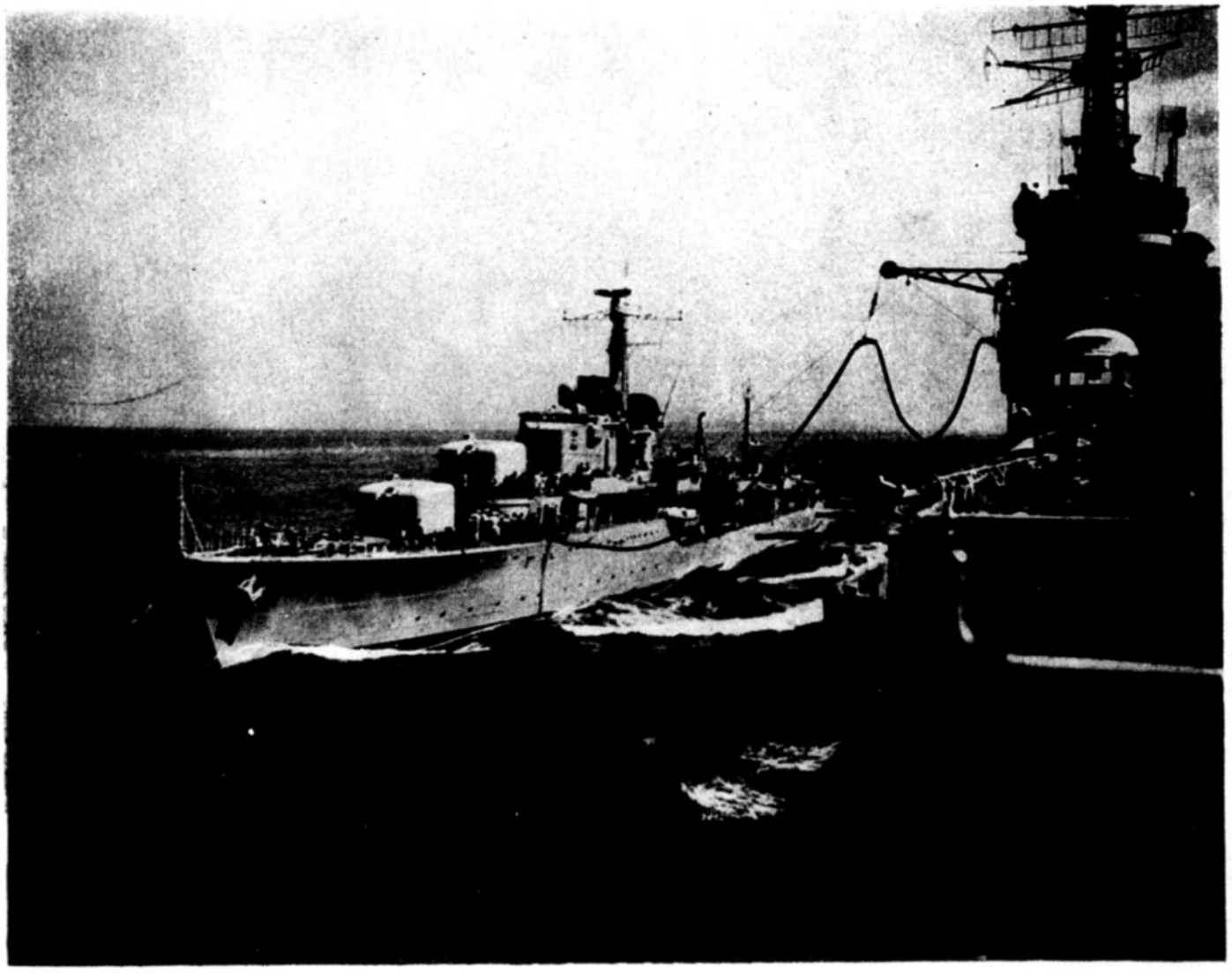
THE NAVY

OFFICIAL ORGAN OF THE NAVY LEAGUE OF AUSTRALIA

NAVY WEEK SOUVENIR PROGRAMME ISSUE



INCLUDING PROGRAMME of

DISPLAY AT GARDEN ISLAND, 12th OCTOBER, 1957

AND

OPEN DAY AT H.M.A.S. "WATSON" AT WATSON'S BAY, 19th OCTOBER, 1957

1/-

THE NAVY
Australia's Maritime Journal

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THE NAVY
Australia's Maritime Journal

OUR FIRST LINE OF DEFENCE

So far in the relatively short history of our country, two world wars have proven the value of naval forces in the defence of Australia. But with the rapid scientific advances in machines of war, many people question the value of a navy in the defence of this country in a future conflict.

The role of the Navy remains unchanged — the defence of sea communications.

Australia is vitally dependent on overseas shipping for a stable economy in time of peace, and for the very existence of the population in time of war.

The present turnover of freight entering and leaving the country is more than 20 million tons annually. Of this, only 2,000 to 3,000 tons is moved by air.

The effort required to lift sufficient goods by air would be beyond the industrial and economic resources of the country, and therefore it is an established fact that Australia will depend on open shipping lanes and the regular turnaround of ships for many years to come.

What is the nature of the threat in the future to our sea communications?

The ocean routes of the world will be subject to attack in basically the same way as they have been in the past: firstly from underwater attack by submarines at almost any position along the route, secondly from surface attack by opposing naval forces, and thirdly by air attack from shore- and carrier-based aircraft.

The Navy is well suited as a mobile defence force to safeguard shipping from all three forms of attack.

Against the submarine menace, the carrier with its anti-submarine aircraft and anti-submarine helicopters is the only means of providing air support for convoys in mid-

SAILORS CAN SWIM

Disproving the old belief that sailors can't swim, 45-year-old Commander G. Forsberg recently broke the record for the English Channel swim from England to France. His time, 13 hours, 33 minutes, was 22 minutes faster than the previous best. Picture shows him entering the water for his record swim.

ocean areas well beyond the profitable surveillance of shore-based maritime aircraft.

Even in areas within range of shore-based aircraft, the carrier provides a more efficient defence in the vicinity of the convoy.

The longer the time spent on transit from base to task, the shorter the time spent on task, and thus the greater the number of aircraft required to sustain adequate protection.

Therefore, because of our great length of coastline and because our trade and convoy routes stretch into the Indian and Pacific Oceans, it can readily be seen that for the protection of sea communications against submarine attack, carrier-based aircraft are essential.

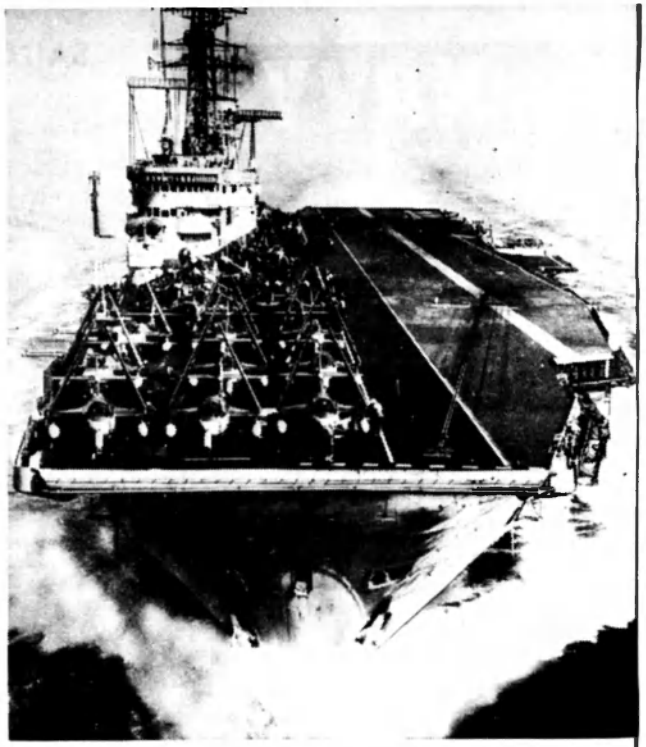
The part the Navy plays in the protection of sea communications against surface attack has remained unchanged with the years, and will be dealt with in the future as in the past by carrier-based search and strike aircraft and by surface ships.

Lastly, the required protection of sea communications against shore-based attack shows the need for naval sea and air forces in their vital offensive role.

It is by striking early at the aggressor and supporting land forces in amphibious operations that the enemy's advance into our outer defences can be contained, thereby denying to him the opportunity to set up bases adjacent to our sea lanes in the islands to the north of Australia, as happened in World War II.

A future world conflict, which is now referred to as a global war, will have unbelievable and horrifying consequences.

The British statement on defence last year said: "If global war were to break out it would be a struggle for survival of the grimmest kind.



In future, large aircraft carriers are expected to be powered by nuclear propulsion. This picture shows H.M.S. Ark Royal steaming through the Mediterranean during recent exercises. Her jet aircraft are parked alongside her angled deck.

Its course would be unpredictable after the initial stage."

In a global war, the mobility of naval forces will to a certain extent enable them to avoid annihilation and thus allow them to take part in the subsequent phases of such a struggle.

Because the ability to annihilate an opponent is now possessed by world powers, it serves as a deterrent to the use of this form of nuclear warfare.

However, experience has clearly shown since the end of World War II that aggression has been successfully carried out without resorting to a major conflict, by infiltration and limited war activities in isolated parts of the world such as Korea, Indo-China and Hungary.

At present, the Iron Curtain is prevented from moving further west by N.A.T.O., south by the Baghdad Pact, and east by S.E.A.T.O.

Any act of aggression launched from behind the Iron Curtain in the South-east Asian area will immediately jeopardise the future security of Australia.

We are bound by treaty obligations to meet any such attack by force at an early stage.

To appreciate the value of naval forces in such a limited war, consider for a moment the role of the Navy in the protection of our sea communications in the three basic ways already outlined above.

On the outbreak of hostilities we will be immediately faced with a submarine threat in the waters about our coasts, and along the supply lines to our forces in the north, and the shipping routes in the Pacific and Indian Oceans.

The threat of surface raiders operating from northern Pacific bases cannot be overlooked.

These will most probably be operated in mid-ocean areas away from the threat of our shore-based air forces.

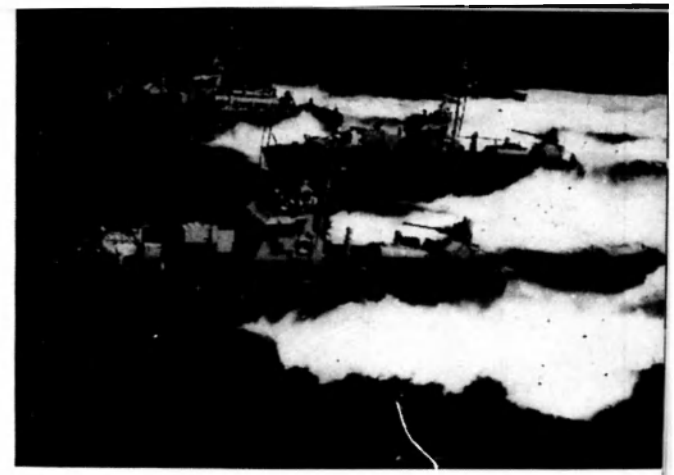
Convoys in these areas, once clear of major shipping concentration areas, will best be protected by the escorting naval forces providing both the anti-submarine and carrier-borne air protection required.

Finally, naval forces will allow us to support amphibious operations and strike the enemy should he pierce the South-east Asian Defence barrier.

There are two marked characteristics of a naval force, that of mobility and versatility. These, backed by modern equipment in ships and aircraft, provide the Navy with a hitting power which can never be disregarded in our country's defence plan.

In time of peace, the sense of urgency and appreciation of the consequences of attack fade quickly into the background of people's minds, and in too many cases disappear from their thoughts completely.

This prevalent lack of thought on such matters is reflected in many ways, not the least of which is a decrease in the finance voted for the support of the defence forces.



Three fast patrol craft leave a sea of foam behind them as they speed through the waters of the English Channel during exercises. They are from H.M.S. Hornet, the Royal Navy's coastal forces base at Gosport, Hampshire.

In industry, old factories using old equipment cannot compete with modern machines and methods.

The same situation is found in ships and equipment. New ships and new equipment are essential to counter the modern threat, and like the new factory this requires a great deal of money. It is just as essential to the future of a country as the industrial ability to produce goods for overseas markets.

The cycle of building ships and training ships' companies takes time. It cannot be carried out on the outbreak of hostilities unless a sound nucleus has already been formed during the years of peace.

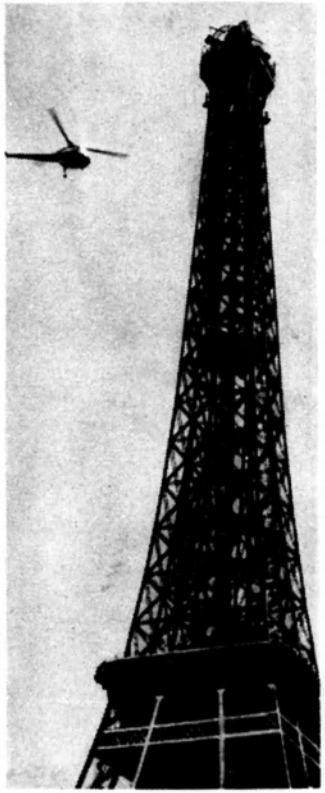
The U.S.S.R. now has the second largest navy in the world and the largest submarine force in the world. Marshal Zhukov said: "In a future war, the struggle at sea will be of immeasurably greater importance than it was last war."

Lady Macquarie's Chair and Farm Cove at the turn of the Century

Scene on arrival in Sydney Harbour of the Duke and Duchess of Cornwall and York in 1901, when H.R.H. came to this country to inaugurate the Commonwealth of Australia and open its first Parliament.

In this picture, which has been kindly lent by Messrs. John Fairfax & Sons Pty. Ltd., publishers of "Sydney Morning Herald," the Royal Yacht "Ophir" (a well-known Orient liner of its day) has anchored in Farm Cove and a regatta is in progress. Lady Macquarie's Chair is seen on the left and some still familiar landmarks can be identified in the background.

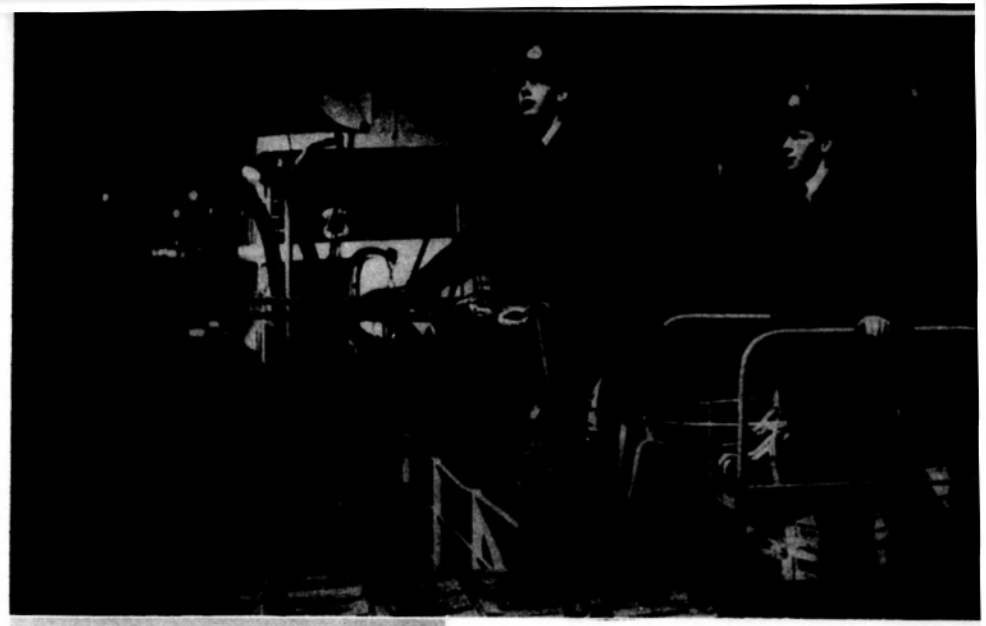
AROUND THE EIFFEL TOWER



Flying past the 985-foot-high Eiffel Tower during a recent demonstration in Paris, is the British "Skeeter Mk 12" light helicopter.

Before a party of French aircraft operators and airline officials, the Skeeter's ability to climb at the rate of 1,600 feet per minute, and its ease of manoeuvrability, was demonstrated by the helicopter test pilot, Mr. K. Reed.

The Skeeter is a single-engined two-seat helicopter.



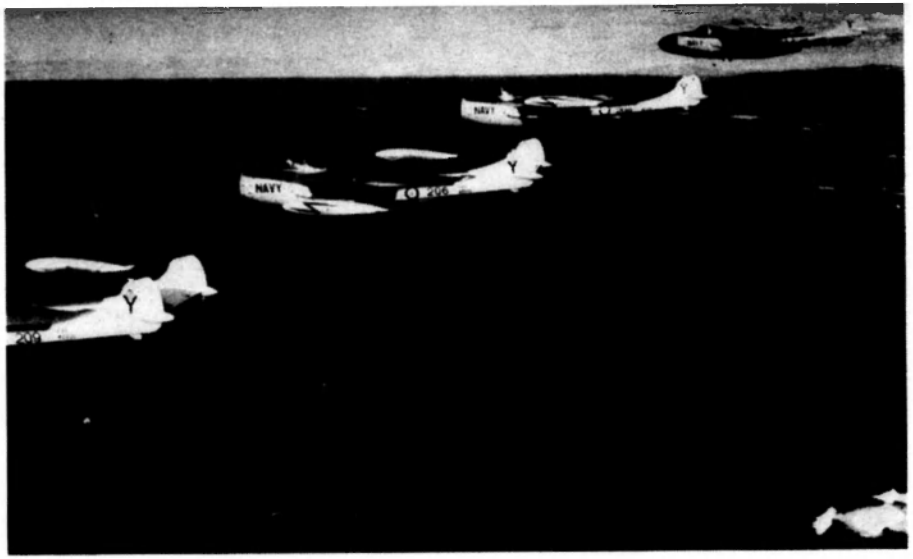
Engineer Apprentices

THE call of the sea is as strong and clear to-day as it ever was, but this is an age of specialisation. Boys no longer run away to sea to begin their careers as cabin boys. The ships of to-day are complex engineering units which have to be manned by specialists in many trades.

One of the largest privately owned tanker fleets in the world is operated by the British Tanker Company, shipping organisation of The British Petroleum Company.

Four years ago, the Company instituted a new scheme for the training of engineer officers. This year the first recruits finish their course and go to sea as junior engineer officers.

Pictured on this page are (above) engineer apprentices leaving the 32,000-ton tanker British Engineer on shore leave and (right) a cheerful young apprentice on the job at sea.



R.A.N. Sea Venom day and night fighters on exercises off the east Australian coast.

WAR IN THE AIR

AIR warfare is becoming an increasingly important part of naval operations.

On the pilots and observers of the Fleet Air Arm in time of emergency the safety of our merchant ships on the high seas will largely depend, for it is they who will patrol the seas from aircraft carriers and play a vital part in protecting shipping from air, surface and submarine attack.

They will also defend our convoys against enemy shore-based air attack and make attacks on land targets.

In addition, they will assist in covering troops trying to land on enemy-held territory, and in safeguarding our army communications and our armies in the field.

By a Special Correspondent

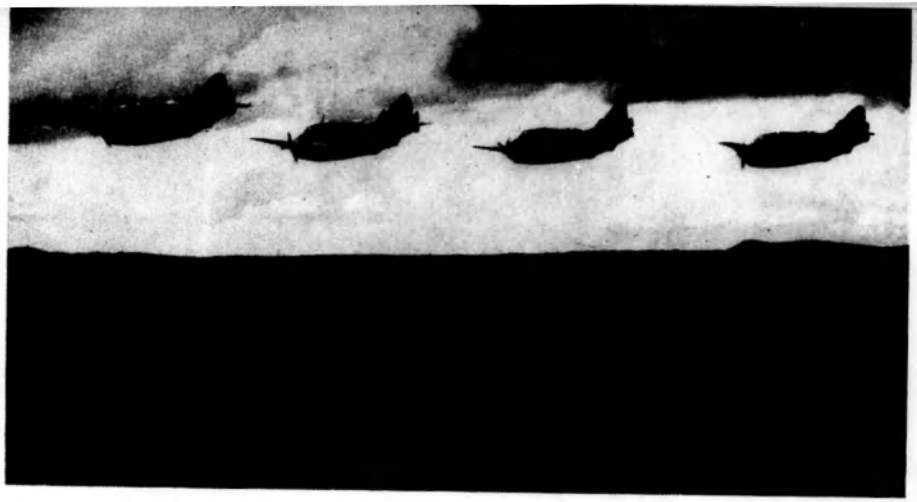
The Royal Australian Navy's aircraft carrier Melbourne is the most modern carrier of her kind afloat and is equipped with Sea Venom jet fighters and Gannet turbo-prop. anti-submarine and reconnaissance aircraft.

She has the latest type of angled deck which permits speedier and less-hazardous flying operations, a steam launching-catapult and mirror deck-landing sights, which eliminate most of the possibility of human error in landing on.

The Fleet Air Arm is looking for young men who wish to become pilots or observers.

Applications for the next entry to the Service, in March next year, close early in January.

Applicants must be over 17 and under 24 at the time applications close and must hold intermediate certificates or their equivalents with passes in at least four subjects, including English and mathematics.



Gannet anti-submarine aircraft (above) of the R.A.N. at target practice; (right) the Royal Navy's new Supermarine N113 ready to take off from the Ark Royal. It can carry an atom bomb.

Successful applicants who eventually become officers will serve for seven years from the date of their graduation, but during that period volunteers may be selected for permanent commissions.

Those who leave the service at the end of seven years will be paid a gratuity.

Those who gain permanent commissions will serve under the provisions of the Defence Forces Retirement Benefit Fund.

They will have equal opportunities with other officers of reaching the highest ranks in the Navy.

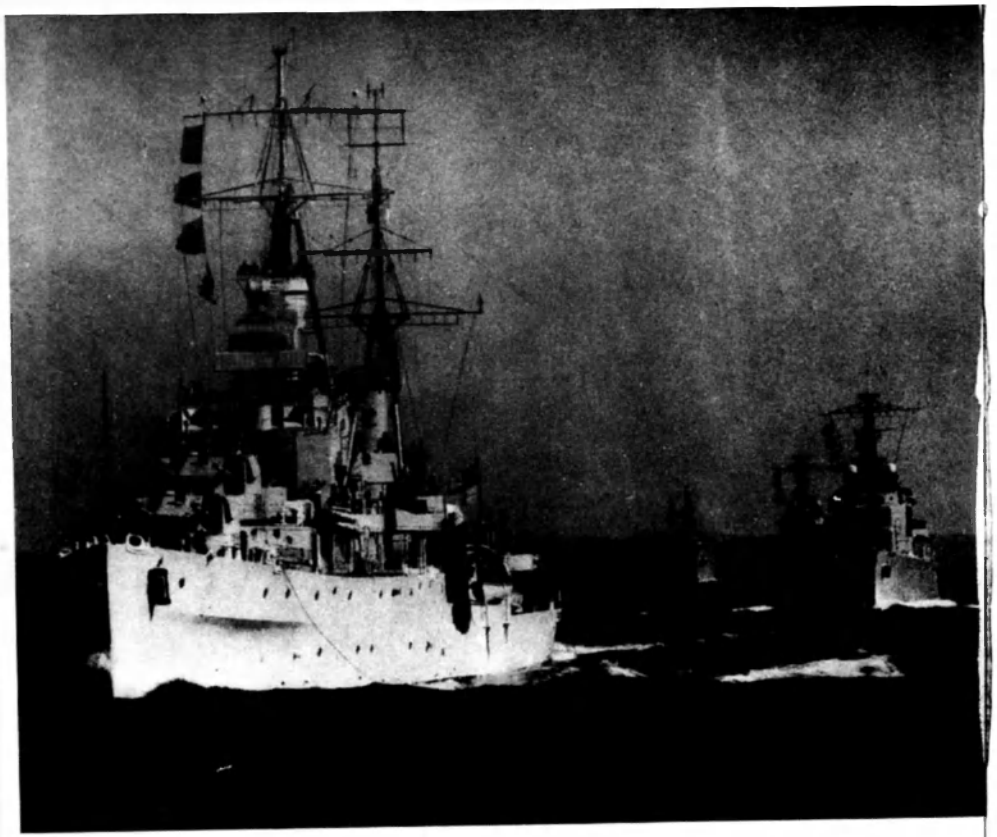
All aircrew do three months' preliminary training at Flinders Naval Depot (Victoria), after which they are selected for training either as pilots or observers.

Those selected for training as pilots do 14 months' training at R.A.A.F. establishments in New South Wales and Western Australia.

On graduation to wings, they are promoted to acting sub-lieutenant and then do six months' operational training in the United Kingdom before joining sea-going squadrons.

Those selected for training as observers are promoted to midshipmen, do a four months' officers' training course and a 12 months' observer course in the United Kingdom.

On graduation they are promoted to acting sub-lieutenant and join sea-going squadrons. Those selected for fighter aircraft do additional training in England.



Our Navy has a vital job in peace and war

People who visit the Garden Island Dockyard and H.M.A.S. Watson during Navy Week will learn a great deal about the Royal Australian Navy and will gain a far greater knowledge than they have at present of its importance in these still-unsettled days.

Mr. Davidson

BESIDES being able to inspect several of the most modern warships in the world, they will see some of the highly-specialised equipment with which the ships are fitted and will witness spectacular displays by various naval branches.

After visiting the engineering and other workshops on Garden Island, they will realise much more than they do now how vital a part skilled civilian technicians and artisans play in supporting the Navy both in peace and war.

It is very desirable that the tasks of the Navy should be continually kept before the public mind.

The celebration of Navy Week, however, provides an excellent opportunity for laying more particular emphasis upon them.

Because of Australia's geographical situation and its isolation from other countries by vast stretches of ocean, the defence of its sea-communications is a matter of the deepest concern to the Australian Commonwealth.

Unless our long sea-lanes are adequately protected in time of war, we could be deprived of essential help from allies in the form of troops and war materials and of commodities from other lands, upon which the industrial war-effort would be entirely dependent.

In other words, we could be rendered almost impotent in the face of the enemy, unable to assist either ourselves or our friends, and possibly reduced to the unhappy position of a vassal State.

By the Honourable
C. W. DAVIDSON, O.B.E., M.P.
Minister for the Navy

One of the greatest threats that the Royal Australian Navy and, indeed, all the navies of the Western Powers would encounter in future hostilities would be the fast, long-distance, long-submersible submarine, and for that reason the present R.A.N. has been designed and equipped in such a way that it would be ready to go into action immediately against enemy submarines, as well as other enemy forces, if war broke out.

In that event, the Fleet Air Arm would have a most significant role.

The defence of long isolated sea-lanes, especially those in mid-ocean, is one that only the Navy can undertake, and even the development by physicists and other scientists of more efficient units and new weapons and equipment has not altered this fact.

The methods of war may be changed by this development, but the essential tasks of the Navy will remain those that they have always been.

The preamble to the Naval Discipline Act of the United Kingdom declares that it is upon the Navy that the wealth, safety and strength of the Kingdom chiefly depend.

With appropriate adaptation, that statement also applies to Australia.

THE BATTLE OF TRAFALGAR

By REAR-ADMIRAL W. H. HARRINGTON, Flag Officer in Charge, East Australian Area.

IN October each year we celebrate the Battle of Trafalgar, a battle which has become a naval legend.

Trafalgar was a naval battle fortunate in that it gave the world freedom from major war for about a century.

In October then, we like to show you your Navy.

Even before the days of Nelson it was necessary to maintain a Navy in peace as well as in war because war at sea has always been a very technical matter.

In the first place before men can fight at sea they must learn to live at sea.

Man is not naturally a maritime creature. To enable him to live at sea it has always been necessary to adjust many of his land habits and customs.

However, life at sea moves with the times, and living conditions in our ships are improving, notwithstanding the intense competition for available space.

