OCEANS
WHAT THEY MEAN TO US

For centuries the oceans of the world have provided mankind with transport and food. Yet, until a few months ago, mankind had never more than scratched its surface. Certainly, man has charted the world have provided mankind with transport and food potential of the oceans. It is pleasing to record that the Australian Government has recognised the value of this research, and that ships and men of the R.A.N., and scientists of the C.S.I.R.O., are keeping Australia well to the fore in this vital work.

But with populations increasing rapidly, man is, for the first time in history, by means of oceanographic surveys, endeavouring to discover the true food potential of the oceans. Today, one can ask: what are the fisheries of the oceans? As a result, catches of fish are getting larger every year, the necessity for developing new ports, this work gets more important every year.

Surveys have been carried out to discover fish resources, and as a result, catches of fish and whales have been limited.

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SCHWEPPESVESCENCE LASTS THE WHOLE DRINK THROUGH

June, 1960

ELECTRONIC AIDS FOR THE SURVEYOR

Just as a new era in Hydrographic Surveying began with the introduction of the Echo Sounder in the 1930s, so is there another new age beginning with the development of position fixing systems suitable for the surveyor.

Until recent years, the surveyor had to fix his position within a certain area by horizontal sextant angles to suitably placed objects on shore. His operations were very dependent on the visibility, and frequent interruptions because of rain or haze were accepted as inevitable. When out of sight of land he was forced to lay floating beacons. If near the coast, these could be fixed with reasonable accuracy, but this declined with his distance off shore. A floating beacon could not be anchored so that it did not move relative to its mooring, and the accumulation of these errors reached undesirable figures.

Modern systems have eliminated the interruptions due to bad visibility, and have increased the accuracy of offshore surveys.

There are several electronic systems on the market for position fixing. The Royal Australian Navy Hydrographic Service has chosen a system known as "Tambor," for fitting in two of its ships. The gear consists of one unit known as the "Master," which is carried in the ship, and two units known as "Slaves," which are set up in selected positions ashore. This equipment gives the ship continuous ranges of the two shore stations, and thus it can steer accurately and instantaneously. Since the range of the equipment is in excess of two hundred miles, areas with complicated bottom topography can be investigated with ease and accuracy, even if they are far offshore.

H.M.A.S. BARCOO is at present fitted with this equipment, and H.M.A.S. WARREGO will be fitted early in 1961. The first areas planned to be surveyed by LAMBDA include Spencer's Gulf, the south-west coast of Victoria, and part of the Great Barrier Reef. Many other areas around Australia, which have presented great difficulty to the surveyor, now become comparatively easy tasks.

In another, but not so obvious, way electronics have come to the aid of the Hydrographic Surveyor. In any survey adjacent to land the surveyor has had to fix his shore marks by triangulation. This has entailed immobilising the ship while detached parties carry out the bush work involved in establishing a series of trigonometric figures, sometimes far inland. This work is vastly reduced by the Tellurometer, a portable electronic distance measuring device. Lengths of sides of figures up to thirty miles in length can be measured with greater speed and accuracy than could be achieved by the laborious conventional methods of triangulation.

The task ahead of the Australian Hydrographic Service is formidable. Due to economic and other factors since World War I, the charting of Australian waters is not as far advanced as it should be. All New Guinea and about half Australia's waters where coral flourishes, and this calls for close examination by the surveyors. There is probably no nation in the world which has a larger charting task than Australia, with its wide continental shelf and its intricate waters.

To survey this vast area, the R.A.N. Surveying Service has had generally the services of one major surveying ship. In contrast, it might be mentioned that Australia's sister Dominion, Canada, employs six major ships and eleven minor surveying vessels. The largest Canadian ship, BAPTON, is only three years old, with a tonnage of 3,700 tons. In Australia, WARREGO, now almost 20 years old and in continuous commission, is a slop of little more than one thousand tons.

