we must now assume that the decision whether or not to build more British aircraft carriers will be judged solely by the role which these ships can perform in limited war or "brush-fire operations.

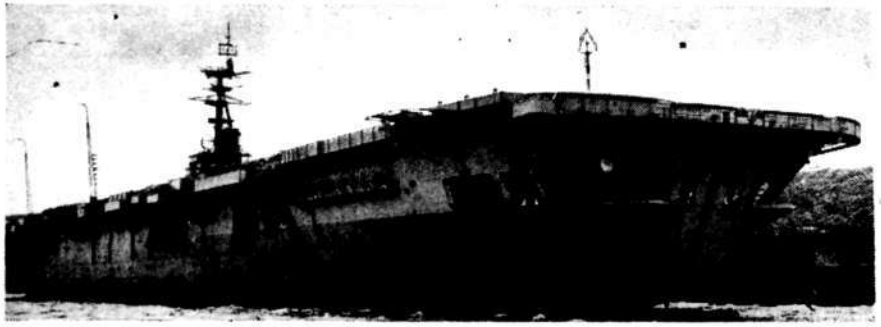
The value of the aircraft carrier in these operations lies in its ability to provide air cover for sea and land forces engaged in remote areas far from other bases. In addition, naval aircraft are specially suited for precision attacks on military targets where damage to non-military installations and civilian personnel must be kept to the minimum. During the Suez operations, most of the Egyptian fighter force was destroyed on the ground by naval aircraft in pin-point attacks on airfields and grounded aircraft; by contrast the night bombing of Cairo Radio and other targets by the Royal Air Force was inaccurate, resulted in civilian casualties, and in consequence gave our enemies a tremendous propaganda weapon to use against us.

When the Minister of Defence spoke of the new concept of mobility of our forces in a speech last spring, he may not have been thinking only of the Commando carrier; in fact, a task force of Commando and conventional carriers with their escorting frigates and destroyers and supporting replenishment ships gives him a compact combat team of sea, land and air forces capable of dealing with most of the "brush-fire" operations one can envisage during the next decade.

The Commando carrier is the pivot round which this force revolves, but alone she is completely defenceless against the smallest-scale of air, surface or submarine attack. If there is even the possibility of slight air attack she must be supported by at least one other aircraft carrier to provide air cover both for herself and for the troops ashore, whilst the surface escorts must protect the carriers against submarine or ship attacks.

With these requirements in mind we can begin to build up a picture of the types and numbers of new aircraft carriers we require. The most urgent task is to start work on a fleet carrier to replace H.M.S. VICTORIOUS by 1967, when her hull will be 28 years old. This replacement need not be as large as the ARK ROYAL, but she cannot reasonably be less than 40,000 tons and still be capable of operating the new types of naval aircraft and of carrying the vast amount of complex equipment which is now essential to all warships.

Should the new ships be nuclear-powered? With design studies for a first British nuclear-powered tanker only just completed, any attempt to incorporate this method of propulsion into the first of the new aircraft carriers would only delay her completion still further. And further delay we cannot afford. In any case, the introduction of nuclear power for surface warships will be a tremendous step forward in our naval practice which will have profound effects on operational factors and traditional methods, and it is to be doubted whether the Naval Staff has yet completed even a preliminary study of all the implications of this advance. But this task must soon be undertaken; the United States Navy will have her first nuclear-powered aircraft carrier, the U.S.S. ENTERPRISE, in service in 1962, and it is to be hoped that at least the last of any new aircraft carriers laid down in Britain during the 'sixties will be nuclear-powered. Otherwise we shall no longer be able to lay any claim at all to be a leading maritime nation.



We have seen that the most useful task forces of the 'sixties and 'seventies will require both Commando and conventional aircraft carriers and any building programme designed to replace our ageing carrier fleet must embrace both these types. To maintain even one such task force developed in the Mediterranean or "East of Suez", as a permanent feature of our strategy, with allowance for refits and repairs, we need at the very minimum a 10-year programme which will produce two new ships of each type.

As he presides over the autumn meetings of the Board of Admiralty at which the Navy Estimates of 1961-2 will take shape, the First Lord should pause for a moment to consider just how much longer he can afford to delay any decision about building a new aircraft carrier. Already the country is restive at the 10 years of official statements, counter-statements, explanations and excuses which have formed the pre-launching history of Britain's first nuclear submarine. And the country knows that when at last she is completed the DREADNOUGHT will not carry a battery of long-range missiles, but the obsolete weapons of 1945.

**At left: H.M.A.S. SYDNEY in mothballs. Observers fear that nuclear submarines firing missiles from under-water, as depicted on the right, may cause more carriers to be placed in reserve.**

## MEMORIAL TABLET TO THE LATE REAR-ADMIRAL C. J. POPE, R.A.N., (Retd.)

A memorial tablet to the late Rear Admiral C. J. Pope was unveiled and dedicated in the Garden Island Dockyard Church on the 18th December, 1960.

Lieut. Pope, as he was then, came to Australia on loan service to the R.A.N. in 1912. He was on the point of returning to England in 1914 when the Navigator of H.M.A.S. SYDNEY, Lt. Cdr. Feakes, became ill. Lt. Pope was recalled to sail with H.M.A.S. SYDNEY, and remained her Navigator throughout World War I.

Because he was Navigator of SYDNEY at the time she sank the EMDEN, he was given the honour of navigating the new EMDEN at the surrender of the German Fleet to her final destination in Scapa Flow.

He transferred permanently to the R.A.N. in 1918, and subsequently was in command of H.M.A.S. ALBATROSS, was Captain-in-Charge, Sydney.

In World War II he commanded H.M.S. CALIFORNIA in the North Sea, then was Commodore-in-charge, Darwin, followed by Commodore-in-Charge, West Australia.

His death occurred on August 4, 1959, aged 72 years.

## ARMY HELICOPTER PILOTS TRAINED BY NAVY

The first group of Army pilots to be trained by the R.A.N. for helicopter flying have successfully completed the course at the Naval Air Station, Nowra.

The training schedule put emphasis on the types of operation likely to be encountered in military activities.

On completion of the flying training the Army pilots were given a special course on the technical aspects of helicopter operation and maintenance.

# H.M. SUBMARINE ORPHEUS JOINS THE NAVY

H.M. Submarine ORPHEUS, the first of the new Oberon class, has commissioned for service under the command of Commander T. A. C. Clack, R.N., and was accepted from her builders, Vickers-Armstrongs (Shipbuilders) Ltd., at sea on Friday, 25th November.

The ORPHEUS, which was launched on 17th November, 1959, has a length of 295 feet 3 inches and a beam of 26 feet 6 inches. The superstructure is of light alloy.

Boats of this class are similar in design to the Porpoise class. They are equipped to fire homing torpedoes and have the latest in detection equipment. They are capable of high underwater speeds and have a very long endurance.

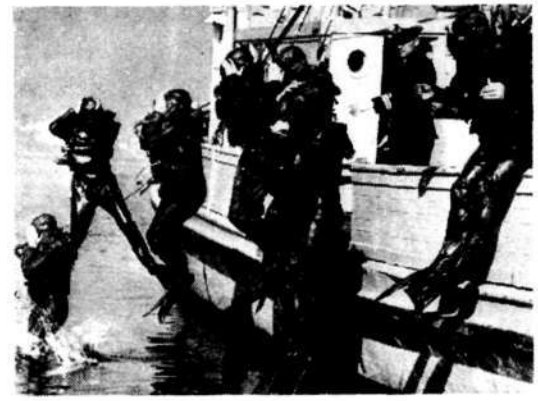
The diesel-electric main propulsion machinery is powered by Admiralty Standard Range diesel engines. In the case of the ORPHEUS, these were manufactured by Vickers-Armstrongs (Engineers) Ltd., and the English Electric Company provided the main propulsion generators, main motors and main controlling switch-gear.

The ship's company of six officers and 61 ratings are provided with a high standard of accommodation and every effort has been made to provide sufficient amenities to counteract the effects of long patrols.





# NAVAL RESERVES TRAIN AS DIVERS



The Royal Australian Navy has introduced a scheme which would enable it to rapidly increase the strength of its diving teams in the event of an emergency.

The Minister for the Navy, Senator Gorton, said recently that members of the Royal Australian Naval Reserve were now being trained in diving techniques. These men were being put through a basic course which would train them to a stage where they could immediately begin more advanced clearance diving training if they were needed in a hurry.

Senator Gorton said volunteers from the reserves were undergoing a series of courses at the Royal Australian Navy's Diving School in Sydney. It was the same basic course as given to permanent members of the R.A.N. who volunteered for diving duties. The course

(Continued on page 31)

## SERVICE CHIEFS VISIT LEGACY

The Senior Officers of the three Services recently visited Legacy and witnessed displays by the Legatees.





## Floating Recruiting Office for R. N. opens on Victoria Embankment

THE ROYAL NAVY'S only floating recruiting office opened for business on 28th November on board H.M.S. DISCOVERY—invariably Captain Scott's "Discovery" to the passing public—berthed in the Thames on London's Victoria Embankment.

It will be the London recruiting headquarters for the Royal Navy and Royal Marines responsible for the administration of an area stretching from the Wash to Sussex, and replaces the present office accommodation in Charing Cross Road.

Although the three masted DISCOVERY has been refitting since May for her new role, the historical parts of the ship, which attract some 200 thousand visitors a year, have not been altered and she will be open again to the public from Thursday, 1st December from 1.0-5.0 p.m. daily.

She will remain one of the three ships of the London Division of the Royal Naval Reserve and the flagship of the Admiral Commanding Reserves (Vice-Admiral R.A. Ewing, C.B., D.S.C.). The ship will continue to be used by the R.N.R. and at the weekend by units of the Sea Cadet Corps and the Sea Scouts.

The adaption of the DISCOVERY for recruiting purposes means that for the first time the three thousand men and women who use the London recruiting headquarters each year will have to go afloat to volunteer their services, to make enquiries or for medical examinations.

On the upper deck, a cabin with a teak door still bearing the inscription "MASTER—PRIVATE" has become the office of the Recruiting Staff Officer for the London Area (Commander W.S.G. Edward, O.B.E., R.N.) and inside are still many of the original fittings—including a brass heel indicator, although now the only movement to its needle is caused by the wash of passing barges.

Below on the main deck, adjoining the ship's Ward Room with cabin doors still bearing the names of their occupants, have been built administrative, enquiry and documentation offices in the place of the original sick bay and Petty Officers and Warrant Officers Messes.

Other parts of the DISCOVERY also have been converted for new functions. The old coal bunkers, engine room spaces and provision stores on the platform deck have been transformed into offices and waiting rooms for the medical department, while further aft another space has become an educational and aptitude test room for use by recruits.

The DISCOVERY, built in 1901 by the National Geographical Society for Captain Scott's first expedition, was presented to the Boy Scouts' Association in 1937, when she moved to her present berth on the Embankment. She was taken over by the Admiralty in 1955 for use as one of the three drill ships of the London Division R.N.R.



### NAVAL RESERVES TRAIN AS DIVERS

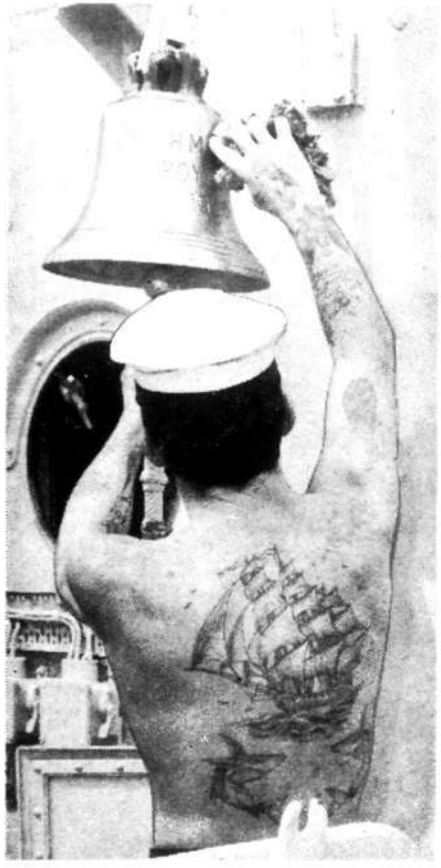
(Continued from page 29)

taught the techniques of compressed air diving, and at the end of three weeks the reserves qualified as divers.

Senator Gorton added that the Royal Australian Navy had reached the stage where it need no longer rely on the experience of the Royal Navy in the training of its divers. In future, all clearance diving officers would be trained at the Sydney diving school.

Divers have an important role in modern naval warfare. They have an offensive task in clearing beach-heads of obstacles, and a defensive role in keeping ships clear of underwater explosive devices.

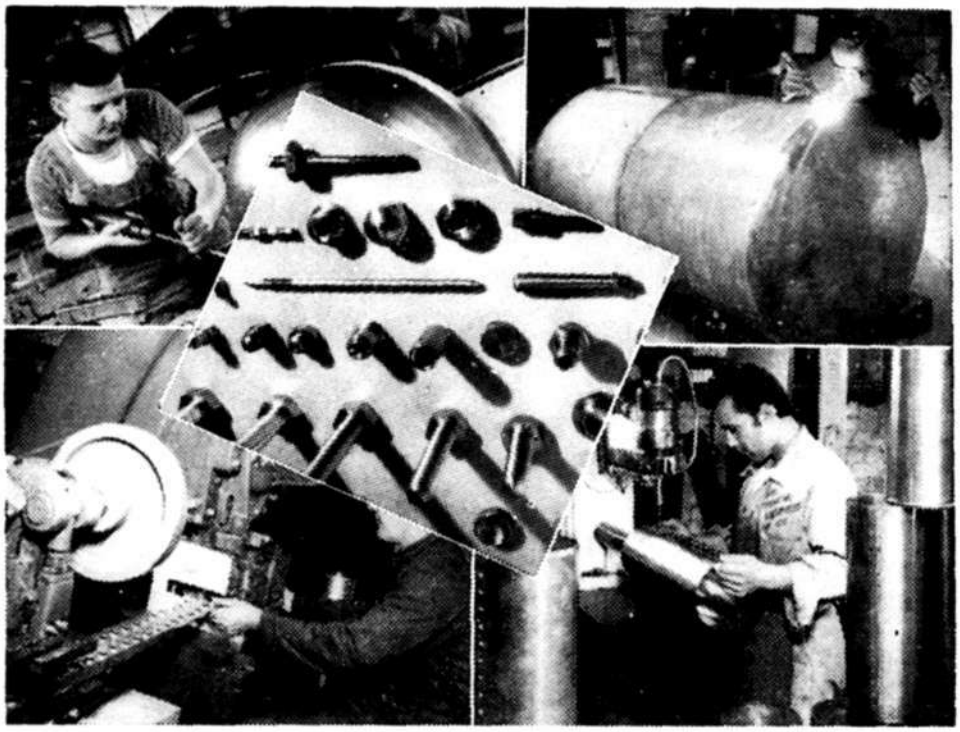
# OLD SHIPS and CUSTOMS



Above: **The tug HERO, a recent marine casualty, tows through Sydney Heads one of the last sailing ships to visit Australia.**

Left: **A Dutch Naval rating from the H.N.M.S. KAREL DOORMAN displays a fine example of the tatooist's art.**

**Captain B. W. Mussared, Captain of H.M.A.S. NIRIMBA, is towed "ashore" as he relinquishes his command. Captain Mussared has been succeeded by Captain F. W. Purves.**



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# THE Navy

MARCH 1961
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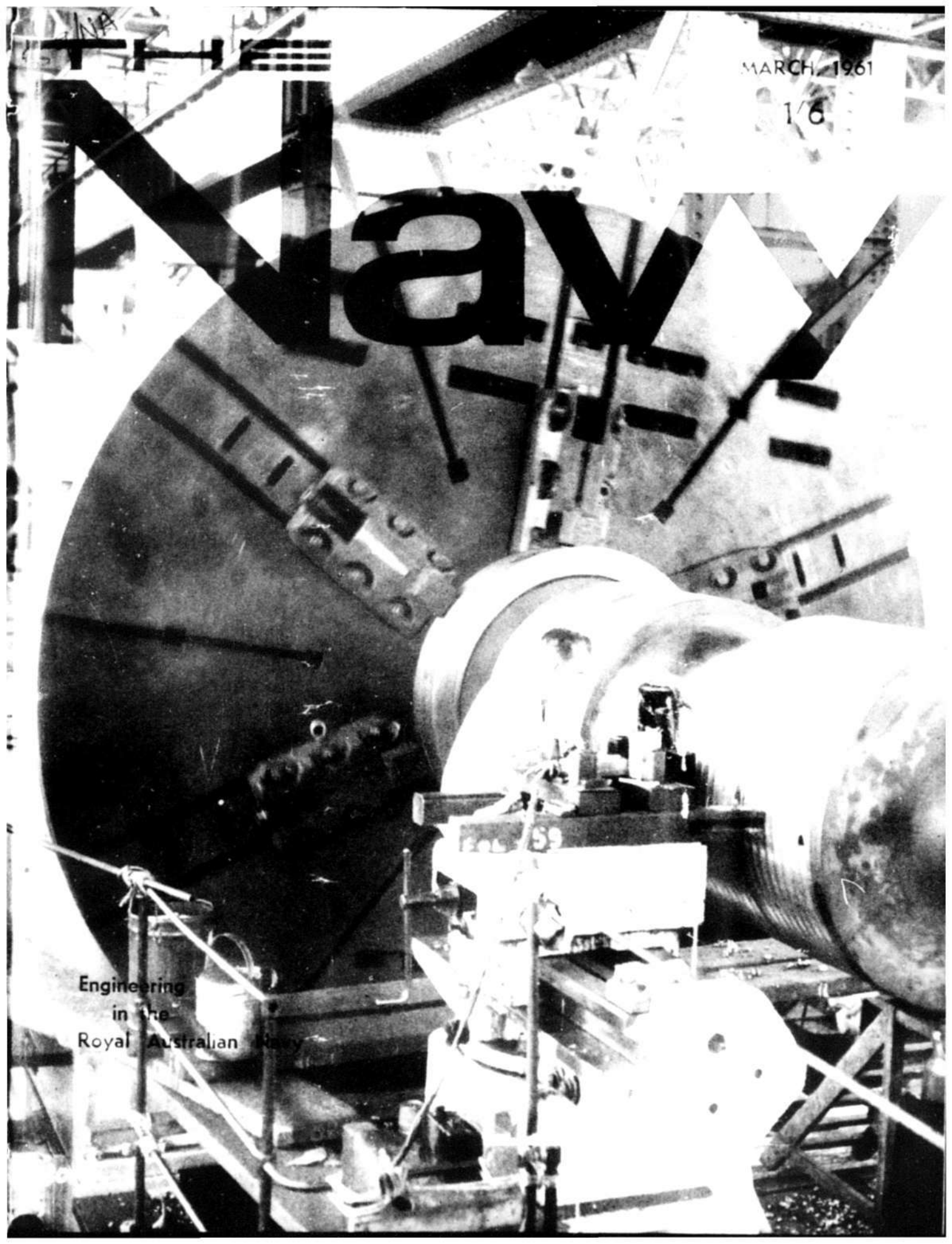

Engineering in the Royal Australian Navy

# THE NAVY

**Vol. 24** **MARCH, 1961** **No. 3**

The Official Organ of the Navy League of Australia




## CONTENTS



(Editor's Note: Because of circumstances, certain articles on the Engineering Branch have had to be held over to the April issue of "The Navy."


