

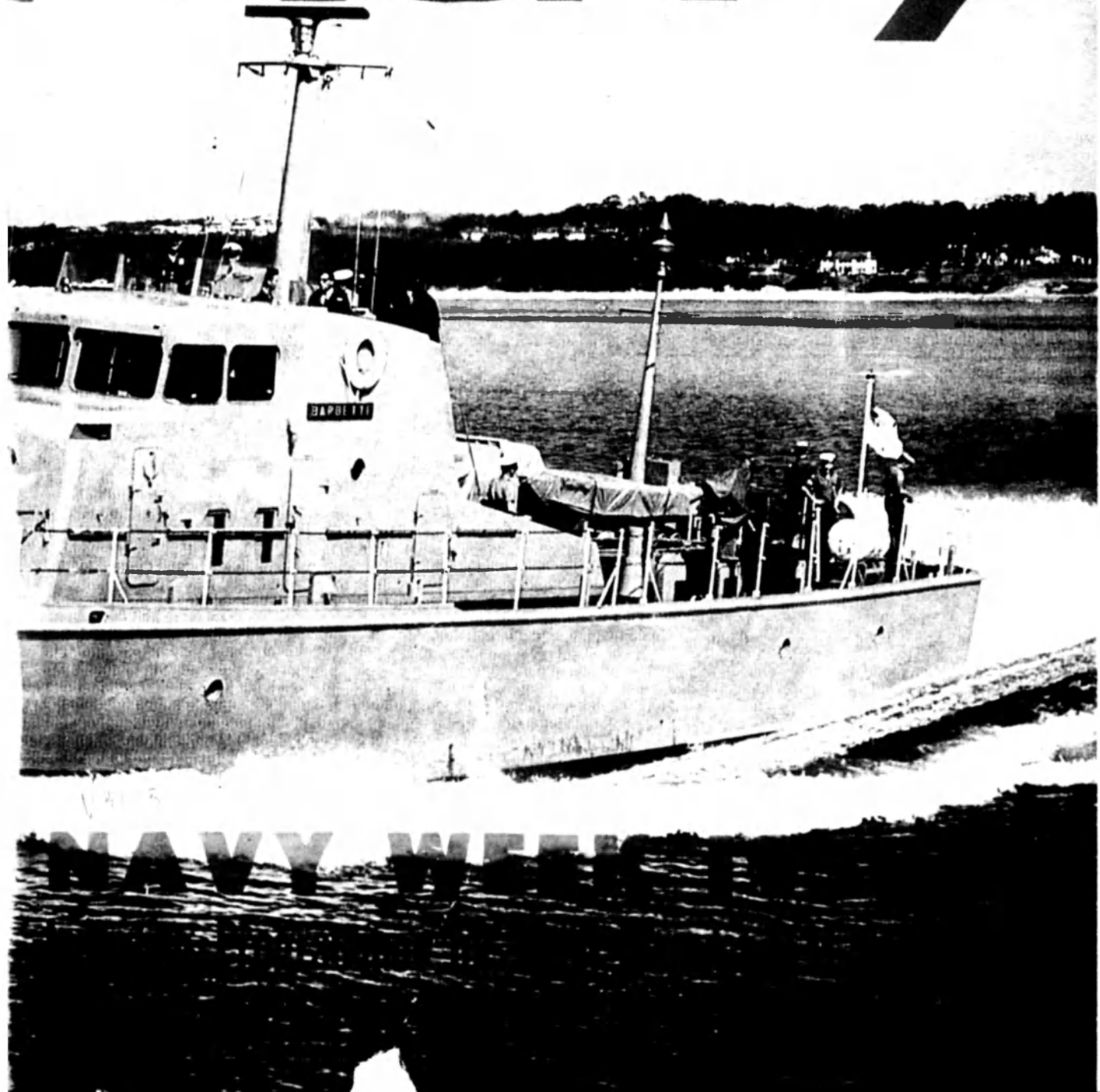
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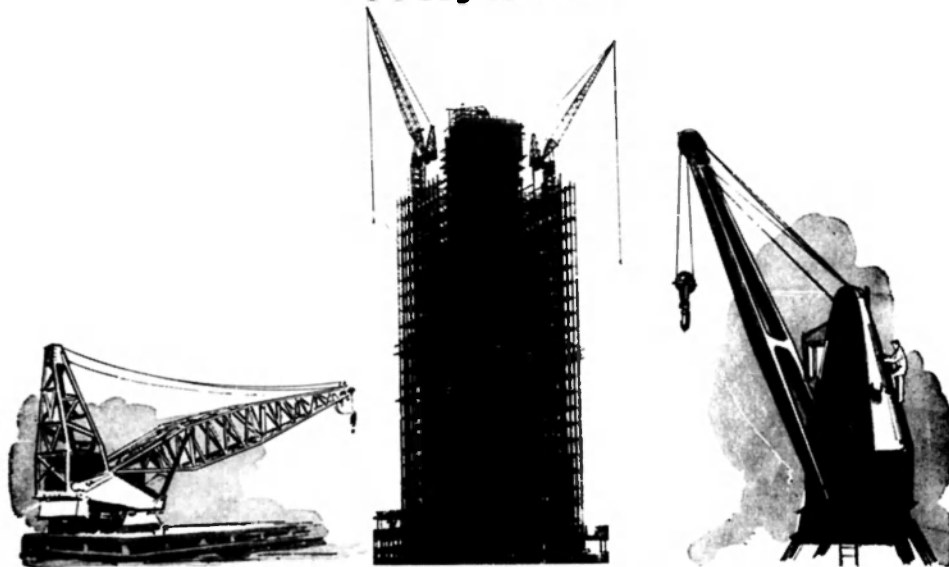
30 CENTS

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# THE Navy



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# THE NAVY

The magazine of the Navy League of Australia  
(Registered in Australia for transmission by post as a Periodical)

Vol. 31

AUGUST-SEPTEMBER-OCTOBER, 1969

No. 3

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

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August-September-October, 1969

THE NAVY

Page One



**BEER IS BEST**



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*Message from . . .*  
*The Minister for the Navy*

**The Hon.  
C. R. KELLY**  
M.P.



Navy Day this year comes shortly after the announcement of three important new ships for the Royal Australian Navy. One, the proposed Fast Combat Support Ship, will give the Navy greatly increased flexibility in maintaining the operational effectiveness of fighting units far from shore supply bases. The other two ships will give the Navy a far greater capability to meet its increased commitments in Hydrography and Oceanography.

In addition, new long range sonar equipment for R.A.N. submarines will give them greater operational capability while a command team training simulator will significantly improve the training of personnel for this branch of the Navy.

In the past year the flagship H.M.A.S. MELBOURNE has completed an extensive refit and has been re-equipped with the most modern aircraft suitable for her role. The third Oberon-class submarine, H.M.A.S. OVENS, will reach Australia on her delivery voyage shortly after Navy Day. And the last of the present programme of River-class destroyer escorts, H.M.A.S. SWAN and H.M.A.S. TORRENS, will commission in the next twelve months.

The Navy has continued to meet the Australian Government's commitment to Vietnam. The Jaring-class destroyer H.M.A.S. VENDETTA is now serving there with the U.S. Seventh Fleet, replacing the guided missile destroyer H.M.A.S. BRISBANE which served with distinction in her first tour of duty in Vietnamese waters.

This year BRISBANE's two sister ships, H.M.A.S. HOBART and H.M.A.S. PERTH, which have each had two tours of duty with the U.S. Seventh Fleet, both received United States Navy Unit Commendations for meritorious service in Vietnamese waters.

The strength of the R.A.N. continues to grow. More ships are being added to the Fleet and personnel numbers are steadily increasing.

The Navy is now stronger in both ships and men than ever before in peacetime. It has never been more ready to fulfill its role in the defence of Australia.

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Patrol Boat H.M.A.S. Barbette (R.A.N. official photograph)

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◆ ◆ ◆  
A Message from the  
First Naval Member,  
Chief of Naval Staff

### *Vice-Admiral* **SIR VICTOR SMITH**

K.B.E., C.B., D.S.C.



◆ ◆ ◆  
Navy Week is a suitable time to check the validity of the requirements for the R.A.N., that is, to see if it is still needed. In this brief message I will limit my case to three points.

1. It was said some considerable time ago that whoever commands the sea ... commands the trade, whoever commands the trade of the world commands the riches of the world and consequently the world itself. This saying remains true today.
2. It is a matter of history that the development of institutions believing in true freedom occurred principally in those nations which border the ocean. If we can ensure control of those ocean areas which are necessary for our purpose then we are doing our part in the preservation of freedom.
3. The primary role of the Australian Services is safeguarding our national interests. The latter might be stated as being the security of our country, the free movement of our commerce, assisting those countries with mutual interests and honouring our treaty obligations.

In conclusion the R.A.N., assisted where necessary by the other Services, has firstly the task of maintaining the freedom of Australia from anyone who would try to impose his will on us and, secondly, assisting other countries in accordance with the policy of our democratically elected government. No one should doubt the importance of those tasks nor the essentiality of the Navy to perform them.



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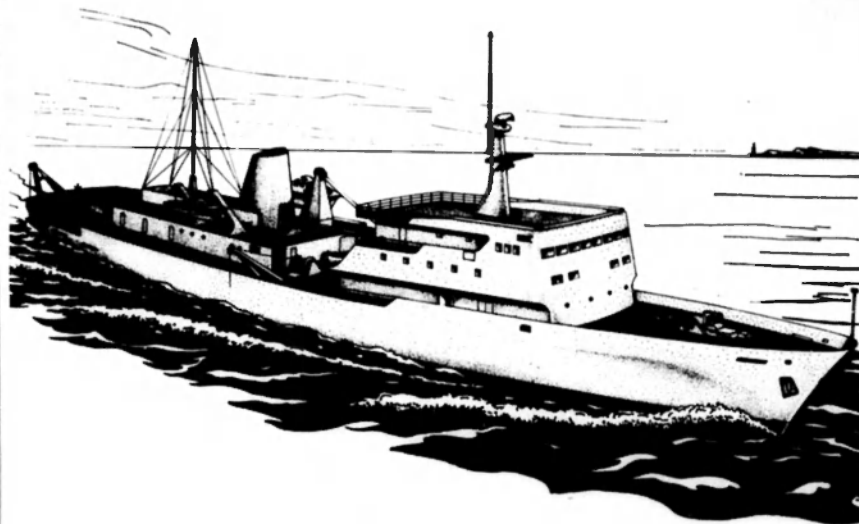
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The Government has approved the Royal Australian Navy constructing a ship to undertake oceanographic research. At present the Navy has only one ship for oceanographic ship work, H.M.A.S. DIAMANTINA, which was built in 1943 and is due to go out of service in 1974. Information on water temperatures, currents, salinity and the nature of the sea bed is important in anti-submarine warfare and in planning mine warfare and mine counter-measures operations. Oceanography also has civilian interest and platform time will be made available to universities and other research organisations.

## NEW OCEANOGRAPHIC SHIP FOR AUSTRALIAN NAVY

Approval has been given for a new oceanographic ship to replace H.M.A.S. *Diamantina*, a frigate completed in 1945 and converted in 1959-60 to the oceanographic role. She has been employed full-time on oceanographic work, including cruises undertaken for civil authorities such as C.S.I.R.O. and universities. But her space is inadequate and she is unsuitable for carrying the full range of equipment necessary for military oceanography. She could not be retained economically in service beyond 1974 and no other ship in service or reserve is suitable for conversion.