With the resources that Australia has been able to afford in the past and the resources she will be able to afford in the future, it is essential that Australian Hydrographic surveys be carried out as efficiently as possible. To achieve this, electronic aids must be fully used.
HYDROGRAPHERS CONFERENCE

THE C.S.I.R.O. laboratory in Cronulla was founded in 1938 to study the fisheries of Australia. It was thought that pelagic fisheries for fish such as tuna and pilchards might be started and that the production of the existing fisheries might be stabilized if scientific information were available. Fluctuations in catches and in availability of stocks are not conducive to a stable industry. It was realised from the start that it was not enough simply to examine the fish. It was also necessary to study the environment in which the fish lived. Thus oceanographical investigations were planned, but owing to the war, it was not possible to carry them out until the early 1950s, and then only in a minor way. The limiting factor was always availability of ships. It was not until 1959, when the R.A.N. refitted DIAMANTINA and GASCOYNE as oceanographical vessels that Australia was able to carry out an extensive deep-sea series of investigations.

C.S.I.R.O.'s own vessels (95-ft. WARRENN and 72-ft. DERM- WET HUNTER) worked in the Coral and Tasman Seas, Bass Strait, the Great Australian Bight, and the Indian Ocean. Apart from one cruise to New Guinea and one to New Zealand, the work was within a few miles of the coast. Without an oceanographical laboratory on board and with speed limited to 6 knots, the scientific work done was very limited. Nevertheless, many valuable results were obtained. For example, it was shown that barracuda congregate at the edge of the water masses moving through Bass Strait rather than at the places where fish food was found.

The Naval frigates with their well-equipped laboratories and speeds of 15 knots, have enabled C.S.I.R.O. to extend the areas of observation and the types of work done. The cruises so far carried out have been exploratory to define the interesting areas and problems so that intensive studies can be planned for future cruises.

H.M.A.S. DIAMANTINA has already made three cruises: Dm 1/59 was a run from Sydney to Perth when oceanographical gear was tested and modified for use on the ship; Dm 2/59 was a long cruise from October 11 to November 9 from Fremantle to Noumea, and returned to Sydney on March 8. Cruise G 2/60 left Sydney on March 17, travelled to Port Moresby, Manus Island, Kavieng, Rabaul, and returned to Sydney on April 21. On these cruises it was found that the deep water in the

AUSTRALIA’S OCEANOGRAPHICAL SURVEYS

By G. F. HUMPHREY, M.B.C., Ph.D.

The Hydrographer of the Royal Australian Navy, Cdr. J. H. O. Osborn (right), discusses with Cdr. J. Schofield which still has to be done. It is estimated that it will be at least 25 years before the Australian coastline will be well charted.

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Coral Sea basin is supplied from the south, while that in the Planet Trench and the Solomon Sea basin comes from the central Pacific Ocean. It seems also that just near the thermocline (the depth at which a clear abrupt change in temperature may occur), there is a quantity of suspended matter, and this makes the water very turbid.

A new series of cruises is now being planned. Dm 3/60 in July-September will work as far as 95° W., and then return to examine an area of upwelling off the north-west Australian coast. Dm 4/60 will work a line of stations to 88° W., and Dm 1/61 will investigate upwelling in the Arafura-Timor area. The process of upwelling is a very interesting and important one, and is caused by wind action and the resulting movement of water from 300-300 m. to the surface layers. It usually brings nutrient salts to the surface so that phytoplankton and zooplankton (the plants and animals that form fish food) grow in good quantity. The Humboldt current along the west coast of South America, with its profusion of life, an area on the west coast of California, with its enormous catches of sardines, and another on the west coast of Africa, with its rich fishery, are well-known areas of upwelling. It is not yet known whether the north-west Australian area is as prolific as these, but fish have been caught there for some years.

Until the population of Australia increases very greatly, the demand for fish will not be enough to stimulate the development of a fishery so far from markets. Other countries are interested in the possibility of securing fish supplies there, because they are short of protein, and fish is an excellent source of this type of foodstuff. In order to assess the productivity of the area and to provide for the proper management of any fisheries which might develop, it is important for Australian fishermen to commence work now. On these cruises there will be studies made of the nutrient salts in the water, the amount of fish food and the movements of the water masses.