Published by the Navy League


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## OUT OF THE MOUTHS OF—

"Dear Royal Navy," wrote the young admirer. "Please would you be kind enough to send me some information about submarines? If so, could you tell me what the inside of a submarine is like, what kind of a job I might have, how much I'd have for wages, etc.

"I've been asking you all this, because my brother Neville, got a book about submarines, and I looked at it, and I found a picture of a silver and golden dolphin and determined myself I'd get one!

"I think that being in a submarine is about the safest place to be during war, because if I was in the Air Force I might have to go in a plane, and be shot down, and if I was in the Army I might be shot, and if I was on a warship I might be torpedoed.—Lots of love from M. Fuller, aged 7."







# Engineering in the Royal Australian Navy

By Rear Admiral K. McK. URQUHART, C.B.E.

Third Naval Member and Chief of Naval Technical Services

Rear Admiral Urquhart Addressing Apprentices

THE celebration this year of the 50th anniversary of the founding of the Royal Australian Navy, is an appropriate occasion to review the important role that the Engineering Branch of the Navy has played in the past and to indicate the present trends in technical developments. The modern warship comprises a complexity of machinery and equipment which would bewilder the engineer officer of 1911 even if he had advanced ideas of the technological progress which was being achieved at that time. Completely new fields of engineering have been developed to improve the military capability of warships. It is imperative that the officers and men who are required to operate and maintain, and in certain instances plan, design and construct the modern machinery and equipment which is built into a warship, are equal to their exacting tasks. This is the function of the Engineering Branch whose personnel are specialised in mechanical, ordnance, electrical and aeronautical engineering.

2. It was comparatively simple 50 years ago to split the personnel of the Navy into sections whose functions could be clearly stated. For example, the main responsibilities of the Engineering Department of a coal-fired battleship of the First World War were related to the boiler and engine rooms. Hundreds of stokers, a relatively unskilled labour force, were re-

quired to trim coal and stoke the numerous boilers.

3. Main propulsion machinery (some steam reciprocating engines were still in use in battleships in 1914, but steam turbines were rapidly displacing them) was the major responsibility of the Engineering Department. The importance of this function is, of course, in no way diminished in a modern warship. However, many additional duties have now been added to the responsibility of the Engineering Branch (and in this I now include electrical engineers). The main engines and boilers and auxiliary machinery are just one important section of the vast technical world which is incorporated in a modern warship.

4. For the ship to be effective in both her military and seagoing roles, personnel must ensure that every unit of machinery and equipment dealing with propulsion, armament, communications, radar and aircraft is operating efficiently. Despite these developments which have transformed the whole concept of a warship there are still some who envisage naval engineering as being a form of marine engineering mainly concerned with driving ships through the water—they have not yet appreciated the engineering complexity associated with the military equipment which distinguishes a warship from a merchant ship. I now propose to cover in a little more detail the range of duties of the Engineering Branch of the R.A.N.

## Mechanical Engineering

5. The propulsion machinery of a ship has undergone great changes in the last half century. Oil fired high pressure steam boilers supplying steam to high speed turbines which drive the propellor shafts through precision gearing form the basic elements of a modern naval installation in a surface vessel. Modern developments in naval machinery have aimed at higher power-weight ratios so that maximum advantage can be taken of the available weight and space in the hull of a warship. The savings that are effected in the main and auxiliary machinery enable the ship to increase her military effectiveness by carrying more armament or other equipment related to the military role. We must always remember that we are limited as to what we can build into a ship of a certain size and displacement—and some compromise must be accepted regarding the various claims. However, with a warship, military effectiveness is the ultimate object and the ship designer therefore always has before him the necessity to provide all the other essential features of the ship with the minimum possible demand on the available weight and space. With the main and auxiliary machinery this requirement has resulted in the development of complex machinery of high performance. At the same time reliability remains all important. It will be seen that at all stages—from the initial design, through manufacture which demands the highest quality of workmanship, to the finished product which must be operated and maintained with skill—the Navy has need of highly skilled personnel to meet the challenge.

## Nuclear Propulsion

6. I have referred particularly to a modern main propulsion installation comprising steam boilers and turbines. The reader may possibly think that we are already out-of-date in our thinking and that we should be building vessels with nuclear propulsion. The advantages and disadvantages of nuclear propulsion for surface warships is a complex study but the answer as far as the RAN is concerned is very clear at this stage—the cost of such vessels far outweighs any military advantages that might be gained by nuclear propulsion. With our limited Naval vote we give the best defence value for our money by equipping our surface vessels with modern conventional oil fired boilers instead of nuclear reactors. We are well advised to leave the high costs of development in this field to the United States Navy until such time as the advisability of its adoption in the RAN is clearly established.

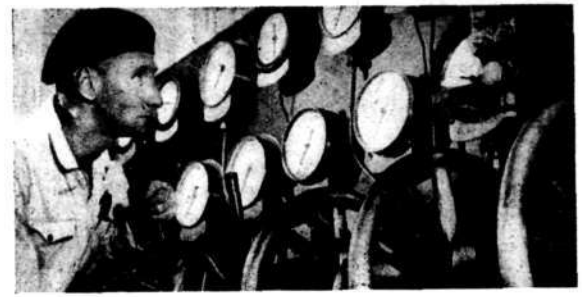
7. The use of nuclear propulsion in submarines is a different proposition—it confers such outstanding military advantages that cost is the only barrier to its adoption universally. If the RAN considers the introduction of a submarine service in the future I am sure that the adoption of nuclear propulsion will be given the fullest consideration.

8. In the meantime a limited number of personnel are being trained in nulear engineering so that we will be able to keep abreast of Naval developments in this field.

9. The personnel engaged on mechanical engineering duties have many responsibilities additional to that associated with the Main propulsion. For example, the generation of up to 2,000 kilowatts of electric power in a modern destroyer requires steam turbine and diesels which in themselves constitute a small power station. In aircraft carriers steam catapults and flight deck equipment have introduced many specialised engineering techniques. The Naval Engineering Branch operates indeed in the many and varied fields of mechanical engineers.







**H.M.A.S. MELBOURNE CONTROL ROOM**
**In the event of a nuclear attack Melbourne's engine room could be controlled from this one room.**

## Ordnance Engineering

10. I have already mentioned the importance of the weapons of a warship. In many respects they constitute the final measure of military effectiveness. In the days of close range surface engagements such as at Jutland heavy guns in heavily armoured battleships pounded away under visual control. Destroyers weaved their way between the opposing fleets and performed feats of skill and daring as they manoevred to fire their torpedeos at the enemy at the closest possible range.

11. In modern naval warfare the types of weapon and the tactical employment of them is far removed from the days of Jutland. Aircraft play a dominating part. Radar en-

**A guided missile being fired from U.S.S. Canberra during a recent visit to Australia.**

ables detection of attacking aircraft out to ranges well over 100 miles, and surface ships can be detected and tracked accurately when they are far beyond the visual horizon. The gun which has been developed into a weapon of great accuracy due to the use of radar and electronics in its control, is now being replaced by the guided missile which operates to greater ranges with improved performance in all respects. To meet the submarine threat remarkable developments have taken place in submarine detection and in weapons to destroy them. But the advent of the high speed nuclear submarine requires that even more effort be put into the development of equipment to counter them effectively. It seems to be a problem in development which is never fully solved.

12 The term "Ordnance Engineering" in the past covered mainly the mechanical side of the weapon and control equipment. Now, the close integration of the electrical and mechanical aspects of this equipment has necessitated the training of personnel in a specialisation which can be broadly designated "Weapon Engineering".

**Aeronautical Engineering**

13. The scope of this specialisation does not need elaborating. It deals with both the engine and the airframe elements of aircraft. At present HMAS MELBOURNE is equipped with turbo-prop and jet fixed wing aircraft. Changes are at present being planned and the adoption of modern turbo powered A/S helicopters by 1963 is expected. The Naval Aviation world has always been one of rapid changes and developments and must be capable of adapting itself readily to these changes. Officers and ratings receive extensive training in Australia and abroad to equip them to meet all the future requirements of the RAN.

**Naval Ship Construction**

14. For the design and construction of vessels for the RAN it is essential that some officers be trained and experienced in Ship Construction and Naval Architecture. The training in this specialisation is superimposed on the basic marine engineering training and is carried out at the Royal Naval College, Greenwich, near London. The officers so trained have opportunities throughout their careers to carry out duies and acquire experience in Marine Engineering.

**Electrical Engineering**

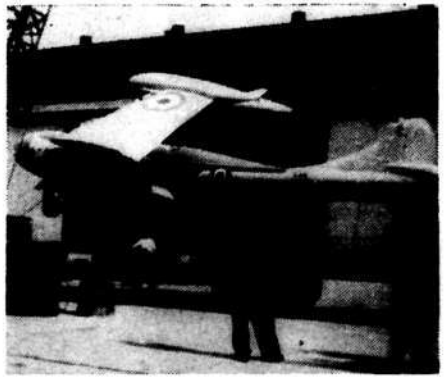
15. In addition to the electrical power requirements of a ship, for normal ship services such as lighting, ventilation, air conditioning and refrigeration, warships have an increasing need for sophisticated electrical equipment for radar and communications, weapon control systems and weapon power units.

16. The wide field, ranging from heavy electrical engineering to the most advanced electronic engineering calls for the services of officers and men with very exacting and highly specialised training.

**The Engineering Branch as a Whole**

17. I have set out some of the functions of the Naval Engineering Branch. Recent reviews of the officer and rating structure have shown that some changes are necessary to meet recent dveiopments. In particular officers duties in electrical and mechanical engineering are much more interlocked than in the past and training and careers are gradually being adjusted to meet this requirement. Thought is also being given to the possibility of training more ratings in a dual capacity as both "operators" and "maintainers". These matters present certain difficulties but they must be faced if we are to ensure that our ships when fitted with the best possible equipment are successfully maintained and operated to give maximum military service.

18. I leave it to others to set out in detail the careers which



**Engineers preparing to maintenance a Sea Venom Jet fighter.**



## An Engineer Officer at the Controls in the Engine Room of H.M.A.S. Parramatta

## One of the R.A.N.'S Latest Ships

are open to young men in the technical branches of the RAN. The young recruit rating who joins the Engineering or Electrical Branch is given every opportunity to acquire skill and experience in the various interesting fields that I have mentioned. If he has the academic ability and requisite qualities he may quickly become an officer. Apprentices are fully trained by the Navy to become skilled artificers in marine, ordnance, air and electrical engineering. Officers are entered mainly through the Naval College where on completion of their cadet training they are selected for specialisation in engineering and their further training includes periods at the Naval Engineering Colleges in the U.K. where University and Post Graduate standards may be attained. Direct entries from University undergraduates are also available.

19. From these trained officers and ratings the Naval Engineering Branch makes its valuable contribution to the Royal Australian Navy. It is not only in the ships where their duties are obvious that these men apply their special knowledge—but also in the Dockyards, Training Establishments, Administrative Headquarters and Design offices they play their important part. It is a career which for both officer and man is stimulating and progressive.

## New British Naval Construction—

# THE NAVY OF TOMORROW

Ships fitted with most advanced equipment are being built for the "Navy of Tomorrow," stated the First Lord of the Admiralty, Lord Carrington, in an explanatory statement accompanying the British Naval Estimates for 1961-62 published in London recently. For new construction £107 million sterling has been provided during the coming year. The net amount which Parliament is asked to grant is £413,200,000 sterling, which is £15,699,990 sterling more than in 1960-61. "Many of the ships, aircraft and weapons now being produced or developed will be entirely novel to the Royal Navy."

The Royal Navy is to have two more guided missile destroyers and a new type of assault ship of 10,000 to 15,000 tons, which will lower herself in the water to launch landing craft and which will have a helicopter platform. Lord Carrington also said new weapons in production include a lightweight anti-submarine torpedeo for use by helicopters and a new mine-hunting device for minesweepers.

The Navy's first front-line squadron of Wessex Helicopters should be embarked in the aircraft carrier, Ark Royal, this Autumn. The weapons being developed include an improved version of the Seaslug guided weapon, with greater range and speed, "to deal with the type of aircraft likely to be encountered during the latter part of this decade." Prominent among the projects at Admiralty Research Establishments are the long-range detection of fast, deep-diving submarines and the introduction of automatic means of handling the mass of tactical information provided by modern radar and submarine detecting gears.

### Helicopter Use

Guided missile destroyers are being armed with the Seaslug and Seacat anti-aircraft missile systems and with four 4.5 inch guns. The ships will not be used only for air defence of the fleet. "They will be thoroughly adaptable fleet units with good surface gunnery and bombardment capability, the latest submarine detecting devices and anti-submarine weapons which will include a Wessex helicopter.

The new assault ship will replace present ships of the amphibious warfare section. She will have a better range, speed and seakeeping qualities than the present L.S.T.s, will be able to deploy tanks, vehicles and men, and to serve as the headquarters ship in an assault area.

The Wessex helicopter will be the first in the navy to be able to strike submarines, as well as hunting them, by carrying a homing torpedeo and dipping ASDIC. Leander and tribal class frigates are to be equipped with Westland P-531, light torpedeo-carrying helicopter.

### Commonwealth Navies

Lord Carrington said: "The growing strength and importance of Commonwealth and Colonial Navies is heartening . . . It is also a source of satisfaction to the Royal Navy, which continues to contribute to this development in many ways. Since the war, 110 British ships, including five aircraft carriers, eight cruisers and 32 escorts have been transferred to Commonwealth and Colonial navies. New building in British yards has made a major contribution to the expansion programmes of all these navies. Five frigates will have been completed for India and New Zealand during 1960-61 and a further three frigates for South Africa are under construction." In addition, the Indian Navy's first aircraft carrier had been completed this month.

As the Commonwealth Navies developed they were able to establish their own training schools; but even so, 1,000 Commonwealth officers and ratings attended courses in the United Kingdom during 1960.

The Fourth and Sixth Submarine Divisions of the Royal Navy operated under the control of the Royal Australian Navy and the Royal Canadian Navy respectively, and the Seventh Submarine Division at Singapore helped in the training of the new Commonwealth Navies east of Suez. In addition, Royal Navy submarines made long passages to take part in joint exercises with Commonwealth navies—a vitally important service.



# THE MODERN STOKER

In the last half century there have been quite remarkable changes in the machinery installations in Warships. It is interesting to record something of the changes which have occurred in the same period to the basic operators of the machinery.

Originally the Stoker, for at least some of the time, earned his title. His primary business was firing the boilers, whether coal fired or oil over coal; a physically exacting task which after many hours using shovel devil and slice made him a formidable worker and something akin to a typhoon ashore, or so legend would have us believe. The Stoker was, in addition, a man who tackled all sorts of difficult and dirty tasks as well as his stokehold work. He received comparatively little training, his advancement was slow and any tendency to improve his status by education was more than likely cuffed out of him by his more hirsute and less intelligent Mess Mates. The requirements of the time did not call for a Stoker to have a great insight into the workings of machinery. It was operated in accordance with certain established practice and was comparatively simple in layout and function.

The principal changes in Warship machinery installations are, broadly, an increase in the numbers and complexity of auxiliary machinery, together with a reduction in the size of Boilers and Main Engines. Recent Warship machinery designs also apparently cater for a reduction in the physical size of Engineroom personnel, who, not being factory made, continue to join the Navy in the same diversity of size and shape that still defies the best efforts of the Clothing Store to kit up in wearable ready-made uniform. Accessibility, so far as these normally-shaped men are concerned, has, therefore, suffered.

While the machinery has been changing, the Engineering School and the Fleet have been continually reviewing the Training needs of the Engine Room Department. Apart from the basic Recruit Training, which has remained almost unaltered—the same drill rifles are, no doubt, still in use—the technical training given to personnel has ben increased to meet service requirements, namely, the need for informed and skilled operators and maintainers. It has not been a startling change, but has evolved with the advances in machinery design. It is not surprising that the Stoker, who no longer stokes a Boiler, should have discarded his once appropriate title for a new one which describes his duties more accurately. Tradition dies hard in the Navy and the first title created the Stoker Mechanic. This was unsatisfactory and, therefore, fortunately short lived, and the present day title of Engineering Mechanic seems more fitting.

In common with Ratings of all Departments, the Engineering Mechanic shares certain shipboard duties as did his predecessor the Stoker. He is well-equipped also by virtue of instruction in classrooms ashore and ships at Sea, to be fully conversant with the machinery under his care. Initially, he receives eight weeks' basic Engineering instruction before joining a ship. This covers the complete range of machinery which he may meet in service, but in no great detail. A consolidation period at sea follows and he then commences a course of watch-keeping and instruction on particular machinery. His knowledge of each machine is tested by examination before proceeding to the next. He is ultimately capable of starting, running and stopping all auxiliary machinery in the ship and is awarded an Auxiliary Machinery Watch-keeping Certificate. He is also taught to carry out minor running maintenance, and in similar fashion to his predecessor, the Stoker who "knew his Boiler backwards", he can change sprayers, clean boilers and work oil fuel almost by second nature.

An important change for the Engineering Mechanic is the increase in his prospects of advancement and the opening of avenues for promotion to officer rank. Again this has been an evolutionary rather than a sweeping change and at least in part is allied to the need for greater skill and knowledge and the reward for those who obtain it.

Taking into account his qualities of inherent leadership and Enginering Mechanic who has been awarded an Auxiliary Machinery Watch-keeping certificate may be recommended by his Engineer Officer for advancement to Acting Leading Mechanic and is drafted as soon as possible after advancement to a Mechanical Training Course. Here

(Continued on page 11)

(Continued from page 9)

his Technical Education is taken a step further and he spends a fair proportion of his time in workshop ilnstruction to train him to undertake more skilled maintenance tasks at sea. On results of the Mechanical Training Course Examinations he may be selected as a provisional Mechanician Candidate in which case he returns to Sea for a brief period before starting a long course of instruction in technical matters and workshop practice, which prepares him to undertake similar watch-keeping and maintenance duties to those of Engine Room Artificers. Should he not achieve the high marks necessary of Mechanician Candidate, the Mechanical Training Course graduate is technically qualified for advancement to Petty Officer Engineering Mechanic. Before advancement he must obtain a boiler room Watch-keeping Certificate at Sea and pass a Fleet Selection Board which tests his Power of Command as well as his technical knowledge.

### Promotion to Officer

Officer Rank may be obtained through either of two avennes. A promising Engineering Mechanic may be specially selected and subject to satisfactory progress may be given direct promotion to Sub-Lieutenant. In this case he is given extensive courses to fit him for his new role. Alternately a specially recommended Mechanician may be qualified at a Fleet Board for promotion to this rank. In the former case the ex-Engineering Mechanic is of an age where he fits the existing Officer structure and his further promotion is parallel to that of Officers recruited through other channels. In the latter case promotion to higher rank follows somewhat different rules and is, in general, slower.

It will be apparent from the foregoing that the training of Engine Room Department Personnel is of paramount importance, particularly in the case of the Engineering Mechanic. The Petty Officer and Leading Engineering Mechanic are now skilled both in taking charge of running machinery and in its maintenance. But with modern complex machinery, where less obvious faults can quickly lead to serious breakdowns, it is largely on the greater ability of the ordinary Engineering Mechanic that the efficiency of the Engine Room Department depends.