The ship to replace *Diamantina* in

1974 will be similar in design to H.M.A.S. *Moresby*, the R.A.N.'s large hydrographic ship built in Australia and commissioned in 1964. The new ship will accommodate 13 scientists (compared with six in *Diamantina*) and, as she will have greatly improved research facilities, she is expected to double the effectiveness of civil and military research programmes.

The new oceanographic ship, being designed by the Navy, will be 315 feet long, 44 feet wide and will displace about 2,300 tons. She will have a platform and hangar for a helicopter which will be carried when the ship is converted to a hydrographic role. Propulsion will

be by diesel engines. She will be constructed in an Australian shipyard at an estimated cost of \$11.958 million. The total project cost including spares, shore support and initial maintenance costs is \$16.732 million.

The advance in oceanographic studies, allowed by the use of this ship, will greatly increase the R.A.N.'s anti-submarine capability because of a greater knowledge of the ocean environment. It will also provide more information for testing R.A.N. equipment at sea, for the investigation of the economic potential of the seabed and waters and for scientific research projects.

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**A Big  
Birthday  
Party  
at the R.A.N.  
Air Station  
— Nowra**

On Sunday, 12 October, the Fleet Air Arm of the Royal Australian Navy will celebrate the 21st anniversary of its reforming and to mark the occasion H.M.A.S. *Albatross*, the R.A.N. Air Station at Nowra, N.S.W., will hold an Air Day.

The name *Albatross* has long been associated with the Royal Australian Navy and Naval Aviation. In 1922, the Australian Government approved the purchase of a seaplane carrier to be built at Cockatoo Island Dockyard. This vessel commissioned as H.M.A.S. *Albatross* in 1929.

The aircrew, who flew the nine Seagull V aircraft carried by

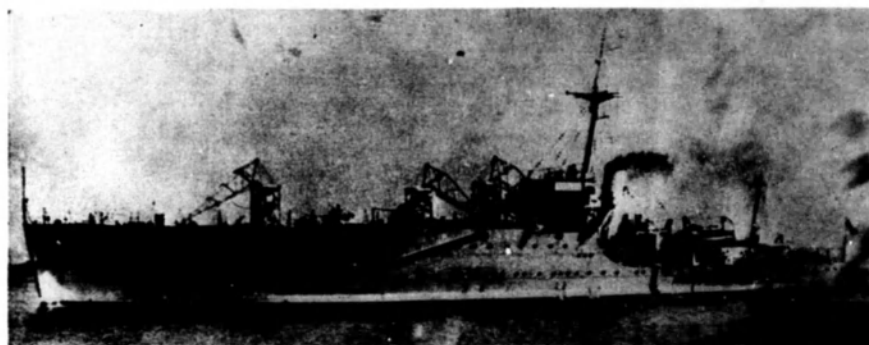
H.M.A.S. *Albatross*, were a mixture of naval and Air Force personnel but the maintenance personnel were from the R.A.A.F.

After four years in commission, H.M.A.S. *Albatross* was paid off into reserve. In the years that followed, a small nucleus of Fleet Air Arm aircraft (Seagulls and Walrus) were flying from R.A.N. cruisers

but even this element was dropped in the latter days of World War II.

H.M.A.S. *Albatross* was re-commissioned in 1938 and sailed to the United Kingdom as part payment for three cruisers—*Perth*, *Hobart* and *Sydney*. After the war, H.M.S. *Albatross* was sold to a Greek shipping line and once more returned to Australia as the *Hellenic Prince* carrying migrants from Europe.

In 1948 when the Royal Australian Navy revived the Fleet Air Arm, *Albatross* was the name aptly chosen for the Naval Air Station at



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Nowra on the N.S.W. South Coast. The airfield, with its satellite at Jervis Bay, was built for the R.A.A.F. during World War II. In 1944 the airfield was transferred to the Royal Navy for Fleet Air Arm training and as a shore base for the Carrier Air Groups of the British Pacific Fleet.

After the war, the Air Station was left in a care and maintenance condition until 1947 when renovation commenced for the intended re-commissioning in 1948.

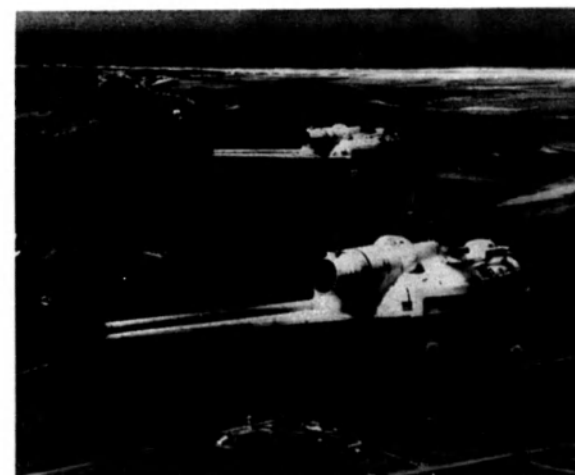
Two major events took place in 1948. On 28 August, the 20th Carrier Air Group commissioned at the Naval Air Station, Eglington and three days later H.M.A.S. *Albatross* commissioned. The R.A.N. Fleet Air Arm was re-borne.

H.M.A.S. *Sydney*, the newly acquired Light Fleet Carrier, brought the 20th Carrier Air Group from the United Kingdom arriving in Jervis Bay in May 1949. The Air Group comprised of two squadrons, 805 Squadron equipped with Hawker Sea Furies, and 816 Squadron equipped with Fairy Fireflies. Eighteen months later, two more squadrons (808 and 817) formed

the 21st Carrier Air Group and arrived in Australia late 1950. Three of the squadrons (805, 808 and 817) combined to form the Sydney Air Group and it was this group that served in the Korean War late in 1951 and 1952. A second tour by R.A.N. squadrons was carried out in 1953 while the Korean cease fire talks were in progress.

Over the years, many types of aircraft have seen service with the R.A.N. In addition to the Sea Furies and Fireflies, Tiger Moths, Wirraways, Austers and Dakotas were to be seen in the skies over Nowra. A Sea Otter arrived with the 21st Carrier Air Group to act as a search and rescue unit. In 1953, the first R.A.N. helicopter, the Bristol Sycamore, came into service and in 1954 Vampire jet trainers were introduced.

In 1956, the newly acquired carrier H.M.A.S. *Melbourne* arrived from the United Kingdom with the second generation of carrier borne aircraft, the Sea Venom (All Weather Fighter) and the Gannet Anti-Submarine aircraft. In 1963, Wessex



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The R.A.N. Iroquois helicopters are used for basic helicopter pilot training and for Search and Rescue duties. It is a utility helicopter capable of carrying out the additional duties of Medical evacuation, Communications, photography and personnel transfer to and from ships.

It is powered by a Lycoming 1100 hp gas turbine engine and carries a normal crew of one pilot, one crewman and up to seven passengers. This type of helicopter is widely used in Vietnam by United States and Australian Forces for Combat Assault and as helicopter gunships.

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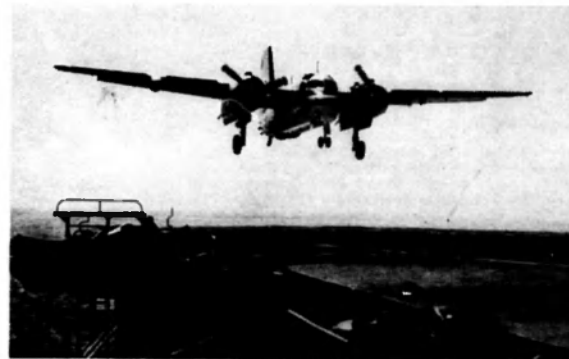


Anti-Submarine helicopters were added to the list of front line aircraft and two Westland Scout Helicopter.

The third generation of Front Line aircraft arrived in Australia in 1967. These were the A4G Skyhawk, S2E Tracker and the Wessex helicopters were acquired for survey 31B helicopter. These aircraft have already been embarked in H.M.A.S. Melbourne and are proving to be a great asset to the fighting arm of the R.A.N.

Consistent with the Government's decision to send Australian forces to Vietnam, was the formation of the R.A.N. Helicopter Flight (HFV). The first detachment of aircrew and maintenance personnel was integrated with a U.S. Army assault Company. It was an unusual combination but time has proved it to be a most effective and efficient outfit, one that has drawn favourable comment from many quarters. R.A.N. helicopter pilots have also served with No. 9 Squadron (R.A.A.F.) in Vietnam.

Now twenty-one years after the commissioning of the 20th Carrier



GRUMMAN S2E TRACKER

The Tracker is an anti-submarine aircraft capable of searching for, detecting, localising, tracking and destroying submarines. Although originally designed in 1949 and first flown in 1952, the Tracker is still considered one of the most formidable carrier based anti-submarine aircraft in the world. The original aircraft has been improved over the years and the well proven engines and airframe now carry the best and latest anti-submarine equipment available.

Air Group and H.M.A.S. Albatross, the Fleet Air Arm is preparing to share its birthday with the general public.

The gates of H.M.A.S. Albatross will open to the public at 10.00 a.m. on Sunday 12 October. A large range of static displays together with a variety of mobile displays, is planned to keep the public entertained prior to the main event in the afternoon—the flying display.

The static displays will cover all aspects of Naval life and it is anticipated that over thirty stands will be on show. The mobile displays include a diving demonstration, a band display and recital, sky diving, gliding, a P.T. display and "Beat Retreat".

The two hour flying display will feature all current R.A.N. types and will include a thrilling performance by the "Ramjets", the Skyhawk aerobatic team. A novelty act will be the dropping of a car from 500 feet. This car, donated by McLean Ford of Nowra, will be driven to the helicopter before being hoisted aloft and dropped. This demonstration will show onlookers what happens to a car being driven at 65 m.p.h. if it stops suddenly.

Light refreshments will be available on the station and parking and entrance are free. Given good weather, Air Day 1969 promises to be one of the greatest shows ever seen on the south coast of N.S.W. and for those wishing to attend the best advice that can be offered is—"COME EARLY".



WESTLAND WESSEX MK31B

The Westland Wessex Mk31B is a modern anti-submarine helicopter capable of locating and destroying submarines by day or night. Its primary detecting aid is a modern American medium range sonar set which is lowered into the water whilst the helicopter hovers close to the sea, and the crew listen for the tell tale "ping" of a submarine contact. This combined with modern radio and navigation aids allows the Wessex to take its place with surface ships in defence against submarine attack.

The aircraft is powered by a Rover Gas turbine developing 1650 SHP, and carries a crew of four, 2 pilots, 1 observer/Tactical Navigator and 1 Sonar Operator.



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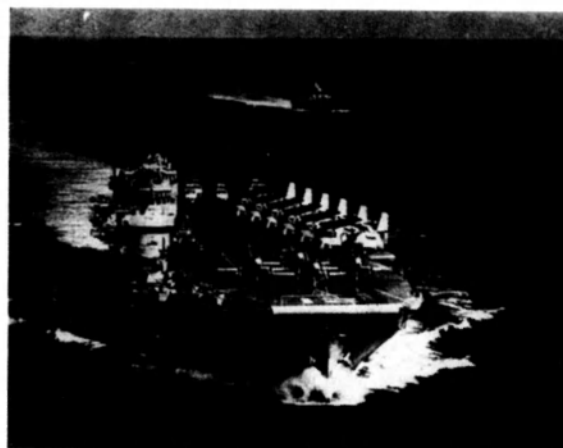
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**H.M.A.S. MELBOURNE**

The light fleet carrier H.M.A.S. Melbourne joined the R.A.N. Fleet in 1956 and originally carried a squadron of Sea Venom fighters and two squadrons of Gannet Anti-submarine aircraft. Later one Gannet squadron was replaced by a squadron of Wessex Anti-submarine helicopters. After an extensive refit H.M.A.S. Melbourne now carries a full outfit of the R.A.N.'s latest aircraft, Skyhawks, Trackers and Wessex 31A, seen here ranged on the flight deck.