On the east coast of Australia, Cruises G 3/60 will be in November and December, and will be specially designed to develop methods for adding radioactive substances to water samples collected at about 50 fathoms, without bringing the samples to the surface. It is also planned to investigate the origin and nature of the particles causing the turbidity near the thermocline. It is hoped that G 1-2/61 (January-March) will be cruises in collaboration with France and New Zealand as part of a "Tasman" investigation on the oceanography of the Coral and Tasman Seas. In 1958, scientists from the Institut Francais d'Océanologie in Noumea and the New Zealand Oceanographic Institute met in Cronulla to discuss with their Australian colleagues how the three countries could co-operate to make their work more valuable. In June there will be another meeting in Wellington to decide if joint cruises by several vessels can be arranged. These joint cruises will be called "Tasmapac."

THE FUTURE

What of the future? The oceanographer sees the possibility of causing artificial upwelling by moving deeper water to the surface with the heat generated by small atomic reactions submerged in the ocean. The benefits we now get from natural upwelling would then follow in areas that we chose. Electricity has already been used experimentally for sea fishing, and the development of "fish farms", using electrical barriers, may become commonplace.

All of these advances require detailed oceanographical information, and the Royal Navy has been appointed. Captain Edmund Irving, O.B.E., R.N., is to succeed Rear Admiral Kenneth St. Barbe Collins, O.B.E., D.S.C., in July this year.

Captain Irving, who was born in April, 1910, has spent the greater part of his service in the Royal Navy with the Surveying Branch. The longest period he has spent away from hydrographic duties is three months, the time spent on the Senior Officers' Technical Course. He has undertaken surveying work in all parts of the world, including the East and West Indies and the China Sea. After wartime duty off the N.W. coast of Scotland and Ireland, he went to the Red Sea in 1942 in H.M.S. ENDEAVOUR, and afterwards served with the Mediterranean survey unit preparing for the invasion of Sicily and Italy.

His first command was H.M.S. FRANKLIN in 1944, surveying captured ports from Cherbourg to Kiel, including the clearance of the Scheldt. He was awarded the O.B.E. for his services in this ship, and remained in it until 1946, when he went to Admiralty for duty in the Hydrographic Department. He was twice Mentioned in Despatches for his war services.

From 1950 to November, 1952, he commanded H.M.S. DAIRYMABLE on survey operations in the Persian Gulf, Zanzibar and the Mediterranean. In 1953 he became the first Commanding Officer of the new survey ship, VIDAL, and at the present is serving as Assistant Hydrographer and Superintendent of Charts.

During his time as Hydrographer of the Navy, Admiral Collins has led the inception of electronic methods of surveying, including the use of two-range Decca and the tele-hydocrometer, and also the hydrodiam with the development of which he was particularly concerned. It has had great interest in the Falkland Islands survey and in the activities of the National Institute of Oceanography.
The ships employed by the Director of Hydrography are LACHLAN, an Australian-built River-class frigate, and the two 22-foot surveying motor launches, TAKAPU and TARAPUNGA. In accordance with tradition and international agreement, those vessels are painted white all over with buff masts and, in LACHLAN's case, buff funnel.

LACHLAN differs from the other frigates of her class in that her armament has been removed; she has a large chart-room aft, and atop this the tall mast used to support her Two Range Decca aerial umbrella. Because of this mast she lays claim to be the only ship of the Royal New Zealand Navy with a mast.

She carries the two-echo-sounder equipped surveying motor boat, PENGUIN and PANDORA. Her other power boat, PUFFIN, can be fitted with a portable echo-sounder to help her larger cousins to carry out the inshore sounding. The ship herself is fitted with two echo-sounders, and her asdic is modified by a reflector plate and special recorder to enable it to be used for passing ahead and deep sounding.

TAKAPU and TARAPUNGA are harbour defence motor launches, sister ships of the Fishery Protection boats operating from Auckland. They are, of course, fitted with echo-sounders, and as they are commanded by surveying officers and a proportion of their crews are survey recorders, they are capable of operating with LACHLAN or undertaking separate small surveys.

The main coastal surveys of New Zealand were done by H.M. Surveying Ships ACHE- RON and PANDORA in the middle of the 19th century. The surveying ship, PENGUIN, was engaged in the beginning of the present century.