With us it is not guns or butter, but guns or bunks. Too late in action to lament that we have chosen amenities instead of armament.

Competition becomes always more intense as we add to the potential and intelligence of our ships by the installation of electronic machines for the control of our weapons.

Each year there are changes. Come and see them in the ships which will be at Garden Island.

Come to H.M.A.S. Watson and see not only the modern living conditions which are now provided for Naval people, but also some of the modern devices used in Naval warfare.

H.M.A.S. Watson, which is the Anti-submarine and Radar School, has some very interesting equipment to show you.

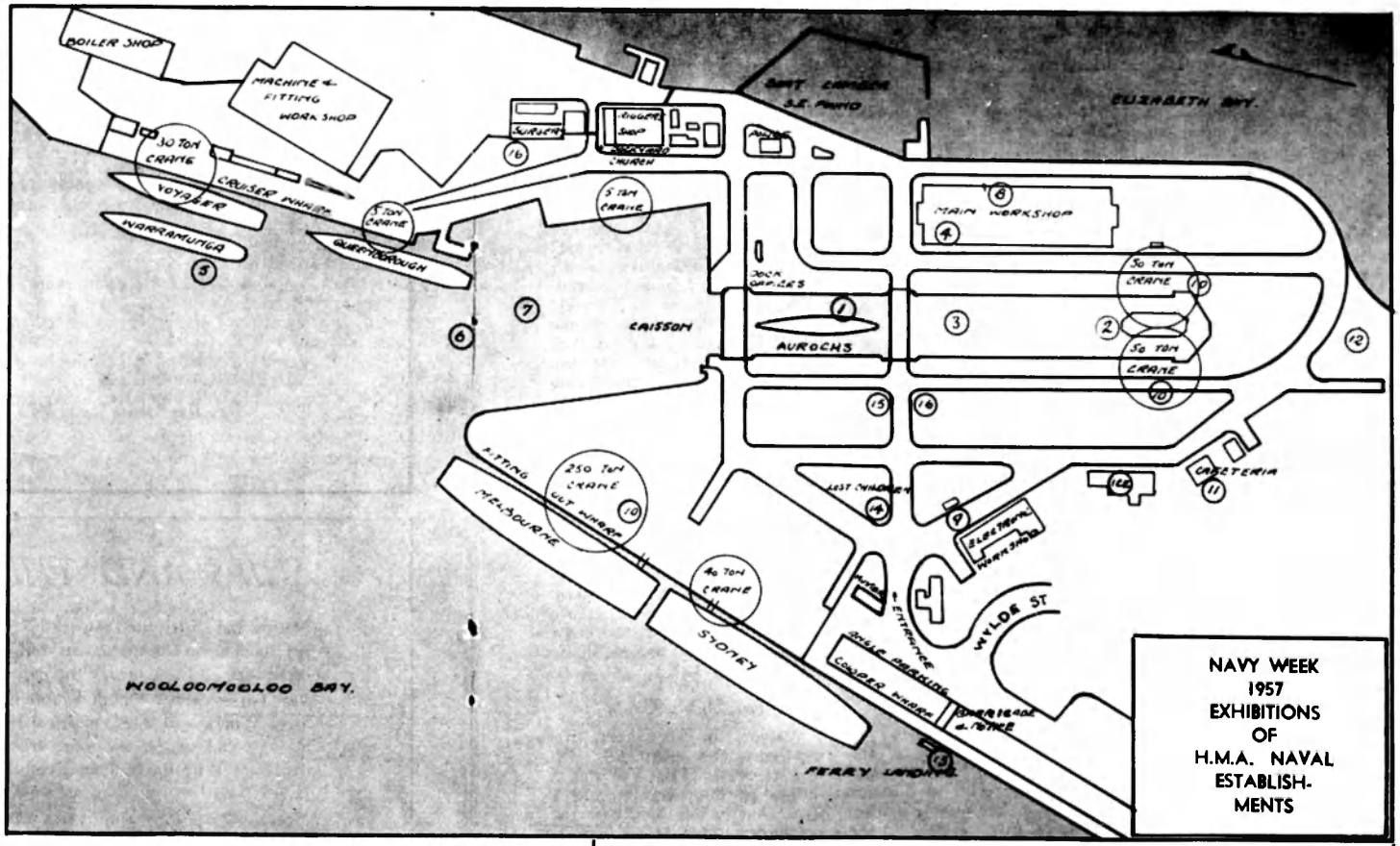
May I welcome you then to Garden Island on Saturday, October 12, and to H.M.A.S. Watson on Saturday, October 19, to see how your modern Navy lives and works and to see the dockyard which repairs and services the ships and their equipment.

NAVY WEEK IN SYDNEY — DISPLAY AT GARDEN ISLAND, OCTOBER 12

PROGRAMME OF EVENTS

Figures in brackets show where events take place —see corresponding figures on the map of Garden Island.

10.30 a.m. Dockyard and H.M.A. Ships open to visitors.
10.45 Crane rides begin (10).
11.00 Flying demonstration by Naval aircraft, from east to west.
11.15 H.M.A.S. Warramunga fires squid (5).
11.20 H.M.A.S. Warramunga fires torpedoes (5).
11.30 Helicopter display (6).
11.50 H.M. Submarine Aurochs dives in Captain Cook Dock (1).
ships closed to visitors.
Crane rides cease.
12.15 p.m. Continuous display by Naval divers begins (3).
12.30 Helicopter display (6).
12.40 Firefighting display (12).
Crane rides begin (10).
1.15 H.M.A.S. Warramunga fires squid (5).
1.20 H.M.A.S. Warramunga fires torpedoes (5).
1.30 Helicopter Display (6).
ships re-open to visitors.
1.45 Frogmen drop and pick up (7).
2.00 Flying demonstration by Naval aircraft, from east to west.
2.15 H.M. Submarine Aurochs dives in Captain Cook Dock (1).
2.35 Helicopter display (6).
2.45 Frogmen drop and pick up (7).
3.00 Firefighting display (12).
Rescue of pilot from burning aircraft.
3.10 H.M.A.S. Warramunga fires squid (5).
3.15 H.M.A.S. Warramunga fires torpedoes (5).
3.20 Helicopter Display (6).
3.30 H.M. Submarine Aurochs dives in Captain Cook Dock (1).
3.50 Firefighting display (12).
4.00 Flying demonstration by Naval aircraft, from east to west.
4.15 Frogmen drop and pick up (7).
4.30 Firefighting display (12).
4.35 H.M.A.S. Warramunga fires squid (5).
4.35 H.M.A.S. Warramunga fires torpedoes (5).
4.40 Helicopter display.
4.50 H.M. Submarine Aurochs dives in Captain Cook Dock (1).
5.00 Ships closed to visitors.
5.15 Ceremonial sunset.
5.30 Dockyard closed to visitors.



KEY TO GARDEN ISLAND DISPLAYS & INSTALLATIONS

1. H.M. Submarine Aurochs dives in Captain Cook Dock.
2. Floating dock with H.M.A.S. Cootamundra in dry dock.
3. Diving display
4. Main workshop.
5. H.M.A.S. Warramunga fires squid and torpedoes.
6. Helicopter display.
7. Frogman drop and pick-up.
8. Apprentices' display.
9. Ceremonial sunset.
10. Crane rides.
11. Naval films.
12. Fire-fighting.
13. Ferry landing.
14. Lost children.
15. Ladies' rest room.
16. First aid.

Corresponding figures are on the map above.

"OPEN DAY" AT WATSON

AS part of Navy Week in Sydney, H.M.A.S. Watson, the naval establishment at South Head, will be open for public inspection from 1.30 p.m. to 5.30 p.m. on October 19.

It is easily reached by buses from Central Railway (Eddy Avenue) and trams from Queen's Square, which terminate almost at the gates of the establishment.

Car drivers should use the second gate.

Car drivers will find ample parking facilities near the Torpedo and Anti - submarine School, which is the most modern of its kind in the British Commonwealth.

Here visitors may see how mines are laid and swept, how a submarine is detected and destroyed, and how demolitions are carried out.

All the real weapons are on display, including devices that fire mortar shells and rockets against submarines and the set that finds submarines for the hunter ship, asdic.

Also in this building is a comfortable cinema, where there will be a continuously running series of short films on the Navy.

Opposite the T.A.S. School are the new accommodation blocks, which will be most interesting to those who like to see how servicemen live in the modern Navy.

Housewives may like to see the galleys, preparing rooms and dining halls that sit four hundred people to a meal.

Ex-Servicemen might be surprised to see the canteens, bars, soda fountains, dance floors and the beer garden, and to note that the parade ground will spend most of its time serving as tennis and basket ball courts.

From the new blocks the road mounts a hill to the new administration block, which will be closed except for the information centre, lost children office and the refreshment room.

Further along the cliff road, the visitor passes the tall radio and radar masts that "see" clearly objects far out to sea and comes to the other buildings, the largest of which are the Navigation and Direction School.

Here all available radar sets will be working, showing how each does a different job in detecting the enemy.

The operators will be seen gathering this information, and plotting the courses of friend and foe, so that a complete picture of a battle can be drawn by a person who never sees it.

History of Watson

There will be three information centres for the benefit of visitors, and four refreshment points, two of which will command some of the finest views of the harbour in Sydney.

Watson was formed in the early years of the Second World War as the Radar School, when the new invention first came into service in the R.A.N.

At this time it consisted of one block of buildings and only two radar sets.

There was no accommodation, and many had to live at H.M.A.S. Penguin, at Balmoral, which meant that when weather was too bad for boats the classes had to use public transport, not arriving at their work until nearly lunchtime!

However, the establishment was enlarged considerably in 1944, and in 1945 it was officially commissioned as one of H.M.A. ships.

In the meantime, it had also become the training centre for navigation, and became known as the N.D. School, which, in peace and war, has supplied nearly 7,000 men fully trained in radar and navigation to the Australian and Allied Navies.

For many years the Torpedo and Anti - Submarine School had been based at H.M.A.S. Rushcutter, but the growing importance of this branch soon showed the need for a larger and more modern school.

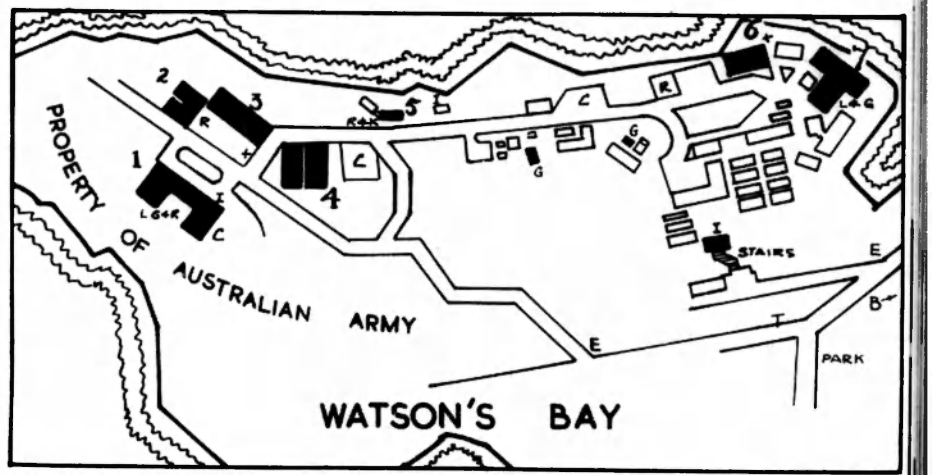
Watson underwent a further enlargement, and in 1956 the T.A.S. School moved into its fine new building, which was soon followed by new accommodation and amenities blocks.

To-day Watson is still expanding, and will eventually become one of the leading Naval establishment in New South Wales, and one of the most up-to-date and comfortable in the Navy to-day.

The Ship's Crest

Watson, in her short life, has worn two completely different crests. The first was a design of thunderbolts and a flying bat, which also uses the principles of radar to find its way. The quartermaster of Captain Philip's ship, H.M.S. Sirius, was a Mr. Watson, who later became the first lighthouse-keeper on South Head. The present crest of H.M.S. Watson, therefore, shows this lighthouse. This is surmounted by the Naval Crown, made up of the sails and high poops of another age, which has been used by the Navy since the days of Drake.

MAP OF H.M.A.S. WATSON



LOCATION OF INSTALLATIONS

Figures and symbols refer to corresponding figures and symbols on the map above.

E. Entrances.
C. Car parks.
I. Information.
L. Ladies' toilets.
G. Gents' Toilets.
R. Refreshments.
T. Tram terminus.
B. Bus terminus.
K. Lost children.
+ First Aid Posts.

1. Torpedo and Anti-Submarine School.
2. New Chief and Petty Officers' accommodation.
3. New amenities block.
4. New junior ratings' accommodation.
5. New administration block.
6. Action Information Teacher Block School.
7. Navigation and Direction School.

Army property adjoins and is all the area south of H.M.A.S. Watson

G.M. DESTROYER BEING BUILT

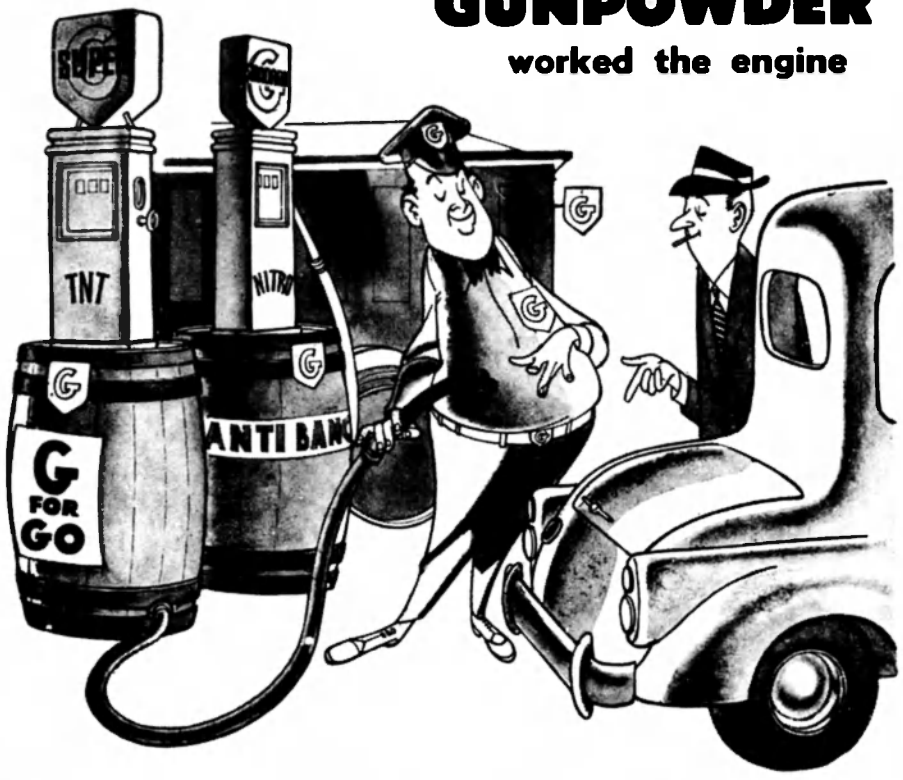
Britain's first guided missile destroyer is now being built.

The First Lord of the Admiralty, Lord Selkirk, announcing this, said that "great importance" was attached to the project.

A ship such as this, he said, "will make a good contribution to the peace of the world — a contribution in no way diminished by the development of inter-continental ballistic missiles."

It was announced last June that the Royal Navy's ship-to-air guided missile, Seaslug, would be fitted to four guided weapon destroyers which had already been placed on order.

GUNPOWDER
worked the engine



Can you imagine driving up to a keg of gunpowder in a service station and asking the attendant to "Fill 'er up"?

It *might* have happened — if science hadn't stepped in.

For gunpowder was the fuel used in what historians believe to have been the first effort to obtain *continuous* motive power.

Christian Huygens, a Dutchman, is credited with trying out the idea about 1680.

Whether or not he blew himself up is not recorded, but for good reasons his example was *not* followed in later and more successful engines.

Believe it or not, modern petrols contain more energy per pound than T.N.T. or any other modern high explosive. The energy they develop gives a steady propulsive force on the engine piston, whereas T.N.T. explodes instantaneously with a shattering, rather than a propulsive, force.

SHELL research is always on the job checking the quality of the fuels and lubricants used in modern high-speed internal-combustion engines.

The development of the unique Shell additive, I.C.A. (patented throughout the world), has been the most significant contribution of recent years to improved engine performance.

Shell Serves Australia . . .

YOU CAN BE SURE OF SHELL

463/D

TRAINING THE NAVY'S OFFICERS

By a Special Correspondent

OLD SALT — NEW SALT:
A Naval College cadet learns about knots and splices from his instructor.

NEXT January a group of light-hearted boys will move into the Royal Australian Naval College, put aside their civilian clothes, and begin a career in the Navy.

Chosen with painstaking care from all over Australia, these boys are the future officers of the Service. Perhaps among them may be an admiral of the atomic age.

Although the College was established as recently as 1913, it has already produced five admirals and a large number of other senior and less-senior officers who have distinguished themselves in war and won high service decorations.

Boys eligible to enter the College are those within two age-groups who can attain, or have already attained, certain educational standards.

The "normal entry" is for those who are between 15½ and 16½ in January of the year they enter the College and who can pass an examination about equivalent to intermediate standard.

The "matriculation entry" is for those who are not older than 19 in January of the year they enter the College. They must have passed the matriculation examination for an Australian University or intend sitting for it in the year they appear before the College interviewing committee.

Boys of both entries join the College in January each year. Applications close in the preceding June.

At the College they are given free education, books, clothing, maintenance and a financial allowance for cadet-midshipmen.

Cadet-midshipmen of the normal entry remain at the College for three years. Matriculation entry cadets remain for three terms — amounting to about 11 months.

Cadets of both types of entry then do three months' basic sea training in an R.A.N. training frigate. After this and after they have passed a seamanship examination they are promoted to midshipmen and go to the United Kingdom for further training at the Royal Naval College, Dartmouth.

This part of their training takes 16 months. They are then promoted to acting sub-lieutenants and go to sea in ships of the Royal Navy or the Royal Australian Navy for periods ranging from four months in the case of electrical specialists to three years in the case of seamen.

Electrical specialists then do a refresher course at Flinders Naval Depot (Victoria) in preparation for an Electrical Engineering degree course at an Australian university. Engineer specialists do a professional course at the Royal Naval College, Manadon.

After they have reached the rank of lieutenant, some officers

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Gunnery training.

AFLOAT SUPPORT

IN this age of nuclear weapons and guided missiles, the Navy's ability to keep its forces supplied afloat is of paramount importance.

One of the Navy's greatest assets is its mobility. Its carriers provide mobile, floating airfields, which are nowhere near as vulnerable as static air bases on shore.

Its submarines and surface craft may provide hard-to-find guided missile "platforms" for long-range shore bombardment.

Naval units, dispersed and under way, do not offer a worthwhile target for atomic weapons.

These advantages, however, would be nullified if the Navy were unable to keep its ships supplied at sea.

For this reason the "fleet train" is a highly important factor in naval strategy.

The fleet train can best be described as a mobile source of fleet supply which enables a task force to remain at sea, far from its base, almost indefinitely.

Before the establishment of fleet trains, a warship could only operate efficiently up to 1,000 miles from base. Today the distance is immeasurable.

Two things have brought this about: the change from coal to oil, which has greatly increased the operating range of ships, and the ability of oil tankers to supply fuel to ships while still under way.

Consequently, a most important factor in a fleet train is the oil tanker, which, in addition to carrying fuel for the ships themselves, can also carry fuel for the aircraft of the task force's carriers.

BATTLE OF THE NILE

Master's Medal

The medal reproduced here by courtesy of Mr. Kenneth C. Bruff Macdonnel, of Sydney, grandson of Mr. Bruff, Master of one of Nelson's ships, "Orion," at the Battle of the Nile, has come down to Mr. Macdonnel as a family legacy.

"Orion" carried 74 guns with a complement of 500 men and was commanded by Captain Sir James Saumarez, of Norman descent but born in the Island of Guernsey. A distinguished naval officer, he was a member of Nelson's Band of Brothers.

A commemorative victory medal in gold to Admirals and Captains engaged in naval actions was not exceptional, but the gift after the Battle of the Nile of gold medals to Admirals and Captains, silver to Lieutenants and Officers ranking with them, copper-gilt to inferior officers and copper-bronze to the men by a private individual, Mr. Alexander Davison, an intimate friend of Nelson's, was exceptional. Mr. Davison was, in this case, agent for sale of the prizes. The device is remarkable in another way; the engraver is said to have made the mistake, on the reverse side, of showing the French Fleet at anchor with the British Fleet advancing to the attack and the sun *setting in the East*. The figure supporting Nelson's profile on the face of the medal is that of Hope.

Continuing . . .

TRAINING NAVY'S OFFICERS

From page 29

who are to specialise in gunnery, navigation, communications, torpedo/anti-submarine and other subjects return to the United Kingdom to do courses which occupy them for about a year.

Some officers are given the opportunity to become pilots in the R.A.N. Fleet Air Arm.

From time to time officers of the R.A.N. are selected for exchange service with the Royal Navy. Normally the period of exchange is two years, during which they may serve at sea in various parts of the world, at the Admiralty, or at some shore establishment in the United Kingdom.

Boys who enter the Royal Australian Naval College immediately become part of the splendid tradition and rich ceremonial of a service that goes back for centuries, a service whose famous names have been spread gloriously across the noble pages of British history.

It is one of the great prides of the Royal Australian Navy that it has always tried to uphold the high examples it has inherited, as the exploits of its officers and men in the two world wars of this century and in the Korean area, have shown.

Life for a cadet-midshipman at the College is, from beginning to end, a fascinating daily round in which he engages in general studies, gains theoretical and practical nautical knowledge and takes part in athletic sports and games and other forms of recreation in delightful and healthy surroundings.

Portion of his recreation includes sailing and racing in the College yachts and dinghies, cutters and other small boats.

Three cadets were included in the crew of the College yacht Tam-O-Shanter, which was one of the contestants in the last race from Sydney to Hobart.

Religious instruction has an important place in the College curriculum and all cadet-midshipmen attend church on Sundays and other special days.

The College assembles for prayers each morning before classes begin.

After a cadet has left the College he is promoted automatically step by step until he has reached the rank of lieutenant-commmander in about 12 years.

From then on, promotions are made by selection, but, as has already been pointed out, promotion to the most senior rank in the R.A.N. is possible.

It is difficult to imagine a more interesting life for a boy to enter than that of a naval officer.

The opportunity to apply to enter is available to every boy in Australia, provided that he comes within the specified age groups and can satisfy certain requirements set out by the Naval Board.

The Navy needs technicians

IN July last year the Royal Australian Navy entered the field of apprenticeship training.

H.M.A.S. Nirimba, at Quaker's Hill, near Blacktown, N.S.W., with its workshops and spacious grounds, was handed over completely for this scheme.

Here are being trained the naval artificers of the future.

The Navy has found that there is a definite limit to the type and number of skilled tradesmen available to join the Service as fully qualified artificers—in fact, there are hardly enough to fill the needs of our rapidly growing industrial strength.

In addition, the years since the end of World War II have seen a rapid change in all manner of engineering processes, particularly in the field of electronics, propulsion, ship and aircraft design. A new era of atomic power is close at hand.

The Navy needs artificers capable of the finest workmanship, working to close tolerances to maintain complicated mechanisms.

The aim of the Naval apprentice training scheme is to take in lads of between 15 and 17 who have been trained to sub-intermediate standard or preferably higher, and give them a four years' course in school, technical and workshop subjects, followed by eight years' practical experience in H.M. Australian ships.

After the first six months' basic training the boys are selected for the various trades taught, great consideration being given to the apprentice's own choice.

The types of training available are for fitters and turners, boiler-makers and welders, shipwrights, electrical fitters, ordinance artificers, aircraft fitters, as well as some who will specialise in electronics and radio equipment.

By a Special Correspondent

During training at H.M.A.S. Nirimba, each apprentice is given sufficient schooling to enable him to complete his trade qualification and will have reached a standard acceptable to industry and the trade unions.

In addition, avenues of promotion to commissioned rank in the Fleet Air Arm or cadetships at the Royal Australian Naval College are available during training at H.M.A.S. Nirimba. Later, promotion to commissioned rank on completion of training is open to artificer apprentices who reach the required standard.

During this initial four years' period food and accommodation are provided, as well as a complete kit of clothing.

Replacement of unusable items

In the workshop.

Apprentices keep fit

BOYS:

This is your chance to take a part in Australia's ever-developing Naval programme and learn an interesting and useful trade.

NAVAL DOCKYARD APPRENTICES

PARENTS! Here is an opportunity for your son to be apprenticed and receive training in all branches of Naval Repair and Refitting work in the largest and best-equipped Naval Yard and Dry Dock in the Southern Hemisphere.

APPRENTICESHIP is available at Garden Island Dockyard, Sydney, controlled by the Commonwealth Government, under conditions which will enable you not only to become an efficient tradesman, but give you the opportunity of qualifying as a Draughtsman in Mechanical or Electrical Engineering, or Ship Construction. The period of apprenticeship is for 5 years and, subject to satisfactory progress, Technical College fees will be paid by the Commonwealth Government.

RATES OF PAY are in accordance with the Arbitration Court Award made between the Department and the Trades Unions. On completion of the first year, an additional weekly payment is made, subject to satisfactory progress. Three weeks' annual leave and liberal sick leave are granted and an allowance is payable to apprentices who are obliged to live away from home owing to distance.

ELIGIBILITY. Age limit is 15 years and under 17 years at date of taking up appointment. A satisfactory pass at the Intermediate Certificate Examination is desirable, but not essential.

VACANCIES exist for the following trade apprenticeships: Fitter and Turner, Electrical Fitter and Mechanic, Radio Tradesman, Boilermaker and Welder, Shipwright and Boatbuilder, Ship's Plumber, Painter, Moulder, Coppersmith, Enginesmith, Motor Mechanic, Sailmaker, Sheetmetal Worker.

APPLICATION must be made on the form prescribed. For application form and copy of conditions of entry, apply to your District Employment Office, or the General Manager, Garden Island Dockyard, Sydney.

is free. It costs parents nothing.

Each apprentice receives £2/19/1 per week, rising to £4/16/7 a week in the fourth year, with an additional 3/6 a week to those over 18.

Other allowances are paid to meet expenses of hair cuts, personal laundry, etc., and during leave periods apprentices get an extra living-out allowance of 9/3 a day.

Free medical and dental services are also provided. Apprentices get two leave periods of three weeks each, with free return travel to their homes.

Those who have to go long distances are given extra travelling time.

The establishment is well fitted out with workshops and machine tools of all description and the boys are taught by skilled instructors, both civilian and Naval.

Emphasis is placed on thorough schooling, laboratory demonstration and then workshop supervision of all technical processes.

A technical reference library is available and much use is made of instructional films.

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Continuing . . .

The Navy needs technicians

From page 40

demonstration models and actual visits to engineering establishments to keep abreast of latest practice.

Every six months the apprentices go to sea for a fortnight in a Naval ship for first-hand experience, or are sent to permanent camps for recreation, fitness and basic military training.

H.M.A.S. Nirimba has large areas of playing fields of all kinds for the apprentices to use in their non-working hours, as well as recreational libraries, games rooms, a large modern cinema and a well-stocked canteen in which parents and friends may be entertained during week-end visiting hours. Sport is encouraged and expert tuition is also given by Naval physical training instructors in the gymnasium and on the sporting fields.

On passing out of the Apprentice Training Establishment as a fully qualified tradesman, the young apprentice is advanced to the rate equivalent to leading seaman and after 12 months he advances to acting petty officer. Further advancement is in accordance with normal R.A.N. regulations, and depends on his ability and vacancies in the various branches.

A lad of 20 who has decided to be trained by the Navy not only receives a good education, full training and qualification in his chosen trade, but a responsible position in the Royal Australian Navy and a future in civilian life after his completion of Naval service.

Imagine a marine world without oil!