**H.M.A.S. ALBATROSS—OPEN DAY  
Programme of Events**

**SUNDAY, 12 OCTOBER, 1969**

10.00 a.m.	Open Gates	1.00 p.m.	Sky-Diving Display
10.30 a.m.	Diving Display	1.10 p.m.	Gliding Display
11.30 a.m.	Band Display	1.30 p.m.	Flying Display commences
11.45 a.m.	Arrival of Senior Guests	3.30 p.m.	Flying Display concludes
12.30 p.m.	Diving Display	3.45 p.m.	"Beat Retreat" — R.A.N. Band
12.45 p.m.	P.T. Display	4.15 p.m.	Official Party departs

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## Fast Combat Support Ship (AOE) For Australian Navy

The acquisition of a fast combat support ship will enable other R.A.N. Fleet units to operate for sustained periods at long distances from base facilities (see photos).

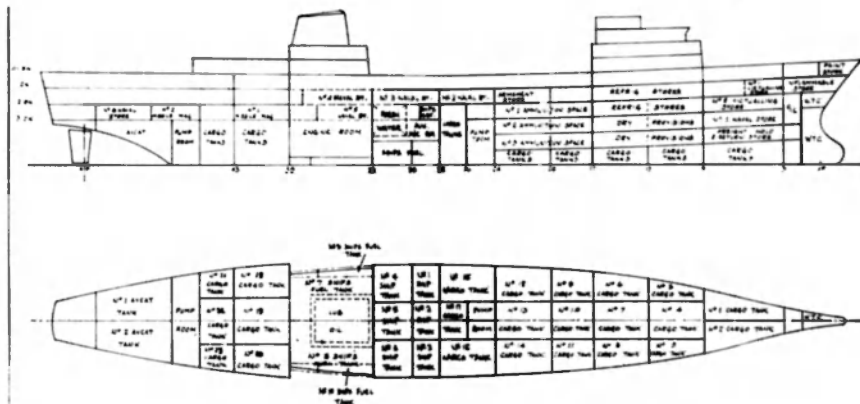
The proposed ship is designed to replenish ships of all sizes in the R.A.N. fleet with a wide variety of consumable stores fuel and ammunition while they are under way at sea. This will enable them to remain on station instead of returning to port.

The new support ship, whose official designation is AOE, will be able to carry several types of liquid fuels at the same time. These will include furnace fuel oil, diesel and turbine fuel.

As well as liquids the AOE will be able to carry ammunition, a

range of several thousand items of naval stores including electronic spares and general hardware, and machinery spares not normally carried in the ships themselves.

Ships will also be able to obtain victualling stores including clothing and fresh, frozen, chilled and canned food.



Section drawings of Australia's fast Combat Support Ship (A.O.E.).

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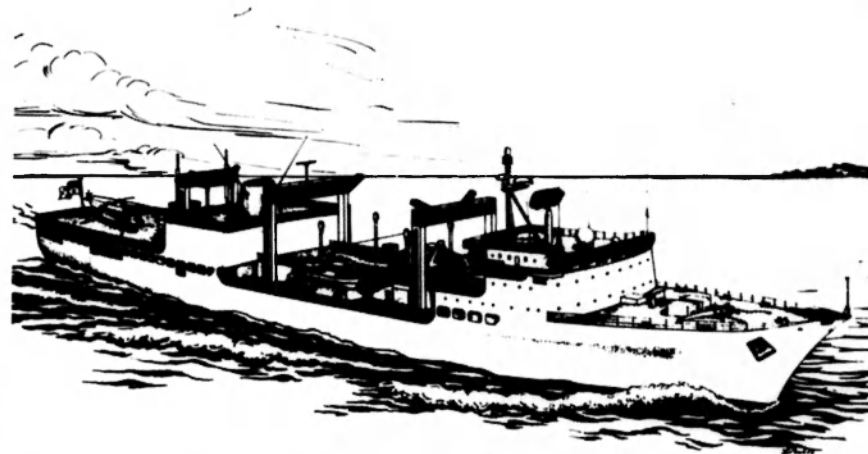
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FAST COMBAT SUPPORT SHIP

An artist's impression of the proposed fast combat support ship to be built for the Royal Australian Navy. The proposed ship is designed to replenish ships at sea in the R.A.N. fleet, a wide variety of consumables, fuel and ammunition while they are under way at sea. This will enable them to remain on station instead of returning to port. As well as being able to transfer fuel and stores by conventional hoses and lines between moving ships, the combat support ship will carry two helicopters to enable stores to be transferred by vertical replenishment.

Ammunition will be stowed in specially fitted compartments with controlled atmosphere and special safety arrangements as appropriate.

As well as the usual method of replenishment by line or hose strung between two moving ships, it is planned for the AOE to carry two helicopters to enable stores to be transferred by vertical replenishment.

Vertical replenishment by helicopter has been developed successfully by the U.S. Navy and will enable the R.A.N. combat support ship to replenish several ships at the same time.

The design of the AOE is for a ship with displacement of about 20,000 tons.

It will have a length of 540 feet, a beam of 72 feet and be equipped with four medium speed diesel engines driving two controllable pitch propellers through reduction gearing.

It is intended that the ship be built in Australia. The cost of the project including construction, spare parts and shore support equipment will be about \$42 million.

## CONTRIBUTIONS INVITED

The editor invites persons to submit articles, photographs and Drawings (Black Ink) for inclusion in the magazine, but regrets that no payment can be made for contributions submitted. Contributions should be addressed: The Editor, "The Navy", Box C178, Clarence Street Post Office, Sydney, N.S.W., 2000, Australia.

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

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

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

Uniforms are supplied free of charge.

Cadets are not required to undergo any medical examination and are fully insured against accident while on duty.

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

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

general sporting activities and other varied subjects.

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

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

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

Senior Officers, Australian Sea Cadet Corps

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

QUEENSLAND: C/- Box 376E, G.P.O., Brisbane, 4001.

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

TASMANIA: C/-

VICTORIA: C/- Room 8, 8th Floor, 528 Collins St., Melbourne, 3000.

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

AUSTRALIAN CAPITAL TERRITORY: Industry House, National Circuit, Barton, 2600.

NORTHERN TERRITORY: Box 444, P.O., Darwin, 5794.

TO: The Senior Officer,  
Australian Sea Cadet Corps

I am interested in joining the Australian Sea Cadet Corps and would be pleased to receive further information.

NAME .....

STREET ..... SUBURB .....

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PHONE No. .... AGE .....

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

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

a valuable reserve for the Naval Service.

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

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

### DIVISIONS

New South Wales — Box 1719,  
G.P.O., Sydney, 2001.  
Victoria — Room 8, 8th Floor, 528  
Collins Street, Melbourne, 3000.  
Queensland — Box 376E, G.P.O.,  
Brisbane, 4001.  
Tasmania —  
South Australia — Box 1529M,  
G.P.O., Adelaide. 5001.  
Western Australia — 182 Coode  
Street, Como, 6152.  
Australian Capital Territory — 60  
Limestone Avenue, Ainslie, 2602.  
Northern Territory — C/- H.M.A.S.  
Melville, Darwin, 5790.

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## THE NAVY LEAGUE OF AUSTRALIA Application for Membership

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The Navy League of Australia,

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Sir,

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(Mr.)

Name (Mrs.)

(Miss)

(Rank)

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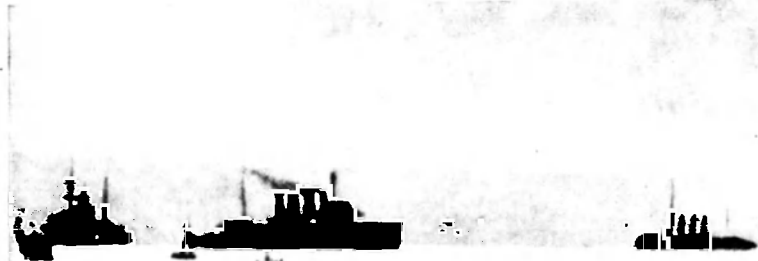
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Signature ..... Date .....

Enclosed is a remittance for \$4.20 being my first annual subscription.

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IONAL SECRETARY — NOTE LIST OF ADDRESSES ABOVE.



# Navy Week In Australia

Navy Week is one week in each year when Australians from coast to coast are urged to pay grateful tribute to those who have served and those now serving Australia at sea. During this week it is fit and proper that a nation of free men and women give well-deserved honour and recognition to the patriotic and victorious achievements of its men of the sea. It is the week for Australians to rededicate themselves to those principles of freedom and self-government which they cherish. It is a week in which grateful citizens should salute their Royal Australian Navy and make sure that it is adequate to fulfill its contribution to our national security.

In the Royal Australian Navy the month of October has always held special significance. The 21st commemorates the 164th anniversary of the victory of the Battle of Trafalgar. Fought in the Atlantic, off the southern coast of Spain, it was the last great Naval battle to be fought under sail alone.

Fifty-six years ago, on 4 October, 1913, the Australian Fleet steamed into Sydney Harbour. Navy Week 1969 was planned to coincide with the anniversary of the Fleet's entry.

The arrival of the ships in 1913 was an event Australians had looked forward to for half a century. They were their own ships, paid for by

their own money and manned in large proportion by their own men; the nucleus of what they hoped would be their own Fleet.

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

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

"Since Captain Cook's arrival, no more memorable event has happened than the advent of the Australian Fleet. As the former marked

the birth of Australia, so the latter announces its coming of age, its recognition of the growing responsibilities of nationhood, and its resolve to accept and discharge them as a duty both to itself and to the Empire. The Australian Fleet is not merely the embodiment of force. It is the expression of Australia's resolve to pursue, in freedom, its national ideals, and to hand down unimpaired and unsullied the heritage it has received, and which it holds and cherishes as an invaluable trust. It is in this spirit that Australia welcomes its Fleet, not as an instrument of war, but as the harbinger of peace."

## Navy League Lunch

(NEW SOUTH WALES)

1969

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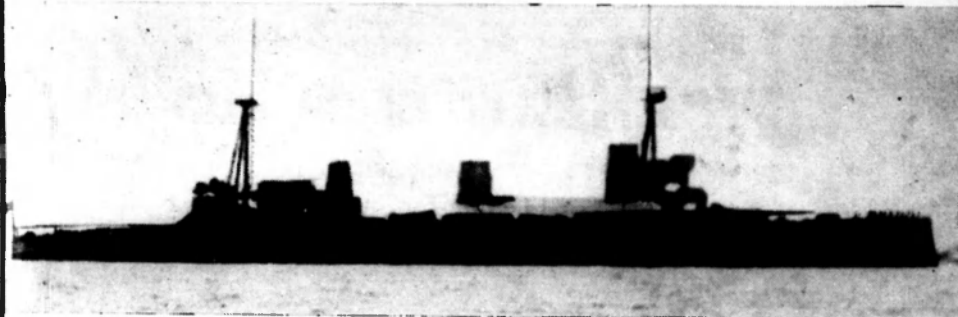
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1913—The Australian Fleet steams into Sydney Harbour.