# AUSTRALIAN FLAGSHIP VISITS ASIA

## Exercises in Indian Ocean and South China Sea

The flagship of the Australian Fleet, H.M.A.S. MELBOURNE, sailed from Sydney at the end of January on what is expected to be her longest cruise in South East Asian waters.

The Minister for the Navy, Senator Gorton, said that the aircraft carrier would steam some 25-thousand miles on her regular annual tour of duty with the Commonwealth Strategic Reserve. It would be the sixth time she had served with the Reserve. Before returning to Australia in mid-June, H.M.A.S. MELBOURNE would, among other places, have visited India, Pakistan and Ceylon, and would have taken part in two international exercises. The two Australian warships at present serving with the Strategic Reserve, the destroyer VOYAGER and frigate QUICKMATCH, would also take part in the exercises.

Senator Gorton said H.M.A.S. MELBOURNE would be accompanied by the fast anti-submarine frigate, QUEENBOROUGH, and the New Zealand cruiser, H.M.N.Z.S. ROYALIST. The three ships would call at Melbourne (10-13 February) and Fremantle (18-20 February) on their way to the Indian Ocean.

In March, H.M.A.S. MELBOURNE would make her first visits to Trincomalee, Bombay and Karachi, accompanied by H.M.A.S. QUEENBOROUGH.

Senator J. G. Gorton

The Australian flagship would also call at Singapore and Manila, returning to Australia by way of Hong Kong and New Guinea ports.





# H.M.A. NAVAL DOCKYARD, GARDEN ISLAND

By CAPTAIN A. M. CLIFT, A.D.C., R.A.N., GENERAL MANAGER

MOST inhabitants of Sydney are familiar with Garden Island; the workshops clustered around the original hill with its sweeping lawns, trees and flower beds presenting an appearance to the harbour in keeping with its name; and beyond, connecting it to the original foreshore, the area containing the Captain Cook Dock and Workshops and dominated by the massive 250-ton crane.

But only those who have been to the Dockyard can appreciate the extent and complexity of the workshops, power houses and equipment necessary for the efficient operation of the main maintenance support for the ships of the Royal Australian Navy.

Garden Island has always been associated with the needs of the Navy. In February, 1788, Captain Hunter of H.M.S. SIRIUS sent a party ashore to clear a garden to grow vegetables for the ship's company. No other use was made of the Island until 1886 when building of workshops, stores and offices was commenced. Although the Royal Australian Navy was created in 1911 the Island was not formally taken over from the Admiralty until July, 1913.

The lessons learnt from the first world war led to a series of new type warships with more and better equipment with a consequent expansion of dockyard facilities and techniques. This was accelerated by the wartime demands of an ever-growing Australian Navy, allied ships, merchant ships and finally in the last year of the war the additional large task of supporting the British Pacific Fleet of many battleships, aircraft carriers, cruisers, destroyers and other vessels.

The 1945 maintenance task was met only by the availability of the Captain Cook Dock project, approved in 1940, and in use early in the last year of the war. The dock, which can accommodate the largest ship afloat, is supported by large workshops equipped with machines capable of handling propeller shafts, propellers and plating up to any size in use afloat. Cranage and other plant is in keeping. The additional wharf space extending from the Woolloomooloo wharves was of great value then and is today.

After the first world war, the complexity and amount of equipment in new design ships was greatly increased. This trend, in an age of rapid technical development, has continued at a rate which imposes great demands on the dockyard. The yard has had to grow to meet this demand, a growth that encompasses not only the additional capacity

An aerial photograph of Garden Island showing the Captain Cook Dock and some of the workshops.

and specialised equipment but also in the number of men of high technical ability with a bigger proportion employed in the electrical and electronic field covering radar, communications, gunnery (and soon guided missile) control systems, underwater detection equipment and underwater weapon control systems.

In modern warships, the ships' companies have little time and lack the facilities to maintain ships' equipment to the extent they were able to do in pre-war ships. Increasing use of repair by replacement means more repair of units in store. Both these factors add to the dockyard's task. This task also includes maintenance, not only of the dockyard, but also the installation and maintenance of the equipment in the training establishments such as H.M.A.S. WATSON, H.M.A.S. RUSHCUTTER, the Naval Apprentices' Training Establishment at Schofields, the Naval Air Station at Nowra and the logistic support establishments — the various stores and armament depots in the Eastern Area.

More workshops with costly but essential testing equipment are planned to keep pace with new equipment expected to be in service in the next few years. Already the area of the drawing offices alone is that of a medium-sized factory.

Associated with the development of the dockyard has been the need for improved organisation and control to run the larger and much more varied field of work which can only be covered by an increased number of specialised sections. The almost frightening cost of modern ships' equipment and the means of maintaining them demands the maximum efficiency in their use. Moreover, only this standard can reduce maintenance periods sufficiently to permit satisfactory operational availability of ships.

**Despite the popular belief that no Commonwealth facility is operated with anything like the efficiency of private enterprise, the taxpayer can rest assured that he is getting good value for his money invested in capital equipment in the dockyard and paid in salaries and wages to those who work there.**

Retaining the quality and numbers of men needed at the dockyard is an ever-pressing problem. Specialists leaving the Naval service make a worthwhile contribution, and the benefits of the long application of good apprentice training policy are now being appreciated. A large percentage of the professional officers and foremen started their careers as Garden Island apprentices. The inducements offered by private industry are difficult to counter — there is a world-wide shortage of engineers, technical officers and skilled tradesmen and the law of supply and demand operates.





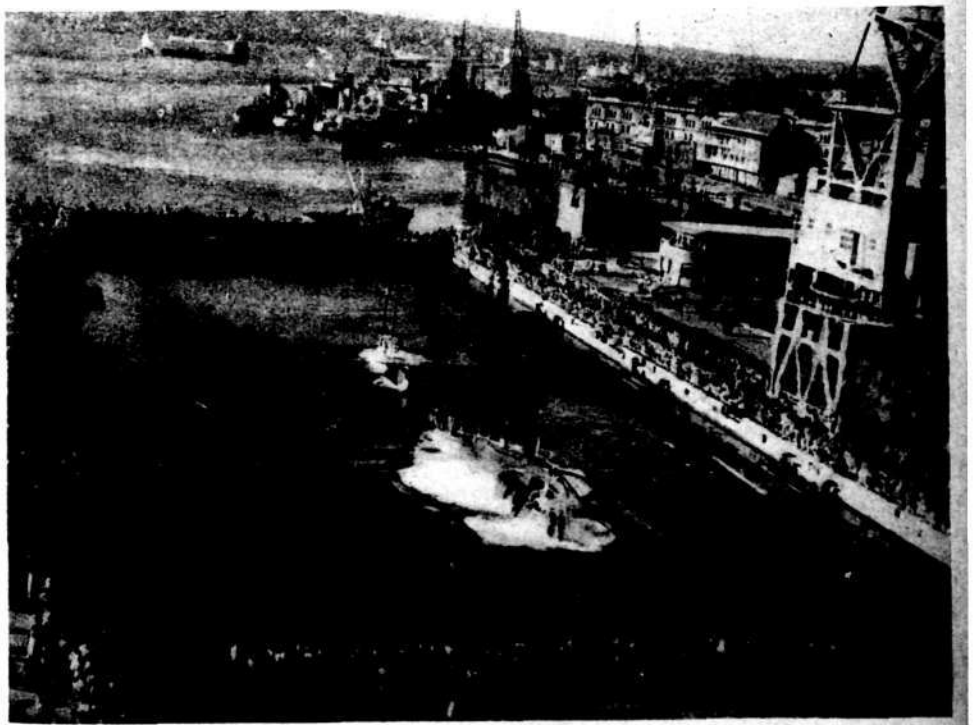
However, it is clear to most that there will always be a Navy — certainly until the distant future when world peace is possible! Security of employment for reliable men is assured — an important factor these days. Working conditions in the yard are good and amenities are good and are being progressively improved. Overseas visitors are invariably impressed with the clean and tidy dockyard, a facet which reflects the importance given to safety measures — in itself an axiomatic part of good management.

Sound, just and progressive departmental policy for employees implemented by sensible management coupled with good conditions and security of employment has made it possible to man the dockyard to do its job and leads to confidence that it can do so in the future.

A little-known aspect of Garden Island Dockyard is its value in contributing to our national development. The 250-ton crane, originally designed to cover heavy lifts such as the major components of battleship turrets, is the only crane in Australia that can handle equipment between 150 and 250 tons. Large transformers now on order overseas and the large components of future nuclear plants could not be brought into the country if we did not have the big crane.

The large dock is also a national as well as a Naval asset. While the dockyard cannot undertake work in competition with private enterprise with the corollary of jeopardising the employment of men in industry, large ships such as ORIANA, CANBERRA and the super tankers were put on the Australian run with the knowledge that the Captain Cook Dock — the largest in the Southern Hemisphere — is

(Continued on page 21)



**The size of Captain Cook Dock may be judged by the fact that a 1,200 ton submarine can submerge in the smaller section. This photograph was taken during an "Open Day" at the Dockyard.**

# Shipbuilding in the Royal Australian Navy

By Commander H. J. Bodman, R.A.N.

The first known vessel built in Australia solely for Naval purposes was the SPITFIRE, a wooden ketch which was completed in 1855 in a yard in Darling Harbour. This was followed by some small schooners intended for patrol work in the South Pacific area.

Shipbuilding prior to about 1850 had been centred in areas where supplies of timber were easily to hand, but in the latter half of the century iron hulled ships began to appear in eastern waters, and the attention of shipbuilders was directed to the larger centres where the means of working iron were available.

The principal works in Sydney, where the most important yards were established, were the Morts Dock and Engineering Company, privately owned and established in 1854, and Cockatoo Island, where the Government opened a new dry dock in 1858 for the purpose of servicing and repairing ships of the Royal Navy serving on the Australian station.

### Modern Naval Ship Construction

Not for some time after the turn of the century was construction of purely Naval vessels undertaken in Australian yards, the first important step being the re-construction of the torpedo boat destroyer WARREGO, completed in 1912 at Cockato Island Dockyard.

This ship was built in England to the order of the Commonwealth Government, then dismantled, shipped to Australia and re-erected and fitted out.

In 1912 also the first orders for modern steel warships of that period were placed in Australia, to be built at Cockatoo Island.

These were for a "Town" class cruiser, H.M.A.S. BRISBANE, and three torpedo boat destroyers, ANON, TORRENS and SWAN, known as the "River" class, all with turbine machinery.

A second "Town" class cruiser, H.M.A.S. ADELAIDE, was laid down in 1917 and was not completed until almost five years later, in 1922, due to certain important machinery and turbine rotor forgings having been sunk by enemy action during transport to Australia from England.

About the time the orders were placed for the above vessels, negotiations were in progress which resulted in the Commonwealth Government taking over Cockatoo Island as a Naval Dockyard in 1913. Extensive development followed which considerably widened the capacity of the works for building and repairing of Naval vessels, and added greater facilities for construction of turbines and boilers of high powers and modern design.

This latter advance was a most important step, observing that the replacement of the machinery components for H.M.A.S. ADELAIDE involved a delay of something over two years, at a time when warships were vitally important.

Resultant on the actual construction of ships mentioned above was developed another important facility at Cockatoo, that of drawing office capacity needed for production of working drawings and a staff capable of interpreting, modifying as necessary, and redesigning to meet changing requirements.

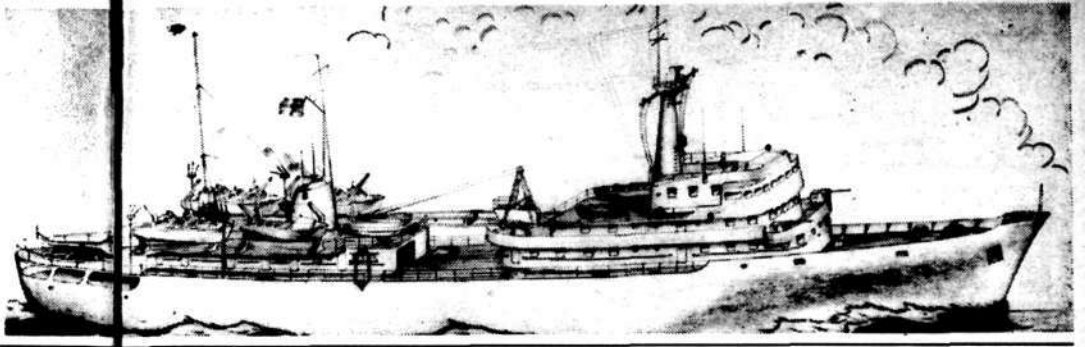
This was to become most significant in later years and less fortunate circumstances, and will be referred to in paragraphs dealing with World War II expansion of warship construction.

During the period from 1918 until the beginning of World War II, warship construction reached a very low ebb, with only one yard, Cockatoo Island, employed on this work, and only one new project undertaken — H.M.A.S. ALBATROSS, a seaplane carrier laid down in 1926 and completed in 1928 to Admiralty design. This project was notable as representing the largest warship construction in Australia up to that time.

One further vessel, a pilot ship, was completed in this yard before it was decided to lease the works to a private company, and thereby avoid the steady and considerable annual drain on public funds by allowing more efficient use of its capabilities in open competition with private industry.



## NEW SURVEY SHIP



Following the lease agreement in 1933 an order was placed by the Commonwealth with the newly formed Cockatoo Docks & Engr. Company for a turbine driven Naval escort vessel, H.M.A.S. YARRA, to be followed by a second one, H.M.A.S. SWAN, in 1934. These were completed in 1935 and 1936, respectively.

There was no further Naval construction undertaken until 1938, when a boom working vessel, H.M.A.S. KOOKABURRA, was laid down.

Two further escort vessels, H.M.A.S. PARRAMATTA and WARREGO, were commenced in 1938 and 1939 and work on these was still in hand at the outbreak of World War II, as well as another boom working vessel, H.M.A.S. KANGAROO, completed in March, 1940.

### Warship Construction During World War II, 1939-45

The situation at the outbreak of war in 1939 was that only one yard in Australia was engaged on Naval ship construction and modernisation, i.e., Cockatoo Island.

Work in hand consisted of:

Fitting out escort vessels PARRAMATTA and WARREGO.

Building boom working vessel KOALA, laid down June, 1939.

Preparation for laying down boom working vessel KANGAROO.

Preparations for construction of "Tribal" class destroyers (RAUNTA and WARRAMUNGA).

Immediately before this, various other modernisation and conversion projects had been undertaken, the most important being modernisation of the County class cruiser AUSTRALIA, including fitting of side armour, modernisation of H.M.A.S. ADELAIDE, conversion of one liner to an armed merchant cruiser, and other supply ship conversions.

From the above it can be seen that a large volume of work in the few years before 1939 had been progressively undertaken and as a direct result of this the organisation at Cockatoo was already on a basis which allowed of rapid expansion at the beginning of the war.

Considerable potential existed in most parts of Australia for shipbuilding, but the immediate need at the outbreak of war was for warships, and Cockatoo Dockyard was the only yard with experience in building them.

Moreover, they were already committed in a Naval programme and could not for a time undertake further new construction projects.

A most pressing problem which faced the Government and the Naval Board was that of finding a way to build warships in yards many of which had not only no experience but had abandoned shipbuilding in favour of general engineering due to lack of orders in the pre-war period.

The solution to this lay in the experienced organisation already in being at Cockatoo, and the capacity of that yard to build engines and boilers at a greater rate than their own construction required.

How efficiently this was achieved is shown by the great number of ships completed in the six-year period by a number of firms in various parts of the country, all of whom obtained drawings, templates, and technical advice and assistance from Cockatoo, as well as all but a small proportion of the boilers and propelling machinery.

Approximate numbers of ships built are:

Destroyers—3.

Frigates — 12 ("River" class.

Corvettes—56 (also called minesweepers and of various classes).

Boom defence vessels—2.

These were built in six yards, including Williamstown Naval Dockyard, which was taken over by the Department of the Navy in 1942 from the Melbourne Harbour Trust, although already engaged in Naval Construction.

Many other craft such as fuel lighters, tugs, etc., were also built during these years, and very extensive repairs to about 40 war damaged ships of four other Navies were successfully achieved.

The end of the war was followed by extensive re-conversion of ships for return to their peaceful uses, and by modernisation of Naval vessels.

New construction took the form of two "Battle" class destroyers, one built at Williamstown Naval Dockyard and one at Cockatoo Island in Sydney, carried on at the same time as conversions of destroyers to fast A/S Frigates, and modernising of destroyers.

At this time, attention was also being directed to all-welded construction, and a great deal of preparatory work, training and study was undertaken at both Naval building yards, with the major part at Cockatoo, where greater drawing office capacity existed.

The first application of modern prefabrication and welding techniques was in the post-war designed, all-welded "Daring" class ships.

These, basically designed by the Admiralty, were extensively modified by the Navy Office design staff before orders for four were placed—two at Cockatoo and two at Williamstown. The second Williamstown ship was later cancelled, due to financial restrictions, before work on the hull began.

The Admiralty concept in the Daring design was closely adhered to in the Australian version, and represented a big departure from previous Naval practice.

This was an attempt to build ships which consisted as far as possible of interchangeable parts and thus permit a "repair-by-replacement" policy for maintenance, intended to reduce the work required of ships' staffs to keep the ships operating.

In practice this has proved a very expensive method of operating a modern, high-powered complex war vessel, and a compromise has necessarily been reached. Nonetheless, the principle remains as an aim which is kept in view during design.

Of interest also is the method of construction made practicable by the adoption of all welded ships, that of prefabrication.

The degree of prefabrication depends in practice on the facilities available in any given yard, but in all cases it consists of building up large sections or panels in special jigs, and then transporting them to the building berth for final welding in place as part of the structure.

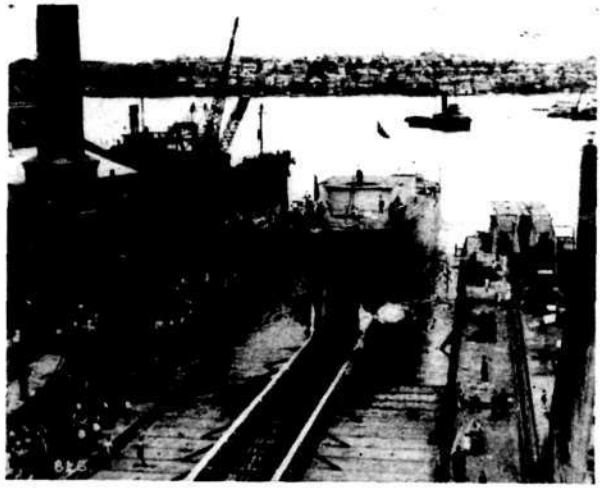
This method was used in all three Daring class ships, and also for the next programme which consisted of fast anti-submarine frigates. Initially six of these ships were ordered, but the number was later reduced to four, two of which are now completing, and two due for launching shortly.

They were all built to the system outlined above, and all main engines and boilers were built at Cockatoo Island.

Once again Williamstown Naval Dockyard and Cockatoo Docks & Engineering Company shared the order.