Hard to do, isn't it? Yet, how much harder it would be to live in such a world.

In the marine field alone oil has contributed to progress in so many essential ways.

And CALTEX, in supplying the ships of the ROYAL AUSTRALIAN NAVY with TURBINE and MARINE ENGINE OILS, continues to play its part in the maritime development of Australia.

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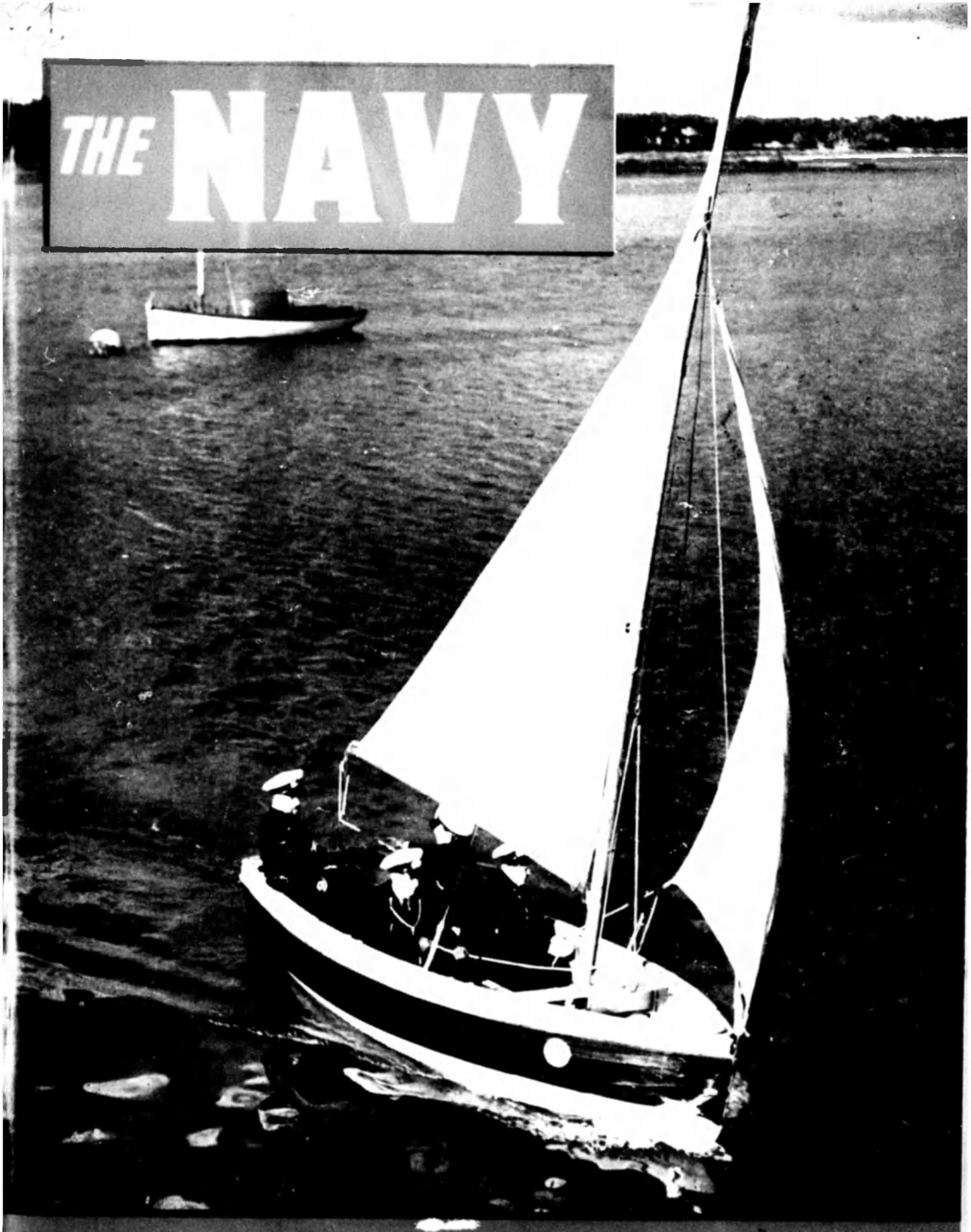
THE NAVY



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THE NAVY
Australia's Maritime Journal

SPUTNIK CASTS A GRIM SHADOW

LAST month Russia thrilled the world with her successful launching of the first man-made earth satellite.

It was a scientific accomplishment of the first magnitude, and for that Russia should receive the plaudits of the world.

In a world free from fear of war that would be given without stint. But the little metal sphere had scarcely settled into its furious orbit around the earth before the average man and woman of the democratic countries were reminded of the immense military significance of this Russian achievement.

If Russia could power a rocket to break through the earth's gravitational pull, then she had the know-how of the I.C.B.M.—the inter-continental ballistic missile—a weapon sought by the big military Powers as avidly as the philosopher's stone was sought by the alchemists of old.

Sputnik showed that when Russia, some weeks before, laconically announced that she had developed the I.C.B.M. she wasn't fooling. And in a few moments the balance of military power in the world had dipped deeply in Russia's favour.

However, we should not let the awesome light of the artificial moon blind us to the realities of our immediate military problems.

America is well advanced in preparations for her own earth satellite and, despite the two failures of her Atlas 5,000-mile-range ballistic missile, there is every indication that she will soon draw level with Russia in space flight achievement.

When that happens, use of the I.C.B.M. by either side will mean a war of extinction. Like the H-bomb, the I.C.B.M. may well provide its own deterrent to its use in war.

But the likelihood of "local" war still remains—war like that in Korea, Indo-China, and Malaya.

For us in Australia particularly it is of more pressing urgency to build up modern, effective "conventional" defences than to shudder at the shadow of Sputnik.

And the sea is our first line of defence.

WRENS LIVE ROUGH

Seen "living rough" during a two-weeks survival course in England recently are these two officers of the Women's Royal Naval Service, Nina Allen and Charlene Gordon.

The girls spent the first week of the course attending lectures and films on subjects such as shelter building, search and rescue organisation and means of survival at sea, in the Arctic, in desert and in jungle.

The second week they were in the field, living off the land and marching by compass 90 miles.

The two Wrens were each given half a parachute, a cape, a compass, a knife and 20 ounces of glucose sweets and water purifying tablets.

They moved from one rendezvous to another living on their meagre survival rations, building their own shelters and hiding from "enemy" observation.

The course was conducted by the Royal Navy Safety and Equipment Training School, which also trains men and tests new survival equipment and methods.

BOMBS.. B and A

Britain's War deterrent

BRITAIN'S successful development of the hydrogen bomb this year profoundly affected the balance of world military power.

It strengthened immensely the strategic position of the Western powers.

It caused Britain's American ally to regard her with increased respect—which in the long run will almost certainly lead to greater willingness by the United States to co-operate with Britain in scientific military projects.

The pictures on these two pages show the enormous power of Britain's nuclear weapons.

Above is an official picture of Britain's first H-bomb explosion, in the Christmas Island area.

Left is the third H-bomb explosion in the Christmas Island test series.

At right, on the opposite page, is Britain's latest atomic explosion, at Australia's Maralinga proving ground last month.

RUSSIA'S INSHORE NAVAL FORCE

By J. MEISTER — in London

WHILE the results obtained by cruisers, destroyers and submarines in past wars were rather disappointing, the Russian inshore naval forces—gunboats, mine-sweepers, motor gunboats, motor torpedo boats and patrol launches — often fought very stubbornly and obtained some honourable successes.

These inshore squadron actions were almost always combined with mine warfare, coastal artillery and, during the two world wars, the naval air force.

Most of the fighting took place within the covering range of Russian coastal batteries and minefields, and only very seldom were offensive sweeps undertaken by light Russian naval forces.

During the Crimean War, the then British Ambassador to Russia estimated that the Russians might have as many as 180 gunboats in the Baltic; and, owing to the lack of such vessels in the British and French navies, the Allied powers were unable effectively to blockade the Russian coasts, although the Russian Navy remained completely inactive.

In the Black Sea, however, Allied naval and land forces forced the entrance to the Sea of Azov, and 14 small British and four French warships destroyed within a week over 500 Russian merchant ships, huge amounts of food and supplies, 340 guns and 14 Russian warships.

During the war of 1877-78 the first Russian torpedo boats were somewhat more successful and active against a superior Turkish fleet.

One Turkish monitor and one gunboat were destroyed on the Danube, one battleship and one frigate attacked off the Caucasian coast by Russian torpedo boats, the latter by the first Whitehead torpedoes.

During the defence of Port Arthur, gunboats and torpedo vessels several times shelled the seaward flank of the advancing Japanese troops and successfully defended the entrance to the port against repeated Japanese blocking attempts; and the last surviving vessels, including the battleship Sevastopol, fought off for six nights repeated attacks by Japanese torpedo boats, before being scuttled prior to the capitulation of the doomed fortress.

The First World War saw the tenacious defence of the entrance to the Gulf of Riga against superior German naval forces. In August, 1915, two German battleships, four cruisers and 33 torpedo boats, supported by many minesweepers and auxiliaries, were to force the Russian mine and coast artillery defences in the Irben Strait.

Of the 20 Russian torpedo boats, four gunboats, one old battleship and minesweepers in the Gulf, only two gunboats and the battleship Sslava were immediately available to repulse the first German attack.

After a few days and considerable losses, due to Russian mines, the German vessels broke through and the two battleships, in a sharp night action in the Gulf of Riga, destroyed the Russian gunboat Ssivoutch; but afterwards, when two British and five Russian submarines appeared, the Germans evacuated the Gulf. German naval forces only re-entered the Gulf of Riga after the outbreak of the Russian revolution and this time the Russian ships did not show much fight and soon retreated.

During the Civil War and against the Allied intervention, the Soviets proved their considerable ability to create and use local naval flotillas of miscellaneous ships.

Though British motor torpedo boats made several successful raids against Kronstadt and on the Dvina River and even in the Caspian Sea, some of the modern warships in the hands of the Reds survived—in very poor condition, but still preserved for the future.

BESIDES the flotillas on the Danube and the rivers of western Russia, created during the war of 1914-17, a Dnieper Flotilla operated against Poland in 1920, and many gunboats were commissioned on Lakes Ladoga, Onega, Peipus and Baikal, and most of the Russian rivers.

The Amun Flotilla played an important role during the armed Soviet intervention in 1929 against Chinese troops in Manchuria, and later during the very violent clashes between Japanese and Russian troops in 1938-40 on this river and on Lake Chanka. Soviet vessels seem to have mostly been on top in these fights.

The real test came during World War II. When the Germans were unable to capture Leningrad in 1941, and the Soviet heavy naval forces were sunk, damaged or just idle, converted gunboats, minesweepers, armed launches, motor gunboats and motor torpedo boats defended the sea lanes between Leningrad, Kronstadt and the islands as far as Lavansaari.

WHILE the Soviet Navy had been unable to protect the Gulf of Riga and the Baltic Islands, it was now at least in a position to assure the supply of the outlying island garrisons and the Oranienbaum Cauldron, although German and Finnish minelayers and motor torpedo boats often visited these Soviet-controlled waters.

In the Black Sea in 1941-42 the Germans had not much difficulty in annihilating the Soviet coastal forces off Nicolaiev, Sevastopol and in the Sea of Azov; but as the German Army could not conquer the Caucasus, many Russian small craft

From 1944 on, Soviet motor toropedo boats, which had so far scored only very few hits, obtained better results, including a few German minesweepers and one destroyer sunk.

They attacked mostly with much dash and courage, but always without any tactical skill. The small Soviet motor torpedo boats had petrol engines and easily caught fire; still the Germans were surprised to note off the North Norwegian coast how far from their bases these not very seaworthy craft operated.

The best designed of all small Soviet naval weapons was the armoured motor gunboat, flat bottomed, with turrets from army tanks, and notable speed. The Germans had nothing equal to oppose, and their lightly armed minesweeping launches and other coastal craft seldom sank any of these Russian vessels.

Former Russian dredgers, armed with 5.1-inch guns, were used as gunboats, supported by the excellent minesweepers of the "Fugas" type, equipped with 3.9-inch guns.

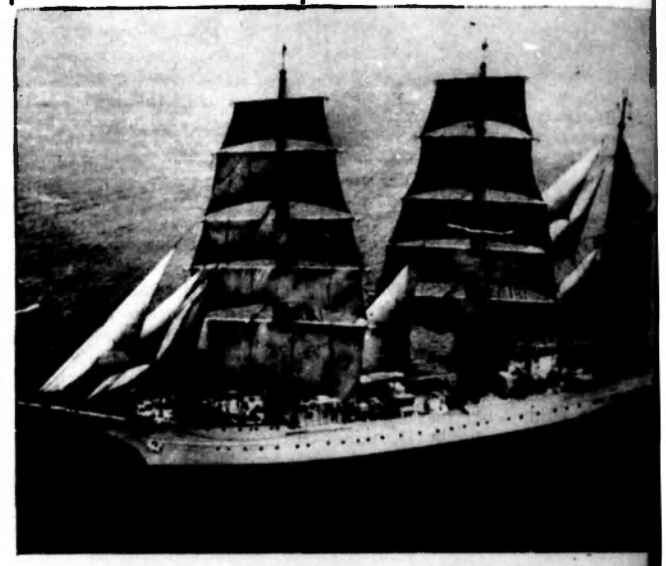
Nevertheless, the Russians limited themselves mostly to the defence of their own coastal waters, not showing much enterprise or taste for offensive action.

On a few occasions, such as during the reconquest of the Sea of Azov in 1943 and of the island of Oesel in 1944, Soviet gunboats shelled the German Army's seaward flank, but without much success.

Naval flotillas on every Russion lake and river reached by the Germans fought to the bitter end, and during the whole war the Soviets were able to hold part of the shores of Lake Onega and Lake Ilmen, while the Caspian Flotilla convoyed the important oil from Baku to Astrakhan, and the Volga Flotilla sup-

TRAINING IN SAIL

Despite its building programme of nuclear-powered ships, the U.S.A. still has this 295-foot training barque, the Eagle. The "Sydney Morning Herald", which published this picture last month, said that no fewer than 33 sailing ships are devoted to cadet training in the maritime nations of the world.



ported the defence of Stalingrad.

The most important theatre in the naval war might have been Lake Ladoga. Leningrad was beleaguered by the Germans and Finns, and the only way the fortress could receive food, fuel and supplies was by ship over Lake Ladoga, while during the winter lorries and trains travelled over the thick ice.

IN the summer of 1942 the Axis powers decided to stop this traffic and to make the blockade tight. Without supplies, Leningrad was bound to fall within a short time, and the fall of Leningrad meant also the collapse of the Soviet front from Murmansk to Lake Ilmen and the destruction of the rest of the Baltic Fleet. It might have changed the outcome of the war in the East.

The very weak Finnish naval forces were, therefore, strengthened by four Italian motor torpedo boats, four German mine-laying launches and about 20 gunlighters, manned by German Air Force personnel.

But while the Axis forces were not suited for the task, suffered many mechanical breakdowns, and were generally ineffective, the Soviets surprisingly enough showed much initiative and even tactical ability, repulsed some German and Italian attacks and kept the lifeline to Leningrad open.

On Lake Ladoga the Soviet Navy definitely had the upper hand, and their heavily armed gunboats and motor gunboats remained masters of this very vital lake.

Of all classes of Soviet surface vessels, the motor torpedo boats were by far the most successful. They and the gunboats, motor gunboats, minesweepers and patrol launches did almost all the work the Soviet Navy carried out during the Second World War, while the heavier ships just provided fat targets for German aircraft and mines.

But the influence of the Soviet coastal forces remained almost exclusively defensive and restricted to zones very near the shores controlled by the Soviet Army.

Russian small craft were not only well adapted for the shallow coastal waters; they were also very numerous. While in peace time the major sea powers possessed only a few vessels for inshore work, the Russians did not rely upon building such craft after the outbreak of war only, but kept up to 200 motor torpedo boats and 300 motor gunboats and patrol launches in service prior to 1941.

Notwithstanding heavy losses, the figures at the end of the war might even have been higher.

To-day Soviet Russia has an estimated 1,000 motor torpedo boats, motor gunboats, coastal submarine chasers and patrol launches.

BRITAIN is the only N.A.T.O. sea power which owns light naval forces which might operate in Russian coastal waters, if any near-by bases could be secured; and the new German Navy may also include such small craft.

But all other N.A.T.O. powers, and above all the U.S. Navy, have neglected to build in peace time more than a few experimental small craft.

The bulk of the responsibility for coastal warfare near a Russian-controlled shore may therefore well fall upon the Royal Navy.

Nevertheless, from German experience during the last war, it can be said that yet more such small craft should be available, and that a shallow draught, armoured and heavily armed motor gunboat (guns and rockets) should be developed.

Although the Soviets may not make full use of their strong coastal forces in offensive sweeps, they will certainly defend to the last the approaches to Russian coastal waters and the main ports and naval bases. Allied losses when trying to penetrate the Russian maritime perimeter will be high, and such operations need well-placed bases and air supremacy over the land-based Russian Air Force.

Admiral Napier, in 1854-55, had only three requests to address to the British Government—sailors, pilots and gunboats — but none could be satisfied before the war was over, and the results of the naval operations remained, therefore, very unsatisfactory.

During the First World War, the German Navy suffered from the lack of small gunboats, while the British Navy, during the intervention, had to use some river gunboats, but this was a typical emergency solution only.

Finally, from 1941 to 1945, German naval officers complained bitterly about the lack of suitable craft, which was not overcome up to the time of the German capitulation.

The same problem has turned up each time operations have had to be undertaken in Russian coastal waters; and, though a saying goes that nothing is ever learnt from history, in the end there must be some exceptions. Soviet coastal craft may use small and hidden bases, and they do not form, when dispersed, interesting targets for atom bombs.

To combat them, similar craft will still be needed, if possible in larger numbers.

—From the London "Navy".

GUIDED MISSILE SHIP

Britain's guided weapons trials ship, H.M.S. Girdle Ness, fires a Seaslug medium range ship-to-air weapon. The missile has been designed to engage any enemy bomber which evades the fighter defences of the Fleet. Seaslug missiles are fired from a triple ramp launcher, automatically fed from a magazine below decks. Targets are plotted by radar.

NEWS that Messrs. Cammell Laird of Birkenhead are to build the Navy's first guided missile ship was given by the First Lord of the Admiralty at the luncheon following the handing over to India of the cruiser Nigeria.

The famous yard at Birkenhead has played a most important part in the development of both the Royal Navy and the Mercantile Marine.

It was in the 1830's that the Admiralty ordered the first iron steamship from John Laird.

Since that event ushered in a new era in ship construction, the name of Laird has become world-famous and the number of ships built on Merseyside probably too numerous to recall.

At the present time, Messrs. Cammell Laird have three submarines and one frigate under construction, and the firm has made the Nigeria, henceforth to be known as I.N.S. Mysore, virtually a new ship.

Now the firm is about to usher in another era of shipbuilding by constructing the first guided missile destroyer, which will bear the proud name of Devonshire.

NATO'S NAVAL TASK

By Rear-Admiral A. D. NICHOLL

DURING the second half of September four large-scale training operations were carried out by the navies and maritime air forces of the Atlantic alliance. Three of these exercises, named Strikeback, Sea Watch and Stand Firm, took place in the Atlantic, the fourth, called Deepwater, in the Mediterranean.

All NATO defence plans are based on the assumption that the allies would continue to control the sea routes in the event of war and that the vital supplies of raw materials and food would continue to reach Western Europe by the Atlantic and Mediterranean.

The basic aim of NATO is to prevent war and the allied power of retaliation with nuclear weapons is the main deterrent to aggression.

The deterrent might fail, however, and it would then be the task of the allied forces not only to make immediate retaliation but also to deal with the immense problems which would follow the use of nuclear weapons by both sides.

None of these problems would be more complex than those facing the NATO navies and maritime air forces.

There would be three main immediate tasks. The first would be offensive in character and would consist of the navy's contribution to the nuclear retaliation and offensive strikes from the sea against enemy advances.

At the same time, these nuclear attacks, which would concentrate on enemy ports, bases and airfields from which the enemy's threat to the allied shipping would emanate, would be a valuable contribution to the defence of shipping.

This task was the basis of Exercise Strikeback, in which nearly 140 allied warships took part.

The allied striking fleet consisted of six United States and three British aircraft carriers whose task was to reach an area from which they could launch bombers armed with nuclear weapons against simulated enemy targets in the United Kingdom and Western Europe and also strikes in support of the Norwegian Army defending their homeland.

It was, of course, assumed that the enemy would make every effort to prevent the striking fleet from carrying out its task, and strong forces of submarines and bombers assumed to be carrying nuclear weapons were sent against it.

A large carrier striking force can carry out a wide range of offensive and defensive tasks while its mobility provides the possibility of evading attack. The force provides its own aircraft for air and anti-submarine defence, working in conjunction with its surface escorts of cruisers and destroyers.

Flexibility in the handling of the various types of aircraft is conferred by the fact that United States and British carriers are operated on identical lines and can use each other's flight decks for launching or flying on whenever desired.

Offensive operations are, of course, only part of the naval task.

On the outbreak of war, immediate steps would have to be taken to safeguard the allied shipping.

There would be two closely allied tasks: First, the control and protection of all shipping underway bringing essential supplies to Western Europe, and the provision of emergency unloading arrangements where necessary; and, second, arrangements for the safety of merchant shipping in European ports, for organising it into convoys and sailing it away from the threatened area as soon as possible.

These tasks were envisaged in Exercises Stand Firm and Sea Watch, respectively.

A particular feature of Exercise Stand Firm was the co-operation between the allied naval authorities and the civil organisations concerned with merchant ships, fishing vessels and ports.

They also provided valuable practice for land-based bombers and reconnaissance aircraft in locating and attacking sea forces and they exercised the air defences of Britain and Western Europe in detecting and meeting attacks from the sea.

The exercises were designed not to find out whether a certain type of operation would succeed or fail in the face of a given scale of opposition, but rather to face the NATO Naval Commanders as realistically as possible with the problems with which they would be faced at the outset of a world war, to test the organisation and communication system which the allies have developed, and to provide intensive training for the crews of ships and aircraft in their wartime tasks and in working together as a unified naval force.

NAVIGATING BY RADAR

RADAR has gone a long way since the first air warning sets began to appear round the coasts of Great Britain shortly before the last war.

In the 20 years that have elapsed since then it has been used for many different purposes on land, at sea and in the air, the basic components of the equipment remaining the same but the design being varied to suit the particular purpose required.

Radar at sea was developed for, and to a large extent by, the Royal Navy during the war. The first sets were intended to detect enemy warships during darkness or fog: they were unable to give a very precise indication of the direction of an enemy ship, although right from the start its range could be measured accurately.

This was a most important virtue of radar, as visual rangefinders have never been very accurate at long ranges or in poor visibility, and radar was able to meet this deficiency.

Then came the development at an English university of the cavity magnetron valve. The frequencies of the radio waves sent out by radar sets were already higher than those used for normal wireless transmissions, but this valve made it possible to use higher frequencies still.

It thus became practicable to produce a radar set which was much more highly directional, and was also capable of detecting much smaller objects.

The set which resulted was rushed to sea in escort vessels, and allowed them to detect the German U-boats which were then making a practice of approaching convoys on the surface by night.

This set was the progenitor of the modern navigational radar sets now used in merchant ships — and indeed in warships as well. Since those early days, naval radar has developed in

By IAN BREMNER
Associate Editor
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(London)

three main channels, dictated by the three main uses of radar in warships. One is for the control of guns, both against surface and aircraft targets: one is for giving warning of the approach of aircraft; and one for keeping a general watch on the surrounding waters.

Among other uses, mention may be made of sets to find the height of enemy aircraft, while aircraft of the Fleet Air Arm have radar sets for a number of purposes.

Navigational radar as used in the Merchant Navy is derived from the general purpose naval set mentioned above, which is itself descended from the first anti-U-boat set brought out so quickly during the war.

The information which any radar set gives is displayed to the user on a cathode ray tube not unlke that of a television set.

The picture on the tube face takes the form either of some sort of graph or of a plan of the surroundings of the set (but never the photographic type of picture which you see on television).

In the case of the general purpose naval radar sets, the plan type ol display is used. The centre of the tube represents the position of the observer's own ship, and other ships, aircraft, or objects such as buoys appear as spots of light on the dark screen, in their correct positions according to the scale used for the display.

Land will also be shown on the display if it is within range, provided that the coastline is sufficiently rugged in shape to reflect back the radar beam. Where the coast is low-lying, it may be the hills inland that are seen.

An instrument of this sort clearly has enormous possibilities as a navigational aid in darkness or log. Approaching ships can be detected in time to avoid them, while if the shape of the coastline can be recognised, the position of the ship can be found by measuring the bearing and distance from some prominent object like a headland.

Naval radar was being extensively used in this way by the end of the war, and when peace came the Admiralty made available for merchant ships a large number of surplus radar sets of a type used in Coastal Forces craft, which were reasonably well suited for navigational work.

At the same time, several of the firms which had acquired experience in radar design during the war were working on the production of sets designed specially for merchant ship use, and before very long commercially-made sets had replaced the Admiralty equipment.

Radar of one sort or another is made by a good many electrical firms in Great Britain, but not all of them have concerned themselves with marine navigational radar.

Those that have include such well-known names as British Thomson-Houston, Decca, Kelvin & Hughes and Marconi. British marine radar has to conform to certain standards set by the Ministry of Transport in order to obtain a certificate of type approval, and although it is not legally necessary to have such a certificate it is in practice obtained by all firms.

The equipment is thus of proven high standard, and this guarantee of merit has undoubtedly been of great assistance in promoting sales of British marine radar equipment abroad.

Use increasing

In British ships, the fitting of radar is steadily increasing, and few new ships of any size enter service without it. In fact, it is probably true to say that the majority of British ships without radar are old vessels on which their owners are unwilling to spend much money, and that as these vessels are replaced the use of radar will become general in the British mercantile marine. This is not, however, to say that it will become universal at sea.

Shipowners of some foreign countries tend to run older ships and to spend a good deal less on them than do their British counterparts.

The ten years since the war have seen a fair amount of change and a great deal of improvement in marine navigational radar.

It may be interesting to review the changes that have taken place and to examine possible future trends. Initially, improvements were in the direction of increased reliability, and then towards simplification of the electrical circuits. Some of the early sets had as many as 80 valves, any one of which could put the set out of action if it failed.

As experience led to improved design, this number was reduced by half or so, and in addition to making sets much more reliable this made them a great deal cheaper.

The general performance of sets was then improved. The aim was to give better results at very long and very short ranges, and also to give a sharper and a clearer picture. All these aims were achieved, although it must be realised that there was still no question of the shape of a ship being visible on the screen.

A buoy or a small fishing vessel would appear as a small blob of light, and an ocean-going ship as a rather larger

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NEWS OF THE WORLD'S NAVIES

Japanese Warship Nears Completion

The escort destroyer Ayanami, launched last June, is rapidly nearing completion.

She differs in profile from the earlier Akebono type in having a forecastle carried after for two-thirds of her length, her dimensions being: 357.7 x 35.1 x 26.7 ft. with a displacement of 1,700 tons.

Engined by twin turbines of 35,000 s.h.p., the designed speed is 32 knots.

She will carry three 3in. .50in. twin mounts, two Y guns, two hedgehogs, and a set of quad. tubes.

She is building at the Mitsubishi Nagasaki Yard.

Four Destroyers for Turkey

Four British destroyers, the Milne, Matchless, Meteor and Marne, have been transferred and are to be extensively refitted for service in 1958 at a cost to the Turkish Government of £3 million.

They carry six 4.7in. in three large gunhouses, and in their day ranked with the finest looking destroyers afloat.

All performed outstanding war service.

France Begins Work on Atom-sub.

Work has begun on the construction of a 500-ton nuclear-powered submarine at present known as Q.244. Natural uranium is stated to be the atomic fuel.

The fast escorts Kersaint and Vanquelin have returned from a 24,000-mile cruise in the Indian Ocean, during which they spent 128 days at sea.