## Programme of Events arranged for Navy Week, '69

### NEW SOUTH WALES

#### AUSTRALIAN SEA CADET CORPS

Units of the Australian Sea Cadet Corps will be open for public inspection on Saturday, 4 October, 1969, between 2.00 and 4.00 p.m. Cadets will be available to conduct visitors on tours of inspection.

A list of the training ships is detailed hereunder:

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# NAVY WEEK IN AUSTRALIA 1969

## — Programme of Events —

### NEW SOUTH WALES

Saturday, 27 September 2.00 p.m.-5.00 p.m. Garden Island Naval Dockyard open for public inspection (refer map, centre of this magazine).  
Sunday, 28 September Special Church Services — St. Andrew's and St. Mary's Cathedrals.  
Friday, 3 October 12.45 p.m. Navy League Luncheon — Hotel Australia (Cornelian Room).  
Memorial Parade and Fly Past of R.A.N. Aircraft — The Centotaph, Martin Place, Sydney.  
Monday, 6 October to Sunday, 12 October Naval Displays in Hyde Park — Part of Warratah Week Celebrations.  
Tuesday, 7 October 12.30 p.m.-2.00 p.m. Navy Band Concert — Wynyard Park.  
Wednesday, 8 October 12.30 p.m.-2.00 p.m. Navy Band Concert — Wynyard Park.  
Thursday, 9 October 12.30 p.m.-2.00 p.m. Navy Band Concert — Wynyard Park.  
Sunday, 12 October 10.00 a.m.-5.00 p.m. H.M.A.S. ALBATROSS, Nowra, Naval Air Station.  
**OPEN DAY**—THEME: "The Fleet Air Arm Comes of Age". Plans include flying displays, aircraft static displays and combined Navy Bands (refer article "A Big Birthday Party" at the R.A.N. Air Station, Nowra).

### VICTORIA

The destroyer H.M.A.S. DUCHESS will be in Melbourne during Navy Week.  
Sunday, 28 September Church Service at Christ Church, South Yarra.  
Monday, 29 September Golf Day at Waverley Golf Club.  
Band and P.T. Display in National Mutual Plaza.  
Tuesday, 30 September Wardroom Mess Dinner, H.M.A.S. CERBERUS.  
Thursday, 2 October Navy League Dinner Dance at Royale Ballroom.  
Friday, 3 October Navy Week Ball at H.M.A.S. LONSDALE.  
Saturday, 4 October Navy Day Handicap at Flemington Racecourse.  
Open Day at H.M.A.S. CERBERUS.  
Sunday, 5 October Church Services at St. Patrick's and St. Paul's Cathedrals.  
March and Shrine service followed by Reception at H.M.A.S. LONSDALE.  
There will be various displays, etc. through the week in the City and Suburbs.

### QUEENSLAND

The Fleet Oiler H.M.A.S. SUPPLY will be in Brisbane during Navy Week.  
Friday, 3 October 8.00 p.m. Ipswich and West Moreton Sub Branch of the Naval Association Ball at Ipswich.  
2.00 p.m.-4.00 p.m. H.M.A.S. SUPPLY open for public inspection.  
8.00 p.m. Annual Naval Re-union dinner, Cairns.

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Saturday, 4 October

The following A.S.C.C. units will be open for public inspection.

2.00 p.m. 4.30 p.m. T.S. ENDEAVOUR, Cairns.  
T.S. PIONEER, Mackay.  
T.S. CORAL SEA, Townsville.  
T.S. GAYUNDAH, Brisbane.  
T.S. MAGNUS, Brisbane.  
T.S. PALUMA, Brisbane.  
T.S. BUNDABERG, Bundaberg.

1.00 p.m. Navy Week Swimming Carnival at Southport Pool, Southport.

2.00 p.m.-5.00 p.m. H.M.A.S. SUPPLY open for public inspection.

7.45 p.m. Old Ships' Re-Union at H.M.A.S. MORETON.  
Navy Day Re-Union, Gladstone.

Sunday, 5 October

9.00 a.m. Naval Wreathlaying Service, Gladstone.

9.30 a.m. Mass at St. Agatha's.

9.45 a.m. Service and wreath laying ceremony at Naval Memorial Cairns, Ipswich.

11.00 a.m. Seafarers' Service at St. John's Cathedral.

2.00 p.m.-5.00 p.m. H.M.A.S. SUPPLY open for public inspection.

1.00 p.m. Navy Week Aquatic Carnival at Goodna Recreation Reserve.

3.00 p.m. Naval Remembrance and wreath laying ceremony at Shrine, Anzac Square.

Monday, 6 October

7.00 p.m. School talks.  
Naval Association Church Service at St. Agatha's to present Chaplain ROWAN with Naval Association Chaplain's badge.

2.00 p.m.-4.00 p.m. H.M.A.S. SUPPLY open for public inspection.

Tuesday, 7 October

12.30 p.m. Naval Memorial Club opening by Naval Officer-in-Charge, Queensland.

7.00 p.m. Norman S. PIXLEY Maritime Museum officially opened.  
H.M.A. Ships MORETON and GAYUNDAH open for public inspection.

Wednesday, 8 October

12.30 p.m. Navy Golf Day at Nudgee Golf Club.

Thursday, 9 October

7.00 p.m. H.M.A.S. MORETON Wardroom "At Home", by invitation only.

Friday, 10 October

8.00 p.m. Maritime Ball at Cloudland.  
Re-Union by Darling Downs Sub Section of the Naval Association.

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- Saturday, 11 October      2.00 p.m.-4.30 p.m. T.S. TYALGUM, Southport open for public inspection.
- 7.00 p.m. Navy League Dinner.  
Trafalgar Dinner proposed by Royal Naval Association.
- p.m. Navy Week Trotting Cup at Redcliffe Trotting Carnival.
- Sunday, 12 October      12.30 p.m. Navy Bowls Day at Wavell Heights Bowling Club.
- 2.45 p.m. Sea Cadet Ceremonial at Brisbane Grammar School ground, Gregory Terrace.
- 9.00 a.m. Wreath laying ceremony at Toowoomba by the Darling Downs Sub Section of the Naval Association.

### TASMANIA

Navy Week activities include:—

- (a) Photographic display in the State Library Foyer.  
(b) Window displays in provincial centres.  
(c) H.M.A.S. BASS open to visitors.
- (d) Free film show at a Hobart Theatre.  
(e) Wreath laying ceremonies and church services.

### WESTERN AUSTRALIA

- 18-25 September      Royal Guard formed by Junior Recruits and R.A.N. Recruiting display at Royal Agricultural Show.
- 23 September      Junior Recruit passing out parade at H.M.A.S. LEEUWIN (25th intake).
- 4 October      Navy Week Race Meeting at Belmont.
- 5 October      Navy Week Church Service at Perth and Fremantle.
- 11 October      Navy Week Service at Fremantle War Memorial.
- 17 October      Navy Cup Trotting Meeting at Richmond Raceway.
- Navy Ball at East Fremantle Town Hall.



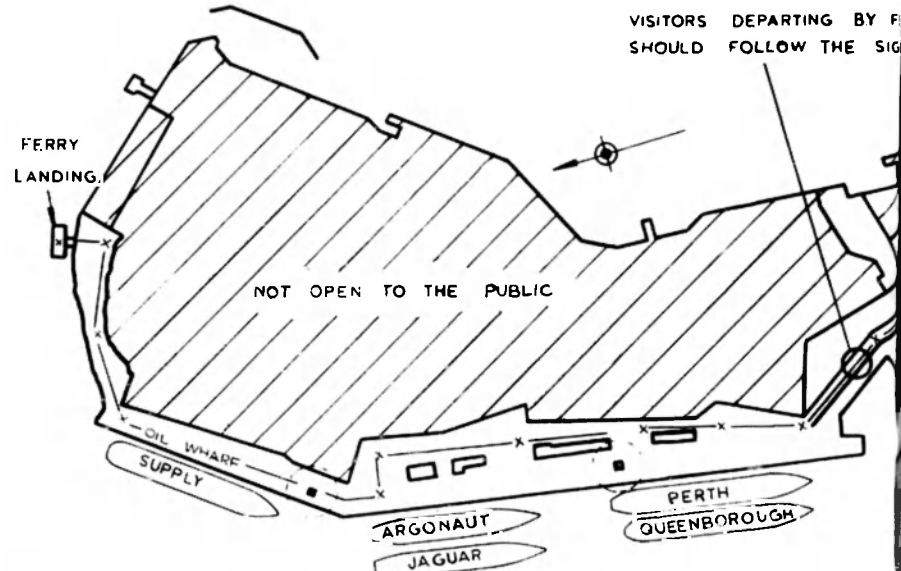
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# NAVY WEEK IN SYDNEY — Display At Garden Island, Saturday, 27 September

ELIZABETH BAY



## GARDEN ISLAND NAVAL DOCKYARD OPEN DAY

Dockyard and certain vessels alongside will be open for inspection by the Public, between 2.00 and 5.00 p.m. As various events are scheduled they will be announced over the Public Address System.

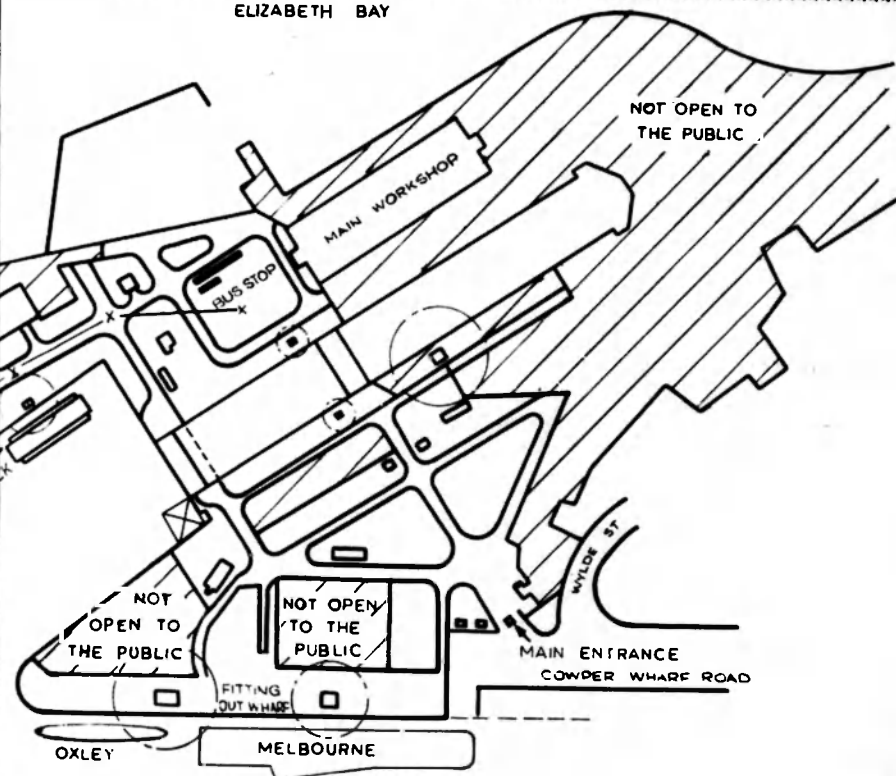
### EVENTS WILL INCLUDE:—

- INSPECTION OF R.A.N. SHIPS
- ENGINEERING WORKSHOPS
- BAND CONCERT
- CLEARANCE DIVING DEMONSTRATION

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# THE BIG ONE

\*\*\*\*\*Second of the series: by Galatea\*\*\*\*\*

In the early afternoon of 7 April, 1945, a great ship lay almost stopped in mid-ocean with a thirty-degree list to port. Her upperworks were scorched evidence of a savage mauling inflicted by carrier-borne bombers of the United States Navy and from myriad points of her shattered hull, dark oil vomited to form an aura of destruction around the dying ship. She had been brutally disembowelled by at least a dozen torpedo strikes.