The foregoing is a general outline of Naval shipbuilding in Australia to the present day, when an uncertain international situation, rapid technical advances in weapons and weapon systems, the threat of the nuclear submarine, guided weapons, and a multitude of other conflicting factors have made the decision as to types and numbers of ships best fitted to defend the nation, a very difficult and hazardous one indeed.

This, then, is the problem confronting the Naval Staff, and until it is possible to reach a solution there can be no question of committing the available shipbuilding capacity to a lengthy and expensive programme of vessels which may well become useless, or of very limited value, before they are even launched.



H.M.A.S. VOYAGER Launching



### Organisation in the R.A.N.

The following notes outline the organisation responsible for the building of ships for the Royal Australian Navy:

The Third Naval Member, in his capacity as Chief of Naval Technical Services, is responsible for all matters relating to Naval ship construction. He is assisted in this task by the various technical Directors, whose work is co-ordinated by the Deputy Chief of Naval Technical Services, and who are generally responsible for the procurement of equipment and materials — although this function has now been largely transferred to the Director of Naval and Air Stores, responsible to the Fourth Naval Member.

The planning of shipyard work, estimates, and control of expenditure, primarily a responsibility of the Chief of Naval Technical Services, are co-ordinated by his Deputy and regulated in one of two ways—in Naval dockyards by the General Manager, who is also responsible for proper overseeing of the work, and in private yards by the General Overseer in the area through. in the case of Cockatoo Docks and Engineering Company, a resident Principal Overseer.

Supporting the overseers, whether they be self-overseeing as in Naval Yards or overseeing private contractors, a General Overseer in each area controls and overseas the manufacture of materials and equipment by industry generally for supply and fitting to ships under construction. Actual procurement of this material is, however, the responsibility of the Supply organisation as indicated above.

Quite a volume of equipment comes from overseas, particularly Britain, and once again procurement is initially the responsibility of the Director of Naval and Air Stores. In

(Continued on page 20)

# HELICOPTER DETECTS AND HOLDS NUCLEAR SUBMARINE

Among reports of the N.A.T.O. naval exercise in the North Atlantic and Arctic at the end of last year, "The Times" Naval Correspondent had an interesting note. He was watching the exercise from H.M.S. ARK ROYAL, which had just established a new record for the largest number of daily sorties from a British carrier since the new generation of aircraft — Scimitars and Sea Vixens — came into service.

He continued his report: "In addition during daylight there is continuous flying by helicopters from this carrier and the flagship HERMES on anti-submarine patrol using dipping asdics. This has produced a notable success in that a helicopter from the HERMES located and held the nuclear submarine TRITON in the role of enemy for so long that official opinion here was that she could have been destroyed under war conditions. Six contacts were, in fact, made with the TRITON followed by three successful attacks, two with aircraft and one by the fast anti-submarine frigates ZEST and UNDAUNTED.

"Ability to locate and hold the position of a fast moving nuclear submarine must be regarded as one of the satisfactions of this exercise since something like invulnerability has long been claimed for them. Captain Hill-Norton, commanding ARK ROYAL, regards the helicopter achievement as a landmark in anti-submarine effort."

This correspondent referred to the point again in a brief survey of the results of the exercise. Among points mentioned, he wrote that: "On the air side, the exercise has been a considerable success; maintenance crews have kept the aircraft flying, the system of briefing pilots after take-off has worked well, and developments in employment of the early warning system by Gannets are now showing a great advance.

"In the anti-submarine field, the position gives no cause for complacency, although some successes have been claimed against fast nuclear submarines.

"The Flag Officer Aircraft Carriers, Rear-Admiral R. M. Smeeton, who commanded the British carrier striking group under his N.A.T.O. post, said that he believed the claims of the submarine to sink a carrier almost at will were not fully justified. While recognising that the submarine was still a very real menace, high speed and evasive steering offered a sporting chance against conventional submarines."

## Nuclear Submarines Noisy

Following the launching of the DREADNOUGHT, Britain's first nuclear submarine, by Her Majesty the Queen, there has been a lot of comment in British papers regarding this class of submarines.

This was one of the comments by the Defence correspondent of "The Guardian":

"The DREADNOUGHT'S main problem will be the high noise level of its engine, which is caused by the primary cooling circuit of the nuclear reactor. Noise travels far in water and is still the main means of detection for submarines. The Americans are making a strenuous effort to solve the problem with the new "Thresher" class of nuclear submarine, which will be at sea after 1962. Ultimately, they hope to convert the heat of a nuclear reactor directly into electricity — and thus achieve a very quite submarine."

### SHIPBUILDING IN THE R.A.N.

(Continued from page 19)

many instances, however, this is standard Naval equipment, manufacture of which is under the control of the Admiralty, in which case the latter is requested to procure it for the R.A.N., a system which makes convenient use of the Admiralty overseeing organisation.

During construction of a ship, a comprehensive programme of tests, trials and inspections is carried out.

This commences soon after launching and goes on continuously until the time at which the ship is formally handed over and accepted by the Navy.

All branches of the Service are involved within their special spheres, and their comments and suggestions at each inspection are put forward for final decision by the Naval Board as to whether they are to be incorporated in the ship.

The actual people who carry out the inspections and conduct tests and trials are officers and senior ratings who may themselves be called on to serve in any of the ships they inspect. By this means, it is hoped, we can achieve the object for which the whole complex organisation exists — the best ship possible for its purpose.



(Continued from page 14)

available at Sydney should emergency docking and repair be necessary. In recent times large emergency repairs were made to R.M.S. HIMALAYA of 28,000 tons and the ore carrier M.V. MOUNT KEIRA.

This completes a broad picture of the large industrial establishment covering 50 acres and colloquially known as "the Island."

The whole Department of the Navy exists for one fundamental purpose — to keep the fleet fit for operation at sea. The maintenance of the fleet is an important part of that purpose and the dockyard at Garden Island is the backbone of the maintenance structure. The yard is proud of its tradition of a high standard in all its work and has met, and will meet, all challenges set by the continuing introduction of new machinery and equipment.

# *Apprentices to Build Steel Yacht*

Apprentices at H.M.A.S. NIRIMBA have commenced the construction of a 40-foot, steel-hulled yacht.

Captain B. Mussared who announced the project at the last passing-out of apprentices said:

"Naval Board has approved the project.

"Mr. Williams, owner-skipper of CHERANA, winner of the 1959-60 Hobart yacht race, has presented a set of plans designed by Mr. Allen Payne, who is at present designing the Australian contender for the next American Cup."

The apprentices will carry out the work during their spare time and it should prove of great practical value to their training.

Many of the apprentices are members of the Royal Naval Sailing Association and have taken part in many of the Association's regattas with great success.

It is anticipated that when the yacht is completed, it will compete, with a Navy crew, in the annual Sydney to Hobart yacht race.

TAM-O-SHANTER, which is entered by the Royal Australian Naval College, is the only Navy-manned entry to participate in the race.

# APPRENTICES AT THEIR LATHES

**Naval apprentices at H.M.A.S. NIRIMBA receive a thorough technical and educational training to equip them for the time they will have to deal with the complicated machinery of a modern warship.**

# S.S. Oriana—Her Engines

When S.S. ORIANA recently arrived in Australia, much was written about her size, her food, her accommodation, but little, if any, was written about her engines.

To those of you who are keen on engines, the following may be of interest.

The vessel is propelled by twin screws, each driven through double-reduction gearing by a set of steam turbines (H.P., I.P. and L.P.) of "Pametrada" design. The total normal service shaft horsepower is 65,000 at 147 propeller revolutions per minute and the total maximum designed shaft horsepower is 80,000 at 157.5 propeller revolutions per minute.

The astern turbines have been designed so as to be capable of developing 65 per cent. of the normal service shaft horsepower.

The steam is to be supplied to the turbines at a pressure of 700 p.s.i.g. and a temperature of 950 deg. F.

The H.P. turbine is of the all-impulse type consisting of one impulse wheel with two rows of blades followed by eight single row impulse wheels machined out of the forged steel rotor. The H.P. turbine is fitted with nozzle control valves for efficient operation throughout the normal service power range. These control valves are arranged in a separate nozzle box of tours design.

The I.P. turbine is of the all-impulse type consisting of nine single row wheels machined out of the forged steel rotor. Bled steam for feed heating is to be taken from this turbine before the 4th and 7th stages at 97 and 45 p.s.i.g., respectively, at maximum power.

The L.P. turbine is of the double flow mixed impulse reaction type consisting of four single-row impulse stages followed by six reaction stages. All wheel discs are machined out of the forged steel rotor.

The H.P. astern turbine consisting of one two-row impulse wheel is overhung at the forward end of the I.P. turbine. The L.P .astern turbine consisting of two separate impulse wheels is incorporated in the forward end of the L.P. turbine cylinder.

The H.P., I.P. and L.P. turbines are designed to run at 4,085, 3,588 and 2,918 revolutions per minute, respectively, at the maximum power.

The two main condensers, which are designed to be capable of maintaining 28 inches vacuum with sea temperature of 86 deg. F., are of the Weir "Regenerative" type. Each condenser has 10,100 cupronickel tubes giving a cooling surface of 32,000 square feet. The total length of tubes in both condensers is 62? miles.

Each turbine drives the main gear wheel through double helical articulated gears consisting of one primary pinion, one primary wheel and one secondary pinion. Each turbine drives its own primary pinion through a small-toothed flexible coupling.

The propellers are of the solid four-bladed type, 20 feet diameter, of nickel-aluminium-bronze each weighing approximately 29 tons.

### The Boilers

Steam is supplied by four water tube boilers of Messrs. Foster Wheeler external superheater design. They are arranged with air attemperators to maintain the superheat constant at 960 deg. F. at the superheater outlet while at sea and to reduce the superheat to 825 deg. F. for manoeuvring. The superheater outlet pressure is maintained constant at 750 p.s.i.g. The combustion, steam-pressure and temperature are all automatically controlled by Bailey Automatic Control Equipment of the latest design.

All boiler drums are fusion welded and are made of open hearth steel. The air to the furnace is to be preheated to 230 deg. F. by Serck non-ferrous bled steam air heaters. The boilers are fitted with cast iron gilled economisers designed for a feed inlet temperature of 240 deg. F.

The heating surface of each boiler is as follows:

Boiler heating surface, 3,755 square feet.
Economiser surface, 19,920 square feet.
Superheater surface, 8,550 square feet.

The boilers are designed to burn oil fuel only under balanced draught. Suitable motor-driven forced and induced draught fans are fitted for this purpose.

The oil fuel burning installation is by Joseph Lucas Ltd., consisting of four pumping and heating units. Only three units are required to be in use at maximum power. Each unit consists of a low pressure and high pressure pump and low temperature and high temperature heater. The Bailey automatic combustion control equipment operates one oil fuel spill valve on each boiler.

The high temperature oil fuel heater has sufficient surface to maintain the fuel oil at 300 deg. F. The steam supply is controlled by means of a "viscostat" to maintain the fuel oil at a constant viscosity for efficient combustion. The burners are of the suspended flame type and are operated with oil fuel at 500 p.s.i.g.





# MONTHLY LIST OF INTERESTING HISTORICAL DATES

## FEBRUARY

**1st**

**1944** 4th Mr. Div. Landed on Roi and Namur, 7th Inf. Div. on Kwajalein Island, in Kwajalein Atoll, Marshall Isands.

**2nd**

**1941** El Agheila reached.

**1943** H.M.A.S. WYALLA attacked McLaren Harbour.

**3rd**

**1942** HOBART rescued passengers and crew of British ship NORAH MOLLER bombed and set on fire.

**1945** 511th Prcht. Inf. (11th A/B Div.) seized Tagaytay Ridge, Batangas by parachute drop.
1st Cav. Div. entered Grace Park, Manila.
U.S. Forces enter Manila.

**4th-12th**

**1945** Assault on Ryuku Islands.

**5th**

**1941** Benghazi captured.

**1942** H.M.A.S. YARRA rescues 1,800 troops from burning ship EMPRESS OF ASIA at Singapore.

**9th**

**1943** Evacuation of Guadalcanal announced by Tokyo Radio.

**10th**

**1942** First Jap landing in New Guinea—Finschhafen.
Gasmata (New Britain) occupied.

**1944** Juncture of elements 32nd Inf. Div. and 8th Aust. Bde. (5th Div.) at Jagomi, East of Saidor.
Patrols 1st Mar. Div. and 112th R.C.T. establish contact on New Britain.
GG Sixth Army terminated Dexterity Operation (Western New Britain and Saidor).

**13th**

**1942** British Ship DERRYMORE torpedoed 7 miles S.W. of Swatcher Is. (Northwest of Batavia).

**14th**

**1942** First landing on Sumatra.
DERRYMORE survivors rescued by H.M.A.S. BALLARAT.

**15th**

**1942** Singapore surrendered. Fall of Singapore.

**1944** Green Island Landing (elements 3rd N.Z. Div.).

**1945** Landing at Mariveles, Bataan by 151st R.C.T.

**16th**

**1943** Sixth Army established in S.W.P.A.

**1944** Naval Task Force struck Truk.

**1945** Corregidor Landings in which H.M.A.S. SHROPSHIRE, ARUNTA and WARRAMUNGA assist U.S. Forces.
5th Fleet struck Tokyo and Hagoya-Kobe areas.

**17th**

**1942** Port Timor occupied.
H.M.A.S. SWAN, WARREGO, VOYAGER, ARMIDALE and CASTLEMAINE escorting convoy to Koepang, heavily attacked by aircraft.

**1944** Naval Task Force struck Truk.
Eniwetok Landing.
5th Fleet struck Tokyo and Nagoya-Kobe areas.

**18th**

**1942** H.M.A.S. BURNIE stood by at withdrawal at Singapore and embarked rearguard.

**1945** American Landing on Iwojima in the Volcano Islands.

**19th**

**1942** Air Raid at Darwin, ships there included H.M.A.S. SWAN, PLATYPUS, GUNBAR, CONGOOLA and MANUNDA.

**1942** Japanese Air Raid on Darwin; numerous R.A.N. Ships engaged, U.S.S. PEARY lost and number of merchant ships.

**1945** Iwojima Landing.
Landings on North-west tip of Samar, Capul and Biri Is. in San Bernardino Strait by elements American Div. and 1st Philippine Inf. Regt.

**20th**

**1942** Evacuation of Sumatra. H.M.A. Ships assisting included GOULBURN, BURNIE, WOLLONGONG, BALLARAT and BENDIGO.
Timor invaded.

**1945** Landings on North-west tip of Samar, Capul and Biri Is. in San Bernardino Strait by elements American Div. and 1st Philippine Inf Regt.

**21st**

**1943** Russell Islands landing.

**22nd**

**1941** H.M.A.S. STUART and VAMPIRE join R.A. 1st Battle Squadron for operational sweep towards Rhodes.

**1943** Northern Solomons Campaign — 22nd Feb., 43—21st Nov., 44.

**23rd**

**1944** Naval Task Force struck Mariannas.

**25th**

**1945** Bombardment of Wewak-Aitape area by H.M.A.S. SWAN.
Last organized enemy resistance in Manila overcome.

**26th**

**1942** Java Sea Battle. H.M.A.S. HOBART and PERTH in action.
**1943** U.S.A.F.F.E. reconstituted.

**27th**

**1942** Battle of Java Sea.
H.M.A.S. HOBART slightly damaged and casualties caused by bomb attack in West Java Sea.

**28th**

**1942** Battle of Java Sea.
**1945** Palawan Landing in vicinity of Puerto Princessa by 186th R.C.T.
Destruction of Japanese on Corregidor virtually complete; Manila Bay open to Allied shipping.

**29th**

**1944** Landing at Admiralty Islands, H.M.A.S. SHROPSHIRE and WARRAMUNGA included in these operations. also H.M.A.S. ARUNTA.

**MARCH**

**1st**

**1942** H.M.A.S. PERTH sunk in Java Sea during night attack in Sunda Strait.
Japanese invaded Java.

**2nd**

**1942** Japanese air raid on Broome caught refugees from Java.
Evacuation of Java, H.M.A. Corvettes BALLARAT and BURNIE assist.

**3rd-5th**

**1943** Bismarck Sea Battle (destruction of Lae Convoy by Fifth Air Force and R.A.A.F. —18 out of 22 ships in convoy sunk).

**4th**

**1941** H.M.A.S. CANBERRA with H.M.S. LEANDER intercepted and sank German vessels KETTY BROVIG and COBURG in Indian Ocean.
**1942** H.M.A.S. YARRA lost off Tjilatjap. Attacked by vastly superior enemy force while escorting convoy from Java to Australia.

**4th-7th**

**1944** Bombardment of Hauwei Island, Admiralty Group, included H.M.A.S. SHROPSHIRE and WARRAMUNGA.

**5th**

**1944** Landing at Mindiri,W. of Saidor, by elements 32nd Inf. Div.

**6th**

**1944** Landing on Willaumez Peninsula, vicinity of Talasea, by elements 1st Mar. Div.—H.M.A.S. SHEPPARTON assists.
**1945** Capture of Meiktila announced.

**8th**

**1942** British evacuated Rangoon.
Lae-Salamau captured.

**8th-28th**

**1944** Jap. assault on Empress Augusta Bay perimeter repulsed by 37th Inf. and American Divs.
**1945** Talasea captured by elements 1st Mar. Div.

**9th-17th**

**1945** Bombardment of Open Bay Area, H.M.A.S. SWAN.
41st Inf. Div. (–186th R.C.T.) landed near Zamboanga, Mindanao.

**11th**

**1941** Lend-Lease Act signed by President Roosevelt.
**1944** H.M.A.S. ARUNTA, in company with U.S. ships, bombarded Seeadler, closing to within less than 4,000 yards.

**14th**

**1944** H.M.A.S. BENALLA carried out survey of Seeadler Harbour during height of bombardment.
Manus Island landing.
**1945** Final clearance of Volcano Islands. Japanese casualties, 21,000 killed. U.S. casualties, 4,189 killed;, 15,749 wounded.

**15th**

**1943** South-west Pacific Force re-designated Seventh Fleet.
**1945** Basilian Island (Sulu Archipelago) landing by elements 41st Inf. Div.

**17th**

**1942** General MacArthur arrived Darwin, Australia.

**18th**

**1944** Lorengau captured by 2nd Cav. Brig.
**1945** Panay Landing, 13 miles W. of Iloilo, by 40th Inf. Div. (–108th R.C.T.).

**19th**

**1941** H.M.A.S. WATERHEN salvaged burning merchant ship MARIE MAERSK in the Mediterranean.

**20th**

**1944** Emirau Landing (4th Mar. Regt.).
**1945** Capture of Mandalay.

**23rd**

**1942** Japanese occupy Andaman Islands.

**(Continued in next issue).**



**An aerial view of the War Memorial Chapel at H.M.A.S. WATSON which was dedicated on the 4th March, 1961.**

# THE NAVY IN A PERIOD OF CHANGE

**An Address by The Right Hon. Lord Carrington, P.C., K.C.M.G., M.C., First Lord of the Admiralty to the Navy League.**

MAY I first of all thank you most warmly for having done me the honour of asking me to this luncheon today, and may I also say how sorry we are that Admiral Sir Ralph Edwards has resigned from the chairmanship of the Navy League: I know how hard he worked for you.

But at the same time, on behalf of the Board of Admiralty, I welcome most warmly Admiral Cazalet in his place.