They tested the behaviour of ships of this class in tropical conditions, and brought back very satisfactory results, although off Durban they had met with heavy seas with waves up to 45 feet.

The submarine Blaison, formerly U-123, has been placed in "B" reserve prior to being condemned.

Two new colonial sloops (or escort vessels) of the "Commandant-Riviere" class have been ordered and named Enseigne-Henry and Protet.

Three "Europe" type minesweepers, D.25, D.26 and D.27, built at Cherbourg under the Off-Shore Procurement, are to be transferred to Yugoslavia in September.

A new "batyscaphe" is to be built by the French Navy and is numbered as F.N.R.S.4 (Fonds National de la Recherche Sous-Marine).

This craft should be able to dive to about 33,000 feet, with the object of exploring the Philippines Trough, which is believed to be the deepest in the world.

Lieutenant - Commander Houot, who dived to 4,050 metres in the batyscaphe F.N.R.S.3, is in charge of the new craft.

U.S.A. May Adopt Another R.N. Device

The U.S. Navy may adopt yet another British carrier device.

This is the positioning roller system, which considerably increases the speed at which modern aircraft can be launched by catapult.

U.S. eyes were fixed on the positioning system during the recent exercise in the Western Atlantic, when aircraft from the 60,000-ton Saratoga operated from the decks of H.M.S. Ark Royal.

At the same time, British Naval aircraft operated from the Saratoga.

The rate of launching from the Ark Royal was, catapult for catapult, higher than that achieved by the Saratoga, the launching time, at the peak of operations, being between 13 and 20 seconds.

Some aircraft operated by the U.S. Navy are heavier than those in service in the Royal Navy. For this reason it may not be possible for the Americans to adopt the system exactly as fitted in British carriers, but the interest shown in the device makes it probable that the idea will be adapted to meet the special requirements of the U.S. Navy.

This would be the fourth British carrier device to be incorporated in the U.S. carriers, the other three — the steam catapult, the angled deck and the mirror landing aid — having immeasurably increased the effectiveness of aircraft carriers in both the Royal Navy and the U.S. Navy.

A.S. Aerial Torpedo Made in Australia

An anti-submarine aerial torpedo recently produced by the Royal Australian Navy Torpedo Establishment in Sydney for the Fleet Air Arm has undergone successful trials.

The Minister for the Navy, Mr. C. W. Davidson, said that the details of the torpedo must remain secret, but it could be revealed that it had remarkable striking power and could be launched with great accuracy.

It had been designed primarily for use in the Fleet Air Arm's Gannet turbo-prop anti-submarine aircraft.

To obtain technical information and experience that would enable them to produce the torpedo, the Superintendent of the R.A.N. Torpedo Establishment, Captain W. J. M. Armitage, and two production executives visited the United Kingdom some time ago.

The Australian Commonwealth Naval Board had congratulated all those concerned in its production and tests.

Mr. Davidson said the new torpedo was much more complicated than the aerial torpedoes which the Torpedo Establishment made for the Royal Navy and the Royal Australian Air Force in World War II, and the fact that it could be made in Australia by Australian technicians and workmen was "a matter of intense satisfaction."

He said that in 1952 the R.A.N. Torpedo Establishment produced the first 21-inch diameter standard surface-ship torpedo made in Australia.

"In the event of another war, the Royal Australian Navy will be able, with the help of outside industry, to supply not only its own ships and aircraft, but also to assist in supplying the navies of other parts of the British Commonwealth," the Minister added.

Most Likely Attack is by Submarines

The Australian Government's Naval policy placed emphasis on the provision of fast anti-submarine vessels because the most probable form of naval attack was by submarine.

The Australian Minister for Defence, Sir Philip McBride, told the House of Representatives this on October 22 when speaking on the Defence Estimates.

He said the Navy this year would have in commission two aircraft carriers, one Daring class ship, three destroyers, six frigates, four ocean minesweepers, and various other smaller vessels.

He said Sea Venom jet fighters and Gannet turbo-prop anti-submarine aircraft had been obtained for the Fleet Air Arm.

Since June, 1950, 215 aircraft had been delivered to the Fleet Air Arm.

The construction of two Daring class ships was being accelerated. It was expected one would be completed at the end of 1958 and the other in the middle of 1959.

Construction of four new type anti-submarine frigates was also being accelerated, Sir Philip said.

Sir Philip said the commissioned fleet was supported by a reserve fleet of destroyers, frigates, and other vessels which were being maintained in accordance with a carefully planned programme of priority.

Shore establishments would be streamlined and the activities of training establishments co-ordinated and, where possible, amalgamated to keep down overhead costs.

Guided missiles were on public exhibition at Britain's Farnborough Air Show recently. This picture shows, in the foreground, the Bloodhound surface-to-air missile; on the left the Australian Jindivik pilotless, radio-controlled target aircraft; and in the background the Thunderbolt surface-to-air missile.

Who will build the first big A-power ship?

BRITAIN'S brightest brains, and some of her finest craftsmen, are lining up for a heavyweight contest with a difference.

It will be a real battle of giants, with four of the most famous firms in the United Kingdom sorting themselves into two camps to slug it out.

At stake: The prestige, the worth of which cannot be assessed in mere money values, of being the designers and builders of the world's first really big atom-powered ship.

Here is the line-up.

In one corner: John Brown & Company Ltd., of Clydebank, proud builders of the world's biggest liners, the Cunarder Queens.

Teaming up with them: The £93,000,000 Hawker - Siddeley Group Ltd., builders of Britain's four - jet Vulcan bombers, makers of guided weapons, and developers of revolutionary new aircraft.

In the other corner: Cammell Laird & Company Ltd., of Merseyside, builders of some of the most famous warships of Britain's Royal Navy.

They are so confident of the atomic shipping future that they are pushing through a £17,000,000 yard expansion programme to build the biggest vessels.

Teaming up with them: The £33,000,000 Babcock & Wilcox Ltds' boilermaking firm.

They have practical atomic know-how. Babcock & Wilcox built the eight boilers at the £16,500,000 Calder Hall, the world's biggest full-scale commercial nuclear power station.

Having got in on the ground floor of Britain's great atomic energy programme, they proved they could stay there.

When the contracts were awarded for the boilers at the No. 2 Calder Hall A-station, and for its carbon-copy at Chapel Cross, Annan, Scotland, 21 boilers in all, Babcock and Wilcox scooped the lot.

The shipping nations of the world will be eager ringsiders at the coming battle of the giants.

By RONALD BEDFORD
Science Reporter of the
London "Daily Mirror"

So, too, will the kingmakers of the shipbuilding world — the tanker-owning brothers-in-law Stavros Niarchos and Aristotle Onassis.

For the heavyweight contest involves the design of atom engines for, and the construction of, a Queen Mary sized tanker of around 80,000 tons, costing between £10 million and £12 million.

The Cammell Laird-Babcock and Wilcox team are known to favour using atom engines that are a scaled-down version of the Calder Hall graphite-moderated gas-cooled reactors — of which they have first-hand knowledge.

The John Brown-Hawker-Siddeley team are silent about their entrant in the propulsion stakes.

But some scientists hint that they may back the organic moderated reactor — in which certain petroleum oil compounds, the polyphenyls, which stand up well to radiation bombardment, are used.

On the shipbuilding side, there is little to choose between the rivals.

John Brown have the advantage of having built the biggest ships. The Queen Mary (81,237 tons) and Queen Elizabeth (83,673 tons) are floating testimonials to their brilliant know-how.

But though this argument goes down well in pubs like the Seven Seas, outside the John Brown main gates in Clydebank Glasgow-road, it is not an argument to use in the Merseyside pubs, where the Cammell Laird men drink.

There, the talk is of ships like the two Ark Royals — the one that Dr. Goebbels sank half a dozen times, and its namesake, now the pride of the Royal Navy's carrier fleet — the battleships Rodney and Prince of Wales, and the 35,000-ton Mauretania, all Cammel Laird-built.

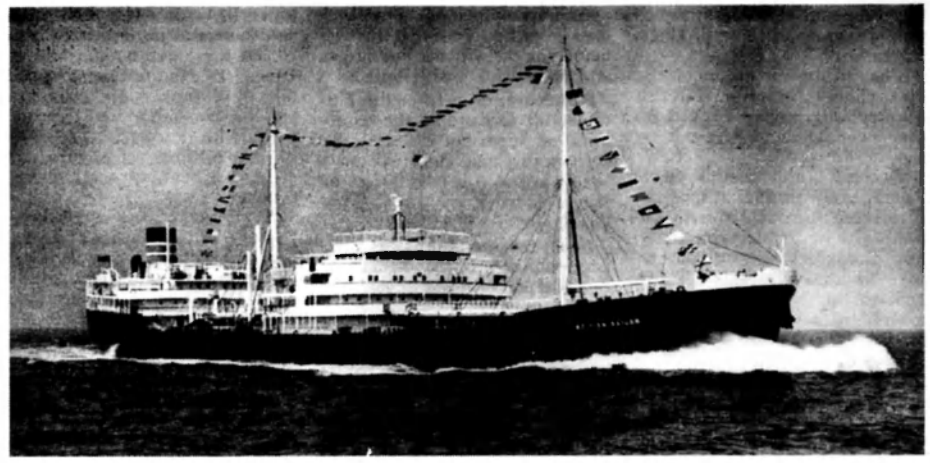
On the scientific side, too, both teams are well matched. Babcock & Wilcox have unrivalled experience in the design and construction of land-based atom power units — and there will not be much difference in the sea-going units as far as operation and design are concerned.

Masterminding the Hawker team are two men of differing personalities, both of whom are outstanding.

One is Sir Arnold Hall, Hawker-Siddeley's 42-years-old Liverpool-born technical director and former head of Britain's Royal Aircraft Establishment.

The other is Sir Roy Dobson, aged 65, the man who will put the Hawker viewpoint at John Brown-Hawker conferences.

One thing is certain. No matter which team loses out in the big A-tanker race, Britain will ensure that the Red Duster, and not a foreign flag, will fly at the stern of the world's first economic atom-powered merchant ships.



The BP tanker British Sailor (32,006 tons), the largest tanker to have berthed at an Australian port.

The trend is to Super-tankers

By D. M. PILCHER, Director, Petroleum Information Bureau (Aust.).

OVER the next 20 years, world demand for oil is expected to double.

This presents a challenge to international shipbuilders. They are racing to produce giant 100,000-ton tankers which will carry the petroleum cargoes of to-morrow.

Ships already on the stocks would have been considered futuristic only a few years ago.

The tremendous development of the oil industry and the uses for new petroleum products created through advances in refining techniques, have caused an astounding growth in the world tanker fleet.

The fleet at present comprises 2,865 vessels. Of these, supertankers in service aggregate 9,640,206 tons and on order 23,569,200 tons.

This trend for bigger tankers is emphasised by the fact that of the large total of 960 tankers under construction, nearly 80 per cent. of the total tonnage are in super-tanker class.

On any given day, 12 million tons of petroleum products, valued at approximately £110 million, are being shipped across the high seas by this ever-increasing armada.

Tanker tonnage now represents about 27 per cent. of the world merchant fleet. This compares with 19.6 per cent. in 1939.

The reason for the rapid growth in size of oil tankers is the great increase in world demand for oil and the change in the pattern of world oil trade.

This has followed the post-war policy of locating new oil refineries in consuming countries rather than near oilfields.

Before the war, four-fifths of transported oil consisted of refined products and only one-fifth was crude oil. To-day, these proportions have been reversed.

The change is particularly noticeable in Australia, where oil refining capacity increased from less than one million tons in 1951 to more than nine million tons in 1956. This was made possible by the establishment of a chain of four new refineries in the last six years at strategic points on the Australian coastline.

Australia's refineries are now processing 80 per cent. of the nation's needs. Eighty-five per cent. of motor spirit used in Australia is refined here and production of aviation gasoline is now approaching 50 per cent. of the needs of the market.

Australia is self-sufficient in capacity to refine its requirements of distillate, diesel and

fuel oils, and there is, in addition, a surplus of those products for export.

The future expansion of the oil refinery industry in this country will largely depend on the encouragement given it by way of the tariff.

Overseas oil groups have spent heavily in the last six years in making Australia almost self-sufficient in refinery capacity, but companies are unlikely to invest any further capital in this field unless they are reasonably assured of an adequate return on this investment.

Despite a vigorous search for oil in Australia, there have been no finds in commercial quantities and the country has therefore to rely on tankers to bring in its requirements of crude from overseas fields.

Australia's imports

With the community spread over a vast area of 3 million square miles, the dependence of communication on oil is high. Last year Australia imported petroleum products valued at £88,500,000 — 78 per cent. of which consisted of crude oil.

To meet the increasing demand for oil, both in Australia and throughout the world, oil companies and independent tanker owners have been ordering bigger vessels over the past five years.

But until recently many owners did not plan to operate ships which were too big to pass fully loaded through the Suez Canal. And because the Suez route halved the Middle East to Europe journey, a limit of less than 40,000 tons capacity was set on oil-carrying vessels using the Canal. In the past 12 months, however, orders for much bigger tankers have been placed with shipbuilders.

This latest development is based partly on experience of lower operation costs of large tankers and partly on the realisation that only one-fifth of the world's tankers use the Canal.

As more pipelines come into use, it seems likely that the demand for oil will become larger and more widely distributed.

Moreover, even from the Persian Gulf to Europe, the economies of super-tankers and the savings in Canal dues will go a long way towards paying for the longer journey via the Cape of Good Hope.

Such considerations are independent of the questions of political or strategic advantages of minimising dependence on the Canal.

But no matter which route is used, the need for bigger tankers is still urgent.

It is estimated that oil exports from the Middle East are likely to reach 400 million tons a year within ten years.

To meet the challenge, world shipyards are confronted with a gigantic task. Last year the world's shipbuilders delivered the equivalent of 212.8 T-2's (the "common denominator" of tanker statistics — a T-2 is rated at 16,600 tons carried at 14.6 knots, since speed is also a measure of carrying capacity), and it is estimated that tankers totalling 38 million deadweight tons will be built between now and 1965.

The whole question of how many orders can be filled by 1965 depends on the ability of shipbuilders to meet steel, labour and yard requirements.

To meet delivery schedules, builders will have to top their all-time record of deliveries of 295 T-2 equivalents in 1954. To do so they must turn out 452.2 T-2 equivalents this year, 438.9 next year, 296.7 in 1959, and at least 230.3 in 1960. Many yards are being expanded in an effort to match the required building capacity.

Regardless of the specific number of tankers to be delivered, the average size tanker in the new fleet will be much bigger than that of to-day.

The pre-war giants of 16,000 tons will be dwarfed. Five years ago there was no tanker of over 20,000 tons, but by the end of June, 1956, the operating world fleet of oil tankers of 29,000 tons and above amounted to 103 ships with a carrying capacity of 3.4 million tons — about eight per cent. of total tanker tonnage.

By the end of November, 1956, there were 311 tankers of 21,000 tons minimum with a total carrying capacity of 9.25 million tons, and now shipowners are planning tankers in the 100,000 tons to 150,000 tons class.

Allowing for wastage and loss, the tanker tonnage available to the free world is expected to increase by 51 per cent. between now and 1951 to a total of 67 million tons.

The United Kingdom is the only country in the world which operates a large tanker fleet, and also builds large tonnages of tankers.

By tradition of maritime nations, Great Britain also builds extensively for other countries. At present tankers total 40 per cent. of ships being built in Britain's shipyards.

The United States, although operating the largest tanker fleet in the world, is a relatively small builder.

Flags of convenience

Account, however, must be taken of the long-established policy of some shipowners to register vessels under the flag of foreign countries, a practice which offers advantages in taxation, in savings on wages of crew, or economic benefits of other kinds.

In terms of ownership of existing tanker tonnage, the U.S.A. and the U.K. continue to run neck and neck, but if the present trends persist the Liberian fleet may well be the world's largest by about 1960.

The striking changes which have occurred in the national fleets since the war, notably the registration of many U.S.-owned vessels under the flags of Liberia and Panama, may be traced in the table on this page.

The total tonnage registered under accommodation addresses in Liberia, Panama, Honduras and Costa Rica has reached a total of some 10,404,000 tons, which compares with only 750,000 tons in 1939.

The practice of sailing tankers under foreign flags has become more prevalent in recent years when shipowners realised that little taxation relief was forthcoming to the shipping industry.

Few Government-owned

Further, the transfer of some ships to Liberia, Panama and other accommodation registeries has made it incumbent for others to follow if they were to remain competitive. Their only alternative is to persuade their Governments to give taxation relief.

It is significant that a very small proportion of total world tanker tonnage is Government-owned. By far the greater part is privately financed with oil companies themselves operating 40 per cent. of the total.

The world tanker fleet is growing so fast that some observers forsee a heavy surplus by 1961. More than 38 million tons are on order, at least six million more planned — with emphasis on big size. However, owners ordering new ships being built in Britain's market will remain firm.

They believe that the demand for more and more oil and the allowance for wastage and loss of tankers will still create a heavy demand for a big tanker fleet.

Recently, the Australian Minister for Shipping, Senator Paltridge, announced that the Federal Government was considering building its own oil tankers. However, the cost of modifying a shipyard and building this new type of vessel under local conditions would be comparatively costly and subsidies from the Federal Government would be needed.

The minimum operating size of such ships would have to be between 15,000 tons and 20,000 tons — very small by present ever-increasing standards. To keep abreast of the present tanker standards, the Government would have to build a tanker of at least 24,000 tons.

Super-tankers have also created another big financial problem, particularly in Australia. There is, at present, a lack of oil ports throughout the world at which mammoth tankers can load or discharge their cargoes direct, and of dry docks capable of accommodating such giants.

Such difficulties can, however, be overcome. Channels at existing ports can be widened and deepened, or new ports built such as the one planned at Milford Haven, in South Wales. In other cases, flexible submarine pipes or off-shore jetties may be used for loading and unloading tankers.

The problem of catering for the giant tanker is still being studied, but the fact remains that the cheapest way of carrying oil over long distances is in super-tankers — they transport more oil faster to satisfy the needs of an oil-thirsty world.

THE WORLD TANKER FLEET

2.000 D.W.T. and Over

(Thousand Deadweight Tons)

Flag	May, 1958	July, 1956	January, 1957
British	5,438	8,210	8,517
Norwegian	2,370	6,899	7,087
Liberian	•	5,272	6,324
U.S.A.	9,638	6,241†	6,175†
Panamanian	1,532	3,149	3,446
French	659	1,993	2,036
Italian	649	1,946	1,992
Netherlands	601	1,569	1,671
Swedish	520	1,581	1,641
Japanese	•	1,192	1,184
Other	1,945	4,904	5,200
World Total	23,352	42,956	45,253

• Included under "Other."

† Excluding U.S. Government tonnage.

10.000 D.W.T. and Over

Ownership	Tonnage	Percentage
Tramp Owners	21,859,600	52
Oil Companies	16,834,000	40
Governments	2,895,400	7
Miscellaneous	437,000	1
Total	42,026,000	100

NEW P. & O. COMMODORE

THE P. & O. S.N. Company has announced the appointment of Captain C. E. Pollitt, who commands the 29,600-ton Iberia, as Commodore of the P. & O. fleet of 35 passenger and cargo liners and troopships.

Captain Pollitt's appointment took effect on October 11.

The retirement as Commodore of Captain E. R. Bodley, D.S.O., was announced a few days earlier.

Captain Bodley was in command of the 30,000-ton liner Arcadia when he retired.

The new P. & O. Commodore stood by the Iberia at the builders until her completion and has remained in command since she was delivered to the Company in September, 1954.

Born in 1897, Captain Pollitt began his career in the Merchant Navy training ship H.M.S. Worcester, joined the Royal

Captain **POLLITT**

Naval Reserve as a midshipman during World War I and saw his first service in H.M.S. Dreadnought.

He has been with the P. & O. Company, which he joined as fourth officer, since 1919.

From 1937 to 1941 he was first and then chief officer of the Strathaird, which did duty as a troopship during the war.

Early in 1915 he took command of the Empire Byng, a ship in the "fleet train" which carried railway engines, tugs and barges to take part in the Malaya campaign.

After the war he commanded the Paringa on a voyage to Australia, then commanded the cargo liner Shillong and the passenger liners Mooltan, Strathaird and Strathmore.

Captain R. J. S. Paice, from the Chusan, has succeeded Captain Bodley in command of the Arcadia.

REVIEWS

GERMAN RAIDER

"The Battleship Scheer," by Admiral Theodor Krancke and H. J. Brennecke (Kimber).

This is the story of the Admiral Scheer and her achievements in sinking merchant ships and running away from possible antagonists.

It is written by her Captain and a German naval author, and gives an interesting account of her breakthrough into the Northern Atlantic, and operations in the South Atlantic and Indian Ocean during which she sank 152,000 tons of Allied shipping.

Her attacks against convoys — especially that so gallantly defended by Captain Fegan, V.C., in the Jervis Bay — make grisly reading.

Tramp sinking by the auxiliary cruisers was one thing: tailing a big convoy and shooting-up tankers with 5.9-in. and 11-in. guns one after the other, leaving a trail of burning, sinking ships until it was time to turn tail and get away from possible trouble, was a very different sort of job which could only carry kudos in German eyes.

But having been built for such employment, ordered to avoid action with enemy warships, and using every trick to get within range of her quarry without exposure to risk, the Admiral Scheer carried out her duties as humanely as possible when dealing with lone ships.

Replenishment of fuel and stores was well arranged from supply ships or obtained from captures, and the ship's company lived in safety and comfort.

Equipped with radar she could keep on the track of her quarry at night, and when closing manoeuvred so as to make the approach bows on.

The authors claim that the substitution of a thick pole mast with wide platforms as in the Deutschland gave her "a completely new silhouette" which made identification confusing, and the elevating of the outer 11-in. with the middle one depressed was intended to give the impression of a "Kent" class cruiser — disregarding the absence of the second superfiring turret.

The "Lucky Scheer" met her end when she was dismantled for an overhaul at Kiel, and sunk by our bombers.

— O.P. (in the London "Navy").

THE RED DUSTER

"Convoy Commodore," by Rear-Admiral Sir Kenelm Creighton (William Kimber, U.K.).

This book, as its title implies, adds one more to the stories — we can never tire of reading them — of the splendid work of the officers and men of the Merchant Navy in World War II.

Called up from retirement, the author, Rear-Admiral Creighton, spent the first three years of the war almost continuously at sea as Commodore of Convoys, mostly on the North Atlantic route but also in troop convoys to Suez via the Cape.

Among the many exciting incidents described are the author's personal experiences when his own ships were sunk — the first by a submarine and the second by a bomber.

But the chief interest and value of the book lies in his account of his relations with the masters and officers of the merchant ships in which he sailed as Commodore.

Some of them were relatively small freighters sailing backwards and forwards across the Atlantic bringing essential supplies.

Admiral Creighton emphasises three valuable lessons — the value of convoys, the much greater safety given by higher speed and the futility of zigzagging if ships are proceeding at less than 12 knots.

His book is well illustrated with an excellent map of the area inside the front and back covers.

— G.P.T. (in the London "Navy").

CIVIL WAR ADMIRALS

"Mr. Lincoln's Admirals," by Clarence Edward Macartney (The Mayflower Publishing Co.).

There has been little enough published about the American admirals who conducted operations at sea during the American Civil War.

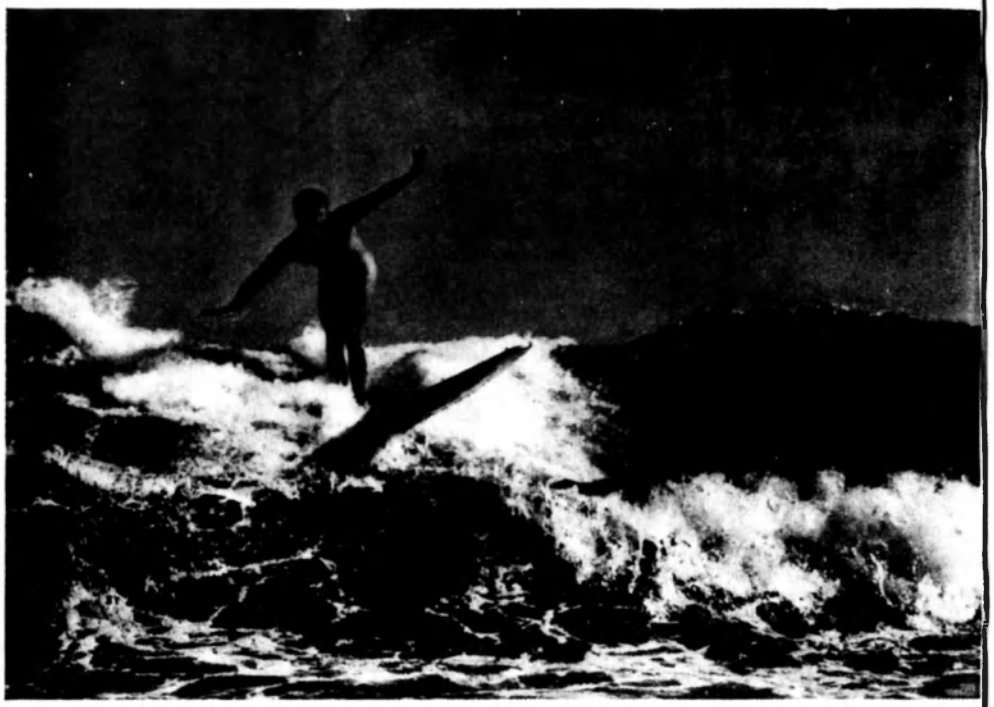
Most British students of naval history will, of course, know of Porter and Farragut. Some will recognise the names of Dahlgren and Worden. But of the others little is known.

There is a chance now to make good this gap in our knowledge, for Mr. Macartney's book introduces them all to us.

For some reason the land campaign in the Civil War is far better known and far more widely studied than that fought out on the sea.

Yet, as the author shows, there was much that happened at sea which is very well worth the attention of the naval student.

— K.P. (in the London "Navy").



The art of surfboard riding was introduced into Australia from the Hawaiian Islands. It is the favourite relaxation of most lifesavers, who spend every available minute on the beaches during the summer. This shot shows a lifesaver at North Bondi, near Sydney, manoeuvring on one of the huge rollers for which the beach is famous.

RUSSIAN NAVAL MOVES IN MED.

From a London Correspondent

RECENT events tend to show that Russia is beginning to assert herself as a major naval power. The significance of her big post-war building programmes is being underlined by events.

Latest in the large number of movements of her warships was the passage through the English Channel of the 15,500-ton "Sverdlov" class cruiser, "Zhdanov", and the 2,200-ton destroyer "Svobodni", bound for the Mediterranean.

Russia's main strength in the Mediterranean is in submarines, mostly at Albanian ports. Submarine pens are reported to have been built in the island of Sazan opposite the port of Valona, where the Nazis based many U-boats during the war.

Valona itself has been re-established as a submarine base by the Russians.

There are also bases for submarines at Dherm, Durres (Durazzo) and Shengjin, which may likewise be used by Russians.

It is difficult to estimate how threatening is this Russian build-up, but Admiral Charles Brown, Commander of the U.S. Sixth Fleet, has said it should not be "belittled", and that he would like to have a hunter-killer group with him.

MARITIME NEWS IN BRIEF

Troop Carrier in Collision

The 20,000-ton liner New Australia collided with a tanker in Torres Strait on September 29.

The liner was carrying soldiers of the 3rd Battalion, Royal Australian Regiment, and their families to Malaya.

The ship subsequently resumed her voyage, after soldiers and crew plugged with concrete a large hole in her bows.

The tanker was the France Stove (16,468 tons).

Bid to Salvage Japanese Freighter

A full-scale attempt is expected to be made soon to salvage the stranded Japanese cargo ship Eifuku Maru, which struck Wreck Reef, 300 miles east of Rockhampton, Queensland, on October 11 and was abandoned five days later.

The ship is valued at £1 million and has £500,000 worth of cargo in its holds.