At approximately 2.15 p.m. she rolled onto her port side and gradually slipped beneath the surface. As she went down, her remaining magazines and boilers violently exploded, thereby damning forever any chance of survival for all but 260 of her total complement of 3,590 men. She was the remaining member of a class of four ships, and was the biggest, most powerful Dreadnought the world has ever known. Her name was *Yamato*. This, in brief is her story.

There were originally four vessels in her class and, in complete defiance of the Washington and London Treaties, design studies were initiated for them in 1934 and progressed through 23 different stages before arriving at a final plan in 1937. They were intended to form a force of invincible Dreadnoughts capable, if

need be, of facing in combat and defeating the existing American fleet of 14-inch battleships, together with their projected and greatly enlarged 16-inch sisters. It was hoped to achieve this by building them to standards of excellence that would enable them to out-gun any existing or projected battleship, either built or building anywhere in the world, and by possessing armour protection of such magnitude that it would render these ships proof against aerial bombardment, as well as other battleships ordnance and torpedo attack. Good high speed cruising properties were also considered

*Yamato* was the first of the quartet to be built; her keel being laid at the Kure Navy Yard circa 1937. The exact date is uncertain. She was followed, in this order, by *Musashi* (built by Mitsubishi), and by *Shinano*, this ship's keel being

laid down in May, 1940 at Yokosuka Navy Yard. *Shinano* was, in fact, the last vessel to be actually completed but, alas, not as a battleship. It became obvious as World War II progressed that there would no longer be any need in the Imperial Japanese Navy for vessels so large and costly as battleships. So, after losing much of the aircraft-carrier force at the Battle of Midway in June, 1942, it was decided to modify the plans of *Shinano* in order that she might be completed as a carrier. She was finally ready for trials in late November, 1944.

The last of the intended four never progressed beyond initial construction stages. Laid down in November, 1940, at Kure Navy Yard, she was known to her builders simply as *Hull III*. Her construction, however, was halted because of the prevailing state of the Japanese economy; the incomplete hull being finally scrapped in 1941.

A fifth ship—Hull 797—was planned under the 1942 Programme, but was cancelled when this particular programme was rescinded.

Meanwhile, building of *Yamato* and *Musashi* proceeded quickly. However because of their intended purpose and of course their immense size, Japanese naval architects and ordnance experts had to rely almost entirely on their own design resources as, in matters such as main armament, hull design and armour protection, these ships would be unique and at the time of construction had no equivalent.

In July, 1917, the Tyne ship-building firm of Armstrong Whitworth and Sons completed the light battle cruiser H.M.S. *Furious* for the Royal Navy. This ship was totally unique in so far as she mounted a main armament solely of two 18-inch guns. The guns, however, proved to be a structurally shattering weapon on such a lightly built ship and she was converted into a partial aircraft carrier with



Battleship YAMATO at 27 knots — the year, 1941

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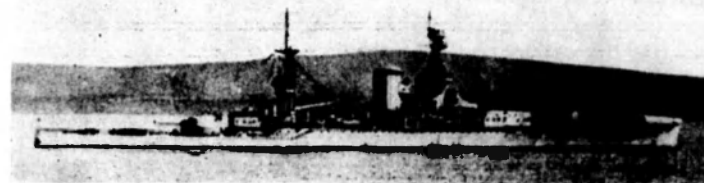
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The carrier SHIMANO, was originally laid down in 1940, as a Super-Battleship of the YAMATO CLASS



H.M.S. FURIOUS, completed as a partial aircraft carrier was broadened into a complete carrier in 1918, and later served in World War 2. Note the 18 in. gun on the afterdeck.

a flying-off deck forwards of the bridge. She was fully rebuilt as a more orthodox carrier in 1918 and the two guns were transferred to monitors and, subsequently, were mounted at the Singapore Naval Base.

The gun itself was a complete success and the Japanese Navy Department continued development of this calibre gun in the 1930s, later producing their own example of 18.1 inch calibre—nine of which were chosen for installation on board *Yamato* and her sisters. The statistics of this main battery would have impressed even the most lubberly of observers. Each barrel was 70 feet long and fired an enormous 3,220 pound shell, which was capable of penetrating the thickest existing armour, even at the absolute range of approximately 31 miles.

The guns were mounted in separate sleeves in three triple turrets and gave *Yamato* a broadside weight of 28,800 pounds as against 18,900 pounds; the latter being the broadside weight offered by the latest American battleship, U.S.S. *West Virginia*. There is no record of *Yamato* ever firing a full broadside either in practice or battle. However, the concussive effect upon those within, let alone without, the ship of even one turret firing must have been absolutely stunning.

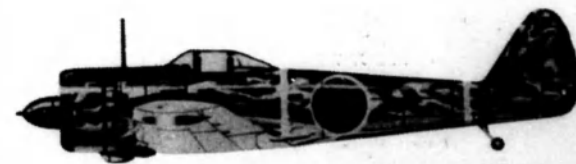
The effects of blast on the upper deck could be solved only by the erection of special enclosures for the ship's boats and for the same reason the entire tertiary anti-aircraft battery were behind shields.

*Yamato* carried a secondary armament that was extremely heavy even when compared with American standards on this subject. Twelve 6.1-inch 'surface' guns were mounted in four triple turrets and twelve 5-inch guns in six dual turrets were installed purely as anti-aircraft guns! As the war progressed, her tertiary battery was increased to 113, 25 m.m. cannon in triple and single mounts, with four 13 m.m. cannon added almost as an afterthought in two light dual mounts. To cap it all, *Yamato* carried her own air reconnaissance capability in the form of six fighter-seaplanes.

We cannot progress further without including a very special ship. Main armament guns were never noted as featherweights and those of *Yamato* and her sister were extremely heavy. In addition, their bulk presented the ordnance factory with more than a few headaches when it came to transporting them from factory to shipyard.

And so the 1939 Programme allowed for the building of *Kashino*; a vessel of 10,360 tons displacement, whose keel was laid at the Nagasaki yard of the Mitsubishi Company on 1 July, 1939. She was specifically designed and built for the task of transporting the massive turrets and 18.1-inch guns from the factory to the fitting-out yards where the various battleships were awaiting completion.

The ship was constructed along tanker lines with two large holds



Ki. 43-111 (load aircraft) of the 64th Fighter Scout.





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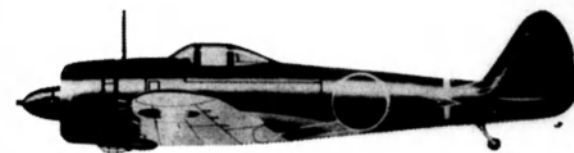
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and hatches which were capable of handling the turrets *en bloc*. As an additional safety and security measure, the normal double bottom was extended up the ship's sides to form a double hull. These extra precautions were taken in view of the exclusive nature of her intended cargo. Also fitted were new high-temperature and pressure boilers from Germany, together with the latest reaction turbines.

Following the completion of the *Yamato* class battleships, *Kashino* was converted into a fast armed ammunition transport, and the huge hatches were sealed up. This was a task for which she was admirably suited, however her services to the Imperial Navy came to an abrupt halt on 9 September, 1942 when she was sunk by the submarine U.S.S. *Growler*.

As *Yamato's* hull took shape, several features that were new to Japanese naval architecture appeared. She was one of the first ships to be fitted with a bulbous bow which, it was found, had the effect of decreasing wave resistance. At the other end, an auxiliary rudder was placed ahead of the main rudder to lessen handling prob-



KI 43-11 of the Fighter Senai, 1st Chutai

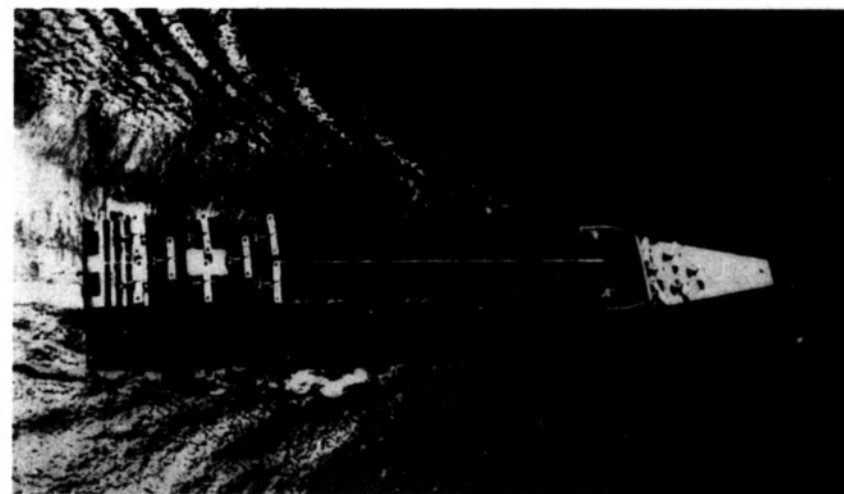
lems under difficult conditions. It is worth noting that, when viewed from above, her hull had the same long bottle-nosed appearance that characterised the later *Iowa* class of American battleships.

In term of armour protection, the story and figures are equally startling. The terms of the 1921 Washington Treaty forced many nations, including Japan to change their syllabus of dreadnought construction. Among the vessels scheduled for sacrifice by Japan were the brand new 38,500 ton high-speed battleships *Kaga* and *Tosa*. *Kaga* won a reprieve when the new carrier *Amagi* was damaged beyond repair on the building slipway by the great earthquake of September 1923. *Kaga* took her place and went on to serve with distinction as a carrier in World War

II; finally being sunk at Midway in June 1942.

The hull of *Tosa* was to provide invaluable data for the future. Incorporated in her design was a new type of inclined armour. This permitted less plating to be used for the same degree of protection attainable with more orthodox, thicker armour-plating. The new inclined armour proved to be highly resistant to shells and torpedoes, and was therefore included in the hull design of *Yamato*.

In keeping with her size, *Yamato* (as well as *Musashi*) could boast of a greater tonnage of armour protection than that carried by any other warship, past or present. The main armament turret-faces had the thickest plate ever devised for a ship



The carrier *KAGA*, before conversion, she was to be the first of the *KAGA* Class Battleships. Her keel was laid down on 19 July, 1929, but was scheduled for scrapping in compliance with the Washington Naval Treaty.

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of war, i.e.: 25.6 inches! That which covered the remainder of the turret was 20 inches thick, and each complete installation (minus guns) tipped the scales at 2,774 tons. The barbettes upon which the turrets rested had a 22-inch casing and main-deck armour was 7.75 inches thick.

The hull belt was 16.5 inches thick, however it covered only 53.5 per cent of the waterline. Notwithstanding this in-built Achilles Heel, *Yamato* carried a total weight of almost 23,000 tons of armour protection, which was 2,000 tons more than the total displacement of Japan's first modern dreadnought; the *Kawachi*. At the time of her completion in 1912, *Kawachi* (along with her later sister *Settsu*) was one of the most modern battleships in the world and mounted twelve 12-inch guns in four triple turrets as well as an extensive 12-inch thick main armour belt.