You have, of course, asked me here this afternoon to say something about the Royal Navy, and it so happens that exactly one year ago today I became First Lord of the Admiralty. It has been a very full, a very enjoyable, and a very educative year. I have visited all the major commands at home; and I have been to Gibraltar, Malta and the Persian Gulf. It is very necessary for all of us on the Board of Admiralty to get about and see the Fleet as much as we can. Generally speaking, it is only the things which go wrong which arrive on our desks. But when one visits the Fleet, one can see that though we in the Admiralty are far from perfect, there is certainly nothing wrong with the Navy.

Perhaps I may begin by saying one or two things about the relationship between the Navy League and the Admiralty. It was Admiral Edwards who suggested to me that we ought to get together a bit more often, and I most whole-heartedly agreed with him. We have arranged a series of meetings with your Policy Committee — we had the first one about two or three months ago — which I think has proved, and will prove, useful to both of us, because we have a common aim: to see in being an efficient and well-equipped Navy, ready and able to carry out its vital role. It is as important for you to know what we are thinking as it is for us to know your views and opinions.

It is perfectly right and proper, if I may say so, that the Navy League should be enquiring searchingly into the Government's naval policy. It is of great value to us that you should act as a goad when you think that we are failing in the job we have set ourselves. At the same time, it is to you that we turn first and foremost for appraisal and comment on the Admiralty's policy, which we believe to be soundly based and to have the broad confidence of the people of this country. We are partners, not antagonists, and the more we see of each other the better.

We are celebrating today the greatest naval event in our history, and in doing so we have been paying our tribute to the great past of the Royal Navy. That is just as it should be, because it is in the past that the traditions — and never let us underestimate the value of tradition — of the Navy are rooted. But although we may draw strength from the past and refresh ourselves with the courage and enterprise of our forebears, we must look to the future; and it is fitting that on this anniversary of Trafalgar, the Royal Navy has entered into a new age by launching a new ship with new propulsion — a ship which I hope will be the symbol for the Navy's future greatness. It is, of course, obvious to all of us that we have in the last 15-20 years lived through a period of revolutionary change. However much we may be tempted to do so, we must never, in any circumstances, base our policy for the future on nostalgia for the past.

### Nuclear Age

What is this new situation to which we must adjust ourselves? The causes of it are, I think, twofold: the coming of the nuclear age, bringing with it the dominance of the two vast opposing industrial powers of the United States and Russia, and our own changed economic position, for our ability to sustain a defence programme is directly related to the strength of our economy. How very simple it must have been — although I have no doubt it didn't appear to be so — to those who were in control of our defence policy 200, 60, and even 30 years ago. War was not total, global war did not mean total destruction, armaments were relatively simple and comparatively inexpensive. When we were at peace, we were not engaged as we are now, in a perpetual struggle in which the chief weapons are not arms at all.

Our first contribution today to the stability and peace of the world lies, I suggest, in maintaining our influence, and with it the influence of the West, in as many parts of the world as we can. This means increasing our overseas trade. In the old days trade followed the flag. Today, I think the flag follows trade. It means contributing to the economy of the under-developed and uncommitted nations; and it means playing an effective and increasingly important part in the economic and psychological phase of the cold war. I do not believe we can do this if our economy is weakened, and although we have recovered pretty well since the war, it is useless to pretend that our resources are what they were in pre-war days. And so with our resources we must in matters of defence strike a balance between the risks of doing too much and those of doing too little.

But there has been another remarkable change in the last 20 years. No longer are we alone in defending our interests and, whether we like it or not, we are inextricably bound up with the other nations of the West whose cause, which is our cause, can only be defended by alliance and co-operation. We have to think in terms of the Western community. We have to think in terms of the Commonwealth and of the Anglo-American Alliance. But at the same time, we no longer need contemplate our single-handed defence against a major aggressor: it is with combined strength that we must meet the threat from the East. Against this background — and I do not apologize for saying what must be very obvious — we must assess the nature and size of our defence commitments and the forces with which to carry them out.

What is this threat to our safety and what are our commitments? The threat, I suppose, takes many forms. It has a nuclear form as well as a conventional form. It appears on land, in the air, as well as at sea. It is a direct threat in the West; an indirect threat in the Middle East; and an imponderable threat in the Far East. Perhaps if we used all the resources at our disposal, we could match one threat fully in one of its forms, but not the others. Rather we must make a balanced contribution to the common defence and, in doing so, we shall, I think, provide ourselves with the best means of carrying out our own particular responsibilities in the areas where we may have to act from time to time without the help of our allies.

### Defence Expenditure

These, it seems to me, are the realities of the situation, and it is on these realities that we have to assess our defence needs, which are in competition with all the other claims on Government expenditure — education, roads, aid to the under-developed, welfare, and all the rest of it. And he would be a sanguine man who would look into his crystal ball and say that in the future a much larger share of our national resources can be devoted to defence. Having been given their slice of the cake, the Admiralty has now got the very difficult task of cutting it into the right pieces of the right shape and satisfying all its hungry and rapacious children.

What are we to do with our money? Are we to have a larger Navy composed of older and simpler ships? If so, can we man them? Are we to have a smaller Navy consisting of new and modern ships with their life in front of them? Well, we have chosen the latter, and I am quite convinced that this is the right answer. I do not believe for one moment that the Royal Navy can afford to be second-rate. If we are going to have a Navy, it must be first-class.

We are carrying out a continuous programme of new construction. Since 1956 we have built no fewer than 35 new frigates — and many of them of a new type, "Type 81" and "Type 12," or the "Whitby" class, which compare more than favourably with those of other classes. We have now put in hand an improved version which we are calling the "Leander" class. We are planning to give these, as part of their anti-submarine

capability, a helicopter carried in the ship.

We are continuing with our programme of new submarines, both nuclear and conventional. You will remember that we have ordered the second nuclear submarine: but we must not lose sight of the great value of conventional submarines of the "Porpoise" and "Oberon" class. Not only are these very much less expensive to build, but we have concentrated on making them as silent as possible, a very important quality for the task they have to perform.

With the new "County" class of guided missile destroyers, of which the first, the DEVONSHIRE, was launched by Princess Alexandra in June, we are entering the guided missile field. These ships will be armed with Seaslug, a missile of great capability against the threat with which we are faced in the next few years. But these ships are not just guided weapon carriers — I would emphasize this; they will also have a powerful anti-submarine capability, and a gun armament. They are both formidable and versatile.

H.M.S. BULWARK, the new Commando carrier, commissioned for the first time this year, represents a new form of naval activity. With her capacity for the rapid movement of Royal Marine Commandos over great distances, she constitutes a big increase in the strength of the Royal Navy. As you know, we are taking H.M.S. ALBION in hand for conversion to Commando carrier next year.

In addition, our aircraft carriers, with their modern aircraft and their quite remarkable radar, add significantly to the naval striking power of the West. I would like to emphasize the important part which the Fleet Air Arm is playing in our future plans. We have recently commissioned the new aircraft carrier H.M.S. HERMES. We are giving the EAGLE an extensive modernization to bring her up to the latest standards. New aircraft such as the Sea Vixen and the Buccaneer will immeasurably improve the Fleet's strike and defensive power. We plan to use helicopters more and more widely, not only in the Commando carrier, but also in our escort vessels. I can promise any young man who is attracted by the thought of flying with the Navy a full and satisfying career as a naval officer.

### The Future

What of the future? Well, you will hardly expect me to be too precise about that.

We are at the moment discussing the problem of a new generation of aircraft carriers and, perhaps even more important, the aircraft which would go with them, because on the aircraft would depend the size and shape of the ship.

We are also considering the best form of replacement for the ships of the Amphibious Warfare Squadron. And many of you must be wondering about Polaris, that remarkable missile system developed so speedily and successfully by the Americans. For the time being the British nuclear deterrent is predominantly in the hands of the R.A.F. However, should circumstances change, and the Government decide in the future that Polaris is to be our deterrent, then I am confident that the Royal Navy will be able to provide it. We are keeping in touch with developments on the other side of the Atlantic; and, of course, the DREADNOUGHT will give us valuable experience of the operation of nuclear-powered submarines.

I hope you will not think I am being complacent: nobody who is in my position can be that. Of course, every First Lord, every Board of Admiralty, would like more ships, but I hope that in what I have said I have at any rate given some idea of the complexities and difficulties which face us, as well as the vastly increased price of everything, both in money and manpower. But if the ships of the Royal Navy are fewer than they were 10 years ago, they possess a vastly greater capability than their predecessors, and I know they are giving us good value for money. Certainly we make a significant contribution to the combined strength of the navies of the Western Alliance.

### The Policy

Above all — I speak as someone who has come from the outside to look at the Navy with different eyes perhaps from all of you — one cannot but be overwhelmingly impressed with the spirit and efficiency of the Fleet.

I hope I have convinced you that the policy which we are pursuing is the right one, a policy not only dictated by economics but by sound commonsense. I hope you will perhaps help us in three ways: First of all, by impressing upon the public the growing importance of the Navy in a world where bases are less secure and mobility more and more important. Secondly, by educating the public in what is involved in maintaining a first-class Navy. And lastly, by helping us to stimulate recruitment, both of officers and ratings, because a career in the Navy today is as fine, as worthwhile, and as satisfying as ever it was in the past.

It is a great honour to be a member of the Board of Admiralty, and I know that I speak for all my colleagues when I say how very conscious we are of the responsibility that that membership places upon us. Upon our decisions depend the future well-being, efficiency and equipment of the Royal Navy. We shall do our best to carry out that task.

# U.S. Navy Antarctic Expedition

Observers believe that the present U.S. Navy expedition to the Antarctica is the biggest in the history of exploration in this continent.

Plans for "*Deep Freeze 61*", the operation code name for the expedition, include:

An attempt by icebreakers to penetrate the Amundsen Sea, the last unexplored coastal section.

Preparation of a site for the building of an atomic power house at the main coastal base at *McMurdo Sound*, 2,500 miles south of New Zealand.

The expedition will be under the command of Rear-Admiral D. M. Tyree and Captain E. A. *McDonald* will be in control of the seagoing force.

Ships taking part will be:—

Four Icebreakers — U.S.S. STATEN ISLAND, GLACIER, EDISTRO and EASTWIND.

Three Cargo Vessels—U.S.S. ARNEB, U.S.N.S. PRIVATE JOHN R. TOWLE and U.S.N.S. GREENFIELD VICTORY.

U.S.C.G. EASTWIND, one of the Polar Expedition ships.

One Tanker — U. S. N. S. ALANTA and one Air Guard Ship, U.S.S. WILHOITE, which will maintain a patrol between New Zealand and Antarctica while air operations are being carried out.

### Aircraft Participation

In addition 22 aircraft of the U.S. Navy's airborne wing, Air Development Squadron 6 (VX6) will be on hand.

The Squadron, led by Captain W. H. Munson, U.S.N., will participate in flying operations between New Zealand and McMurdo Sound.

Also, it will operate into the interior of the huge ice continent that is roughly twice the area of Australia.

Some of the aircraft will fly direct to the South Pole, 800 miles inland from McMurdo Sound, where the U.S. maintains a permanent 18-man scientific base known as Amundsen-Scott Station.

### Jets With Skis

For the first time this season the U.S. Navy will operate four of its new C130 Hercules Turbo-jet 350 m.p.h. transport aircraft in the Antarctic.

Similar to the Hercules owned by the R.A.A.F., these giant 60-ton planes, fitted with skis, will land at the South Pole base which is at an altitude of almost 10,000 feet on top of the blizzardly interior Antarctic Plateau.

They also will land on the snow and ice at the remote Byrd Station, bringing in new huts in pre-fabricated sections to build a complete "under the snow" township to replace the existing base which is rapidly being covered by drift.

The Hercules also will carry south some of the parts needed for the £6,000,000 plan to install nuclear power stations in the Antarctic which mean the reduction of about 60 per cent. of the oil fuel hauled south each year.

The first station will be ready early in 1962.

Other aircraft in the U.S. Navy's VX6 wing include jet-boosted Neptune bombers with skis, Dakotas, a Super Constellation, a Skymaster, and numerous Otters and helicopters.

All icebreakers where possible carry helicopters on the exploration trips.

### Amundsen Sea Effort

Largest sea-going operation, outside of the supply runs, will be the attempt to enter the ice-filled Amundsen Sea by icebreakers GLACIER and STATEN ISLAND.

The two vessels will carry scientists representing the fields of oceanography, ornithology, seismology, geology, and other geographical sciences.

The GLACIER and STATEN ISLAND are to commence the Amundsen Sea voyage early in February. The sea is known to be heavily ice clogged, subject to fog and violent blizzards and subject to illusions.

Captain Edwin A. McDonald who will lead the two icebreakers on the Amundsen Sea operation is a Navy cold weather expert and a veteran of six Arctic and five Antarctic expeditions. So far the sea's rugged ice pack has repulsed all attempts by ship to reach the Antarctic coastline in this region. It is one of the last unexplored coastal portions of Antarctica. The sea is bi-sected by 115 deg. west longitude. Beside it is another little known water which was entered by U.S.S. GLACIER last year — the Bellingshausen Sea.

All ships are scheduled to leave Antarctica before darkness and the winter ice packs close in towards the end of March.

# Two more Frigates for Royal Navy

The keels of two more general purpose frigates of the Tribal class were laid on Thursday, 1st December.

The first ship, which will eventually be named the ZULU will be built by Alex Stephens & Sons Ltd. of Linthouse, Glasgow.

Parsons Marine Turbine Co. Ltd., will supply the steam turbines and gearing and Yarrows Ltd. will provide the gas turbines for this vessel.

The second ship, to be later christened MOHAWK, is being constructed at the Barrow-in-Furness shipyard of Vickers-Armstrongs (Shipbuilders) Ltd.

The machinery for this frigate will be built by Vickers-Armstrongs (Engineers) Ltd., who will supply the steam turbines, and Associated Electrical Industries Ltd. who are building the gas turbines.

Ships of the Tribal class have a standard displacement of approximately 2,500 tons, a length of 360 feet and a beam of 42 feet 6 inches. The hulls are of all-welded, prefabricated construction and are specially treated to prevent corrosion.

The propulsion machinery consists of a combination of both steam and gas turbines. The steam turbines provide power for normal cruising and manoeuvring and the gas turbines, operating the same shaft, will give immediate power for high speed steaming and getting under way in an emergency. Denny Brown stabilizers are also being fitted.

## Reserve Training Ship Visits Noumea

Late last year the Ocean Minesweeper, H.M.A.S. WAGGA which is used as a training for the Royal Australian Naval Reserve paid a visit to Noumea.

This is the first foreign cruise which has been made by WAGGA, though she has previously visited Tasmania and the Barrier Reef.

French Naval Officers, who visited the ship, were amazed that the ship was entirely manned by Reservists and said that they had no idea that the Australian Naval Reserve was so strong.

Eight sea cadets were among the ship's company of 10 officers and 76 ratings who manned the ship for the cruise.

H.M.A.S. WAGGA, commanded by Lt. Cdr. R. F. Williams, D.S.C., R.A.N.R., steamed a total distance of 2,200 miles during the cruise, the first foreign visit ever to be undertaken in peace time by a Reservist manned ship.

## Visiting Naval Ships From Three Nations

Naval ships from three countries made operational visits to Australian ports in January.

The visiting warships were from the United States, France and New Zealand.

The American ship was the destroyer escort, U.S.S. WILHOITE, which had been serving with the United States Antarctic expedition, "Operation Deep Freeze." She was at Hobart from 11th to 16th January and visited Sydney from 19-23 January. WILHOITE had a crew of thirteen officers and 166 men, and was under the command of Lieutenant-Commander C. H. Willis.

Senator Gorton said the French frigate, FRANCIS GARNIER, arrived at Sydney on 17th January, and remained for three weeks. She underwent maintenance at Garden Island.

The New Zealand visitor, H.M.N.Z.S. ROYALIST, arrived in Sydney on 28th January. She sailed on 31st January, calling at Melbourne (10-13 February) and Fremantle (18-20 February) on the way to a tour of duty in Asian waters and to take part in SEATO exercises.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**Hon. Sec. - Hon. Treas.:** K. Olson, Esq., 62 Blencowe Street, West Leederville, W.A.

April, 1961

# R.A.N. Divers in Deep Dive on Snowy

Divers of the Royal Australian Navy led by Commander H. S. Batterham and Lieutenant Ron Titcombe arrived at Lake Eucembene in the Snowy Mountains area early in March to prepare for their most difficult task yet.

The Navy divers have been asked by the Snowy Mountains Hydro Electric Authority to examine stop logs at the entrance to the diversion tunnel under the Eucumbene Dam, 260 feet below the surface. This dive will be the deepest dive of this nature on record in the Southern Hemisphere.

Stop logs at the intake of the tunnel around Eucumbene Dam were recently lowered to enable a routine inspection and test of the main gates in the tunnel to be made. Leakage at one of the two sets of stop logs led the Authority to believe that there is probably an obstruction at the seating of the logs. This leakage was temporarily sealed which enabled the inspection and maintenance of the main gates in the tunnel to be carried out satisfactorily, but before the stop logs are removed and the main gates are brought into operation it is important to know the nature of the obstruction at the stop logs. This examination of the stop logs can only be done by divers. The Authority is also taking the precaution of having the divers available should underwater assistance be required in removing the stop logs.

Opportunity will also be taken to use the divers to clear any debris which may have collected around the stop log openings.

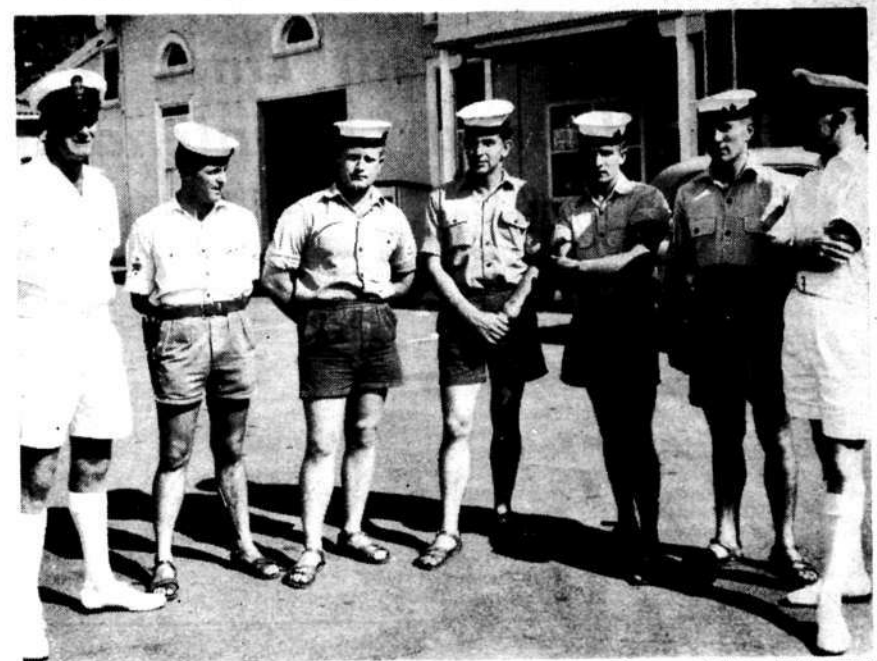
It is pointed out that this tunnel was driven to carry the Eucumbene River past the dam-site during the construction of the dam. Flow through the tunnel is controlled by the main gates near the centre of the tunnel which are operating satisfactorily. The purpose of the stop logs at the tunnel portal is to enable the tunnel to be de-watered for inspection and maintenance of the tunnel and the main gates.