A Japanese firm, the Nippon Salvage Co. Ltd., will send men and equipment to Queensland for the job.

The ship was carrying wheat, barley and tallow for Japan.

Court Order on Motor Vessel

In a reserve judgment in the Darwin Supreme Court on October 3, Judge Kriewaldt ordered that the 733-ton motor vessel Rose Pearl be sold and £15,585 of the proceeds be paid to Dalgety & Co. Limited.

He also ordered that legal costs be paid from any surplus.

If there was no surplus, costs were to be paid by the defendant, Clive Bruce Aitcheson, of Los Angeles.

Dalgety's claimed moneys allegedly owed for goods supplied and wages paid to the crew.

New Arrangements to Ship Migrants

The Australian Minister for Immigration, Mr. A. G. Townley, on October 17 announced new shipping arrangements for bringing migrants to Australia.

He said the new arrangements would ensure shipping berths for an additional 6,000 assisted migrants, making a total of 50,000 for 1957-58.

They would also save about £500,000 a year in transport costs and would stabilise for the next four years the rates Australia had to pay for migrant fares.

Mr. Townley said arrangements had been made for a four-year charter of two foreign ships — the Fairsea and the Castel Forte — to provide a high standard of accommodation.

The newly-converted Castel Forte would replace the ship New Australia.

The two ships would provide an annual life of about 12,000 British migrants to Australia.

Freighter Sinks: Two Crew Missing

The P. & O. freighter Shillong sank in the Red Sea on October 23 after a collision and two European members of the crew are missing.

The remaining 85 members of the crew and all six passengers were picked up.

The Shillong (8,934 tons) collided with the Belgian tanker Purfina Congo (11,134 tons) 160 miles south of Suez.

The rescues were made by the Danish tanker Skotland in darkness and stormy weather.

Some of the Shillong's complement had taken to the boats. Others had leapt into the sea.

The survivors were landed at Suez.

New Type Harpoon to be Tried

A Norwegian carbonic acid harpoon is to be tried out in whaling around Iceland.

When the harpoon hits a whale, the shell releases 2.5 cubic metres of carbonic acid, which spreads through the whale's body and kills it in two seconds.

The gas then causes the whale to float up to the surface without air having to be pumped into it.

New Tugs Ordered for Kwinana

A £600,000 contract has been placed with the Queensland shipbuilding firm, Evans Deakin and Co., for two new tugs for the Kwinana refinery.

The tugs, which replace the existing vessels now in service in Cockburn Sound, will be capable of handling the larger-type tankers of the BP Tanker Company.

Each tug's equipment will include a 1,500 b.h.p. diesel engine: a single screw revolving inside a Kort Nozzle rudder to increase the effective propeller thrust and provide more flexibility in manoeuvring; a 220-volt power supply for the electric steering gear and winches; four fire monitors, each capable of delivering 2,450 gallons of foam a minute: two 28-man fibre-glass lifeboats; radio-telephones, searchlights, and an air-foil mast to carry steaming lights, but no normal funnel.

Each tug will be 137ft. long, 31ft. wide, will have a loaded draft of 14ft. 6in., and a speed exceeding 11 knots.

Continuing . . .

NAVIGATING BY RADAR

From page 13

one. There was thus no means of telling in which direction a ship was moving except by making a plot of a number of consecutive positions of its echo on the screen.

The last paragraph has been written in the past tense, as current design is looking towards further improvements, but in fact it is applicable to almost every radar set at sea to-day.

If we compare what a navigating officer can see with his eyes and what he can tell from looking at his radar screen, we find that each has its advantages.

Radar versus visual

Through the bridge windows he can see whether the object is a ship, and can tell which way it is heading (fairly accurately), how fast it is going and how far off it is (not so accurately).

He will also notice any change of course by the ship as soon as it starts to turn.

On the radar set he can measure at once and with accuracy how far off the ship is; he can tell which way it is heading and how fast it is going more accurately than he can by eye, as long as he has time to follow the echo for a little and plot successive positions; but it may take him some minutes to see that an approaching ship has changed course.

This comparison shows that, providing that time is available to assess the situation, to-day's radar can claim to give more accurate information than can be had by looking out of the bridge windows.

There must not be too many ships about, and those that are there must be a good way off. In crowded waters, and with other ships nearby, radar is at best a poor second. In practice the comparison is further unbalanced by virtue of the novelty of radar.

Senior officers at sea to-day have spent a lifetime on the bridge, and their reaction to an awkward situation in clear weather is almost instinctive, and therefore instantaneous.

When using radar this is no longer so, and the business of translating the plan shown on the radar screen into the familiar mental image of what is happening creates one more stage in the process of making a decision where an error of appreciation or judgment can lead to disaster.

In the vast majority of cases, radar is successfully used to save a ship's time in log, and collisions are avoided. However, there have been sufficient collisions between ships navigating by radar to cause a certain amount of concern, a notable example being that between the transatlantic passenger liners Andrea Doria and Stockholm off New York last year.

Radar designers are now working hard to improve radar sets still further, mainly in the direction of making the information that they provide available to the user at a glance.

One important development by a British firm, Decca, is what is known as true motion radar. In this type of set, information fed from the ship's compass and log makes the observer's own ship move across the radar screen with its correct course and speed.

The whole picture moves, too, and this means that other ships also move with their correct motion, instead of merely with their motion relative to the observer's own ship.

This is important because moving echoes on a radar screen appear to have a trail behind them, actually formed by the dying away of previous echoes. On a true motion set these trails coincide with the wakes of the actual ships, and therefore show at a glance the direction in which a ship is heading, and any change of course.

Appreciation of what is happening is thus much quicker than with the normal type of set. True motion sets are now being produced by other manufacturers as well, and represent a very definite advance.

Progress is still being made in the technical field, too. A recent advance by another British firm, Kelvin & Hughes, is a new type of aerial which offers better performance for less weight and wind resistance.

The set in which this aerial is used also breaks new ground in marine radar with the use of what are called printed circuits — a recent development in radio technique.

In the future

After this, we come to the future. The next advance is likely to be towards sets using an even higher frequency. This will allow the shape of ships to be seen on the screen when they are still some way off. They are likely to appear as little more than an elongated blob, but it will be possible to judge both the size of a ship and its direction at a glance.

Details of harbours, piers and jetties will also be much more clearly portrayed, and sets of this sort may make it possible for ships to be brought right alongside the jetty in fog, as long as the last few moments of the approach can be made visually. Experiments are being made with sets like this in Great Britain, and one has actually been produced in Holland.

It might in time be possible to produce a radar set that gives a photographic picture of what can be seen from the bridge windows, resembling the picture of a television set.

This would reduce to the absolute minimum the difference between navigating in clear weather and navigating by radar.

Whether or not such a set is eventually developed probably depends most on the human factor; how far those at sea become fully accustomed to navigating from the plan-type picture now in use.

Modern radar and television techniques make almost anything theoretically possible to-day.

It is mainly a question of balancing the advantages of new developments against their cost.

(From the London "Navy")

FIREFIGHTERS SHOW HOW IT'S DONE

Navy Week was observed in Sydney from October 12 to 19. Pictured here are trainees of the Navy Damage Control School extinguishing an oil fire as part of the many demonstrations which the Navy staged at Garden Island when it was open for public inspection on October 12. About 40,000 people visited the island. They saw helicopter displays, watched H.M. Submarine Aurochs dive in Captain Cook Dock, saw H.M.A.S. Warramunga fire torpedoes and Squid anti-submarine weapon, went on board the carriers Sydney and Melbourne and gazed at a replica of Sputnik, the Russian earth satellite.

THIRD OF FISH CATCH IS FROM NORTH PACIFIC

About 20,000 million lb. of fish, one-third of the world's supply, is taken in the North Pacific Ocean, Roy I. Jackson, Director of the International North Pacific Fisheries Commission, told a meeting of Canadian fisheries officers at Vancouver.

Japan takes 8,000 million lb. and U.S.A. 1,000 million.

FLEET TRAIN'S BIG JOB

By DONALD BARRY
in London

THE U.K. Government's decision to base the main elements of the Royal Navy on a limited number of highly mobile aircraft carrier task groups considerably increases the importance of the Royal Fleet Auxiliary Service.

It is imperative that the Navy should become more mobile and less dependent on highly organised shore bases for two reasons: first, because bases would be extremely vulnerable in a global war fought with nuclear weapons: and secondly, because the demand for self-government by many countries throughout the world is continually compelling the United Kingdom to lessen its grip on many overseas bases.

In the past, overseas bases have been the cornerstones of British strategy, but, in a world in which they might be obliterated by nuclear bombardment from extreme range, their importance becomes less and the Navy's ability to move about without being tethered to bases by a short rein becomes more important.

Ships must always be docked for repairs, refits and conversions, but a comparative state of independence can be achieved if means of supply, maintenance and servicing are available at sea or in some pre-selected harbour or anchorage.

They must have what is now described as "afloat support," or what has been more familiarly known as a Fleet Train. In other words, routine port facilities must become mobile.

This is not a new problem. It has been practiced in wartime and peacetime, but never as a deliberate policy to eliminate the need for fixed base facilities as far as possible.

For a decade the United States Navy has now operated a system of afloat support for its Sixth Fleet in the Mediterranean but the Americans have no bases of their own in that part of the world.

The Royal Navy still has valuable base facilities within reasonable distance of any of its ships, but it proposes to do without them as much as possible.

This is the crux of the new defence policy as it affects the Navy.

Afloat support was the key to Naval warfare in the Pacific during World War II.

The factors involved in fighting a naval war in such a large ocean compelled the United States Navy to develop its logistic supply and support system to an extent never previously contemplated.

Then, later, the Royal Navy had to adopt the new pattern of waging war at sea.

But, unlike the U.S. Navy, who had had time to acquire a series of temporary bases (in some cases they were merely atolls) across the Pacific as they pushed towards Japan, the Royal Navy, when its main strength was transferred from the European theatre of war to the Pacific, had to operate immediately in regions 3,000 to 4,000 miles from its main base at Sydney, having temporarily lost both Singapore and Hong Kong.

To support it, the British Pacific Fleet Train was formed under the command of Rear-Admiral D. B. Fisher, to feed, maintain and service the fighting ships at sea.

This train became, in effect, a floating industrial seaport with factories, repair shops, floating docks, cranes, stores, barracks, refrigerators, waterworks, fuel depots, breweries, hospitals, administrative offices and social amenities, all within floating hulls.

It comprised well over 100 vessels of 30 specialised types sailing under the White, Red and Blue ensigns, bringing the sinews of war, the means of sustenance, and the opportunities of recreation to a Service population as numerous as the inhabitants of a sizeable town: one of the ships was equipped with a swimming bath, library and cinema which men of many ships used by rotation in off-duty hours, another had a brewery which produced 1,800 gallons of beer a day for the Fleet, bringing a welcome addition to the daily tot at sea.

Some idea of the task of supporting a fleet in this manner may be gauged from the statistics of the basic 1945 Fleet requirements in the Pacific: 22,100,000 lb. of meat, 49,280,000 lb. of fresh vegetables, 23,000,000 lb. of flour, 9,000,000 lb. of sugar, 1,100,000 lb. of tea.

Then there were utensils and crockery needed as replacements: 600,000 cups, 600,000 plates, 200,000 knives, 25,000 spoons.

Without such supplies the British Pacific Fleet could not have carried out its non-stop attack on Japanese airfields, which, with the American offensive, led to the ultimate collapse of Japan.

It was the experience gained during the war against Japan which enabled the Royal Navy to take part so readily in the war in Korea.

The Royal Fleet Auxiliary Service was called on again, and although it had by then reduced to peacetime strength it was fully competent to deal with the situation.

Its tankers fuelled at sea not only H.M. Ships but the ships of the Royal Canadian, Australian, New Zealand and Netherlands Navies and the United States Navy.

More than 20 Royal Fleet Auxiliaries and carrier support ships wearing the White Ensign kept the operational ships in fighting trim.

More recently, the nuclear tests in the Pacific have shown the value of "afloat support."

Without a naval supply line the tests could not have taken place.

Operating 9,000 miles from the United Kingdom, ships of the Royal Fleet Auxiliary Service were responsible for supplying food, water, fuel and many other requirements of the Grapple force in the Christmas Island area during the months of preparation and the trials period.

This supply force included ships of the Fort class, some of which formed part of the British Pacific Fleet Train during the Pacific War.

First to arrive was the **Fort Beauharnois**, which acted as logistic support and temporary headquarters ship during the early build-up, the **Fort Constantine** and the **Fort Rosalie**.

These ships, built in Canada, are named after a ship of forts between Canada and New Orleans, erected by the French in the nineteenth century to contain British settlers on the West Altantic seaboard. They are ships at 13,800 tons displacement.

Also supplying the Grapple Force were tankers of the Royal Fleet auxiliary: **Wave Prince, Wave Ruler, Wave Sovereign, Wave Chief,** each of 16,500 tons displacement and capable of carrying a large cargo of fuel oil. The smaller tanker, **Gold Ranger,** was also there.

One of these ships, the **Wave Chief,** accompanied the Royal Yacht **Britannia** to the Antarctic during the world tour of His Royal Highness, Prince Philip, Duke of Edinburgh. She was

responsible for refuelling the Royal Yacht between Australia and St. Helena.

It is on such ships as these that the brunt of supporting the Navy in the distant parts of the world rests.

In war, merchant ships can be converted for service within a fleet train, but in peacetime "afloat support" is almost entirely the responsibility of the Blue Ensign Auxiliary Fleet, comprising tankers, store issuing ships, tugs, salvage vessels, etc., manned by a body of Merchant Navy officers and seamen who, in the main, are engaged on normal Board of Trade articles. Nevertheless, they are in a very real sense part of the Royal Navy.

Peacetime Fleet support is normally well within the capacity of the Royal Fleet Auxiliary Service.

Some of its tanker tonnage is, in fact, chartered by the Admiralty to commercial companies and some store issuing ships not required for the close support of the Fleet are employed in transporting Naval stores and equipment throughout the world.

The decison that Fleets, as we know them to-day, shall eventually be replaced by aircraft carrier groups is, however, causing the Navy to look at the problem afresh and it is noticeable that in the past two years greater emphasis has been placed by the First Lord of the Admiralty on the role of the Royal Fleet Auxiliary.

In the recent White Paper it was announced that steps are to be taken to modernise the ships of the R.F.A., and as a first step three are to be taken in hand this year.

The light fleet carrier **Triumph** is also to be converted for service as a heavy repair ship under the White Ensign.

In a world in which bases could be obliterated at one stroke the logical conclusion is that ships must become more self-sufficient and capable of looking after themselves on the high seas.

This is a big and complex logistic task, but one well within Britain's capacity.

Nuclear propulsion may eventually ease the problem by reducing the requirement for oil fuel, but whatever the future may hold, ships of the Royal Fleet Auxiliary, which have played a vital role in two world wars, and all vessels which can support fighting units in distant waters will become immeasurably more important than they have been in the past.

(From the London Navy)

HE WON THE DIAMOND SCULLS

Australian sculler Stuart Mackenzie, of Sydney Rowing Club, photographed getting ready for a practice row. In England recently he won the Henley Diamond Sculls, one of the classics of the rowing world.

BERTHS FOR BIG SHIPS

In the U.K., berths for ships up to 100,000 deadweight tons are to be provided at Milford Haven, for ships up to 65,000 tons at Southampton and up to 100,000 tons on the Clyde.

On the Mersey, a new oil berth is contemplated for vessels up to 65,000 tons or up to 100,000 tons subject to a draught restriction.

Friends and relatives of the ship's company farewelled H.M. Submarine Thorough when she left Balmoral, Sydney, for Britain on October 8. The submarine had served in Australian waters for eight years.

MAKING THE SEA A SAFER PLACE

By JOHN CAMPBELL

The prototype of the largest lifeboat yet built of fibreglass seen during its trials off Southern England. It can carry 144 people and is powered by the largest air-cooled engine used in a ship's lifeboat.

STORM, stranding and fire have been sea hazards through the centuries, taking a heavy toll of the lives of seamen and of their passengers. With the coming of the steam engine and the great increase in travel which followed during the latter part of the nineteenth century, this toll increased sharply; and the stories of early passenger liners in particular are dotted with the names of ships lost with all hands, or with heavy loss of life.

The Load Line — the Plimsoll Line after its great advocate, Mr. Samuel Plimsoll — came in 1875 as the first major measure to improve safety at sea; and increasing effort has been directed to this end ever since.

Board of Trade Regulations have been progressively stiffened as one tragedy or another drew attention to a particular need. As an outstanding example, when the Titanic sailed in 1912, one of the features of the ship was thought to be the lavish provision of lifeboats.

Yet they proved tragically inadequate in the disaster which followed; and in the outcome the requirements were revised to improve arrangements, both for provision of boats and for practice in their use.

Another step forward has been the tremendous development of wireless, still in its infancy in 1912. Yet wireless must still be supplemented by rockets and flares; and the Schermuly Company, who celebrate their Diamond Jubilee this year, are still among those firms who supply this type of gear, which is particularly necessary in aiding lifeboats and liferafts to make their presence known to rescuers.

The First World War perhaps underlined needs rather than remedies, though technical advance continued steadily. The development of the internal combustion engine brought the motor lifeboat, with many advantages but equally with certain limitations.

The memorable voyage of the survivors of the Trevessa in 1923 was made under sail; for clearly the motor lifeboat cannot carry fuel for an extended voyage. Indeed, if help is anywhere near, to move far from the scene of a disaster may provoke worse tragedy, since a small boat is very difficult to find, as many survivors can testify. The motor-boat's best service has often proved to lie in keeping other boats and rafts together until help has arrived.

The Second World War again brought out the needs where safety at sea was concerned. In some respects technical research facilities were better equipped to meet them. To take a well-known instance, it was electrical development which made possible the small light attached to lifebuoys to which many men owed their lives. When the losses came to be analysed at the end of the war, however, it was found that a horrifying proportion of deaths were due to exposure while in boats. Further, in too many cases there was either no time to get boats away, or a list made it impossible to launch from one side of the ship.

When these facts became apparent the Admiralty undertook extensive tests of lifesaving gear. Carley floats used in H.M. Ships had proved very successful. Further, between the wars Mr. R. F. Dagnall, an airship designer, had developed for the R.A.F. an inflatable rubber dinghy which had saved the lives of many ditched airmen.

Working on these lines, the Elliot Equipment Company designed for the Admiralty a 20-man inflatable liferaft, with a canopy for protection against exposure, which is now standard equipment in H.M. Ships.

In October, 1956, this type of equipment was made compulsory in British fishing vessels, the decision being largely influenced, no doubt, by the fact that in that year 57 fishermen were reckoned to owe their lives to these rafts, which functioned safely when ordinary lifeboats could not be used.

Similar rafts are now approved by the Ministry of Transport for use in British merchant ships, and consideration is being given to making them compulsory. The position here is complicated by international agreements which supplement and strengthen national regulations.

The International Committee on Safety at Sea, meeting in 1948, forbade the use of lifesaving equipment inflated by gas or air: though it has been suggested recently that another conference should now be called to reconsider this question in the light of current developments. The point is underlined by recent tests which show that the standard kapok-filled lifejacket loses its buoyancy in oily water, while inflatable lifejackets remain uaffected.

Experiment goes on steadily to improve the rafts. Mr. Dagnall's company — The R.F.D. Co. Ltd. — sticks to the round shape of the R.A.F. dinghy.

Most other makers use an oval shape. Elliott rafts have a light on the canopy to make them more easily found. Beaufort Air-Sea Equipment have been experimenting with daylight fluorescent pigments for the canopy with very satisfactory results.

As a further aid, experiments are now going on to adapt Ultra Electric's SARAH (Search And Rescue And Homing) equipment for use in liferafts and lifeboats. At present, however, survivors must depend on some form of light signal, and much research has gone into the development, by the McMurdo Equipment Co., of the Aqualite which can either be fitted to the canopy of a dinghy or can float in the water beside a buoy or raft. Special batteries give the light a life of 40 hours.

But the lifeboat itself is not outdated yet. The latest types are of aluminium and fibreglass, lighter and stronger than hitherto. New types of release gear and davits have been developed, such as those designed by Welin-McLaughlin for the Orient Line's Oriana, recently ordered. Air-cooled diesel engines, developed by Petters and McLaren, have the great advantage that they can be started before the boat is in the water, so that on launching she moves away at once from the ship's side, thus greatly reducing the risk of accidents.

The fact still remains that in too many instances lack of time, or a list, precludes the launching of lifeboats. This was the case in the Andrea Doria-Stockholm collision just under a year ago.

Yet it is also true that the liferaft has no means of propulsion but drifts at the mercy of winds and currents; and it is also admittedly difficult to locate. In a recent case men drifted for 60 hours before being picked up, though, if reports are correct, they were apparently only some 20 miles from shore.

It was truly said 2,000 years ago that there is no one road that leads to Rome. Safety at sea, if it can ever be attained completely, may well lie in some combination of boat and raft, and in the application to technical advance of all the knowledge and ingenuity with which man is endowed.

(From the London "Navy")

Australia's Lighthouses — a vital service

By a Special Correspondent

THERE are 217 lighthouses, auxiliary lights, lightships, buoys and beacons under Commonwealth control on the Australian coast. Of these the majority are automatic, requiring only periodic servicing, but 67 lighthouses and auxiliary lights are manned.

In addition, in 1918 the Commonwealth assumed control of about 30 lights and 50 unlighted beacons on the coastline of Papua and New Guinea.

Types of lighthouses on the Australian coast vary considerably, each being designed to meet particular local requirements.

The most important lights are established at prominent land marks or near turning points on important shipping lanes such as Cape Leeuin, in the south-west of Australia, Cape Borda on Kangaroo Island, South Australia, and Gabo Island in Victoria; or near important shipping centres, for example, Macquarie near the entrance to Sydney Harbour, Nobby's Head at the port of Newcastle and Cape Moreton on Moreton Island, near the entrance to the Brisbane River.

First lighthouse

The first Australian lighthouse was opened at South Head, Port Jackson in 1817, orginally burning whale oil.

Present day lights are usually manned by two or three lightkeepers, who live on the stations with their families. Their important duty is to make sure the lights are operating.

Lighthouse apparatus is installed in lanterns of metal and glass placed on towers of concrete, steel or stone. Powerful light beams of up to 3,000,000 candlepower are produced by the magnification through revolving lenses, of either a powerful electric lamp or an incandescent mantle in which a mixture of air and kerosene vapour is burnt.

Lighthouses in some areas, especially the north-east, are built to withstand gales of 130 miles an hour.

They are spaced at frequent but varying intervals, averaging about 20 miles. Generally, lights are spaced at longer intervals.

Lightkeepers live a lonely life. However, they usually live in comfortable homes built near the tower. They are given 28 days' recreation leave yearly, exclusive of Sundays and travelling time to and from the lighthouse house.

They play an invaluable part in helping to keep our seaways free of tragedy.

Most northerly of the Commonwealth's lighthouses is at Cape Don, 100 miles north-east of Darwin; the most southerly is on Maatsuyker Island, a rocky outcrop off the lower tip of Tasmania.

Most easterly-located is on a dangerous cliff which drops almost vertically 370 feet to the sea on Cape Byron near Lismore, and the most westerly is at Cape Inscription on Dirk Hartog Island, South West of Carnarvon.

The most brilliant light on our coasts is the 3,000,000 candlepower one on Rottnest Island.

The light-station on Tasman Island near Port Arthur in Tasmania, rises abruptly from the sea to 900 feet. It is one of a number of lights which has to be serviced by the use of a spectacular flying fox, while amphibious ducks equip several lights on the coasts of Queensland, Northern Tasmania and South Australia.

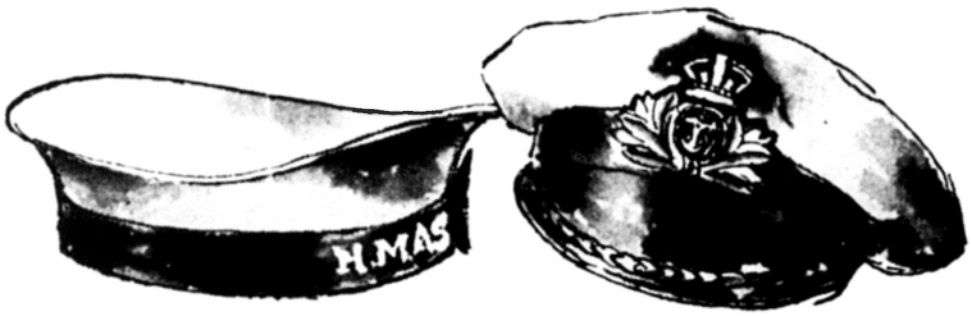
Saved many lives

No figures can truly assess the value of service given alike to the ocean liner and fishing smack on our long coast line. But it can be safely said that aids provided by the Commonwealth Lighthouse Service have saved many lives over the years in our more dangerous sea lanes.

With advanced techniques in navigational aids, it is not unlikely that some of the lights, lightships, buoys or beacons will be replaced by more scientific equipment such as radar reflector beacons.

Should that occur the seafarers who ply our sea tracks will no doubt adopt the change. But in the manner of mariners the world over they will retain affectionate memories of the light that has served their safety so well.

(From "The Accelerator")



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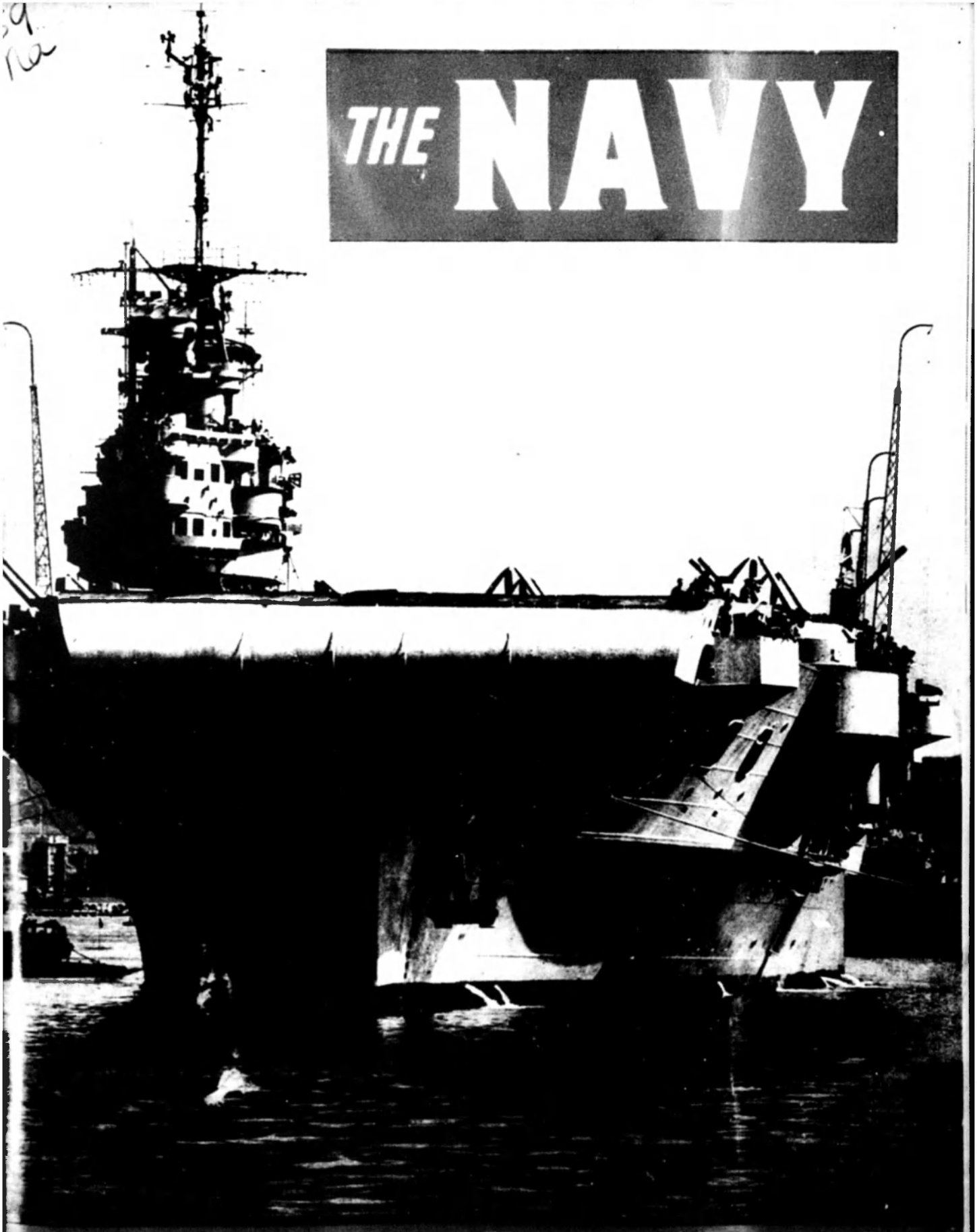

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THE NAVY
Australia's Maritime Journal

THE STATE OF THE S.C. CORPS

PRE OCCUPATION with highly necessary building programme and a scarcity of instructors have caused a drop in the strength of many sea cadet units in N.S.W.