Strangely enough, despite this massive tonnage of armour, *Yamato* was not the most heavily protected dreadnought ever built. This honour was reserved for the American *Iowa* class, which sported a 19-inch thick main belt extending over two-thirds of their entire length. Turret armour was uniformly thick at 18 inches. When you realise that this class was 20,000 tons lighter than their *Yamato* opposite numbers, it is not hard to see how such a comparison can be made.



A Kawanishi Niki Kyogu ("Ros") fighter seaplane, similar aircraft were used aboard *YAMATO*.

At the Kure Navy Yard, *Yamato* was completed in an atmosphere of almost unbelievable secrecy. A gigantic sisal rope screen covered the entire slipway, and workers were forbidden to leave the area under pain of solitary imprisonment for life. All unnecessary civilian personnel were cleared from the immediate area on the date of her launch (15 December, 1941), and at the fitting-out basin she was entirely covered by camouflage nets and screens.

For two years after her launching, American naval circles buzzed with rumours about a colossal ghost ship the Japanese were supposed to have constructed. Her first extensive voyage began in May, 1942, when, as

the Flag Ship of Admiral Isoriku Yamamoto, she passed through the Bungo Straits on the way to the Midway Islands, south of Honolulu.

The voyage passed without incident and she returned safely to Yokohama without being sighted by any of the Allied forces.

It was not until Christmas night, 1943, that the giant vessel first struck trouble. She was cruising at medium speed 180 miles north of Truk Island in the Carolines group. Without any visual warning from the lookouts, two torpedoes flashed through the water to strike home on *Yamato's* starboard bow. The tremendous double explosion caused more noise than damage; however, they were enough to send *Yamato* back to Japan for repairs.

She did not venture out again until 21 October, 1944, when, accompanied by her sister ship *Musashi*, she left Lingga in Malaya as part of a spearhead force intended to stab at American cargo vessels stationed at Leyte. She was sighted almost immediately upon entering her intended area by carrier-borne reconnaissance aircraft. Both ships went immediately to action stations once they realised they were compromised. This was not a moment too soon, as, within minutes, swarms of torpedo-bombers from Admiral Halsey's carriers descended upon them.

The bulk of the attacks seemed to be directed against *Musashi* and



Iowa Class Battleships Missouri (63) and New Jersey (62).

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Grumman Avengers gave fine service during World War II and continued in use until 1954. Aircraft of this type were used to hunt YAMATO.

the first four waves of bombers sent the big Dreadnought reeling.

Almost immediately she flooded heavily fore and aft as a result of the combined bomb and torpedo attack and slowed down very quickly to little more than ten knots.

A second attack followed closely on the first and after absorbing an estimated ten more heavy bombs and the last of twenty direct hits by torpedoes, she keeled over and sank beneath a curtain of steam and smoke.

Meanwhile, despite three direct bomb hits on her topside, *Yamato* barely showed a dent. Feinting westward, she gave Halsey's bombers the slip and ploughed along the hazardous reef-strewn waters of San Bernardino Strait. She emerged just prior to first light at 7 a.m. on 24 October, and promptly got the shock of her life. In full view of her bridge staff lay the six escort carriers of Rear-Admiral C. A. Sprague. Once again *Yamato*'s crew went to action stations and within minutes had opened fire from A and B turrets at a range of 38,000 yards. The shells fell only one hundred yards short of one of the carriers and then, for reasons still unknown, *Yamato* went about and retired at full speed. This had been one of the very few occasions when the colossal 18.1-inch guns were ever fired in anger.

On 1 April, 1945, the Americans made a casualty-filled landing on

the beach at Okinawa. *Yamato* had just completed repairs following a brush with U.S. destroyers in the China Sea, and at the time of the Okinawa invasion, was swinging round her anchor at Mitajuri. Naval Headquarters in Tokyo, alarmed at the inroads made into their territory at Okinawa, ordered the commanding officer of *Yamato*, Captain Agira, to raise steam immediately. His orders also directed him to take *Yamato*, in company with two cruisers and ten destroyers, and head for Okinawa in order to bombard the enemy.



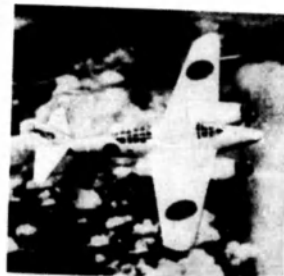
The Navy type carrier reconnaissance plane SAIUN C61 (MYRT).

At this stage of the War, Japan's oil fuel supply was extremely critical and, at the time of departure, only the Flag Officer in charge of the squadron (Admiral Seichi Ito) and Captain Agira knew that *Yamato* had only enough fuel for a one way journey. In short, the ship was on a suicide mission.

After navigating through the Inland Sea, *Yamato* and her accompanying squadron passed through the Bungo Straits between Kyushu

and Shikoku and after sunrise on 7 April, reached a position almost due south of Kagoshima. At exactly 8.00 a.m. she altered course towards Okinawa.

Two hours and seven minutes later she was sighted by reconnaissance aircraft and the report radioed immediately to Vice-Admiral Mitscher's carrier task force steaming about forty miles to the south-west. By 10.26 a.m. all available torpedo bombers and fighters, minus reserves, had shot off the carrier's decks and the last act of the drama began.



Mitsubishi Ki 44-II ("Dinah"), the outstanding W.W.II Japanese reconnaissance aircraft.

Several flights of Japanese aircraft rose to meet Vice-Admiral Mitscher's attacking force, but the Americans rammed through them in overwhelming strength and completely smothered the Japanese fighters.

Having disposed of the meagre air-cover offered by the Japanese, the American aircraft pounced on the escorting destroyers and cruisers. Within minutes, the light cruiser *Yahagi* went spiralling to the bottom in a flurry of spray and bursting bombs.

One by one, ship after ship was disposed of until all but *Yamato* had either been sunk or had fled.

Then the big moment arrived. Back on the lead carrier, the commander of the American Air Group, Commander H. N. Houck, sent six torpedo-laden aircraft and six bombers armed with 500-pound bombs against *Yamato*. The bombers' fighter escort went in first and silenced *Yamato*'s light anti-aircraft

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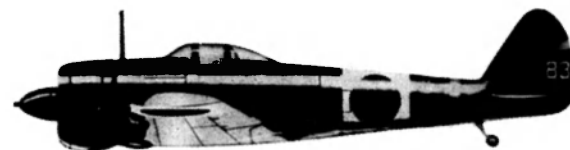
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batteries with cannon and machine-gun fire and they were followed immediately by bombers which began to pound *Yamato* mercilessly. Within seconds, the lead aircraft scored four direct hits with bombs at *Yamato*'s upper deck from the suicidal height of only 1,400 feet, and the attacks continued without ceasing until approximately 1.45 p.m. when the aircraft planted at least five heavy bombs and six torpedos almost simultaneously into *Yamato*'s hull, whereupon the now almost helpless vessel heeled to port.

In a desperate attempt to right the heeling ship, the decision was made to flood the starboard engine room. With all communication systems now out of action, the engine room staff had no inkling of what was about to happen. A wall of seawater suddenly engulfed them and, without exception, they perished. Seconds later, the starboard boiler room disintegrated when the seawater reached the boilers, thereby adding to the frightful chaos which already existed below decks.

At this point, Captain Agira sent a junior officer below to gauge the state of the ship between decks. He could travel no further than the bloody shambles of 'E' deck and after a long period away from his post, he returned to the Bridge to report that the ship was almost a total inferno.

At that moment a thudding explosion threw all remaining personnel

off their feet as two simultaneous torpedo strikes hit the stern and the stricken vessel increased her list to port by 10 degrees.

The ship was almost dead in the water and all guns were now silenced. The captain stoically made a last entry concerning the ship's list in the log book and after initialling the entry, placed the book in a sealed container and threw it overboard. The Admiral and Captain Agira then went below to what remained of their cabins, and those surviving members of the crew made what preparations they could to save themselves. Some, however, as a last act of faith in their Emperor, chose to stay with the ship even to the point of tying themselves to stanchions; thereby ensuring that as the ship perished, so would they.

At 2.10 p.m. she commenced a final slow roll to port and a thunderous explosion echoed across the sea as bulkheads burst, allowing cold sea water in on her remaining boilers which exploded and touched off the after magazines.

A 160-foot deep whirlpool cone formed and at approximately 2.15 p.m., *Yamato* disappeared.

### Footnote:

*Yamato*'s converted sister ship, the carrier *Shinano* did not live for very long. After being originally laid down in May, 1940, she was not to be fully completed as a carrier until November, 1944.

She was destined to be the biggest aircraft carrier in the world until the *Forrestal* class of American aircraft carriers of the '50's. She made only one voyage, a short trip to another yard to complete her fitting out. It was on this voyage that the American submarine U.S.S. *Archerfish* sank her after only two weeks in commission.

The abrupt end of *Shinano* after so long a building period must have broken the heart of the Japanese Navy and hastened its defeat by pointing out the utter futility of further resistance to the overwhelmingly superior Allied war machine.

It is worth mentioning as an afterthought that diesel engines originally designed for use aboard the *Yamato* class as generating equipment were subsequently installed aboard the 1,400 ton armed survey ships *Miho* and *Tsukushi* as main propelling machinery. This ingenious improvisation endowed both ships with a top speed of almost 20 knots from a three-shaft engine arrangement totalling a 5,700 shaft horsepower.

If we now hark back to the standards of ship-building pertaining during the First World War, we can recall the fact that, even then, German dreadnoughts proved extremely difficult to sink and this tradition was carried forward to the Second World War when it took 3,000 heavy shells and 23 torpedo strikes to sink the great battleship *Bismarck*.

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The destroyer ISO-KAZE of the Kagura Class was sunk in company with YAMATO on 7 April, 1945 (Battle of Bonin Islands).



Aircraft Carrier SHINANO — her conversion from a battleship was to use her as a mobile air base to give maintenance to the aircraft from other carriers.

Bearing these facts in mind it will now be shown that, huge though they undoubtedly were, *Yamato* and her sisters did not represent the ultimate in man's ambitions concerning battleship design. The largest projected battleships were the German H.44 class but, fortunately for the Allies, these monsters never passed beyond the draughting office.

For the statistically minded, included below are the relevant details of this class:—

*Full Displacement:* 141,500 tons.

*Length:* 1,132.25 feet.

*Bram:* 169 feet.

*Engines:* Geared steam turbines & cruising diesels.

*Power:* 280,000 S.H.P. (projected total both systems).

*Speed:* 30 knots (projected maximum).

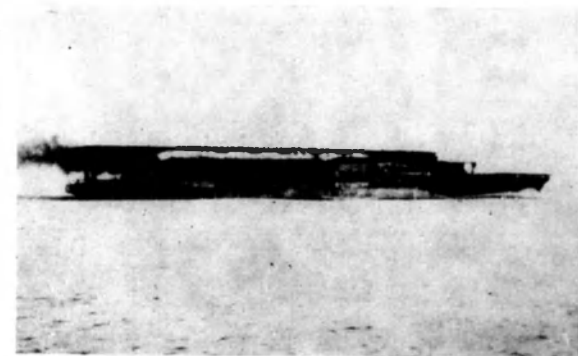
*Main Armament:* eight, 20-inch guns (four dual turrets).