Because of the extreme depth, considerable preparation is required. All the eight divers have been down to a depth of 120 feet and become familiar with the underwater surroundings of the tunnel intake. The submersible decompression chamber weighing 3½ tons has been tested underwater and all the other equipment to be used has been rigorously tested.

The divers wore diving suits especially ordered from France because of their ability to protect the diver from some of the effects of the extreme pressure and intense cold of 9 degrees above freezing point.

**Leading Seaman Moore and AB. Jeffress entering the decompression chamber.**





**The picture shows some of the divers who are at Lake Encumbene. They are (left to right): Chief Petty Officer W. T. Fitzgerald, Leading Seaman K. Gregson, Leading Seaman D. Moore, AB. N. Jeffress, AB. K. Creasey, Leading Seaman J. Ingram, with Lieut. R. Titcombe.**

# YOUNGER GIRLS GIVE W.R.A.N.S. RECORD INTAKE

Fifty girls from all parts of Australia entered the Women's Royal Australian Naval Service recently in one of the biggest Wran intakes of all times.

The Minister for the Navy, Senator Gorton, said that 17-year-old girls would comprise sixty per cent. of the recruits. It was the first intake reflecting the response to the lowering of the entry age from 18 to 17. Since the reduction of the entry age last October, enquiries and applications for the service had doubled.

Senator Gorton said the fifty recruits, thirty of whom were seventeen, would begin their training at Flinders Naval Depot, Victoria, next Tuesday. There would be 12 recruits from Queensland (four 17-year-olds); 12 from Victoria (eight aged 17) 11 from Western Australia (eight); six from South Australia (three); six from New South Wales (five), and three from Tasmania (two).

He said that after completing their basic training at Flinders Naval Depot, the girls would be posted to naval establishments in various parts of Australia, serving in categories ranging from drivers to radio operators.

The service was now close to its establishment of three-hundred Wrans. The unavoidable wastage rate would necessitate continued recruiting, but there would be need for even greater selectivity.

Senator Gorton said the good response from 17-year-olds was probably because at that age they had not become too settled in other employment.

In announcing the reduced Wran entry age last year, Senator Gorton said the idea was to attract girls direct from school and to increase average "life" of Wrans. Marriage caused by far the greatest wastage, but at least one-third of the girls waited until they were twenty-one before getting married.

# P & O-Orient Lines Adopt Planned Maintenance

P & O Orient Lines announce that Captain Duncan Campbell, R.N., who retired at the end of last year as Director of Royal Navy Fleet Maintenance at Bath, has been appointed Planned Maintenance Adviser.

He is establishing a planned maintenance service with an initial staff of four for the P & O-Orient Lines' fleet.

Planned maintenance, which has recently been adopted with success by large industrial organisations and the Royal Navy, is a system whereby the great majority of maintenance needs are planned, noted, recorded and interpreted in considerable detail. As a result, it is possible to judge more exactly the performance of any piece of machinery, to employ one's own maintenance staff to the best effect, to forsee in greater detail what help from ship-repairers may be needed, and when and where it can best be sought. The decision by P & O-Orient Lines to adopt planned maintenance and the appointment of Captain Campbell are results of the increasing complexity of ships, particularly exemplified in CANBERRA and ORIANA.

To start with, the department will concentrate on new construction.

Captain Campbell, who will rank as a Superintendent with P & O-Orient Lines, is 53 years old and has been in charge of the Royal Navy's planned maintenance for the past two years. He received his early engineering training with Alexander Stephens & Co. Ltd. on the Clyde and at Glasgow University, whence he graduated with first-class honours in engineering in 1928.

He was employed in the design departments of Associated Electrical Industries until 1935, when he entered the Admiralty Civilian Electrical Engineering Service. In 1949 he transferred to the new Naval Electrical Branch, with the rank of Commander, and was promoted to Captain in 1951.





# ANOTHER STOKER IN THE R.A.N.

Reg. Ch.M.E. J. Hanke.

I joined the Navy 3rd March, 1941, at H.M.A.S. RUSHCUTTER and after about two weeks of boat pulling, marching and scrubbing duck suits each day was sent to F.N.D. Engineering School. On completion of training was sent to H.M.A.S. PENGUIN, which in those days was Garden Island with converted ferry KUTTABUL — which was later sunk by a torpedo from Japanese midget sub. — as accommodation vessel. Garden Island was in those days still an island, and they were at that stage filling in the channel between Garden Island and the 'Loo to make Captain Cook Dock. My stay at Garden Island ended after a fortnight, when I was sent on temporary draft to H.M.A.S. PERTH as part of a boiler party. Being the smallest in the party I was loaded into the superheater drums, there to remain until I was drafted to H.M.A.S. WARRNAMBOOL.

The WARRNAMBOOL was a brand-new O.M.S. not yet in commission, with a single World War I 4in. gun, but to me she looked like the K.G. V. We commissioned in September '41 and joined up with the 21st Minesweeping Flotilla; after a few months minesweeping in Bass Strait and with Japan's entry into the war we were sent post-haste to Darwin. One week after arriving in Darwin I was fallen in on Q.D. waiting to see the Captain to be rated a First Class Stoker when the wharf disappeared in a cloud of smoke. The first raid on Darwin was on; we had quite a hectic time, as we were lying at anchor with both boilers cold and ships going down all around us. We finally got under way and barely cleared the harbour before the second wave hit. We spent the rest of the year convoying ships from Thursday Island to Darwin, our only break being three days in Darwin every three weeks for boiler cleaning. No leave, of course. During this period we were despatched in company with the TOWNSVILLE to collect the survivors from the VOYAGER, which was aground and afire on the coast of occupied Timor. We returned south at the end of '41 for refit and I was rated A/L/Stoker and drafted back up north again to join GLENELG, which was at the time running convoys from Townsville to Milne Bay. About July '42 she, too, came south for refit and I was drafted to PENGUIN, which had just been built at Balmoral. This for me was most unfortunate, as my arrival in PENGUIN coincided with a seamen's strike, so the day I got to PENGUIN also happened to be my day of departure for Newcastle and the s.s. IRON DUKE. This ship had a queer set-up as far as I was concerned. She was a single screw job with one triple expansion reciprocating engine and a L.P. turbine geared to it. After two months of swinging a banjo and trying to juggle a 90 lb. slice the strike ended and I was returned to PENGUIN. My blisters had almost healed when the SHROPSHIRE arrived from England and I found myself on her, and up to New Guinea we went together with AUSTRALIA, two American light cruisers and four U.S. destroyers. These eight ships did all the bombardments for landing on Beak, New Britain, Hollandia, Manus, etc., until we finally joined up with the Pacific Fleet for the invasion of the Philippines. During the Philippines invasion SHROPSHIRE and ARUNTA joined with the American Fleet in what turned out to be the biggest naval battle of World War II, when we met and sank the Japanese Fleet in Surago (don't know how it's spelt) Strait. After the invasion of the Philippines SHROPSHIRE returned to Sydney for refit and I was drafted to AUSTRALIA, which was on its way to England for a major refit following the pounding she took from suicide bombers. About this time Germany had surrendered, so for the first time we sailed with no blackout and with the upper deck ablaze with lights and went via the Panama Canal to New York, spent a week in New York then across to Plymouth. Had about one month in Plymouth then was drafted to H.M.S. SUFFOLK, which was a County Class cruiser. She was in dry dock in Liverpool when I joined

her and a couple of days later Japan surrendered. We steamed the SUFFOLK back to Australia and on arrival was drafted to Darwin, whence I spent a couple of months sweltering in the middle of bay on an oil fuel lighter. The crew of the lighter consisted of myself, then a stoker P.O., two stokers and one A.B. The living conditions were slightly primitive. Our food for the day was put on the wharf by the victualling truck each morning at 0830, what was left of it by 1100 was brought out to us by the duty boat; for cooking we had a coal-fired stove and we took it turn about to try and poison each other; once a week we had to lower our dinghy and row about a mile down the harbour to the coal hulk for our domestic. The fishing on the lighter wasn't the best, so one of the stokers dug up some detonators and proceeded to do a spot of blasting for fish. They got no fish but managed to spring half the rivets.

At this stage there was in operation a points system for discharges, and when my number came up in May '46 I paid off and kicked off afresh as a civvy. Was in the cold, cruel, outside world for approximately nine months and couldn't settle down so in March '47 re-engaged for another 12 years.

Spent from March '47 to January '48 on the MURCHISON doing daily running from Watsons Bay on A/S training; was then drafted to F.N.D. to do the M.T.C. to requalify for my P.O. rate. After being rated Sto. P.O. again I was sent to Dreiger Harbour to join H.M.A.S. SWAN, which was mine-sweeping round New Guinea and the Solomons, remained in SWAN until January '49 when I was drafted to BARCOO, which was at the time surveying after one survey season in Spencers Gulf. BARCOO returned to Sydney and paid off. I was selected to remain as C. and M. Pty. and stayed until September '50; was then drafted to KANGAROO and off we went to Manus Island. Just after I joined KANGAROO I was rated Chief Stoker, and as the boom boats do not carry Chief Stokers I was drafted to H.M.A.S. SYDNEY, joining in March '51 at the time the war in Korea was in full swing, so we headed for Japan and Korea. The war in Korea was pretty dull for most engine room bods, as on the very rare occasions we did manage to get fresh air we couldn't see a thing anyhow. The monotony was only broken by a typhoon we managed to tangle with off Japan in '52. After our tour of duty up north we returned home after refit then round to Monte Bello Island for the testing of Britain's first atom bomb, which I saw from a distance of about 30 miles; we then wended our way slowly back to Sydney. It was now March '53 and the SYDNEY was preparing to go to England for the Coronation and having no ambitions along these lines I applied for and was given an exchange draft to the BATAAN, which I joined the day the SYDNEY sailed. After five months of leisure I was drafted to the WARRAMUNGA, which was being converted at Garden Island, then in May '54 was sent to PLATYPUS S.I.R. In October '54 received another draft, this time to JUNEE and spent 13 months in W.A. carrying seasick national servicemen up and down the coast. In November '55 was drafted to WARREGO, back to the survey crowd for another 13 months. In January '57 the powers-to-be decided I was due for a spot of shore time, so after a series of short-lived drafts I finally wound up in Holsworthy, where I spent almost 18 months as Compound Supervisor. This period was to me the best of all my drafts, as it was a complete change from engines and boilers. In July '58 was again on draft, this time to F.N.D., and spent five months there on the maintenance staff until December, when I was sent on my way to Maralinga. This, too, was a good change, as there were the three Australian Services, three British Services and civilians all messed together. Hardly got settled into my locker there when it was decided, owing to the suspension of atomic weapons testing, that the complement should be reduced, so packed the bags again and joined MELBOURNE in July '59.





Scene in the engine-room of H.M.A.S. Parramatta.

# Ships of the R.A.N. Built in Australia

| Name | Type | Commissioned |
|---|---|---|
| ADELAIDE | Light Cruiser | 1922 |
| ALBATROSS | Seaplane Carrier | 1929 |
| ANZAC | Destroyer | 1948 |
| ARARAT | Corvette | 1943 |
| ARMIDALE | Corvette | 1942 |
| ARUNTA | Destroyer | 1942 |
| BALLARAT | Corvette | 1941 |
| BARCOO | Frigate | 1944 |
| BARWON | Frigate | 1945 |
| BANKS | G.P.V. | 1950 |
| BASS | G.P.V. | 1959 |
| BATAAN | Destroyer | 1945 |
| BATHURST | Corvette | 1940 |
| BENALLA | Corvette | 1941 |
| BENDIGO | Corvette | 1941 |
| BOWEN | Corvette | 1942 |
| BRISBANE | Light Cruiser | 1916 |
| BROOME | Corvette | 1942 |
| BUNBURY | Corvette | 1943 |
| BUNDABERG | Corvette | 1942 |
| BURDEKIN | Frigate | 1944 |
| BURNIE | Corvette | 1941 |
| CAIRNS | Corvette | 1942 |
| CASTLEMAINE | Corvette | 1942 |
| CESSNOCK | Corvette | 1942 |
| COLAC | Corvette | 1942 |
| CONDAMINE | Frigate | 1945 |
| COOTAMUNDRA | Corvette | 1943 |
| COWRA | Corvette | 1940 |
| CULGOA | Frigate | 1947 |
| DELORAINE | Corvette | 1941 |
| DIAMANTINA | Frigate | 1945 |
| DUBBO | Corvette | 1942 |
| ECHUCA | Corvette | 1942 |
| FREMANTLE | Corvette | 1943 |
| GASCOYNE | Frigate | 1943 |
| GAWLER | Corvette | 1942 |
| GEELONG | Corvette | 1942 |
| GERALDTON | Corvette | 1942 |
| GLADSTONE | Corvette | 1943 |
| GLENELG | Corvette | 1941 |
| GOULBURN | Corvette | 1941 |
| GYMPIE | Corvette | 1942 |
| HAWKESBURY | Frigate | 1944 |
| HORSHAM | Corvette | 1942 |
| HUON | Destroyer | 1915 |
| INNISFAIL | Corvette | 1941 |
| INVERELL | Corvette | 1942 |
| IPSWICH | Corvette | 1942 |
| JUNEE | Corvette | 1944 |
| KALGOORLIE | Corvette | 1942 |
| KANGAROO | Boom Working Vessel | 1940 |
| KAPUNDA | Corvette | 1942 |
| KARANGI | Boom Working Vessel | 1941 |
| KATOOMBA | Corvette | 1941 |
| KIAMA | Corvette | 1944 |
| KIMBLA | Boom Working Vessel | 1956 |
| KOALA | Boom Working Vessel | 1940 |
| KOOKABURRA | Boom Working Vessel | 1939 |
| LACHLAN | Frigate | 1945 |
| LATROBE | Corvette | 1942 |
| LAUNCESTON | Corvette | 1942 |
| LISMORE | Corvette | 1941 |
| LITHGOW | Corvette | 1941 |
| MACQUARIE | Frigate | 1945 |
| MARYBOROUGH | Corvette | 1941 |
| MILDURA | Corvette | 1941 |
| MURCHISON | Frigate | 1945 |
| PALUMA | Survey Vessel | 1957 |
| PARKES | Corvette | 1944 |
| PARRAMATTA | Sloop | 1940 |
| PARRAMATTA | Type 12 Frigate | 1961 |
| PIRIE | Corvette | 1942 |
| ROCKHAMPTON | Corvette | 1942 |
| SHEPPARTON | Corvette | 1943 |
| SHOALHAVEN | Frigate | 1945 |
| STAWEEL | Corvette | 1943 |
| STRAHAN | Corvette | 1944 |
| SWAN | Sloop | 1937 |
| TAMWORTH | Corvette | 1942 |
| TOBRUK | Destroyer | 1947 |
| TOOWOOMBA | Corvette | 1941 |
| TORRENS | Destroyer | 1916 |
| TOWNSVILLE | Corvette | 1941 |
| VAMPIRE | Daring Class Destroyer | 1959 |
| VENDETTA | Daring Class Destroyer | 1958 |
| VOYAGER | Daring Class Destroyer | 1957 |
| WAGGA | Corvette | 1942 |
| WALLAROO | Corvette | 1942 |
| WARRAMUNGA | Destroyer | 1942 |
| WARREGO | Destroyer | 1912 |
| WARREGO | Sloop | 1940 |
| WARRNAMBOOL | Corvette | 1941 |
| WOLLONGONG | Corvette | 1942 |
| YARRA | Sloop | 1936 |
| YARRA | Type 12 Frigate | 1961 |

## MONTHLY LIST OF INTERESTING HISTORICAL DATES

MARCH — Contd. from last issue.

**28th**

**1941** Battle of Cape Matapan.
Three heavy Italian cruisers, one large destroyer and one small destroyer sunk. One 6-inch gun cruiser probably sunk. British forces suffered no damage or loss. Battle of Cape Matapan (Ionian Sea), in which H.M.A.S. VENDETTA was the first Australian unit to come under fire. H.M.A.S. PERTH and STUART also participated.

**1942** St. Nazaire: Principal battleship dock wrecked.

**29th**

**1945** Negros Landing (W. Coast, near Palu Pandan) by 40th Inf. Div. (-108th R.C.T.).

**30th-31st**

**1944** Naval Task Force struck Palau, Yap, Woleai.
Hollandia air strips heavily bombed, approx. 288 Jap. aircraft destroyed.



**APRIL**

**1st**

**1944** Naval Task Force struck Palua, Yap, Woleai.

**1945** 158th RCT landed at Legaspi, SE Luzon.

**1st-3rd**

**1944** Hollandia air strips heavily bombed, approx. 288 Jap a/c. destroyed.

**2nd**

**1941** German Counter-offensive in North Africa.

**2nd April-15th June, 1941.**
British withdraw from Merza Bergo.

**1945** Elements 41st Inf. Div. landed Sanga Sanga Island, Tawi Tawi Group.

**3rd**

**1941** British evacuate Benghazi.

**6th**

**1941** German forces invade Yugoslavia and Greece.
British and Imperial forces consisting of nearly 60,000 men under General Sir Henry Maitland Wilson sent to Greece from General Wavell's force in Libya.

**1942** Japanese landed at Bougainville.

**1945** Establishment of GHG. AFPAC.

**7th**

**1942** Buin (Southern Bougainville) occupied.

**9th**

**1940** Germans invade Denmark.
Copenhagen occupied.
Germans invade Norway.

**1942** Surrender on Bataan.

**1945** Elements 41st Inf. Div. landed Jolo Island, Sulu Archipelago.

**10th**

**1940** 1st Battle of Narvik. H.M. destroyers HARDY, HOTSOYR, HAVOCK and HUNTER destroy six enemy supply ships and an ammunition ship, and damage two destroyers.

**1942** H.M.A.S. VAMPIRE sunk in Bay of Bengal.

**1945** Fall of Hanover to U.S. Ninth Army.

**11th**

**1943** H.M.A.S. PIRIE defends convoy against heavy air attack. H.M.A.S. PIRIE suffered direct bomb hit in enemy air attack on Oro Bay.

**1945** Elements American Div. landed on Bohol (visayas).
U.S. Ninth Army reaches the Elbe near Magdeburg.

**13th**

**1940** 2nd Battle of Narvik. H.M. battleship WARSPITE and H.M. destroyers ICARUS, HERO, FOXHOUND, KIMBERLEY, FORESTER, BEDOUIN, PUNJABI, ESKIMO and COSSACK destroy nine enemy destroyers.
Seige of Tobruk begins. Germans capture Bardia.

**1944** Bogadjim occupied without opposition by elements 15th Austn. Bde. operating under command of 11th Austn. Div.

**1945** Vienna falls to Russians.

**14th**

**1941** H.M.A.S. WATERHEN rescued the personnel of damaged Hospital Ship VITA in Med.

**1943** H.M.A.S. KAPUNDA, WAGGA and WHYALLA defend convoy heavily attacked by aircraft.
H.M.A. Ships KAPUNDA, WAGGA and WHYALLA did good rescue work in heavy enemy air attack on Milne Bay.