When the Director of Naval Reserves made his inspection of units a few months ago the situation briefly was this:

T.S. Tobruk (Newcastle): Strength 47. Short of instructors. The unit has a whaler and a 14-ft. sailing dinghy.

T.S. Condamine (Manly): The unit has 35 cadets in cramped quarters, with little room for expansion. It has no boat, but gets the loan of a whaler from H.M.A.S. Penguin occasionally.

T.S. Australia (Waverton): Strength 45 cadets. For the past three years the unit has been allowed the use of Boom Depot, Waverton. With the reduction of the depot and the stowage of equipment, space has become restricted.

T.S. Warrego (Woolwich): Strength 15 cadets. A committee raised several hundred pounds, which was spent extending the small drill hall. The unit has its own whaler.

T.S. Sydney (Snapper Island): Strength 33 cadets. It has facilities for training, is ideal for week-end camps, and has ample boats.

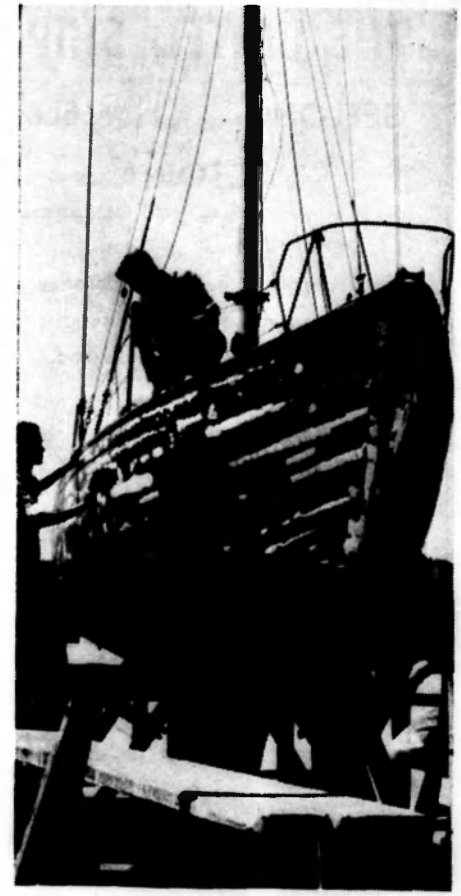
T.S. Shropshire (Canterbury): Strength 51—the highest in N.S.W. A great deal of work has been done with voluntary labour in building and improvements. The unit is short of officers.

T.S. Sirius (Arncliffe): Strength 12 cadets. It has bought with its own funds three huts from Disposals and is erecting them on two acres of land given by Rockdale Council.

T.S. Albatross (Wollongong): A local committee recently raised enough money, with financial help from the Navy League and the Navy, to build a £5,000 training headquarters.

Between the lines of the D.N.R.'s report can be read a tolerant criticism, which cannot fairly be denied.

FOR HOBART RACE



Workmen at Captain Cook Naval Dockyard are shown reconditioning the R.A.N.'s yacht Samuel Pepys for the Sydney-Hobart race, which started on Boxing Day.

The whole picture shows a struggle for funds, and a struggle to get equipment and competent instructors, without which recruitment is well nigh impossible.

This is a job not only for the existing units and the Navy League, but for all citizens.

"MONTY" SAYS SEA POWER WILL BE DECISIVE

In a recent talk to the Navy League in London, Field-Marshal Viscount Montgomery said: "It is obvious that, in future war, sea power will be a decisive factor."

The following are the main points of the Field-Marshal's address:

IT is interesting that the dates of Trafalgar — October 21 — and Alamein — October 23 — are so close. Yet they have more in common than that. Both marked the turning point in a long war against a powerful Continental enemy.

And though Alamein was fought on land, it marked the climax of a long sea and air battle which had been going on for three years.

If we had not been able to build up our supplies and troops faster than Rommel, the issue would have been lost and with it Egypt, the Canal, and possibly the whole of the Middle East.

Because we were masters of the sea, Alamein was fought and won.

It was because we had defeated the French and Spanish fleets at Trafalgar that in 1808 we were able to land our army in Portugal.

Six years later we beat Napoleon. He wielded far greater military power but was confined to a land strategy.

Nelson saw very clearly what the annihilation of the combined fleets would mean in the struggle against Napoleon. Few perhaps of our generals in those days realised the greatness of his victory.

In recent years there has been a school of thought which considered that there will be no role for the British Navy in future war.

Never was there a greater error.

Where are the facts?

First, we are an island people. We fight our wars in other people's countries — France, the Low Countries, Germany, the Americas, the Crimea, Africa, India, the Pacific, and so on.

We prefer it that way. It is inconvenient when you have to fight in your own country.

The Army must be taken to those places by sea, and nourished by sea.

When it fights it generally has one flank on the sea — as we had in North Africa and in North-west Europe.

Its supplies must come by sea. The day when an army can be supplied entirely by air is still many years away.

Then there is another point — one which is vital to the nations of Western Europe. Western Europe — including the United Kingdom — is the centre of a world-wide economic system. In that system there are no large supplies of raw materials, except possibly coal.

Large imports of food are necessary to feed the populations. But the overseas sources of raw materials, particularly oil, and the sources of food supply and the transit areas through which they must come, are all subject to pressure and to threats of a "cold war" nature.

They must be protected, together with the bases and sea communications from which they are controlled.

Failure to protect them would lead to the collapse of the whole economic system, and ultimately to the loss of Free Europe to international Communism.

Russia will strive for success in this direction, the indirect attack, rather than by direct aggression against the NATO front in Europe — since the indirect method is far less costly and is far more likely to succeed.

One last fact: Three-quarters of the surface of the world is water.

IT is clear from what I have just said that the Western Alliance must have the free use of the water areas in peace and in war.

The teaching of history is that from the days of early Rome the nation which had control of the transit areas and seas in the end prevailed.

Those are the facts. We cannot change facts. We must base our policy and action on them. Whichever way you look at it, the Western Alliance must be able to use the major oceans and seas.

To-day, control of the seas is a matter for ships and aircraft — all operating under naval direction and control.

To carry out this task efficiently, the Navy must have its own aviation. Furthermore, the aircraft carrier of the Navy is the indispensable mobile airfield of modern armed forces.

These mobile airfields are greatly valued by the Army.

AS an example, take the Suez operations in November last year. In those operations the bulk of the air support for the Army came from naval aircraft operating from carriers.

And in the future air support from mobile airfields on the sea may often be the only support the Army will get in the early stages of those operations which are carried out at a distance from the normal airfield complex.

There is therefore an Army need for the naval aircraft carrier, and a need about which we soldiers feel keenly.

The Navy League exists to remind the people of this country and the Commonwealth of all these things, and of our maritime traditions.

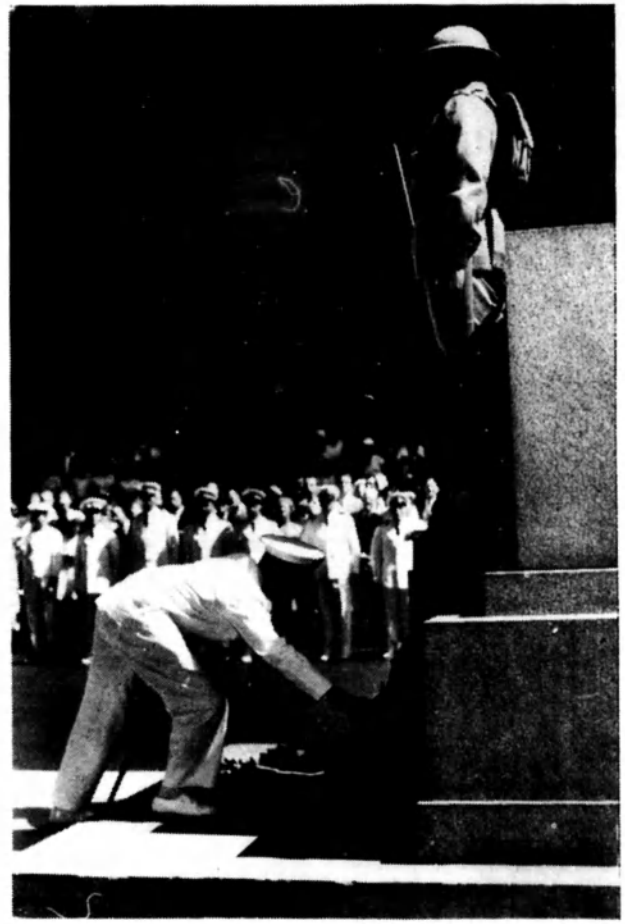
Let me give you an example of how naval tradition is upheld.

During the operation in Crete in the late war, a dangerous and difficult evacuation became necessary..

There was a view that to hazard ships in those parts would involve far too great a risk — that they were at the moment more valuable than the weary men. Indeed, the implications of their loss and the subsequent loss of sea control were very serious.

But the Admiral of the Fleet, Sir Andrew Cunningham, said very quietly that the Navy had always been accustomed to take the Army to its destination, and bring it home afterwards. It

FRENCH ADMIRAL LAYS WREATH



The Commander of the French Naval Forces in the Pacific, Rear-Admiral G. de Toulouse-Lautrec, placing a wreath on the Cenotaph in Martin Place, Sydney. Rear-Admiral de Toulouse-Lautrec arrived in Sydney early this month in the French sloop, Francis Garnier.

— Block by courtesy of "The Sydney Morning Herald."

took only a few years to replace any ships that might get sunk, but a lost tradition would take centuries to replace.

The Navy therefore would go and evacuate the Army — if they so desired. But, he added, if they refused to be evacuated, then the Navy would come and take off the Marines!

There is another form of tradition that is peculiar perhaps to the Royal Navy.

Down the centuries, ordinary men, many of whom may never have seen the sea in their lives, have come forward from the plough or the anvil, or in later years the factory, to serve in our ships. They have come in their thousands.

They do not belong to the R.N.V.R., or the R.N.R., nor are they fishermen, or any sea user. They are the people of Britain, a complete cross section of the country.

IN the past we have had time to train these men so that they have become professionals. Will there be time to do so in the future? I doubt it.

That is why it is so important to get men into the voluntary organisations now — today. Here the Navy League helps, and this task will remain in the future.

Against this general background it is obvious that, in future war, sea power will be a decisive factor. And by sea power I mean ships and naval aircraft operating from carriers, since the one without the other is useless.

I was delighted to read in the Press that when the Minister for Defence returned from a trip in U.S. nuclear-powered submarine Nautilus, he said that the nuclear submarine represented a revolutionary advance in naval warfare as great as the change from sail to steam.

He was right.

And I remember that when the Naval Estimates were being debated in Parliament it was stated that we were building a nuclear submarine.

That was right, too.

A revolutionary advance in naval warfare is definitely coming, brought about by nuclear power.

It is heartening to learn that the British Government is fully alerted to this fact.

The Navy must turn over quickly to nuclear power: in due course the Merchant Navy will do the same, and with far less constructional cost than at present.

The merchant ship of the future will travel under the sea. The Japanese are already building a 65,000-ton submarine for freight carrying use.

The navies of the Western Alliance must, collectively, ensure control of the major oceans and seas in any East-West contest.

I would like to emphasise the word "collectively." Those who want to see Britain strong in every component of her armed forces are inclined to forget that we belong to an alliance. From the point of view of overall efficiency for the least financial expenditure, we must plan to get the maximum value from the alliance — working for balanced collective forces within the alliance as a whole.

If each nation wants self-sufficiency in its armed forces, what value do we get from the alliance? Unless nations are sensible in this respect, and will trust each other, defence budgets will increase to an alarming degree.

Take, for example, the war at sea. In the present contest between East and West, there cannot be war in the Atlantic without general war on a global scale. The danger of aggression in the N.A.T.O. area is remote, because of what has been achieved in building up military strength in the Western Alliance.

In fact, the overall deterrent against general war, with nuclear weapons, is very strong.

The danger areas are now in the Middle East and Far East, more especially the former.

We cannot be strong everywhere. We must balance the risks that have to be taken. We must tackle local and guerilla type wars instantly — before they develop and spread.

It seems to me to be common sense that the United States, with her powerful fleets should be mainly responsible for war in the Atlantic, with Britain playing a part.

British sea power could then be deployed in strength in other oceans and seas, and to guard the sea approaches to our island home.

I look forward to the day when we shall see a strong British fleet, ships and naval aircraft, operating in the major oceans and seas east of Suez, showing the flag and landing Royal Marines if necessary, backing up the Army in troublesome areas, and by such inter-Service action dealing quickly with situations which, if not handled firmly at once, could develop into unpleasant conflagrations.

A study of our past history reveals that British strategy has always been based fundamentally on sea power. That is the right strategy, now linked to air power.

The late war was, in essence, a struggle for the control of sea communications, and until we had won that struggle we were unable to proceed with our plans to win the war.

It will be the same in future war.

If we reduce our Navy too much, the Army will have to add "swimming" to the many hard feats it has to perform at the start of our wars.

JOIN THE NAVY LEAGUE

The object of the Navy League in Australia, like its older counterpart, the Navy League in Britain, is to insist by all means at its disposal upon the vital importance of Sea Power to the British Commonwealth of Nations. The League sponsors the Australian Sea Cadet Corps by giving technical sea training to and instilling naval training in boys who intend to serve in Naval or Merchant services and also to those sea-minded boys who do not intend to follow a sea career, but who, given this knowledge, will form a valuable Reserve for the Naval Service.

The League consists of Fellows (Annual or Life) and Associates.

All British subjects who signify approval to the objects of the League are eligible.

MAY WE ASK YOU TO JOIN and swell our members so that the Navy League in Australia may be widely known and exercise an important influence in the life of the Australian Nation?

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LOBSTER — OR CRAYFISH?

By FRANK McNEILL

(From an A.B.C. talk)

NOW, firstly — this name "lobster." I don't think inquirers will ever tire of asking: "Are there any lobsters in Australian waters?" The same question crops up year after year.

At one time it sprang from arguments among those who had enjoyed a meal of our luscious sea foods. To-day the same question has gained impetus from the great activity of spear fishermen.

It looks to me as if the names "lobster" and "crayfish" will never cease to be used indiscriminately by Australians.

But it's quite wrong to do so!

An early jolt to the arguers is this: There are no lobsters in the seas of the Southern Hemisphere.

Lobsters have large, powerful claws, and are found only in the North Atlantic and adjacent seas.

Our marine crayfish definitely don't have claws.

The earliest settlers called these marine crayfish "lobsters" because they bore a superficial resemblance to lobsters of their home seas, and the name has persisted ever since.

The French have a distinctive name — langouste — for a Mediterranean and Eastern Atlantic relative of our marine crayfish.

If we were to adopt the name, langouste, in Australia it would remove all cause for argument.

It would be much better than to use the American compromise of "Spiny Lobster."

Now, just to make things a bit more difficult, we also have freshwater crayfish in Australia, and their presence can cause some confusion.

Our Australian freshwater crayfish have a pair of big claws. In this they're more like the true lobsters than crayfish. As a matter of fact, two giants of the freshwater family are occasionally, though incorrectly, referred to as "Murray River Lobster" and "Tasmanian Lobster."

Now the question of prawns. There are few Australians who are not familiar with the kinds that are netted and sold in such quantities in all our capital cities.

Some merely eat and enjoy these sea delicacies.

But there are many other people who find as well a natural history interest.

To them it's a baffling mystery why, among the vast numbers netted, they find no outward sign of breeding.

Prawns and shrimps generally carry clusters of eggs on the underside of the body. But the odd part is that just two families of prawns — the families to which the schooling commercial kinds belong — differ from all the more numerous kinds in their breeding. They never carry clusters of eggs on the underside.

Very occasionally you do find an egg-laden prawn in the nets. Such finds have often been brought triumphantly to the museum as evidence of breeding.

But disillusionment soon follows when it's pointed out that these are a different kind that have got into the net amongst the others.

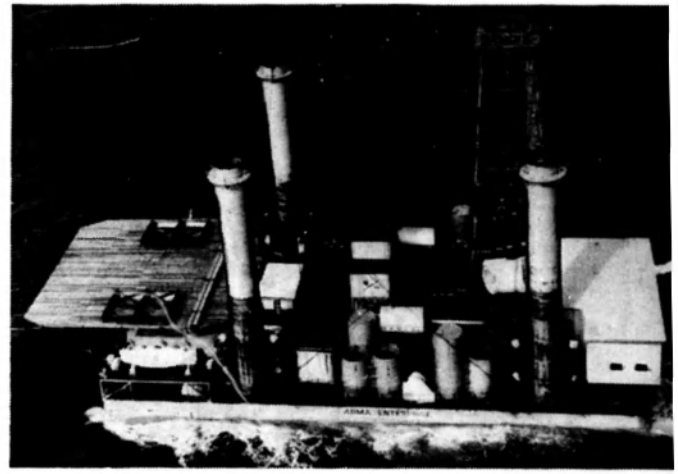
The females of all our kinds of commercial prawns pass out their eggs to float free in the water. Eventually they hatch there, and release the tiny larvae which look nothing like the parent.

It takes four or five castings of the shell, and as many changes in shape, before the growing young resemble the adult.

So, you see, the field of natural history is still a fertile one for the gathering of false impressions.

From earliest times it has been subject to numerous fallacies, and it's a function of the museum curator to keep on breaking these down.

OIL FROM THE SEA BED



The Adma Enterprise in tow through the Red Sea.

HAWK-EYED masters of the Arab trading dhows beating through the brassy flatness of the Red Sea recently gazed in disbelief at a strange craft which was slowly being towed through their waters.

The Adma Enterprise, out of Kiel Canal, Germany, was on the last stages of its 6,800-mile tow to Das Island in the Persian Gulf, where it will be used to establish a deep test well for Abu Dhabi Marine Areas Ltd., a subsidiary of The British Petroleum Co. Ltd.

Averaging 4½ knots in calm weather, the Adma Enterprise was towed by a single tug, which had a constant struggle since it set out.

Heavy seas, with waves breaking over the helicopter platform 35 feet above sea level, have delayed the journey.

FROM A SPECIAL CORRESPONDENT

Gale force winds off Ushant tore the tug apart from its ponderous charge, but, after a five-hour struggle with wind and waves, the tow line was replaced and the journey resumed.

The barge, a miracle of compactness, was designed by the DeLong Corporation of New York for drilling oil wells in water up to 80 feet deep. In its 200ft. by 100ft. hull, comfortable air-conditioned accommodation for 50 men has been arranged.

While the barge is being towed out, the barren island of Das, once an uninhabited speck in the Persian Gulf, has become a scene of feverish activity. A force of 500 men are preparing the base camp, and construction of accommodation, offices, stores, and workshops is well in hand.

A temporary airstrip has been completed and an 800ft. breakwater has been built out from the harbour to protect the fleet of small craft which will operate between Das and the well-site, 20 miles away.

Exhaustive exploratory work by marine seismologists determined the location of the test site.

Data on the geological structure of the sea-bed was obtained by exploding underwater charges and measuring the sound waves reflected from the layers of rock beneath the earth's surface.

Frogmen, protected by special metal cages against attack by the sharks infesting these waters, were then sent below to carry out underwater gravimetric surveys and to obtain specimens of the rock formation on the ocean floor.

After additional fitting out as Das, the Adma Enterprise will be towed to the location of the first test well.

The four 165ft. long retractable legs will be elevated by hydraulic jacks, and the ungainly vessel will heave its 5,000-ton bulk 40ft. above the surface of the waves.

Early next year, the probing drill-bit will bite its way through the sedimentary ooze which has lain undisturbed on the ocean floor for millions of years, deep into the rocks below.

Time alone will show whether all this endeavour will tap a storehouse of the liquid wealth so vital to this age — or that another dry hole can be recorded in the ceaseless search for oil.

'RIDING TO BATTLE IN 'A HELICOPTER

By CAPTAIN T. M. P. STEVENS, M.C., R.M.

ANALYSIS of the several methods of bringing an effective force to quick action in far away campaigns highlights the great advantages offered by having an aircraft carrier equipped with a helicopter component. This would conveniently consist of 20 helicopters and a Royal Marine Commando of some 600 men.

The helicopter-borne force could strike quickly against enemy 50 or 100 miles inland without need for beaches or landing grounds. With its great mobility it could attack any part of the enemy it chose, destroying headquarters and communications, switching the attack rapidly as the enemy reserves moved, destroying them piecemeal. The enemy might sometimes defend, but could not counter-attack because they could never move fast enough.

So far the British have only used helicopters in small numbers against guerillas, in Malaya and Cyprus, but the French have used them extensively in Algeria. Experience shows that helicopters can give a small force a power out of all proportion to its size.

A light fleet carrier could be used, and could carry 20 helicopters and 600 men without major modification. The most suitable helicopter is the S.58, carrying 14 men at 100 knots. The original Sikorsky S.58 is already in service with the U.S. Marine Corps and U.S. Navy, and the French have used many in Algeria.

The prototype of the British version, the Wessex, which is being built by Westlands, flew recently and looks promising, but production models are not likely to be ready until 1959 or 1960. As a temporary measure the latest mark of Westland Whirlwind (S.55) might be used, with a slightly higher performance than the Whirlwinds used at Port Said.

Twenty S.58's carrying 14 men each gives a powerful punch. But it is important to get the helicopter carrier in perspective. It is not the answer to all cold war problems. It has its limitations like every other weapon.

Sometimes it can act on its own, but usually it must work as part of a team.

It would probably operate with a carrier task group, the aircraft from the strike carrier giving close support to the lightly equipped helicopter-borne forces. But even with air support there will often be incidents beyond the powers of a carrier task group.

LET us consider a cold war situation where a minority tries to seize power in a remote place.

The carrier task group and the helicopter carrier are rushed to the spot, and the helicopter-borne force, supported by air strikes, saves the immediate situation and forces the enemy to the defensive by hitting them continually in unexpected places.

Meanwhile, troops from the strategic reserve are flown from Britain to an airfield within striking distance, and when the helicopter-borne force captures an airstrip the troops are flown in.

These troops would have been immobile because of their lack of transport: but often they too, can use the helicopters, and the whole force, army and marines, can overwhelm the enemy by their superior mobility.

The commando is the cutting-edge to the helicopter operations, the trained nucleus who have worked out the technique and are best for the difficult jobs.

But the helicopter carrier can do far more than just make one commando mobile, since it can give the strategic reserve a power it would never have had.

The helicopter carrier and strategic reserve are not to be seen as rivals. There will often be occasions when the helicopter carrier can act on its own: but its greatest value will often lie in giving striking power to the strategic reserve.

The idea of using helicopters in amphibious operations started with the United States Marine Corps.

After Hiroshima they saw that the World War II concept of amphibious assault, with great concentrations of shipping and troops, would not work against an enemy with atomic weapons.

Helicopters offered a way to capture a beach-head without providing atomic targets, and to win the land battle quickly.

The Marine Corps had been studying helicopter operations for years. They already have a converted escort carrier, the U.S.S. Thetis Bay, carrying 20 helicopters and 1,000 marines, as a forerunner of this kind of ship. They think in terms of large numbers of helicopters playing the main part in the landing.

Britain may never have enough helicopters for this, but even one helicopter carrier could have a great effect in an amphibious assault.

Troops could attack the beach defences from behind, or could capture bridges or other vital objectives inland. They could knock out enemy batteries, or fly observation posts or guns on to the enemy's flank.

AFTER the capture of the beach, the helicopters could be used to ferry stores ashore, straight to the forward troops (so cutting down the number of vehicles to be landed), or could give mobility to reserves in the beach-head.

During the break-out battle they could again put down troops behind the enemy, and in the advance inland they could give the force great mobility, sometimes enabling it to do without ground lines of communication.

Some of these jobs could be done by paratroops. But helicopters have greater power to choose and change landing zones. Besides the helicopter-borne forces can be used several times, and the helicopters can pick up troops who have had no special training.

The main argument against helicopters in tactical operations is vulnerability.

However, experience in Korea, Algeria and Port Said shows that helicopters are far less vulnerable than was expected.

A helicopter at Port Said had 20 bullet holes, including six in the rotor blades, and still flew.

In Algeria, aircraft frequently come back riddled with bullets, and very few have been shot down.

With self-sealing petrol tanks and body-armour for the pilot, helicopters will be even less vulnerable.

Anyway, the basic principle in amphibious operations is to land the helicopters away from enemy fire — "hit 'em where they ain't" is a U.S. Marine Corps slogan.

Against a strong enemy air threat helicopter operations would be risky: but so would any amphibious assault until the enemy air had been reduced to reasonable proportions. Against a reduced air threat, enemy intruders reaching the assault area would find it difficult to get their sights on dodging helicopters, and our own

(Please turn to page 21)

HELICOPTERS FOR SALVAGE

A Royal Navy Whirlwind helicopter tows the 360-ton coastal minesweeper Cavington during an experiment off the coast of England recently. The test was designed to show the value of big helicopters in salvage work. Smaller helicopters have already been used in Britain for towing small craft.

NEWS OF THE WORLD'S NAVIES

N.A.T.O. EXERCISES

LONDON: It has been said that anything a conventional submarine can do the United States Navy's nuclear-powered submarine Nautilus can do better, quicker and longer.

Those concerned in the autumn N.A.T.O. exercises had an opportunity of assessing the importance of the nuclear submarine as a weapon of war. It is certain that the Nautilus will figure importantly in the final exercise analysis, but the known facts of her performance alone appear to justify claims made for her.

When she surfaced in the English Channel at the end of Exercise Strike Back she had cruised submerged for approximately 14 days, she had covered a distance of 5,007 miles—she had done this at an average speed of approximately 15 knots—and she had made her deepest dive, though for security reasons the actual depth reached has not been announced.

While the submarine was at Devonport the First Sea Lord, the Minister of Defence, and other V.I.P.'s were received on board and went for a short cruise in the English Channel.

They were able to assess the submarine's potential as passengers for five hours.

They were shown all over the vessel and United States officers explained in detail the construction and method of operating the boat. They also explained the results obtained during the N.A.T.O. exercises.

"It was an unforgettable experience," said the Minister of Defence when he stepped ashore afterwards.

"With her exceptional speed, her capacity to dive to unprecedented depths and her remarkable manoeuvrability, this nuclear submarine represents in the sphere of naval warfare a revolutionary advance as great as the change from sail to steam."

One of the things which impressed the party most was the accommodation for the ship's company, which is more spacious than in conventional submarines, as the nuclear reactor and propulsive machinery take up less space.

It was a preview of what conditions may be expected by the ship's company of the Dreadnought, which will be the Royal Navy's first atomic submarine.

ATOMIC NAVY

Encouraged by the success of the Nautilus, the United States Navy intends to have a small fleet of atomic submarines within the next decade.

Already the second nuclear-powered boat, the Seawolf, a craft of some 2,700 tons, is in service and six others are under construction.

Four of these are medium-sized attack vessels, Skate, Swordfish, Seadragon and Sargo; another is the Skipjack, a single-screw high-speed attack submarine, and the sixth is the Halibut, the first submarine to be designed as a guided missile boat.