*YAMATO* (as designed)  
*Full Displacement:* 71,659 tons.  
*Length:* 863 feet (overall).  
*Bram:* 127.75 feet.  
*Engines:* Geared steam turbines.

*Power:* 150,000 Shaft Horse-Power.

*Speed:* 27.5 knots (actual).

*Main Armament:* nine, 18.1-inch guns (3 triple turrets).



The 28,100-ton KAGA, seen on her trials, was one of the six carriers in the Hawaii Operation in December, 1941. She was lost in the Battle of Midway.

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## New Small HYDROGRAPHIC SHIP FOR AUSTRALIA

The Royal Australian Navy is responsible for the production and publication of navigational charts in the Australian area.

In recent years the advent of deep draught snips has led to a demand for accurate and detailed charts of deeper waters of our existing harbours and approaches. In addition the development of mineral resources, particularly in north western Australia, have increased the requirement for surveys of waters in many previously remote and unimportant areas.

The Navy has accepted a commitment to speed up the surveying and charting of shipping routes to all ports within 10 years. This alone will involve one million miles of sounding.

Two survey ships are in commis-

sion with the RAN. The larger, H.M.A.S. *Moresby*, is a modern specially designed vessel completed in 1964.

The smaller ship H.M.A.S. *Paluma*, which was built as a motor stores lighter in 1945-6 and converted to a hydrographic vessel in 1957 is in urgent need of replacement.

Government approval has been given for the construction of a small specialised ship, similar in design to a hydrographic ship built recently in Australia for use by the Philippine: Government. (See Photo.)

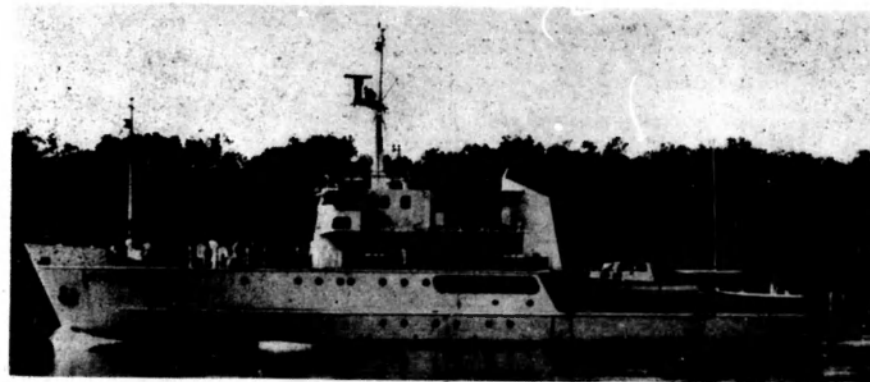
The proposed ship will have about a 50 per cent increase in output over the ship it replaces, *Paluma*, due

mainly to higher speed, better endurance and better sea keeping qualities.

It is expected that *Moresby* and the new ship, with assistance from patrol boats, will be able to complete 100,000 miles of sounding a year and meet the R.A.N.'s agreed hydrographic commitment.

The length of the proposed vessel will be 150 feet, beam 33 feet, displacement about 790 tons and driven by diesel engines. She will have a planned total complement of 36 officers and sailors.

The estimated cost of construction, initial spares and shore support is \$3.283 million.



SMALL HYDROGRAPHIC SHIP

The Royal Australian Navy is to build a small hydrographic survey ship to assist in charting waters off the Australian coast. The new ship will be similar in appearance to a hydrographic ship (pictured) given recently by the Australian Government to the Philippines Government.



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# THE MYSTERY OF THE SEA

by R. W. Tindall

The exploits of astronauts have kept millions around the world enthralled.

So far, however, the public imagination has not been captured to nearly the same extent by exploration of the vast unknown tracts here on earth—the sea and its bed, which covers four-fifths of the planet.

Yet the sea holds resources of wealth which are yet barely tapped, despite the growth in size and sophistication of fishing fleets and the now familiar off-shore rigs and platforms exploiting the reserves of oil and natural gas buried in the seabed.

Some idea of the impact of the sea on our daily lives and the wealth it might one day be made to yield is given in a report published in London earlier this year. (Report on Marine Science and Technology Command 392—17 April).

### THE WEATHER

For example, large scale movements of water masses with differing temperatures and salinities lead to the transfer of heat from one part of the ocean to another and so affect the weather through reaction with the air above.

"It seems probable that the key to an improvement in our ability to forecast the weather may lie in a closer understanding of these air-sea interactions," says this report.

"The movement of sea water also affects the supply of inorganic nutrients essential for plankton growth and may in consequence be crucial in determining the basic productivity of fish stocks."

In addition to their salt content, the seas of the world also contain many rare elements, some of which are of potential economic value, so research into the chemistry of the ocean may also lead to direct benefit for mankind.

The report, itself, comes from a working party set up by the British Government to carry out an inventory of research into government-backed marine science and technology and to suggest ways by which it might be better co-ordinated and improved.

### FARMING FISH

The Government, which is spending something like \$28,929,150 a year on this research, has accepted the group's report and says that its proposals for further spending will be considered in relation to other public needs.

But, perhaps, the report's main interest lies not so much in its recommendations as in the glimpse it gives of the many lines of research which are being pursued in Britain, at least.

The sea's most readily accessible commodity is, of course, its fish, but scientists are now far advanced in the art of rearing and fattening fish and shell-fish in controlled areas—such as can often be provided by using the heated water released by coastal power stations—so that they can be "farmed" when ready, rather like any land crop.

The warmth emitted by power stations on the coast could also be used to cultivate species of high commercial value, such as clams, prawns and oysters, and the working

party foresees export possibilities for Britain in the additional production of fish in these ways.

### HIDING THE LOBSTER

The fish and shellfish now caught represent only a small fraction of the biological resources of the oceans and here again it may be possible for man to modify the natural environment, so that the populations of desired species of fish increases rapidly.

Reducing the number of predators, and increasing the food supply for the fish are possibilities being explored in several countries.

The report even mentions the idea of introducing into the sea artificial hiding places for lobsters.

Any increase in natural cover will have some effect on the number of lobsters in an area.

What the scientists are now trying to find out is which kind of hiding place the lobster prefers.

The North Sea off Britain's east coast is now the field for intensive exploration for oil and natural gas, with many rich strikes already made.

But, Britain has a share of the continental shelf—the gradual sloping area of the seabed around the coastline—which is something like four times the size of her island landmass, and the report points out that promising sedimentary deposits are known to occur elsewhere—in the Irish Sea, the Western approaches to the English Channel and north west of the Outer Hebrides, for example.

Thus the need, emphasised in the report, for a geological and geophysical survey of the whole of the United Kingdom Continental Shelf so that any important mineral resources do not escape undetected.

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### SAND AND GRAVEL

For Britain second in importance only to North Sea gas are the deposits of sand and gravel around her shores. Some 7,000,000 tons a year is now abstracted from coastal deposits—about ten per cent of total production—but with demand rising and land increasing in price, the sea as a source of this vital building material is likely to become more and more important.

But finding the best and most economical methods of exploiting the deposits is only part of the story. For the scientists it means research into other aspects of the problem.

What does the removal of large quantities of sand and gravel mean when it comes to preventing the erosion of the coast? How does it affect the shallow water fisheries and the nursery grounds for flat fish as it changes the topography of the sea bottom?

It is questions like these that scientists in a variety of disciplines are trying to answer. The report gives a comprehensive picture of men at work—on fisheries, mineral resources, coastal protection, the

dangers of pollution from oil and industrial waste.

The sea is still full of mystery. And the search for answers may prove just as exciting as the quest in space.

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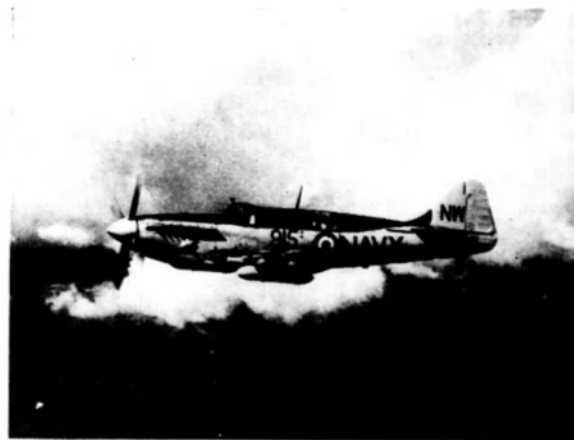
The Royal Australian Navy Fleet Air Arm's birthday is considered to be 28 August, 1948, the day the 20th Carrier Air Group, borne in H.M.A.S. SYDNEY, was commissioned at the Naval Air Station, Eglington, Britain.

The Australian Government had formulated a long term plan the year before to build up gradually a force capable of providing aerial anti-submarine and fighter protection for the Fleet. It was decided to acquire a light Fleet carrier and in December 1948 H.M.A.S. Sydney was commissioned under the command of Captain R. R. Downling, R.A.N.

A shore establishment, H.M.A.S. Albatross, was commissioned at Nowra, N.S.W. In order to keep a carrier at sea, personnel essential to operating its aircraft must be trained ashore. The mechanics, safety equipment, electrical, ordnance and radar ratings graduate from the various schools at Nowra and eventually take their place in the front-line squadrons which operate from the carrier. When a carrier is not at sea, her aircraft are disembarked to the naval air station.

The airfield at Nowra and its

satellite airstrip at Jervis Bay were originally constructed during the Second World War for the R.A.A.F. In 1944 it was transferred to the Royal Navy for Fleet Air Arm training and as a shore base for carrier air groups of the British Fleet.



Fairey Firefly Aircraft operated from H.M.A.S. SYDNEY during the Korean War.

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At the end of the war the airfield was left under "care and maintenance" until 1947 when renovation began. It was commissioned on 31 August, 1948, as H.M.A.S. Albatross. Since that date Albatross has provided support for the aircraft carriers H.M.A.S. Sydney, H.M.A.S. Vengeance and H.M.A.S. Melbourne.

In May, 1949, Sydney carried the first post-war squadrons, comprising

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the 20th Carrier Air Group, from  
Britain to Australia. The squadrons  
consisted of Fairey Fireflies and  
Hawker Sea Furies, the latter  
credited with being the fastest  
piston-driven aircraft of the period.  
Eighteen months later, two more  
squadrons arrived from Britain, for-  
ming the 21st Carrier Air Group.  
From these was formed the Air  
Group which operated from Sydney  
during 1951-52 and flew in the  
Korean War.

After the Korean War new air-  
craft were added and old aircraft  
were relegated to training squadrons  
or passed out of service use. In  
1953 the first helicopters, Bristol  
Sycamores, were introduced for  
search and rescue duties and train-  
ing.

In February, 1953, the Admiralty  
lent Australia the aircraft carrier  
H.M.S. *Vengeance* which was com-  
missioned in the R.A.N. so that the  
Navy would have two operational  
carriers. In 1955 a new carrier,  
H.M.A.S. *Melbourne*, was commis-  
sioned and *Vengeance* returned to  
Britain.

In 1954 Vampire jet trainers were  
received by the Fleet Air Arm and  
in 1956 H.M.A.S. *Melbourne* arrived

from Britain with the second gene-  
ration of carrier-borne aircraft—  
Sea Venom all-weather jet fighters  
and Gannet turbo-prop anti-sub-  
marine aircraft.