**1941** H.M.A.S. STUART and H.M.S. GRIFFIN bombard Sollum.

**15th-18th**

**1940** British Expeditionary Force lands in Norway at Namsos and Narvik.

**1943** Air attack on Naval installations at Darwin.

**1945** Canadians reach the North Sea.

**16th**

**1942** Japanese landed at Capiz and Iloilo (Panay).

**1945** 77th Inf. Div. landed on Io Shima.

**17th**

**1945** X Corps landed Malabang — Cotabato Area Mindanao. 24th Inf. Div. made initial landing, followed 22nd April by 31st Inf. Div.

**18th**

**1945** U.S. Third Army enters Czechoslovakia.

**19th**

**1941** H.M.A.S. STUART, VOYAGER and WATERHEN in company with R.N. destroyers land night raiding party at Bardia.

**1944** Attack on Sabang; H.M.A.S. NAPIER, NEPAL, NIZAM, QUIBERON and QUICKMATCH participate.

**20th**

**1945** Fall of Nuremburg to Seventh Army.

**21st**

**1945** Italian Front — fall of Bologna.

**22nd**

**1944** U.S. landings at Tanamerah Bay, Humboldt Bay, Aitape Area. H.M.A.S. AUSTRALIA, SHROPSHIRE, ARUN-

TA, WARRAMUNGA, WESTRALIA, MANGORA and KANIMBLA take part with preliminary surveys by H.M.A.S. MORESBY, BENALLA, SHEPPARTON, CAPE LEEUWIN and POLARIS. Hollandia and Aitape landings.
1st Corps directed operations at Hollandia with 41st Inf. Div. (163rd RCT) landing Humboldt Bay and 24th Inf. Div. (-34th RCT) landing at Tanahmerah Bay. 34th RCT was I Corps Reserve. -163rd RCT landed at Aitape.

**1945** Russians enter Berlin.

**24th**

**1941** Evacuation of Greece. H.M.A.S STUART, VOYAGER, VAMPIRE, VENDETTA and WATERHEN play important part.

**1944** Madang captured by elements 15th Austn. Bde. (11th Div.) and 8th Austn. Bde. (5th Div.).

**25th**

**1941** 25th April-2nd May, 1941. Evacuation of Imperial Forces from Greece. 45,000 troops evacuated.

**1944** Australians capture Madang. H.M.A.S. VENDETTA and BUNDABERG present.

**1945** Conference of the United Nations at San Francisco (25th April-26th June, 1945).

**26th**

**1944** Alexishafen occupied by 8th Austn. Bde. (5th Div.). Hollandia, Cyclops and Sentani l/mes captured by elements 24th and 41st Inf. Divs.

**1945** Baguio captured by 129th Inf. (37th Inf. Div.).
Fall of Bremen.
Stettin falls to Russians.
U.S Third Army enters Austria.

**27th**

**1941** Germans occupy Athens.

**28th**

**1941** Germans capture Sollum.

**1945** Mussolini, attempting to flee the country, caught and shot by partisans.

**29th**

**1942** Japanese cut Mandalay-Lashio railway. Fall of Lashio. Evacuation of Mandalay. British retreat to India.
Four-fifths of forces evacuate to India.

**30th**

**1944** Naval Task Force raided Truk.

**1945** Fall of Munich to Seventh Army.





# Navy Research Ship for Tasman Survey

A Royal Australian Navy frigate sailed from Sydney on 12th January to complete the first stage of an oceanographic survey that is giving scientists important information about the content and behaviour of the seas off the eastern coast of Australia.

The Minister for the Navy, Senator Gorton, said that the oceanographic and training frigate, H.M.A.S. GASCOYNE, which had already conducted a survey in the Coral Sea, would now carry out research in the Tasman Sea. This would complete the preliminary survey off the eastern seaboard, giving Australian scientists information of vital importance to national development and defence.

Senator Gorton said six scientists from the C.S.I.R.O. Fisheries Division in Sydney were abroad GASCOYNE when she sailed. Working under the direction of Mr. E. J. S. Wood, of Sydney, they would conduct their research from the frigate's "floating laboratory."

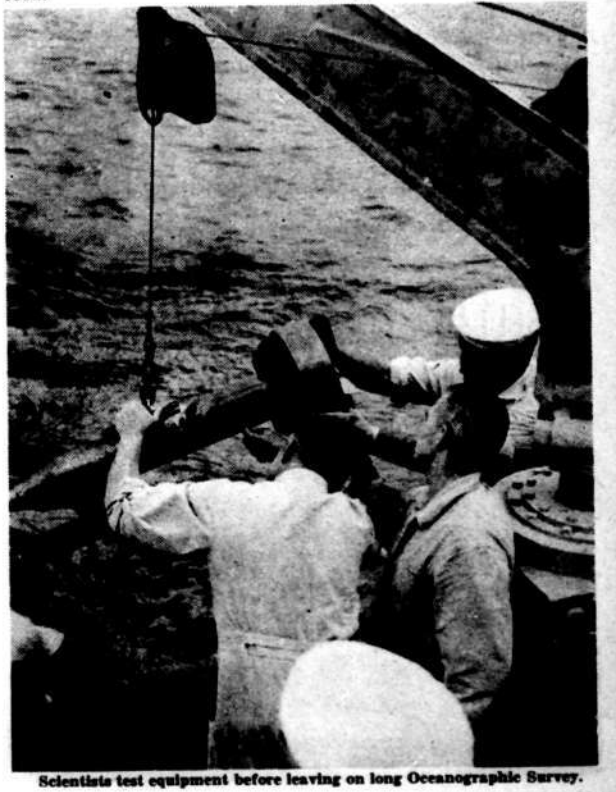
Senator Gorton said the survey would take GASCOYNE 170 miles south of Tasmania, and then follow a zig-zag course to the south of New Zealand. The frigate would cross the estimated sub-tropical convergence; this was the point where sub-tropical waters from the north met the Antarctic water masses from the south. It would be the first detailed investigation of the convergence, which had a vital bearing on fish life. The reaction of the water at the area of convergence caused rich nutrient salts to rise to the surface of the sea. This in turn created food for fish.

Senator Gorton said that because the convergence was so closely associated with fishery resources, it was proposed to investigate the nature of the convergence and to discover something of its movements.

The various methods of scientific research would include what was known as "drift stations," in which the ship and underwater scientific equipment would be allowed to drift for eight hours at a time. This would all help provide information on the production of fish food.

The scientific cruise, which was the most extensive of its kind undertaken in the Tasman, would continue west of the north island of New Zealand before the frigate returned to Australia in February.

Senator Gorton said H.M.A.S. GASCOYNE would visit Wellington and Bay of Islands. At the Bay of Islands the frigate would join the New Zealand Navy celebrations of the Treaty of Waitangi, an important milestone in New Zealand Naval history.



Scientists test equipment before leaving on long Oceanographic Survey.

# SYDNEY — AS A PORT

**Sydney Harbour has developed from a distant penal colony of Great Britain to a major world port serving a city of more than two million people.**

WHEN Arthur Phillip, Captain-General and Governor-in-Chief of all the territory between Cape York and Tasmania, sailed with his few ships into what was to become Sydney Harbour in January, 1788, there was a sand bar inside the entrance.

This sand bar, carrying a depth of 20 ft. at low water, did not hinder Phillip's ships, for those ships had a maximum draught of only 15 feet.

The bar and other shoal areas in the port were, in the years to come, removed by dredging to provide the wide, deep channels now available to the world's shipping.

With the growth of the wool trade in the early nineteenth century, wharves and warehouses were built round Sydney Cove.

Then the pioneer pastoralist John Macarthur built a private jetty at the end of Market Street on Cockle Bay, soon to be developed as Darling Harbour. In mid-century Circular Quay was built.

In the next 30 years the population of Sydney increased from 53,000 to 380,000 and transport changed from ox-waggon and sail to railways and steamships; wheat became a major export to Britain.

All kinds of commercial activities flourished in the Port of Sydney, the great terminal where roads and railways met the seaways and the big new steamships from Europe and the United States.

This activity was, as it is now, the basis of Sydney's prosperity.

However, the siting and development of most of the Harbour installations was haphazard — some were built by the Government, some by private enterprise, some came under the general supervision of the "Wharf Association."

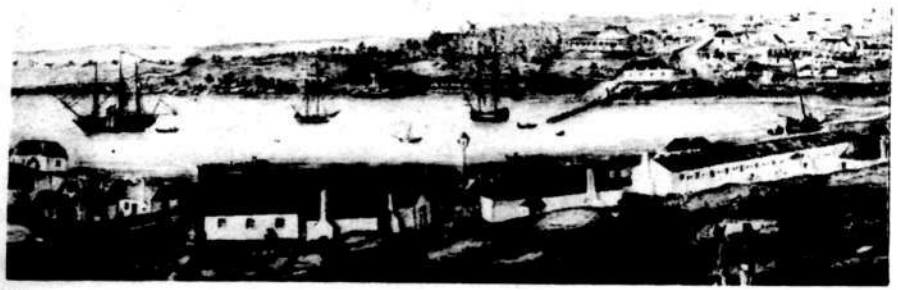
It was only with the establishment of the Sydney Harbour Trust in 1901 that the real work began of making Sydney a modern port with good harbour facilities.

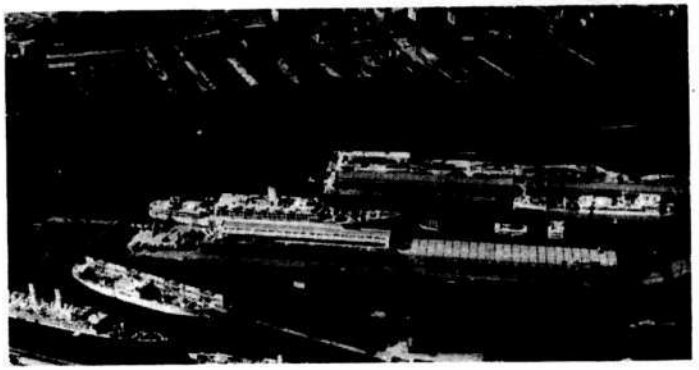
Large-scale works were then undertaken to provide the main wharves in Woolloomooloo, Walsh Bay, Darling Harbour and Pyrmont, the timber wharves at Rozelle Bay, the great wheat terminal at Glebe Island and to link these with the State's railways.

Shipbuilding was well established. Shipwrights had already established themselves at Pyrmont and Balmain, and in 1854 the Government built Fitzroy Dock at Cockatoo Island. Soon afterwards Thomas Mort completed his dock at Waterview Bay, and later the same concern built the large Woolwich Dock.

## CIRCULAR QUAY

Two views of Circular Quay in the 17th (above) and 18th Centuries.





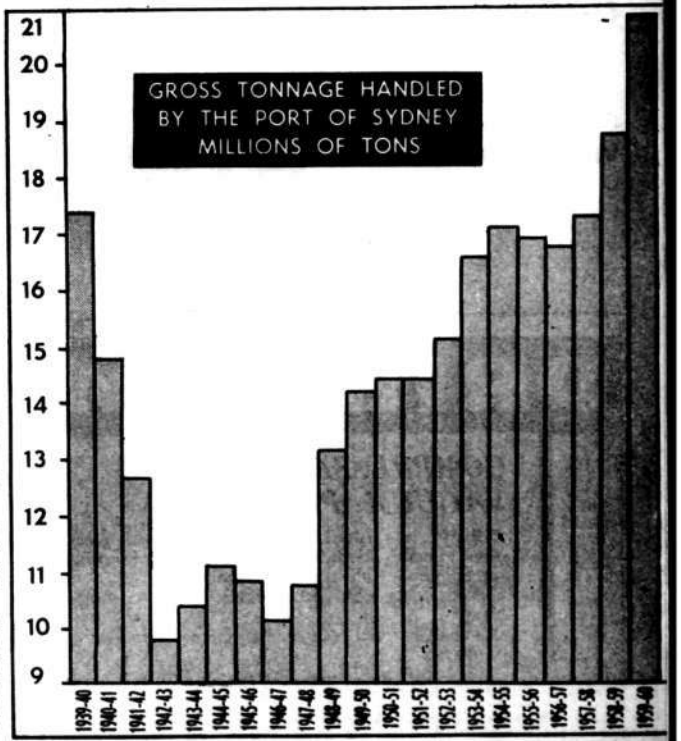
**DARLING HARBOUR.**
**An aerial view of Darling Harbour, one of the busiest sections of Sydney Harbour.**

### Miles of Wharves

Today in the 13,600 acres — about 21 square miles — of Sydney Harbour there are about 12 miles of wharves, excluding berths for harbour craft.

The wharves are under the control of the Maritime Services Board, which took over from the Harbour Trust in 1936.

The principal wharfage is conveniently and centrally sited for both commerce and shipping, for it is within four or five miles of the sea and within a mile of the heart of the city.



Apart from the general cargo berths, wharfage facilities include special berths for handling cargoes such as oil, timber or coal.

Most wharves are built of timber piles, although the solid fill method has been used for recent work. All new construction has concrete decking and the timber decking of the older wharves is being replaced with concrete when renewal becomes necessary.

About half the area of the Harbour carries a depth of water not less than 30 feet at low tide. The average width is just under one mile, but although the Harbour extends only about 13 miles inland, there are 152 miles of foreshore bordering the various arms and the many sheltered bays.

The entrance between Sydney Heads is nearly a mile wide and 80 feet deep.

The greatest depth in the Harbour is 155 feet off Blues Point, a little to the west of the Bridge.

Comparatively little dredging is required to conserve the depths in the channels and at the berths, where up to 40 feet of water is available.

Most of the berths have roomy cargo sheds with a total area of nearly three million square feet, or about 73 acres. It is usual for general cargo to be handled at berths by ship's gear, but cranes and other equipment are available at some points.

The Captain Cook Dock, on the east of the approach to Woolloomooloo Bay, ranks among the world's largest graving docks. It is 1,139 ft. long, 147 ft. 7½ in. wide and 45 ft. 2 in. deep over the sill at high water.





# NUCLEAR SUBMARINES

By NORMAN POLMAR

The United States Congress has now authorised funds for more than fifty nuclear-powered ships for the American Navy although it is only five years since the pioneer nuclear submarine, NAUTILUS, got underway on nuclear power.

In the recent appropriation sessions the Congress authorised the Navy to construct four more attack submarines and five Polaris-firing atomic submarines. In addition, approval was given to procure long-lead time items (primarily reactor parts) for another seven Polaris atomic submarines.

This brings to 53 the number of atomic submarines so far authorised: 30 attack type (eight now in service); one radar picket type (in service); a lone guided-missile-firing type (in service); and 21 Polaris atomic submarines (two which will go on station this autumn, the GEORGE WASHINGTON and PATRICK HENRY, and two others to be operational by the end of the year, the ROBERT E. LEE and the THEODORE ROOSEVELT).

In addition, three nuclear-powered surface warships are under construction in U.S. shipyards; an attack aircraft carrier, a guided missile cruiser, and a large destroyer type missile ship.

By contrast the rest of the world can boast but one operational atomic ship, the Soviet icebreaker LENIN.

Britain will launch her first nuclear submarine, H.M.S. DREADNOUGHT, on October 21, and the Soviets are reported to have three atomic submarines under construction.

Italy and France are giving serious consideration to the construction of nuclear submarines and the director of the Japanese Defence Agency has been quoted as saying Japan is also studying the possibility of building a nuclear-powered submarine.

The U.S. is also completing a nuclear-powered merchant ship, the N.S. SAVANNAH, launched on July 21, 1959. She will go to sea early next year.

* * *

In the history of naval science probably no other technical development has been introduced into a fleet as rapidly as has nuclear propulsion in the U.S. Navy.

In 1946, one year after the first atomic bomb explosion, a Navy group headed by a Captain Hyman G. Rickover went to the United States' Oak Ridge atomic research installation. The purpose of the trip was to study the possibility of producing useful power from the atom.

On Janary 17, 1955, less than 10 years later, Rickover, with two stars on each shoulder, went on another trip. This time it was on the nuclear-powered submarine NAUTILUS down the Thames River from Connecticut into Long Island Sound. During the short voyage the NAUTILUS made the historic signal "underway on nuclear power."

A new age had dawned.

That trip by Rickover was made after a series of battles both inside and outside the Navy in which he made many enemies and won a few friends, but gave the world its first nuclear-powered vehicle.

The submarine was now a true "submersible," completely independent of the earth's atmosphere and with a fantastically long cruising radius. The advent of the snorkel in the 1940's allowed a diesel-electric submarine to remain submerged indefinitely, but still required it to remain near the surface in

order to "snort." Thus, periodically the submarine would be vulnerable to both detection and destruction from air and surface forces.

The atomic-powered submarine can remain underwater, at whatever depth its pressure hull can withstand, indefinitely and is limited in its underwater endurance only by the human factor of its crew.

While the NAUTILUS was still under construction a second atomic submarine, the SEAWOLF, was ordered in mid-1955. A different type of reactor, using liquid sodium instead of pressurised water as the heat transfer agent, was planned. Despite initial delays in the SEAWOLF'S completion because of reactor difficulties, she entered service in 1957 and was termed "highly successful."

However, in 1958 it was decided to change her reactor to one similar to that of the NAUTILUS and later atomic submarines. The extensive 20-million dollar project was undertaken because the liquid sodium caused damage to certain machinery parts, and although causing no radiation danger, it restricted the SEAWOLF to only 80 per cent. of her potential power. During her year of operation before conversion she steamed more than 35,000 miles, the greater part of that submerged and including one underwater endurance test of 60 days. She was recommissioned on September 30.

With the age of nuclear propulsion barely out of its womb, the U.S. Navy embarked on an unprecedented peacetime submarine construction programme.

In mid-1955 the first production atomic submarines, the SKATE, SWORDFISH, SARGO and SEADRAGON, were ordered. All are now in commission.

The seventh, the SKIPJACK, also ordered in 1955, introduced the revolutionary "teardrop" hull configuration in nuclear submarine construction.

The new shape had been tested with the diesel-electric powered auxiliary submarine ALBACORE. She was able to outrun conventionally shaped atomic-powered submarines for limited periods of time.

The speed of the SKIPJACK, commissioned in 1959, has been estimated as high as 45 knots while submerged. As the 252-foot craft "flies" under the surface her "pilot" manoeuvres her with an aeroplane type "joy" stick. Key control personnel man their stations with safety belts holding them in place.

The SKIPJACK — with her diving planes mounted on her "sail" (previously called conning tower)—set the design for future attack and ballistic missile atom submarines. The latest ones have such great underwater speeds that new devices are being developed for controlling them. In future U.S. atomic submarines, the speed and depth indicators, as well as certain other instruments, will show the position and speed of the submarine two or three minutes in advance if her current speed, course, etc., are held. This is designed to improve reaction time by control personnel. In addition, the "pilot" will watch a television screen which will show a "highway." He will then manipulate the submarine's controls to keep a box-like affair on the "highway," thus keeping the submarine on her course.

After the SKIPJACK the U.S. Navy began two special purpose atomic submarines: the radar picket TRITON and the guided-missile-firing HALIBUT.

The TRITON is the largest submarine yet built. Her surface displacement is 5,900 tons and she is 447 feet long—virtually an underwater cruiser. The world's first twin-reactor submarine, she is designed to serve as an early warning radar picket station. Her surface speed approaches 30 knots, somewhat more than her submerged capability.