In addition, some four or five other boats are to be built.

One of the most important projects is that of the Triton, a radar picket submarine. This will be the largest submarine ever built by the U.S. Navy and the first one to have two nuclear reactors.

The day is not far distant when submarines will carry and fire intermediate range ballistic missiles, according to Rear-Admiral Rickover, the man responsible for the building of the Nautilus.

These he calls "underwater satellites."

They would be nuclear-powered and carry a weapon with a range of 1,500 miles, similar to one which the U.S. Navy is at present developing.

While this type of submarine cannot be built immediately, it is feasible and has a tremendous potentiality.

Finding and destroying it, according to Admiral Rickover, would be like "trying to find a black cat on a vast and empty plain on a moonless and starless night."

U.S. plans for nuclear-powered ships are not confined to submarines.

Congress has authorised the building of a nuclear-powered guided missile cruiser. This will be the Long Beach, the contract for which has been awarded to the Bethlehem Steel Company of Quincy, Mass.

The power plant being developed for this vessel by the Westinghouse Electric Corporation will give it a far greater cruising range than that of existing fleet escort ships.

Its armament will protect Task Forces against air, surface and undersea attack.

Congress has also authorised the procurement of components for a nuclear-powered aircraft carrier, and the Navy hopes that a large destroyer type of nuclear-powered ship may be included in an early building programme.

HELICOPTER CARRIER

Reports that the Admiralty is planning to convert an aircraft carrier for use exclusively and permanently as a floating base for helicopters have been discussed in the Press and commended as a logical outcome of the British operations in the Suez Canal area.

During these operations last November some 500 officers and men of 45 Commando, Royal Marines, were landed in 91 minutes from H.M.S. Theseus and H.M.S. Ocean by a force of naval Whirlwinds and some Sycamore machines of an Army experimental unit.

This was the first time for helicopters to be used in a battle role.

While no official credence is given to these reports the success of the helicopter landings at Port Said is clearly an indication of the value of an aircraft carrier for carrying helicopters to land troops, particularly where speedy police action is necessary.

This lesson most certainly has not escaped the naval staff, or the Royal Marines, who see in it a modern method for performing their time-honoured role.

A helicopter carrier would be an important unit in a carrier task force and it would obviously increase the flexibility of the Fleet Air Arm and the mobility of the Royal Marines.

The machine which would most probably be used in such a role would be the Westland Wessex, a large number of which are ordered.

They will carry about 15 men with full fighting kit, a considerable advance on the carrying capacity of the Whirlwinds used in the Suez Canal zone.

R.A.N. COLLEGE MOVES

MELBOURNE: The Royal Australian Naval College at Crib Point (Vic.) will close on December 6 and re-open at Jervis Bay on January 31.

Transfer of the college has already begun.

R.A.N. ships have carried to Jervis Bay books, equipment, furniture and boats not needed until the New Year.

The College is to be named H.M.A.S. Creswell, in honour of the late Vice-Admiral Sir William Creswell, known as the "father of the R.A.N. College."

SUB. CIRCLES WORLD

LONDON: H.M. Submarine Thorough, which left Sydney on October 7 after service with the Fourth Submarine Squadron, will have sailed around the world by the time she berths at Portsmouth a week before Christmas.

It is believed that she will be the first submarine to circumnavigate the world.

Now commanded by Lieutenant-Commander R. C. H. Mason, R.N., the Thorough originally sailed from Portsmouth in October, 1949, and made a passage by way of the Mediterranean and the Suez Canal to Australia, where she provided anti-submarine training for ships of the Royal Australian Navy and the Royal New Zealand Navy and units of the Royal Navy based in the Far East.

She is returning to Britain across the Pacific and through the Panama Canal, a journey home of more than 12,500 miles.

She is scheduled to arrive at Portsmouth on December 17.

THE SUPERMARINE SCIMITAR

By M. J. LITHGOW, O.B.E., Deputy Chief Test Pilot, Vickers-Armstrongs, and G. S. HENSON, B.Sc.(Eng.), D.C.Ae., A.F.R.Ae.S., Assistant Chief Designer, Supermarine.

AS it will not be long before Naval aviators come to grips with this large and potent monster, it seems a good idea to give them a general introduction to the aircraft, describe cockpit systems and handling characteristics and give as much information as security will allow on performance and future developments.

Compared with current single-seat Naval strike/fighter aircraft, the Scimitar is large "immense" has been unkindly used!). This larger size has, broadly, three causes: Nearly twice the weight of useful load is carried; there is a higher thrust/weight ratio giving a very high initial rate of climb; and greater range and endurance is provided. Further, the aircraft has plenty of development potential.

A wide variety of equipment is already planned for the different roles and design studies for continued improvements are under way.

These are possible because recent tests with the blown flap have been very satisfactory and the aircraft is well within the limits of the ships' gear. More details of the operational equipment and its deveolpment are mentioned below, but we will start on details by describing the cockpit.

Starting at the port side aft, there are two long levers operating the L.P. fuel cocks, with relighting circuit breakers on their right.

Forward along the console we have the emergency flap/undercarriage/hook levers and the L.F.F. and V.H.F. control boxes.

Immediately aft of the throttle quadrant are the rudder and standby tailplane trimmers. The throttles also incorporate the H.P. cocks.

The relighting switches are on the rear face of each throttle lever and the starboard throttle grip houses the airbrake and "press-to-speak" switches.

The airbrakes are at present infinitely variable but are being modified to two positions — in or out.

Forward of the throttle quadrant are grouped the engine starting switches, and above it the sliding hood control switch.

To the left of the main instrument panel, from top to bottom, are the arrestor hook lever, cockpit emergency lights, flap and undercarriage controls, undercarriage warning lights and brake gauge.

Alongside the flap lever is a desynn indicator showing trailing edge flap angle, and next to it a similar type of indicator for the airbrakes. (This will later be changed to a "doll's eye" showing white when airbrakes are out.)

The main instrument panel layout conforms to the latest N.A.T.O. requirements (unless this is again altered whilst this article is in print!).

The engine instruments and fuel presentation are on the right of the main panel.

Each fuel tank is individually gauged on the long bank of vertical-scale indicators. The pointers for each tank are all in line when the fuel balancing system is functioning correctly.

In the event of it not doing so, the fuel can be manually balanced by means of the three-position switch underneath the gauges.

To the right of this switch can be seen the cabin altimeter and three "doll's eye" indicators for engine fuel pressures.

A flowmeter showing rate of flow and pounds of fuel gone will also be fitted here.

Above the main fuel indicators is a "totalising" fuel gauge which reads the last 2,000 lb. Alongside are two J.P.T. gauges. The two instruments next above are the r.p.m. indicators which are (at last) calibrated in per cent. r.p.m.

Coming down to the starboard console forward we have the centralised warning system, comprising a total of 10 potentially "vital" failures — cabin pressure, wing fold, two generators, two hydraulic pressures, compressor port and starboard, and fire warning port and starboard.

IN the event of a failure of any of the above items, the main attention-getter lights flash red — these can be seen in the front top corner each side of the cockpit. The pilot then refers to the panel to determine the exact nature of the failure, cancels the flashing lights and takes appropriate action.

All of the C.W.P. are bomb and R/P selector switches, audio approach, stores jettison, pressure cabin switch, cabin temperature control (fully automatic), oxygen panel (which also has a remote indicator in the centre above the main instrument panel), wing fold lever, g-suit control, etc.

The transverse panel above the main instrument panel is being extensively rehashed to incorporate radar navigation and sighting devices. Below the main panel are the trim indicators, pilot heat switch, instrument early-start switch and override switch for use with drop tanks.

Longitudinal and lateral trim is obtained by the four-way switch on the control column and there is also a standby tail trim switch on the port console.

The trim indicators are "doll's eyes" and are trimmed white for take-off, but all go black when the weight comes off the undercarriage legs. The brakes are toe-operated, and may be parked by pulling out the T-lever (to be repositioned central, top of main instrument panel).

The hood is force-jettisoned by pulling the lever on the inner side of the port console. Pulling down the ejection seat blind automatically fires the hood before the seat.

All in all, a comfortably large cockpit excellently laid out. Apologies are offered for some omissions in describing the cockpit due to lack of space in this article.

The control system has remained basically unchanged since the first flight, and consists of rod/cable runs operating the valves of hydraulic actuators. Feel is provided artificially. It is a straightforward system, with a minimum of tricks and gimmicks.

Pitching control is obtained from a tailplane operated directly by a tandem actuator, as can be seen in the diagram. There are no elevators or tailplane flaps.

The two cylinders of the actuator are fed by entirely separate hydraulic systems. Full operation on either system alone is possible, except at supersonic speed when there is a small reduction in the available g. Since each hydraulic system is provided with two pumps, one on each engine, the failure of one system will not occur due to an engine or drive shaft failure.

COMING forward from the actuator one passes the flap-operating link (below), a non-linear gearing, to arrive at the artificial feel system which is under the cockpit floor.

Duplication of artificial feel is arranged so that failure of one system will not be felt by the pilot. Twin hydraulic jacks provide the feel forces which are varied by E.A.S. and Mach number pressure capsules.

At low air speed a constant jack "base pressure" gives effectively a plain spring feel. At speeds above 300 knots E.A.S. the pressure increases with speed to remain proportional to "q." Above M = .9 this pressure is biased by the Mach meter capsule to prevent the gradual "stick heavying" which would otherwise occur.

The ailerons are also operated directly by tandem actuators using the two independent hydraulic systems.

Again unlimited operation on either system alone is possible, except at supersonic speed where the available rate of roll is reduced. The actuator valves are operated by push-pull rods and cables via a small actuator. The two hydraulic systems also feed this actuator which is used for overcoming the circuit friction so as to give very low break-out forces at the stick. Feel is provided by a simple spring that does not vary with speed. The electric trim actuator provides a bias to this spring.

The rudder is little used at

high speed and one hydraulic system provides actuation and "q" feel. Reversion to direct pedal control is used if this one system fails.

Engine failure and landing with one engine on pedal control causes no headaches. This is a convenient point to mention the flaps, which are operated by a link in the tailplane and maintain the aircraft in trim. As the trailing edge flaps go down, the nose flaps and "blow" come into operation. For landing, the flaps come full down and bring in the fuselage flaps.

For take-off or over-shooting, drag is reduced without any noticeable change in lift by partially raising the flaps. Flap blowing and its effect on handling are dealt with later on.

HAVING disposed of the dry bones of descriptive matter, we can get on to handling during a strike sortie.

Catapulting: The aircraft is pulled hard down on to its tail-skid for launching at an altitude of 12 degrees which, surprisingly, feels quite comfortable and normal.

Flap blowing is used for the extra lift available more than outweighs the loss of engine thrust; the minimum launching speed is, in fact, about 10 knots less with blow on than off. A further reason for using blow is a marked improvement in fore-and-aft controllability.

At the time of writing, the aircraft has not been catapulted with external stores.

Climb, high-altitude handling: These are the aspects which at present leave most to be desired. (The words "at present" need emphasising, of course. We hope squadron pilots will never know there were any problems!)

When climbing at the best climbing speed the aircraft is difficult to control accurately in pitch. The reason for this is that it suffers a nose-down trim change corresponding to a degree of tailplane angle in going from M = .85 to .95.

The position is aggravated by inadequacies of the tail actuator system which are manifest to the pilot in the form of a slight lag from stick movement to aircraft response.

A similar problem exists on the aileron control, making it difficult to fly the aircraft level with the degree or precision one would like.

As a result, both the tail and aileron controls have been subjected to a "five-star" flight test programme and (dare one say it?) we think we now know the answer.

The departures from straight and level flight referred to are, of course, extremely small and in no way limit the aircraft — in fact, the problem does not exist at the higher speeds

Most noticeable is the disappearance of the buffet boundary when pulling g at transonic speeds. The buffet boundary, not surprisingly is low at subsonic speeds up to .95, but at supersonic speeds quite high g can be pulled without a sign of buffet.

The pitch-up problem — the bete noir of modern aircraft — has been transformed by the anhedral tailplane which, as all Naval pilots have undoubtedly noticed, is now fitted to all Scimitars.

Descent: The airbrakes consist of six petals (three each side) on the aft engine nacelles which open outwards through 80 degrees. Extension of these causes a slight buffet at medium speeds, none at all at high speeds, and they decelerate the aircraft from 500 knots to 250 knots in 45 seconds.

High Speed, Low Level: At present this condition has been only briefly explored but a "sprint" into the target will be possible at nearly Mach 1, when carrying the bomb and drop tank.

A feature of the aircraft is the enormous strength for this role, the design diving speed, for example, being supersonic at sea level. Other than for the "sprint" an economical cruising speed of about 400 knots would be used.

The range of "loiter" time can be extended by dousing one engine, the directional trim change resulting therefrom is negligible and no one has yet failed to relight a serviceable Avon at low level!

Landing-on: A brief description of the flap blowing system may not be out of place here.

The jet of air, blowing aft from a fixed nozzle, follows round the surface of the flap to flow downwards and aft. This deflects a large mass of air and about doubles the effectiveness of the flap.

The effect of blow, coupled with increased flap area, was proved during recent trials to have reduced the approach speed of the Scimitar very considerably (compared with the double-slotted flap version). Apart from this very acceptable speedwise improvement there were some very satisfactory gains from the handling viewpoint, namely, a more nose-down attitude, excellent engine handling (r.p.m. on the approach averaged 81 per cent.) and improved longitudinal stability.

As already mentioned, audio approach is fitted and was tested on the recent deck-landing trials in Ark Royal, with very satisfactory results.

Both longitudinal and lateral control is very powerful and effective on the approach, two very necessary ingredients of a good deck-landing aircraft.

The first prototype Scimitar flew in January, 1956. The first series of deck landings took place in H.M.S. Ark Royal in April, 1956.

Both the second and third prototypes, and the first production aircraft flew within 12 months of the first aircraft.

There were 10 aircraft engaged on development flying by June, 1957, and it is hoped to start a Service Intensive Flying flight before the end of summer. Formation of the first squadron will follow a few months afterwards.

Development flying will clear the basic aircraft and the wide variety of alternative equipment carried in the different roles.

WHILE early aircraft should be operationally effective, continued development is planned.

For example, a new navigating system will improve the strike role and an alternative armament to the four 30 mm. cannon will improve the aircraft in the fighter role.

Both these roles will be aided by the introduction of an auto pilot. Further developments are being actively pursued.

Besides these two principal roles the Scimitar is intended also for fighter reconnaissance and ground-attack duties. In the former case the folding nose is unpinned and a camera nose added.

These alternatives and additions have resulted in little increase in the aircraft's weight. The basic airframe is being continually refined as production continues and over half the weight is military load and fuel.

The fact that a Naval aircraft is now one of the country's two fastest single-seaters is a tribute to the careful planning laid down some years ago in D.A.W. and the close liaison with the Ministry of Supply, both of which the writers would like to acknowledge.

—From the London "Navy"

Continuing

Riding to Battle in a Helicopter

From page 15

aircraft would be there to stop the enemy from searching for helicopters.

The Americans envisage using helicopters against atomic threat. It is unlikely that, at the moment, anyway, Britain envisages amphibious operations of any sort against an atomic threat. But in other limited war assaults a helicopter carrier could be a vital factor.

There is one other important role for the helicopter carrier — anti-submarine.

Helicopters could be changed from an anti-submarine to an assault role in a matter of hours, though the reverse change would take longer.

There is nothing in the design for a helicopter carrier to prevent it being used for anti-submarine operations, but it might not always be practicable to carry the equipment and ammunition for both roles. The best way to see the two roles is the carrier itself being switched to either role as the national priority changes from hot to cold war and vice versa.

We should look on the Navy's helicopters and light fleet carriers as a pool, which can be diverted to suit the priorities of the moment.

Thus the helicopter carrier is a versatile weapon, valuable in every operation the Navy might be called on to do, from hot war to flood relief or bus strikes.

But its most important task would lie in the cold war, in enabling the Navy to help protect our interests abroad.

—From the London "Navy"

A-POWERED SUB. TANKER PLANNED

LONDON: British marine engineers are reported to be testing a model of a nuclear-powered submarine oil tanker.

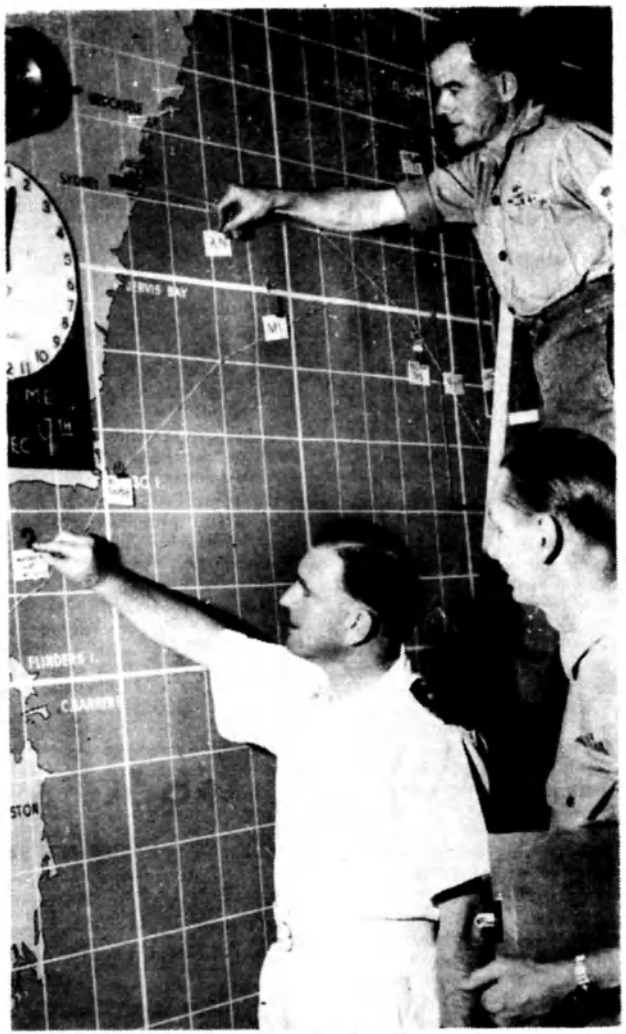
The Petroleum Information Bureau (Australia) reports that the first of the submarine tankers probably will cost millions, but once built, it could operate more cheaply than any surface craft.

Oil companies have evinced interest in the experiments and it has been suggested that the U.K. Government might co-operate in defraying the initial cost in view of the enormous strategical importance of sub marine tankers.

In the meantime, Germany and Japan are experimenting with nuclear-powered surface tankers.

Germany hopes to have her first tanker off the slips by 1961.

PLOTTING OPERATION



Watched by Group-Captain R. N. Dalkin, Commodore I. Purvis and Petty-Officer J. Holloway (on ladder) fix shipping positions on the giant map of "Operation Astrolabe" at the secret exercise direction and operation centre.

Naval units and planes of the Australian and New Zealand forces in this photo were searching for two "enemy" submarines in the Tasman Sea.

REVIEWS

BUILDING AND SAILING

"The Southseasman," by Weston Martyr; published by Hart-Davis (U.K.).

"Wylo Sails Again," by Frank A. Wightman; published by Hart-Davis (U.K.).

The two latest volumes of the Mariners' Library are well up to the standard of their predecessors.

At Sheldon, in Nova Scotia, we are taken through the whole process of the building of a schooner, and gradually the vessel is built, and for those fortunate to sail in her or in other ships we are told of a certain cure against seasickness, namely, to eat a great deal and continue to do so, thus making one's inside happy with no time to play any tricks!

The next best thing to sailing in such a yacht as the Wylo through the Milky Way of the Caribbean Islands is to follow her voyage in this book by her owner, Frank Wightman.

That odd little island, Bequia, he found delightful, as also Saba, although he does not mention that the people who dwell in the village, called The Bottom, which lies 3,000 feet up from the sea, and is the island's capital, occupy themselves with the building of ships that, of course, have then to be slid down into the water.

In the interior of Dominica we find the Caribs, the last of the original inhabitants of the West Indies.

—H.B. (in the London "Navy").

STRANGE PEOPLE

"Strange Peoples," by Irvin Block; published by Harrap (U.K.).

Mr. Irvin Block tells us that were it not for a number of other books this one of his would never have been written.

And his modesty becomes him well, for he does not appear to have himself penetrated to the lands of the Tchambuli, the Iswakintl, the Eskimos and others of whom he writes.

Perhaps he thought that the fruit of certain anthropologists should be served up by him instead of being read by us in their own works and he certainly tells his tale in the plainest language, avoiding all literary decoration.

—H.B. (in the London "Navy").

CRESTS AND BADGES

"Heraldry in the Royal Navy. Crests and Badges of H.M. Ships," by Alfred E. Weightman; published by Gale and Polden (U.K.).

To anyone who is a keen collector of ships' badges Mr. Weightman's book will be a source of great pleasure for it contains descriptions of over 350 badges, official and unofficial, and all are illustrated with line drawings skilfully executed.

Before official badges were adopted in the Royal Navy in December, 1918, ships frequently changed their crests every time they recommissioned, sometimes even when a new Commander joined during a commission.

Mr. Weightman quotes an officer who served in H.M.S. Africa and said that they had eight different badges while he was in the ship!

These unofficial badges are of the greatest interest and the book might well have contained more of them.

Incidentally, many of the old devices are far more attractive than the official ones.

But in addition to the badges, the author has included a "potted" naval history and accounts of the services of a number of the ships and their forbears.

These seem to have been selected at random and in some cases it is not easy to see the reason.

So we have here an excellent cross-section of naval history in a condensed form, albeit somewhat disconnected. There are also many notes on mythology which are of value to the unclassical reader.

From the heraldic point of view I feel that the author has been badly served by the Ships' Badges Committee for the blazoning of the badges is an amazing hotch-potch of heraldic language and plain English.

Take the case of roundels, for instance. In heraldry each coloured roundel has a distinctive name, but in the official blazon of the Broadsword we read of a "rondel red," yet in blazoning the badge of the Actæon a "pomme" is referred to, a pomme or pomeis being a green roundel.

In the cases of the Cochrane and Sluys, a "torteau" is referred to, but this is merely a red roundel as in the Broadsword.

The Finisterre has a "flag white charged with a hurt"—a blue roundel, and so on.

It would be helpful to the reader unacquainted with the jargon of heraldry if a glossary of heraldic terms had been included.

The term "apaumee" is used at least twice, but the average reader will not know that this means a hand with the palm showing.

Though the author does not mention it, the badges given to the destroyers of the "Battle" class are classified.

In the case of sea battles the field is blue and the device is surrounded by a laurel wreath.

The land battles have a red field and a wreath of palm.

The book, however, can be warmly recommended. Mr. Weightman has obviously taken an enormous amount of trouble over its production and the illustrations are really excellent.

The Admiralty Archivist, Lieutenant-Commander P. K. Kemp, has written an introduction.

—T.D.M. in the London "Navy."

BIG SHIP

"Ark Royal," 1939-1941," by William Jameson; published by Hart-Davis (U.K.).

The story of the Ark Royal, the third ship of that name to have served in the Royal Navy, and affectionately remembered by thousands who knew her magnificent record in the last war, is beautifully told by Admiral Jameson.

Particularly is his book impressive for the way in which the human side of life in the ship is so extremely well blended with the technicalities.

There is "atmosphere" in every page, and the fine spirit which pervaded the carrier's company and her air crews is brought out naturally and spontaneously.

There is lots of fun in it, too, as witness this extract in connection with one of the many visits the "Ark" paid to Gibraltar when she formed a part of Force "H." " . . . Once again the trivial round had the Ark Royal in its grip. . . . Two very senior officers returning to the 'Ark' after curfew time that night, were held by a zealous sentry at the point of a bayonet until released by a very mellow libertyman who alone could remember the password!"

The book will not only give much joy to those who served in the old Ark Royal, but will provide the man in the street with a splendid picture of "big ship" life during the Second World War.

—R.S.D.A. in the London "Navy."

MARINE PROPULSION BY NUCLEAR ENERGY

By ALEXANDER CAMPBELL

In an A.B.C. broadcast

MARINE propulsion by nuclear energy is feasible.

This has been proved by the extensive nuclear submarine programme of the United States and by the experience of reactor operation in the United Kingdom.

The problem of commercial use is, then, not in the actual engineering, but in developing a reactor which will give power costs competitive with the conventional methods.

In the sphere of military use, on the other hand, there are factors which may outweigh any wish for competitive costs.

In the military field, the greatest effort has been made in the United States, who have a large submarine programme.

For this, the main reactor chosen has been the pressurised water reactor, although a reactor using liquid sodium as coolant was studied, but later abandoned, as the United States Navy does not intend to continue with sodium cooling.

The United Kingdom has announced its intention to build a nuclear-powered submarine, which will also use a pressurised water-reactor, similar to that used in the Nautilus.

Another prototype reactor for submarine propulsion will come into operation at Harwell later this month.

Known as Neptune, this reactor will be a homogeneous reactor. That is, the fuel and moderator are in form of a solution, which will act as its coolant.

The United States also intends to build two nuclear-powered warships—a guided-missile cruiser and an aircraft carrier—powered by pressurised water reactors, two in the first and eight in the second.

This multiplicity of reactor units will mean that the ship can remain under way although some of the reactors are out of operation.

For merchant shipping, a reactor producing power at about one half-penny sterling per shaft horse-power hour, the present cost of oil-fired ships, must be developed.

Costs of about 0.2 pence per unit can be obtained by the large graphite moderated natural uranium reactors of the United Kingdom electricity authorities, but it remains to be seen whether this system would be economically competitive when scaled down for ship use.

Because of the higher capital costs of a nuclear power unit, the system chosen shall have to use a low enrichment fuel to give low running costs to offset the high capital charges.

To benefit from the low fuel costs afforded by natural uranium, the ship would have to be a large ship which spends most of its time at sea, such as an oil tanker, because the reactor would be necessarily large and heavy.

Nearly continuous use of the power unit is desirable to allay the high capital cost.

It has been decided to build a nuclear-powered tanker in the United Kingdom, whose operating costs should be competitive.

For smaller ships which spend relatively longer time in port, it may be that a smaller reactor with lower capital cost will be

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RECENT DEVELOPMENTS IN A-S AIRCRAFT

By M. J. HARDY

RUSSIA's recent claim to have produced and fired successfully an intercontinental ballistic missile has tended to overshadow somewhat an equally potent menace in possession of the Kremlin: A submarine fleet, believed to number more than 500 vessels, which is being added to at the rate of 60 to 70 ships a year.

Yet to the general public it is the guided missile and the supersonic bomber, i.e., the threat from the air, that is the most dangerous, and the submarine tends to be bracketed with the tank and the piloted aircraft as a weapon of the past and present rather than of the future. Yet the modern submarine can carry guided missiles with conventional or thermo-nuclear warheads, and can itself be powered by atomic energy, giving it virtually unlimited range.

Such a submarine is just as potent as a supersonic bomber or a guided missile, and it is known that the Russians have developed underwater missile-launching systems.

It was not surprising, therefore, that Admiral of the Fleet Earl Mountbatten of Burma said at the dinner given by the Society of British Aircraft Constructors on the eve of its annual display at Farnborough: 'The Admiralty's greatest wish for Coastal Command is that they may be allowed to have an adequate number of modern aircraft to fulfil their functions."

The First Sea Lord stressed the need for numbers of aircraft, and for a very good reason.

Although the trend in modern weapons is for ever greater destructive power to be contained in a single unit, and consequently the need for fewer units (whether they be V-bombers or guided missiles or submarines) to accomplish a given task, this trend does not apply to the anti-submarine aircraft.

COASTAL Command's motto "Constant Endeavour" admirably sums up the task of submarine hunting: aircraft for this purpose have to search before they can strike — they are, in fact, defensive rather than offensive weapons.

And since such a large portion of the earth's surface consists of seas and oceans, adequate numbers as well as adequate means of searching and striking are essential.

Fighting the submarine menace is one branch of warfare in which superior numerical strength alone could still win the battle.