Late in 1962 the first Wessex anti-  
submarine helicopters were added to  
the list of front-line aircraft. Train-  
ing commenced in January 1963 and  
in July of the same year the first  
Wessex anti-submarine squadron  
was formed. In the next year Iro-  
quois helicopters were introduced to  
replace the Sycamore in search and  
rescue work, and two Westland  
Scout helicopters were obtained for  
survey work—one being perman-  
ently attached to H.M.A.S. *Moresby*  
(Survey Ship).

During this period the Fleet Air  
Arm's role had been confined to  
anti-submarine duties, depending  
mainly on helicopters. In 1965 the  
Government decided to purchase a



Sea Furies (lower left) and Fireflies in  
formation over H.M.A.S. SYDNEY.

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new generation of fixed-wing aircraft—the Douglas A4G Skyhawk fighter-bomber to replace the Sea Venom and the Grumman Tracker anti-submarine aircraft to replace the Gannet. The new aircraft were acquired in 1967. In addition, the Wessex 31A helicopters were converted to the later model 31B.

H.M.A.S. *Melbourne*, the flagship of the R.A.N., underwent an extensive refit in 1968 to enable her to fly the new aircraft. H.M.A.S. *Sydney* ended her career as an aircraft carrier in 1962 and now serves as a troop transport.

On 30 June, 1969, H.M.A.S.

Wessex 31B Helicopters operate from  
H.M.A.S. *Melbourne*.



for firing practice, is manned and maintained by *Albatross*.

As a community service, search and rescue helicopters from *Albatross* are frequently called upon to assist civilians in distress and to carry out medical evacuations. The ship's company borne in *Albatross* is available to assist the public in times of emergency.

### Fleet Air Arm 21st Birthday

The Air Day will be held as part of the Navy Week celebrations.

The Air Day will be held on 12 October as part of the Navy Week celebrations because the weather at Nowra in August is usually unfavourable to an air display.

The station will be open to the public from 10 a.m. to 5 p.m.

The main event of the programme will be an air display by all types of R.A.N. aircraft including Douglas Skyhawk attack aircraft and Grumman Tracker anti-submarine aircraft.

Past and present R.A.N. aircraft will be on show on the ground and the programme will end with a "beating of the Retreat" by a Naval Band.

More than 20,000 visited the Naval Air Station for the last open day in 1967 and many more are expected this year.

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## Making an Estuary Safe for Ships in Fog

by G. A. G. Brooke



The Tees Estuary on the north-east coast is one of the busiest seaways in Britain. It serves the Tees Dock, Middlesbrough Dock, Middlesbrough Wharf, Stockton Quay and numerous smaller docks, wharves, and shipyards, and the large Hartlepool Docks are nearby. Not long ago the river was widened to accommodate a two-way movement of vessels of up to 65,000 tons and in the future 200,000 tons ships will require access. This increased traffic makes new and greater demands on those whose responsibility it is to maintain the safety of the Estuary, on the pilots, ships' captains and the traffic-control personnel in the Harbour Master's Office.

Many of the vessels are tankers, travelling to and from the new Shell and Phillips Imperial refineries on both banks of the river. Turn-around time for these ships is short and efforts are being continually made to reduce it for greater profitability.

### LONG STRETCH ON DISPLAY

These two factors, safety and short turn-around times, made it necessary for the Tees and Hartlepool Port Authority to install the most advanced harbour radar available. After exhaustive investigation the Photoplot system of the British firm Kelvin Hughes was chosen as

The Tees Estuary on the north-east coast of England is one of the busiest seaways in Britain. Vessels using the Estuary include some of the biggest tankers in the world. To ensure their safety and that of other vessels using the port a new radar system, the Photoplot of the Kelvin Hughes organisation, has been installed. The main display console consists of three Photoplot radars whereby the area is photographically integrated with the radar information.

meeting all the requirements. It provides a display of a four-mile stretch of the waterways, from the river mouth up towards the Middlesbrough Dock. Using V.H.F. radio to communicate with the ships, the controllers can watch for congestion or any other undesirable condition and regulate the movement of the ships for maximum efficiency.

The Photoplot system is unique to Kelvin Hughes. First developed by them to meet a Ministry of Aviation specification for an advanced postwar radar chain, it was incorporated in an American early warning system. Later it was adapted for use in ships and over 100 are now at sea.

With the Photoplot a small cathode ray tube (C.R.T.) is photographed and the film processed, fixed and projected on to a plotting surface every few seconds. Thus the observer is not looking at a C.R.T. of, say, 16 inches (the maximum normally encountered), but at a projection of it 24 inches in diameter. Many advantages accrue from

this, apart from increased size, but the most immediate are—daylight viewing, the ability for observation by several people at once, and the fact that targets are black on white (as if drawn) instead of being spots of light which become hard on the eyes.

### CONTROL CENTRE PHOTO PLOT

At the Control Centre a combined console contains three 16 m.m. Photoplots, a conventional 16 inch direct viewing display (for use at times of low traffic density) and V.H.F. radio telephone controls. Two of the Photoplots are overlapping, and set to a range scale that covers the port area. The third display shows the entire estuary.

To begin with, the Harbour Master is provided with much greater magnification over a wide target area since two overlapping Photoplots give a roughly oblong radar display 44 inches by some 20 inches (the diameters for the two overlapping 24 inch pictures varying from 24 inches to 18 inches). Now the shape of a normal estuary is



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long and narrow and an oblong display suits this well. You have, therefore, the equivalent of a 44 inch display, since those parts of the 44 inch circle that are absent would be wasted over the land anyway.

Inherent with two or more integrated Photoplots, but none the less useful, is the fact that there can be no confusion when a "target" passes from one display to the next. It does, in fact, appear on the new display before leaving the old, but since they overlap, there can be no confusion of identity. A ship can thus be tracked without interruption from one end of the monitored area to the other.

Another major advantage is the ability to plot on paper, in daylight, with ordinary instruments direct onto the radar picture. This is common to all varieties of Photoplot, but in the harbour radar form there is the additional presence of chart information—fathom lines, buoys, land, and so on—which are automatically superimposed, transparencies of the chart being photographed at the same time as the C.R.T.

#### SUBSIDIARY ADVANTAGES OF FILM PROCESS

The film recording process used in the display allows for several valuable refinements. When the film has been processed, it is dry and

permanent, and, subject to normal care in storage, it will not fade, distort, or deteriorate in any way. A slide can be inserted at the beginning of each reel of film, so that the date, site, weather, and any other information may be photographically recorded. A clock inserts the time at the end of each frame of the film. The range scale and the photographic time cycle are also recorded on each frame. If the film is run through a separate projection system at a later date it thus provides a dated, timed record of the incidents. A simultaneous tape recording of the V.H.F. radio communication will complete the picture.

Replaying such records presents an excellent way of training new observers, or of analysing the traffic flow. A particular incident may be repeatedly re-enacted to study how an accident happened. In the case of one collision off Thameshaven (where an early model Photoplot system was installed some years ago), the replaying of the film to the legal representatives of the two parties resulted in a change of opinion about their relative legal responsibility.

A problem that usually confronts the designer of a harbour radar installation is that it is almost impossible to site a single radar equipment so that the whole of the required area is visible. Headlands cut off the view "round the corner", while the various loading docks are often parallel, and the view into them is obscured.

#### MICROWAVE LINK

At Teesport the system scans the estuary from two 15 feet aerials mounted on 100 feet towers. One of these is alongside and the other three miles away. Considerable problems have been most successfully overcome with a Ferranti Microwave Link, the 1400 HR, a variant of which was specially designed for the Teesport installation.

In addition to transmitting the radar picture from the remote station to the Lackenoy Dock Control Centre, the link also provides channels for the aerial bearing and synchronising data, monitoring information and engineer's speech. In the other direction, a narrow-band microwave link is provided for



The remote radar equipment and Ferranti two-way microwave link terminal installation at the entrance to the Tees Estuary.

remote control of the South Gare fog-horn, lighthouse, MF/DF beacon from the Control Centre and engineer's speech.

# INVALUABLE SAYS HARBOUR MASTER

Captain T. Hand, Harbour Master Tees, commenting on the Kelvin Hughes harbour radar system, said: "For harbour surveillance the equipment has been invaluable in the control and co-ordination of traffic, checking the positions of floating navigational marks, and detection of surface obstructions.

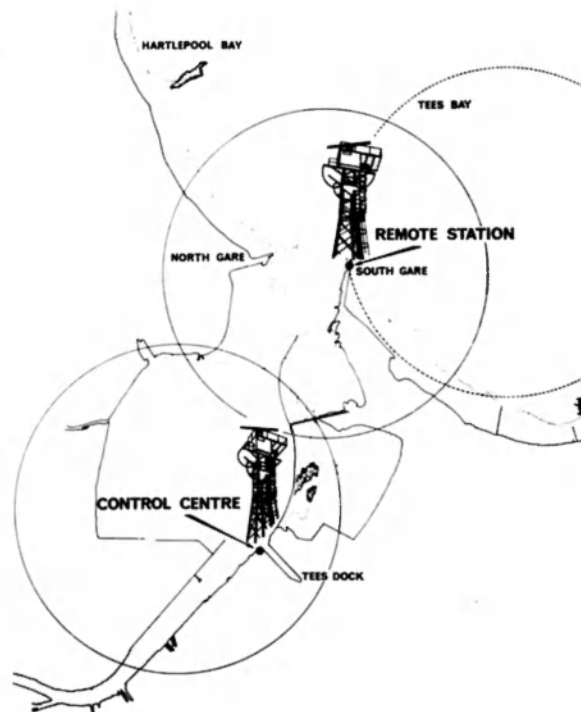
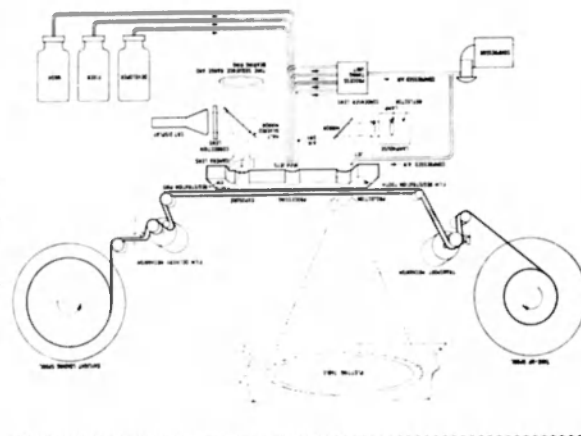
"Having seen the Harbour Radar in use," Captain Hand added "pilots and masters invariably say that fears of being caught in the Tees in a narrow channel in fog will disappear.

"This attitude has had marked effect in that, not only do vessels enter and leave in reduced visibility knowing that complete loss of visibility is possible but quite a substantial number have deliberately entered or sailed in bad visibility having first arranged with the Duty Assistant Harbour Master for Radar Checking.

"We had the case of a 20,000 ton tanker, in ballast, leaving her berth at Teesport in dense fog, swinging and being successfully guided to the open sea with a tug alongside acting as communications link, tugs being successfully guided from sea to base when otherwise they would have spent a most unprofitable night in the lower reaches; three large hoppers being warned off the beach and guided into base; and two vessels, ignoring radar advice and running ashore."

Teesport's Harbour Radar system has been widely reported as the most advanced in the world. It would seem that this claim is justified.

Above: A diagram showing the basic principles of the Photoplot system which gives a complete picture of activity on the water of the Tees Estuary, even in dense fog. Below: How the Photoplot system covers the Tees Estuary.



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