On February 16, 1960, the TRITON left New London, Connecticut, on her sea trials. At 5.37 p.m. local time she slipped beneath the waves. Her hull next broke water 84 days later when she completed the first underwater voyage around the world. With 183 officers, ratings, and civilian technicians and scientists aboard, she steamed 41,519 miles, with only her sail breaking water on two occasions. This feat shattered

A Guided Missile being fired from an Atomic Submarine.

the previous underwater endurance record of 60 days set by the SEAWOLF.

The TRITON'S cruise provided valuable data on the feasibility of keeping ballistic missiles submarines on underwater deployment for months at a stretch.

The HALIBUT is the world's first missile-firing atomic submarine. She was designed to fire the surface launched Regulus II 1,000-mile guided missile. However, the missile project was cancelled late in 1958 and only a few of the older 500-mile Regulus I missiles remain available. The air-breathing Regulus missiles are capable of carrying a nuclear or conventional warhead and are guided by electronic signals from either the launching submarine, another guidance submarine, or aircraft. The controls can also be pre-set before launching.

Additional Regulus-firing atomic submarines were later ordered, but with the cancellation of the missile they were redesigned as attack submarines.

With the initial success of the first atomic submarines the U.S. Navy undertook the construction of a large nuclear submarine force. Since the SKIPJACK was ordered, contracts have been placed for 19 additional attack hunter-killer submarines: SCAMP, SCORPION, SCULPIN, SHARK, SNOOK, THRESHER, PERMIT, PLUNGER, BARB, TULLIBEE, POLLACK, HADDO, JACK, TINOSA, DACE, GUARDFISH, FLASHER, GREENLINE and GAZO. Of these 19, SCORPION, commissioned on July 29, 1960, TULLIBEE on October 15, 1960, and SHARK is to be commissioned in late December; five are scheduled for commissioning in 1961; seven in 1962; and four in 1963.

UNITED STATES NUCLEAR SUBMARINES

| Type | Commissioned | Under Construction | Approved in 1960 | Total |
|---|---|---|---|---|
| Attack-SS (N) | 8 | 18 | 4 | 30 |
| Radar Picket—SSR (N) | 1 | | | 1 |
| Guided Missile—SSG (N) | 1 | | | 1 |
| Ballistic Missile—SSB (N) | 2 | 7 | 12(a) | 21(a) |

(a) Five fully funded and already contracted for and approval of long-lead time items only for seven others.

In the fiscal 1961 Shipbuilding Programme the Navy asked the Congress for funds to construct one additional nuclear attack submarine. Vice-Admiral Rickover urged construction of 10 to 13 atomic submarines describing them as "the best means we possess to attack and sink Russian submarines." Congress voted the Navy enough funds for four.

During these Congressional hearings on submarine construction, Admiral Rickover also said the first nuclear core installed in the now operational SKIPJACK will run the submarine for three or four years. The NAUTILUS had her original core replaced after steaming more than 62,000 miles in two years of operation. Her second core was replaced after 90,000 miles and her present one is expected to last 120,000 miles. Ironically, while the "life" of her nuclear fuel elements have been increasing the costs have been decreasing.

In 1955 the Navy investigated the possibility of adopting the Army's Jupiter intermediate range ballistic missile for shipboard use. After a few months the Navy decided the liquid-fuelled JUPITER was not suitable for shipboard use and in mid-1955 the Navy began work on the Polaris. The programme was formally approved on 1st January, 1957. Rear-Admiral William F. Raborn (since promoted to Vice-Admiral) was named head of the project with authority to cut across the lines of responsibility within the Navy and given direct access to the Secretary of the Navy.

The Polaris fleet ballistic missile has the single purpose of being a retaliatory weapon as are also I.R.B.M.'s and I.C.B.M.'s. The advantages of a submarine-fired missile over a land-based one are many. A submarine is invulnerable to ballistic missile attack and requires no base on foreign territory. Nuclear submarines are also extremely difficult if not impossible to track down and destroy at the present time.

In February, 1958, Admiral Raborn expressed his belief that the basic problems of designing the Polaris system had all passed from the scientific to the engineering state. Then, in an unprecedented move on 11th February, 1958, the Congress approved a bill funding three Polaris-firing submarines. With speed being the keyword, the plans for a new attack type submarine on the drawing boards were literally cut in half and a 130 *foot amidship section* was inserted. Here were placed the Polaris fire control system and launching tubes for 16 missiles.

Like the SKIPJACK, the Polaris submarines have the ALBACORE'S streamlined hull and single propeller driven by a pressurised water reactor. However, because of the added weight, the speed of the first Polaris atomic submarines is considerably below that of the SKIPJACK.

An inertial navigation system allows Polaris atomic submarines to fire their missiles with pinpoint accuracy while fully submerged. Data from this system is automatically fed into a fully transistorised fire control system.

In the 1959 shipbuilding appropriations the Congress provided funds for another six Polaris-firing atomic submarines and the Navy requested an eventual force of 45 Polaris submarines.

While the new underwater giants were being constructed, it was decided to depart from the system of naming U.S. submarines after fish and marine life and name them after people famous in American history. Thus, the first Polaris atomic submarine — commissioned in December, 1959 — bears the name GEORGE WASHINGTON. She is followed by the PATRICK HENRY, THEODORE ROOSEVELT, ROBERT E. LEE, ABRAHAM LINCOLN, ETHAN ALLEN, SAM HOUSTON, THOMAS EDISON, and JOHN MARSHALL.

In the fiscal 1961 Shipbuilding Programme approved by the Congress this past spring, the Navy had asked for funds to build three more Polaris atomic submarines and order long-lead time items for six others. Instead the Congress voted full funds for five and lead items for seven others. This brought to 21 the number of Polaris atomic submarines approved since 1958 although the missile had yet to be fired from a submarine.

The ETHAN ALLEN and later ships are of a new design. They will be more than 400 feet long compared to the GEORGE WASHINGTON'S 380 feet. Like earlier ships, they will carry 16 missiles which can be fired either while the submarine is on the surface or submerged.

The submarines authorised this year (one to be named LAFAYETTE) will be of a still newer design.

On May 20, 1960, the first firing of a Polaris from a submarine was made when the GEORGE WASHINGTON successfully fired two of the 28-foot missiles. Ten days later a third Polaris was successfully fired which, like the others, travelled 1,100 miles to its target. However, a fourth firing failed. But the Navy was pleased and announced that the GEORGE WASHINGTON and PATRICK HENRY would both go on station this autumn, each armed with 16 missiles capable of delivering a nuclear warhead 1,380 miles away.

The Polaris will eventually have a range of 2,875 miles.

Each Polaris atomic submarine also has six forward firing torpedo tubes giving it a "conventional" war capability.

Also of note, each ballistic missile submarine will be assigned two crews designated Blue and Gold (the U.S. Navy colours). One crew of about 100 officers and ratings will take the submarine to sea for a month or more, while the other crew undergoes rest and training. After a cruise the submarine will have a short yard period, have her missiles checked, and be taken to sea by the alternate crew. With this system it is hoped to keep about 30 Polaris submarines at sea at any given time with a total force of only 45 ships in service.

# S.S. "CANBERRA"

## A PROBLEM IN PLASTICS AT SEA

The revolutionary design of the P & O-Orient liner "Canberra," 45,000 tons, at present fitting out at the Belfast Yard of Harland & Wolff Limited, has been responsible for many "firsts" in shipbuilding and fitting-out techniques.

No liner afloat will contain as great a variety of the materials of the 20th century—plastics, fibre glass and so on. But the use of these materials has not been without its problems.

One of the most difficult to solve was how to bond together wood, aluminium foil and a plastic material to produce the gold and silver panels which will decorate the tourist class restaurant and lounge.

The normal bonding method is by high pressure hydraulic press, but, under heat, wood shrinks, metal expands and plastic to some degree remains stable. The experts of Heaton Tabb & Co. Ltd., the ship furnishers, who are responsible for a considerable part of the fitting-out of "Canberra," set about finding an answer to this baffling problem with a series of experiments. Fifty-three prototype panels were produced without any real measure of success, and just when hopes of finding a solution were beginning to fade the right process was discovered.

The secret is the length of time which the panels remain in the giant presses at just the correct temperature and pressure.





# SHIPBUILDING IN UNITED KINGDOM

THE Shipbuilding Conference has issued figures for new orders received by British yards during the third quarter of 1960. They show new contracts for 38 vessels, of 63,000 gross tons in all. Against this must be offset the cancellation of 22,000 tons of earlier orders, so that the net addition to the order book amounts only to 41,000 tons. This means that for the first nine months of the year new orders (less cancellations) have amounted to 277,000 tons, which is more than 700,000 tons below completions during the same period. The shipbuilding order book now stands at 3,494,000 gross tons, valued at about £525 million.

Lloyd's Register of Shipping figures issued at the same time show that the reduction in tonnage under construction in British yards has also continued and at 1,753,843 gross tons the total is the lowest since mid-1946. Completions were not far below the quarterly average for the last three years, but the volume commenced, at only 179,398 tons, is well below the quarterly average, which had already fallen from 400,000 gross tons in 1957 to 285,000 tons in 1959.

The "Financial Times" commented in a leading article that: "Failing a complete change in the situation, it seems now to be only a matter of months before unemployment becomes appreciable in the industry. This is not, of course, a purely British problem. Some of the overseas shipbuilding industries are, in fact, worse hit than we are. It would be quite wrong to describe the present recession as the product of inefficiency in British yards.

"However efficient the industry was it would still be in difficulties to-day. So far as production is concerned, one of the biggest problems is indeed the increasing sparseness of orders, which inevitably means that production must be spasmodic and discontinuous, and that capital overheads are not fully covered. So far as exports are concerned, the industry has what appears to be a legitimate complaint about the inadequacy of credit facilities compared with those available to some overseas competitors. The trouble is that shipbuilding credit is normally of between five and seven years, a period too long for the banks and too short for the insurance companies.

"At the same time it would be idle to deny that the question of the industry's efficiency is becoming one of mounting public concern, and that there is a growing feeling in some circles that British shipbuilders entered the slump in an unnecessarily weak position, despite — or, in some cases, perhaps because of — the big backlog of orders (which still amounts on paper to about 2½ years' work). This feeling has been fanned by the unfortunate leakage of some of the contents of a special confidential report on the industry by the Department of Scientific and Industrial Research, which the industry itself regards as prejudiced and unfair.

"The D.S.I.R. report, in fact, criticises the industry—though it specifically exonerates a number of firms in it—for not spending enough on modernisation or research, for insufficient standardisation and for the existence of too many small firms; it is also critical of the quality of management in the shipyards. It is also, not surprisingly, highly critical of the behaviour of the trade unions in the industry, but it apparently implies that management must also bear some of the responsibility for poor labour relations and unsatisfactory use of labour.

"Not surprising, the shipbuilding employers are resentful about the report, and deny most of its charges. It does seem that some of the criticisms made in the report are superficial and unjust. But at the same time the employers should realise that it is now too late to try to suppress the whole thing and pretend it never happened. Now that the issue has been ventilated—and ventilated in a way which could hardly have been more unfortunate for the industry,

since it is presumably inhibited from replying to charges which have never been officially published and are in theory confidential—the best tactic for the industry and the public would be to have a second inquiry which would examine the charges made by the D.S.I.R. and which would be intended for publication. This would give the industry an opportunity to present its case—which is in many ways stronger than most people suspect—in public.

"This has been the procedure followed in the case of the machine tool industry, following a similarly explosive but secret report by the D.S.I.R. . . . This could constitute a precedent for shipbuilding."

At the moment of going to press the only other comment to hand is from the "Scotsman," also 26.10.60: "A pattern of incipient depression again appears in the latest figures from the shipyards, which confirm the evidence of previous quarters . . . The recession into which the industry is drifting has been long foreseen, though its severity and duration are more difficult to forecast. As there is a big surplus in world shipbuilding capacity, some economists take a gloomy view of the chances of British yards in competition with those in Germany and Japan, where the shipbuilding industries have surged ahead in recent years. But in these countries, too, there was a fall in tonnage under construction during the last quarter.

"Critics of the British shipyards have been given fresh ammunition by the Department of Scientific and Industrial Research. Though a report on shipbuilding by the D.S.I.R. has not been published, knowledge of its contents seems to be widely diffused among those interested in the industry. It is said to have examined shipbuilding and found it wanting in managerial efficiency, slow to modernise itself, in need of reorganisation, and reluctant to perceive the benefits of standardisation.

"No doubt these faults are to be found in shipyards here and there, but indictments which are brought against a whole industry are generally exaggerated, and perhaps it is premature to call for wholesale reconstruction of ship building just because it is sliding into the trough of the wave. It may be able to regain an even keel more quickly than is commonly thought, even if times are not so easy as they were a few years ago."









# UNITED STATES NAVY BASE IN CUBA

Cuba is today one of the trouble spots of the world, and for the United States Navy Cuba means Guantanamo Bay — one of their largest bases outside of the United States.

The base was seized by American marines, assisted by Cuban insurrectionists, from the Spanish in 1898 and since then it has by treaty always remained a U.S. Navy Base.

During the last war it was a vital convoy port and played an important part in the British and American war against German submarines in the Atlantic.

Since the revolution in Cuba, Castro has made many threats against Guantanoma, or Gitmo, as it is more familiarly known to the U.S. Navy, but observers consider that the dollars which flow in from the base will cause him to reconsider any ideas that he may have about its seizure. They point out that:

The base's resident military population is now about 250 officers and almost 2,700 enlisted men, plus 200 United States civil-service employees. Dependants number about 2,500. In addition there are normally 4,000 to 5,000 men aboard ships of the fleet based at Gitmo.

Some 3,600 Cubans, including almost 2,200 civil-service employees, run the base's power plants, laundries, machine shops, recreational areas and other facilities, and help in the hospital and mess halls. Usually about 800 of these live on the base — many of the cooks and maids in the homes of employers, the others in specially provided barracks.

These workers are the economic mainstay of the Guantanamo area of Oriente Province. Their wages are higher than the average paid in the eastern section of Cuba in normal times — far higher than most wages now being paid — and the civil-service employees have pension rights. The total Cuban payroll is now about $6,790,000, and the base spends another $656,000 locally for foodstuffs and supplies.

A well-known American defence writer recently summed it up:

What then, is Gitmo's future?

There are three types of threat to the base. The most extreme — all-out attack by the Cuban armed forces and militia — is unlikely, since it might precipitate our armed intervention in Cuba against Castro. Besides, the 180 to 240 marines normally stationed at Guantanamo, reinforced by a tough Seabee battalion and hundreds of trained sailors, all supported by attack aireraft and the guns of the fleet, would be too much for the Cubans. Guantanamo Bay, moreover, can be rapidly reinforced from Roosevelt Roads in Puerto Rico or from the States.

The second threat is the possibility of harassing demonstrations and provocations by the Cubans to induce us to take armed action against them. This threat presents its dangers, but they are not major. What the Cubans do outside the base is Cuba's business. Inside the base, provocations will not be tolerated.

The third threat, sabotage, is by far the most serious. Given an army of Cuban workers all over the base, and a Fifth Column of fanatic Fidelistas among them, sabotage would be easy despite the manning of anti-sabotage posts in times of tension. Workers leaving the base are searched regularly, but are only spot-checked entering it. Sabotage, perhaps accompanied by some terrorism, could occur in varied forms. If it does, the ultimate answer would be the exclusion of all Cubans from the base. Specialists of the Navy's Construction Battalion could provide essential services, and eventually the Cubans could be replaced by workers from the States.

There still remains a weakness. No fresh water has been found on the base, despite intensive drilling, and distillation equipment of the required capacity has been considered too expensive. The Yateras River pumping point, from which water is now drawn, is more than four miles beyond the reservation fence. The Cuban Government could cut off the flow of fresh water to Gitmo at any time, or a Cuban fanatic could sabotage the pipeline.

The Navy has plans to meet such an emergency. Gitmo normally uses 2,500,000 gallons of fresh water a day for all purposes, including car washing and lawn watering. With strict rationing it could get along with 500,000 gallons daily. Recently completed tanks have brought the water-storage capacity up to 9,500,000 gallons. If worse comes to the worst, Gitmo will be supplied with fresh water by tanker ships. A new pumping line to the old battleship

moorings in the bay will enable tankers to discharge water faster than the base can use it.

In short, Guantanamo Bay is fairly secure against physical threat. More dangerous to its future — indeed, to the future of other bases overseas — is the inclination of some Americans to appease, compromise or retreat in the face of threats, or the danger of physical violence.

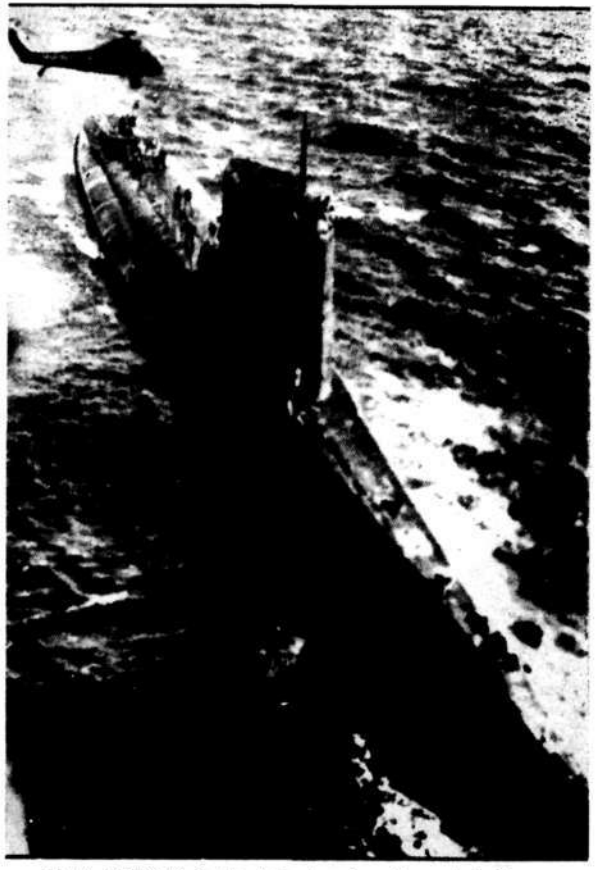
Admiral Fenno, supported firmly by the Pentagon, will have none of this. "If we left Guantanamo," he said recently, "we would lose so much face here in the Caribbean it would be reflected all over the world. How long are we going to be pushed around? We have no intention of giving up this base. We are not interfering with the internal affairs of Cuba. We are meticulous in living up to our end of the agreement."

So long as the nation supports a policy of firmness, it stems likely that the Cubans will limit their attacks against Gitmo to harrassment, pressure against the workers, propaganda and threats.

Things are bound to get worse in Cuba before they get better, and Gitmo may be affected. But we are there legally. We have converted an arid wilderness into a first-class naval base with American dollars, and our continued presence is in the best interest of the United States, and the Cuban people too.

**Gitmo, important militarily, is even more important as a symbol of the United States' position in the world today, and as a sanctuary of freedom in a land where freedom is dying. We retreat at our peril.**

## *U.S.S. TRITON — The World's Largest Submarine*



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Her surface displacement is 5,900 tons and she is 447 feet long.


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