Unfortunately, this country's past achievements in winning battles although outnumbered to an apparently hopeless degree has resulted, it seems, in an inbred psychological distrust of mere numerical superiority.

We feel instinctively that we are at our best when fighting with our backs to the wall, and perhaps this is just as potent a factor as the demands of national economy in dictating the small size of this country's anti-submarine fleet.

Certainly our limited defence budget demands that good value is obtained for the money spent, and British anti-submarine aircraft have not been found wanting in this respect.

Latest of these aircraft is the Westland Wessex helicopter, a version of the Sikorsky S.58 built under licence by Westland Aircraft Ltd., of Yeovil. Unlike the piston-engined S.58, which is in service with the U.S. Marine Corps and U.S. Army, and is used for anti-submarine work by the U.S. Navy, the Wessex is powered by a gas turbine.

The latter type of power plant is being applied to more and more helicopters; that fitted to the Wessex is a 1,450 s.h.p. Napier Gazelle.

The Wessex can do approximately twice the job of the S.55 Whirlwind and its turbine engine means that ships need not carry petrol, only all-paraffin fuel.

The prototype Wessex was actually built in America and made its first flight with its British engine only a few months ago. It should not be

long, however, before production deliveries are being made from Yeovil to Naval units.

The Wessex will be armed with some kind of homing weapon.

Westland has been producing the smaller Sikorsky S.55 for civil and military use for some years now, and many are in service with the Navy.

American-built Whirlwinds equipped the Navy's first helicopter anti-submarine unit, No. 845 Squadron, which used the "dunking sonar" technique to detect submarines.

A new version of this aircraft, the Whirlwind H.A.S. 7, is now being produced at Yeovil; the Mark 7 has an Alvis Leonides Major piston engine and is armed with an anti-submarine homing torpedo in a special bay under the cabin floor, which has been raised to accommodate it.

This new version of the Whirlwind is now undergoing proving trials with "H" Flight of No. 700 Squadron, based at Lee-on-Solent. This Flight was formed as recently as 18th March this year.

With another Whirlwind equipped to detect submarines, the Mark 7 version could form a "hunter/killer" team. The larger Wessex is very probably capable of both hunting and killing.

THE Royal Navy continues to rely on its turboprop Fairey Gannets for submarine protection, and it was recently revealed at Farnborough that this aircraft could carry two homing torpedoes in addition to a considerable variety of other weapons.

The Gannet is powered by an Armstrong - Siddeley Double Mamba turbo-prop, which consists of two "single" Mambas coupled together to drive two four-bladed contra-rotating airscrews.

For long periods of cruising, one Mamba can be stopped and the airscrew it drives idles; when a submarine is sighted, the dead engine is started again and full power is available for a fast run over the target.

France's Breguet Alize (this name means "Trade Wind") is rather similar to the Gannet in appearance, although it is not quite such a sophisticated design.

It is powered by a single Rolls-Royce Dart turboprop, and is intended for the French Navy's light aircraft carriers.

Like the Gannet, the Breguet design carries a crew of one pilot and two observers, but whereas in the Gannet the three crew members are seated in tandem, the Alize's pilot is seated to port and the two observers, each with a radar scanner, to starboard.

This enables the observers to change seats in flight to avoid radar eye-strain.

Catapult trials of this aircraft have been successfully completed at Farnborough, and 100 aircraft have been ordered for the French Navy; the first Alize squadrons will probably be formed next year.

An unusual feature of this aircraft is that the main wheels retract forwards into fairings on the wing leading edges; these fairings also house anti-submarine gear and landing lights. Bombs and rockets can be carried both externally and in the fuselage bomb bay.

Something that few people could have foreseen in the war was that the modification of a basic airliner design into an anti-submarine aircraft might be entirely feasible.

An interesting French development in this direction was the Hurel-Dubois H.D.35 — an ungainly-looking twin-engined, high-wing monoplane with a fixed undercarriage and a high aspect ratio wing (i.e., one that is long and narrow, like a plank).

This was a development of the earlier Hurel-Dubois H.D.31 airliner, and the prototype H.D.31 was handed over to the French Navy for evaluation last year.

THE H.D.31 series is intended to use small, undeveloped airfields and has the ability to fly at slow speeds, which is so important to the modern anti-submarine aircraft.

The H.D.35 has an endurance of 20 hours at 100 m.p.h., and features an MAD (Magnetic Airborne Detector) installation in the rear fuselage and search radar under the nose; it could also carry homing torpedoes.

So far no production orders for the H.D.35 have been announced.

Great roominess, exceptional carrying capacity, a very long range and ample cruising speed — these are some of the Bristol Britannia's qualities.

These same attributes are just as useful in an anti submarine aircraft as an airliner, and are to be found in the Canadair CL-28 Argus, a Canadian development of the Britannia for long-range ocean patrol, using the same wings, undercarriage and tail unit as the Bristol product, but with a completely new, unpressurised fuselage and Wright Turbo-Compound piston engines in place of the Britannia's Proteus turboprops.

The choice of piston engines may seem a retrograde step, but the turboprop's fuel consumption at low altitudes (where most submarine hunting is done) is greater than that of a piston engine.

The Canadair Argus will thus be able to employ the Britannia's exceptional fuel capacity to the best advantage, and it will undoubtedly have a very long range. And, although it has a maximum gross weight of 118,000 lb., it is fast — the maximum speed is 350 m.p.h.

The first Argus made its first flight in March of this year, and the Royal Canadian Air Force should have taken delivery of their first Argus by the time these words appear.

Orders have been placed for something like 50 aircraft for the R.C.A.F. and the type has been evaluated by the U.S. Navy.

The Argus can carry a very large load of weapons including, one may assume, mines, depth charges, anti-submarine bombs, homing torpedoes and air-to-surface guided missiles.

There are no fewer than 21 distinct radio or radar installations, including very powerful search radar mounted in a prominent bulge under the nose, and an MAD housed in a long, cone-shaped fairing aft of the tail unit.

The crew of 15 will enjoy the benefits of a spacious fuselage with ample cooking and rest facilities as well as effective soundproofing (crew comfort is very important in ocean patrol aircraft, and excessive engine noise can cause great fatigue on lengthy missions).

It is perhaps paradoxical that although the Westland Wessex, Breguet Alize and Canadair Argus are so dissimilar externally, they are all designed for the same basic task. But this diversity of design features and basic configurations serves to emphasise the immensity of the submarine menace, and the number of different ways in which it must be tackled from the air.

—From the London "Navy"

INTO THE MISSILE AGE

By B. J. HURREN — In London

SOME Americans talk big for one simple reason: They are big. Just such a one is Colonel John Smith Blair, III, who from his H.Q. in Germany has recently gone on record with an epic statement: "I have more firepower at my fingertips than any commander in any war in history."

Grandiloquent though his words are, the colonel still understates the case. In fact, he disposes more firepower than all the wars of history lumped together, for he commands four battalions of atomic cannon and three of assorted atomic missiles.

The captain of a modern warship armed with atomic weapons is in the same state as the Colonel. As a fighting unit such a warship completely eclipses whole Navies of the past, including those which fought as recently as the Korean War.

Both colonel and captain have more than firepower: they have range beyond all previous understanding. To see this in true perspective, recall that in Nelson's time the range of his guns was a matter of a few hundred yards. The greatest naval gun ever at sea could not fire 20 miles. Big Bertha, mounted on rails, had a range of 75 miles. The German V-2 rocket reached about 200 miles. The modern missile goes 1,500 miles, and on the plate is an intercontinental ballistic missile of 5,000 miles range.

In short, using a 5,000-mile missile at five strategic bases, ashore or afloat, the military command of the world is a fact. The prospects are grim and daunting.

Now in process in British forces is what is euphemistically termed a streamlining of personnel. Quite apart from financial reasons for Service cuts, this is necessary as a new method of war is now being forged — a method which diverges from existing methods as the Sumerian arrows from Leonardo da Vinci's cannon.

Army, Navy and Air Force are all faced with a monster headache; for what goes up must come down, and once the atomic missile is launched, then it must either pursue its mission with immeasurable effect or be intercepted on descent and destroyed before it is on target. So far, only the starry-eyed believe that such interception can be effected.

Recently, the U.S. Marines took part in a most instructive exercise. With justice one might say "heroically," some 2,000 Marines crouched in trenches only three miles or so from an atomic explosion which was of such magnitude that its shock wave was felt 300 miles

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I.G.Y. IN ANTARCTICA

By P. G. LAW

In an A.B.C. broadcast

IT will come as a surprise to most to know that exploration, survey work and geology are not included in the scientific programme of the International Geophysical Year.

Most of the I.G.Y. work is concerned with observations to be made from fixed stations, using complicated modern equipment — observations of the electrified upper atmosphere, of the aurora and cosmic rays, of the earth's magnetism, of local and regional meteorology, and of gravity and seismology.

In Antarctica the scientists concerned will follow a routine similar to that which they would follow at an observatory in a temperate country, and the inside of a physics laboratory at our Mawson station looks much the same as a physics laboratory in a university.

The duties of these observatory scientists may not be as dangerous as those of men working out in the field, but they are every bit as hard, and in many ways demand more of the man, in self-discipline and determination and energy, than does the more glamorous exploration or survey work.

I am not trying to detract from the credit due to the man who battles out by dog-sled or motorised vehicle over the Antarctic plateau.

I am simply trying to show that the man at base, with an important and onerous job, requires just as much guts, and deserves just as much credit, as the explorer.

The explorer works in bursts. He has the stimulus of excitement and new horizons, and often magnificent scenery: and his achievements are broadcast to the world.

The observatory man, on the other hand, must face an unremitting routine which extends ahead day after day without break until the end of his year of service, and no one hears of his solid, but unspectacular work.

The magnetician, for example, who without fail must go daily to the magnetograph hut, situated several hundreds of yards from the main station, to change the recording traces —who must do this in fine weather or foul, even though it involves his crawling most of the way through heavy snow drift, hauling along the blizzard line into an 80 m.p.h. wind — can hardly be said to have a "cushy" base job!

A man may force himself to keep this up for a week, or a month, or a couple of months. But if this magnetician is to succeed he must continue on, without respite, for a whole year! This is what I mean by self-discipline and determination.

The meteorological team faces a heavy year. As "met. observations" must be made every three hours, the work is shift work, and the men are tied down to the station except when, by doubling up on their shifts, they can relieve one of their number to participate in a field excursion.

I might point out that it is not much fun to rise in the middle of a winter's night and stumble in a blizzard along the rope to the meteorological screen (set up on the most exposed area of rock available), scrape the snow from the inside, and, with the aid of a torch, read the instruments.

Neither is it pleasant to stand for nearly two hours in midwinter in the open, behind a rather ineffective, wooden breakwind, and continue to twiddle the knobs of a theodolite with freezing fingers to track the path of a pilot balloon, which rises up and up, until it bursts at a height of perhaps 60,000 feet or more.

This year, our Mawson men set up a small meterological and auroral observatory 60 miles west of Mawson on a small island. Each week they flew two men there to relieve the previous week's operators. The men lived and worked in a small tent. As observatory work goes, this can be classed as rather tough, particularly in the middle of the antarctic winter.

THE maintenance of this outpost throughout July, with all the flying involved, was a very creditable performance.

Since then a party has hauled materials to this spot and we have had a permanent base built, comprising two huts.

In some ways, life at base falls into a routine pattern, much the same as back at home. One rises at 7.30 a.m., breakfasts at 8, walks across to one's work hut, and starts work at 8.45 or 9, walks back for lunch at 12.30, or for dinner at 6 p.m.

However, there is no time lost travelling, or in holidays, or in week-ends, or in social evenings. Saturday and Sunday are the same as any other day, for the work goes on just the same, and on most evenings after dinner the young scientist will return to his lonely little hut and continue to work on until midnight.

It is not any wonder that an energetic man can do two year's work in one at an Antarctic base.

AT our stations we endeavour to arrange that each observatory man has a chance to go on at least one field trip.

This acts as a holiday break from the routine of his normal work, and gives him the experience, which he generally is anxious to gain before he returns home, of Antarctic travel.

Only if the physicists work as a team can this be done, for a man's specialised tasks must be taken over by one of his comrades while he is away.

The participation of scientists in field trips is also essential because in small parties, such as we provide at Mawson, there are not sufficient men over whom to spread a year's field activities if the observatory men are not at times roped in to assist.

There is one aspect of field work which is included in the I.G.Y. programme and that is glaciology. One glaciology programme includes the measurement of the depth of ice at different points on the Antarctic plateau.

It has already been proved that at some places this ice is more than one mile thick.

Imagine a train, consisting of a tractor, towing four or five sledges, moving slowly at about 4 m.p.h. over the rough-ridged wind-packed snow, several hundred miles inland. The temperature is —30° F., although the sun may be shining. At a given point, the train stops and the men pile out to carry out the jobs in which they have been drilled.

A surveyor sets up a theodolite to take sun shots, and a radio man runs out the aerial, before listening in for time signals.

A seismologist enters one sledge, upon which is mounted a stainless steel cab, filled with an intricate array of electronic apparatus and instruments. His assistant begins to drill a deep hole in the ice, with an engine-powered mining drill mounted on another sledge.

Another man lays out a number of microphones on the snow surface surrounding the hole, but at some distance from it, and connects them by wires back to the recording cab.

When the drilled hole is deep enough — perhaps 30, perhaps 60 feet — charges of TNT are wired together, and placed in it. The charge is then exploded, and the sound waves from the explosion pass down through thousands of feet of ice, to be reflected upwards again by the solid rock far below.

The arrival of the reflected waves is detected by the microphones, and recorded on the instruments in the cab.

The men then pack up again, and move on a couple of miles to the next seismic station.

In this fashion they proceed to run a line of readings for two or three hundred miles across the plateau.

Each night they sleep in a caravan, mounted on yet another sledge behind the tractor. It may be all of two months before they return to their base.

When you are lying cosily in bed in your own home, perhaps you will give a thought to these tough young men and the important scientific work which they are accomplishing, for the results of their work will have important implications for you and for the rest of mankind.

Continuing

INTO THE MISSILE AGE

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away and its flash observed in an aircraft 1,000 miles away.

Fifteen minutes after this man-made hell had occurred, the Marines were up and out of their trenches, going into mock action. Lesson One is therefore that with proper shielding the atomic horror delivered by missile is at some discount.

Applying this lesson to ships, then with comparatively straightforward design changes, the crew would be reasonably protected against anything other than complete disintegration of the ship. This could happen; under the super-heat of a near explosion the metal of the ship would melt.

There are three consequences of an atomic explosion, apart from the heat. All are killers unless there is a protective shield.

First there is the flash, which sets on fire things like curtains and wooden windows.

Secondly, there is the shock wave which, for example, causes buildings to collapse.

Finally, there are the gamma rays which are fatal to human beings.

In a warship, protection against all three is perfectly feasible.

While secrecy rightly masks what is being done, it can be assumed that all missiles will have atomic warheads.

From statements at ministerial level it is evident that perhaps more than a hundred firms in Britain are engaged in development and production of missiles of one form or another. What is less understood is how much the lack of test facilities is imposing delays which are putting Britain behind in the race for re-armament.

It is known that the three Services are deeply concerned and affected by these delays, and that America, Russia and even France are jumps ahead of Britain. There is a test zone at Cardigan Bay and another 12,000 miles away in Australia — this, established for political reasons, could hardly be more inconvenient.

The types of missile for test complicate the issues. They are: Ground to air, air to ground, air to air, ground to ground, ship to air, air to ship, ship to ship, ship to shore and shore to ship. To lay on one test may take weeks of preparation, with Army, Navy and Air Force in a queue for the vital few seconds that one missile occupies.

Missiles come into two main categories: Those which are guided, and those which are ballistic. The latter are entirely offensive; many of the guided missiles are defensive, e.g., those carried by fighters to destroy bombers, being fired air-to-air.

The ballistic missile, used for attack or fired, for example, from a ship to intercept and destroy an oncoming missile, does not need guide control after launching. But the very long range intercontinental type usually has a slave control built in.

—From the London "Navy"

NEW B.I. APPOINTMENT

Mr. Franklin Thomas Andrews has been appointed Commodore Chief Engineer Officer of the British India Steam Navigation Company's Fleet, in succession to Mr. K. A. Miller, who has retired.

TANKER'S RECORD CARGO

What is claimed to be the biggest cargo of any kind ever to be shipped from Western Australia, and possibly Australia, in one vessel left the B.P. Refinery at Kwinana last month in the tanker Narek.

The cargo was 19,000 tons of marine diesel oil for Aden, one of the largest bunkering ports in the world.

The previous highest loading rate at Kwinana was about 1,500 tons an hour.

Continuing

Marine Propulsion by Nuclear Energy

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developed, although in this case the fuel costs would be larger since the reactor would require enriched fuel.

Two reactor types are being actively studied in the United Kingdom with this use in mind.

The first of these is the organic liquid moderated reactor, which uses an organic liquid as moderator and coolant.

The second is a gas-cooled reactor with a heavy water moderator, in which, because of the better moderating properties of heavy water, the fuel will not require to be as highly enriched as for the organic liquid moderated reactor.

A third possibility is the high temperature gas cooled reactor, using the uranium 233 thorium breeding cycle, and giving higher thermodynamic efficiencies than the others.

These reactor types will probably be developed first of all as land-based reactors and the technology applied to marine propulsion.

It is unlikely that there is a reactor system which will apply to marine propulsion but have no land-based uses.

A CHRISTMAS PARTY FOR FAR WEST CHILDREN

Quartermaster Robert Ellis holds a little girl from the Far West Children's Health Scheme home at Manly, N.S.W., as she cuts a Christmas cake on the Orient line Orontes. She was one of forty children from the home who were guests of the ship at a special Christmas party.

FOR SEA CADETS

THE NELSON TOUCH

By COMMANDER WILLIAM DONALD, D.S.C., R.N. (Retd.)

I RATHER suspect that Nelson would have been a very smart Sea Cadet.

Everyone, I suppose, knows that Nelson won the battle of Trafalgar, but how many people realise that he showed the same qualities of greatness all through his life?

The secret of his success was his personality, that "something" which it is so hard to describe in mere words. That he possessed this "something" to a marked degree is even more obvious when one considers the following two facts:

Firstly, Nelson was a very poor specimen from a physical point of view: at the age of twelve he was fragile and sickly, and would have stood no chance of passing the present-day Navy medical examination.

Furthermore, at the age of thirty-six he lost the sight of one eye after being wounded in action, and a few years later another wound resulted in his right arm being amputated. Only a man of Nelson's calibre could have survived such handicaps.

Secondly, it must be remembered that a very large number of men on the lower deck in those days were the dregs of society, the sweepings of the jails and those caught by the press-gang in seaside towns. Not only that, but they spent long periods at sea in the most intolerable conditions, often without any pay at the end of it.

Yet somehow Nelson was able to inspire these types of men with the highest degrees of loyalty and courage, as indeed he did everyone with whom he came in contact. One of his greatest attributes was the care he had for the welfare of his men, who were often at sea for months on end without a break.

He first showed what sort of stuff he was made of when he sailed with his uncle, Captain Lutwidge, in a ship called Carcass on a polar expedition. Nelson and another midshipman slipped off in search of adventure and soon met it in the shape of a large and angry polar bear. When his musket misfired, Nelson grasped the barrel and advanced to fell the monster; the noise of a gun fired from the ship in the nick of time, however, scared the bear away.

When Nelson returned on board to receive a severe "ticking-off" from his uncle for his rashness, he replied with dignity, "Sir, I was determined to kill the bear to take its skin to my father."

Near Death

Service in the West Indies followed during the American War of 1775-1783, during which time the climate and lack of proper medical supplies nearly finished Nelson off, but his spirit never failed and the Admiralty soon realised that he was an outstanding man.

In the peace that followed, he was given command of the frigate Boreas on the same station, and it is on record that such care did he take of his men that not a single life was lost in his three years of command. That was a fine feat in those days.

In 1793, trouble broke out in Europe and from then on till his death in 1805 Nelson was almost continuously at sea in the service of his country, in company with other famous admirals like Hood and Jervis.

At the battle of St. Vincent in 1797, when he was in command of the Captain, at a critical moment in the battle Nelson hauled out of line and placed his ship in the way of the larger part of the Spanish fleet.

This unorthodox movement prevented the latter escaping, and, to make doubly sure, Nelson took his ship alongside two of them and captured them. After this battle he was promoted to Admiral and from then on he never looked back.

The next year, only a few months after he had lost his right arm, he chased the French Fleet all round the Mediterranean and ran them to earth, snugly anchored behind the sand dunes of an Egyptian Bay.

As the sun went down, lighting up the scene with a golden glow, the English ships glided in and began to anchor, as Nelson had planned, beside the French. As darkness fell, there commenced one of the most dramatic and amazing sea battles ever fought: all the night the two fleets pounded away at each other at short range: the darkness turned to red as ships caught fire or blew up: and when dawn came, only two French ships survived out of seventeen.

Brilliant seamanship and great courage had won another British victory.

It did not seem to matter to Nelson where he was called upon to fight.

Three years later, when the confused politics of those days found us fighting the Danes, he won another famous victory at the Battle of Copenhagen. It was during this engagement that Nelson's Senior Officer sent him the signal to break off the action: then Nelson made history by putting his telescope to his blind eye and remarking, "Really, I do not see the signal."

But the climax of Nelson's brilliant career was the victory at Trafalgar.

At Trafalgar

After a campaign of chases and indecisive actions that had lasted nearly two years, during which time England was threatened with most perilous invasion by Napoleon, Nelson and his "band of brothers" finally brought the combined French and Spanish fleet to action.

It was the normal plan in those days to line up alongside the enemy ships at sea to fight them. But Nelson formed the British Fleet into two squadrons and approached the single line of the enemy at right angles, piercing it at many points and throwing it into confusion, as he intended.

And all that October afternoon on the deep blue water off the coast of Spain the battle raged until — as an extract from the log of the Victory reads — ". . . 4.30 p.m., victory was reported to the Right Honourable Lord Viscount Nelson, who shortly afterwards died of his wound."

So ended the Battle of Trafalgar. Neither the French nor the Spanish Fleet ever rose again to challenge its verdict; nor did any other country for over 100 years.

THE FASTEST MAN IN THE WORLD ON WATER

Pictured below streaking across Coniston Water — the scene of his previous triumph — is the Bluebird, in which Donald Campbell established a new world water speed record of 239.07 miles an hour.

The Bluebird, a jet hydroplane, made two runs over the measured kilometre. The first was at a speed of 260 m.p.h., and the return run at 218.024 m.p.h.

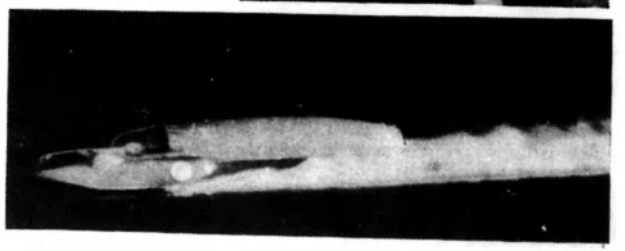
Campbell's previous record of 225.63 m.p.h. was set in September last year, over the same course.

After making his record-breaking runs, Campbell's only comment was: "I really had a pasting."

Campbell is 36 and is the only man to better 200 m.p.h. in a water craft.

Since July, 1955, he has broken the world record four times — three times in the United Kingdom and once on Lake Mead, Nevada, U.S.A.

At right, Campbell enjoys a "cuppa" after his gruelling speed dash.



FOR SEA CADETS

Cadets Adventures in "Operation Survivor"

The following account of an exercise in which Geelong (Vic.) sea cadets took part is republished from the "Geelong Advertiser":

"OPERATION Survivor" held on the night of 15-16 November was an unqualified success. Officers and men of 8 Medium Regiment, Royal Australian Artillery, took the field and defended Geelong from "enemy seamen" who were "survivors" from an "enemy" ship "sunk" off Torquay.

Unfortunately, due to various reasons, the defending party consisted of only approximately 30 men. (Naturally, this would not be the case in the event of an actual military engagement.)

Nevertheless, 21 survivors were captured by the combined efforts of the Army and the Geelong police.

Eight cadets, Petty Officer Instructor G. T. Walker, Leading Seamen O'Shea and Sorenson, Honorary Instructor T. Thomson, Able Seaman Hutchinson, Ordinary Seamen Burnett and Quirk, and Recruit Seaman Hosford safely reached their base.

They are to be congratulated on their initiative and fortitude in negotiating the hazards of barbed wire, brambles, creeks, police and army road blocks, army patrols, and, by no means easy adversaries, bulls!

From 3.15 a.m. the Commanding Officer's home (neutrality for the "survivors") looked like a refugee camp, with tired cadets lying everywhere.

Then, at 5.30 a.m. with only two cadets not accounted for, all cadets ("killed" and "captured") the mobile radio station and the control radio station (which was based on top of the cell block at Police Headquarters) congregated at the C.O.'s home to exchange experiences.

Enquiries were made as to the last known whereabouts of the two missing cadets.

Upon investigation it was discovered that one had been in bed since midnight.

After relating their experiences to anyone available, everyone went home for sleep, eats and/or work.

At 7.30 a.m. the last "survivor" arrived at the base safe and sound, having negotiated the obstacles from Torquay to Geelong only to get lost in West Geelong.

Several questions remain unanswered.

(1) Who were the cadets who ambushed the taxi and told the driver that he was their prisoner and was to drive them to Geelong? (attempt unsuccessful).

(2) Who owns the bull that frightened the daylights out of a certain cadet petty officer?

(3) Who was the cadet who, when stopped by an Army utility, said, "I am a cadet in an exercise, and have to get to Geelong, will you give me a lift?" (he was captured).

(4) Who was the soldier hiding by a creek, who burst into peals of laughter when he frightened a band of cadets into flight?

And, finally, who, among all who took part in this exercise, did not thoroughly enjoy the experience?

TASMANIAN CADETS

Cadets from T.S. Tamar (Launceston) took part in a march to the Cenotaph with ex-Navalmen and Sea Rangers on Trafalgar Day.

A wreath on behalf of the Navy League was laid on the Cenotaph.

Cadets from T.S. Emu (Burnie), ex-Navalmen and Sea Rangers marched to the Burnie Cenotaph on Trafalgar Day. A Cenotaph Guard was provided by the Sea Cadets during the service.

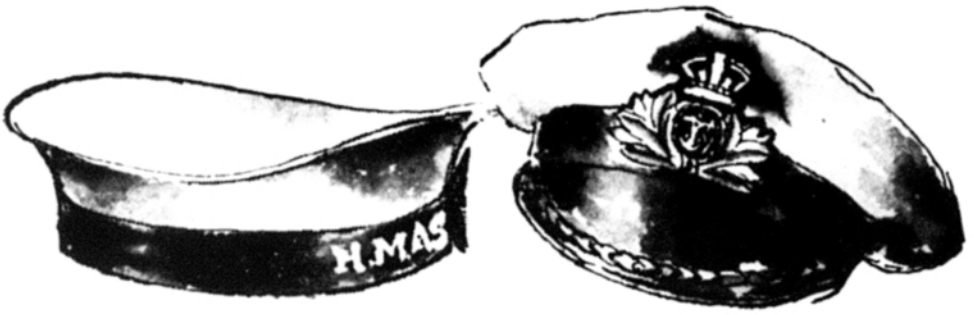
Cadets of T.S. Emu and T.S. Leven (Ulverstone), with Army Cadets from the Burnie schools, took part in a combined assault exercise on Turner's Beach.

T.S. Leven Cadets have now moved into their new headquarters on the banks of the Leven.

All the work of putting this building into service was done by members of the Ulverstone Sea Cadet Committee.

Three former sea cadets of T.S. Derwent (Hobart) have received commissions in the Navy, one in the Fleet Air Arm and two as sub-lieutenants in the R.A.N.R.

During the recent visit of H.M.A.S. Sydney to Hobart a party of sea cadets visited the ship. Two former cadets of T.S. Derwent, who joined the R.A.N., are now serving the Sydney—E.W.W.B.



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