With the exception of the work done by ENDEAVOUR, the coastal charts of New Zealand depend upon surveys dating from these times, with corrections to topography resulting from Lands and Survey Department surveys. LACHLAN began the work required to bring these surveys up to date in 1949. Soon after she commenced work she was joined in her long task by the two launches.

The work has been progressing steadily. Since she began her service with the Royal New Zealand Navy, LACHLAN has been responsible for the production of nine medium scale coastal charts covering the areas from Wanganui via Wellington and Dunedin; from Banks Peninsula via Cook Strait nearly to Westport; from Whiti to Dromedary; and over 25 large scale surveys of harbours and anchorages.

In order that the ship's company might have some respite from the surveying weather conditions on the coast, it has been a policy in the past that LACHLAN should spend some two or three weeks each winter in the Pacific Islands, undertaking such surveys as may be needed in New Zealand Dependencies and adjacent waters. Pili, Samoa and Tonga have been visited for this purpose.

As well as regular surveys, there are investigations to be carried out. New Zealand's sea lanes must be searched for the vague reported and fixed rocks and shoals which abound in the area.

(Continued on page 26)
AUSTRALIA'S DEBT TO THE ROYAL NAVY HYDROGRAPHIC SURVEYORS

By OYFREY C. INGLETON

(Author, "Charting a Continent")

T

HE first hydrographic survey from the Royal Navy to work in Australian waters was Lieutenant James Cook, who discovered the eastern coastline in 1770 and conducted a running survey in H.M.S. ENDEAVOUR. The voyage was named after Captain Francis Blackwood, R.N., in H.M.S. FLY, Captain John Lort Stokes, R.N., in H.M.S. BRILL, Captain Sir George Davis, R.N., in H.M.S. RATTLE-SNAKE, and Lieutenant C. B. Burrard, R.N., in H.M.S. cutter BRAMBLE. All hydrographical data, much of it exploratory surveys, which added greatly to the knowledge of these waters. Most interesting narratives of the voyage were written by the hydrographers, and reports of the differences between the surveys of Flinders and Cook. In spite of great care to name the new inner harbour at Port Kembla, the Matthew Flinders Harbour, the name is kept before the public by the extraordinary number of place-names which were named in his honour or after members of his family. For some strange reason, almost every year, someone in Australia is inspired to name something after Matthew Flinders. The latest proposal is to name the new inner harbour at Port Kembla, the Matthew Flinders Harbour.

In 1814, following the publication of Flinders' "A Voyage to Terra Australis," the Admiralty issued a series of charts from Cape Leeuwin to Port Curtis, skilfully compiled and beautifully engraved. Aaron Arrowsmith, and based largely on Flinders' surveys. Aaron Arrowsmith was noted cartographer, whose contribution to the charting of the Pacific has never been fully recognised in Australia. An Australian, Lieutenant-Commander Richard King, R.N., was the next hydrographic surveyor to survey in Australian waters. His work was the most outstanding by the pioneers, and much of it still survives on the Admiralty charts, especially on the north-west coast of Australia. King also conducted a noteworthy survey along the coast of Chile, much of it in the region of the recent series of earthquakes.

Following that arduous survey, King returned to Australia to occupy his private capacity. The position of authority on hydrographic matters in Australia. His advice was sought constantly, and some of the copies were published locally in Sydney. He died, a Rear-Admiral, in 1856.

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EXERCISE SEALION
LARGEST SEATO EXERCISE HELD

FOUR Australian warships, including the carrier, H.M.A.S. MELBOURNE, have played an important part in the SEATO Exercise SEALION, just concluded.

The exercise was the biggest of its kind yet held by SEATO. More than 60 ships and 150 aircraft from all eight member nations took part.

MELBOURNE, with the Daring Class destroyers VENDETTA and VOYAGER, formed part of three carrier groups which protected a large convoy of supply ships moving from Manila to Singapore.

The three groups sailed from Manila on May 6, and in the South China Sea were joined on May 11 by a second smaller force of warships that had sailed from Bangkok on May 9. This second group included the Australian fast anti-submarine frigate, H.M.A.S. QUEENBOROUGH.

VENDETTA and VOYAGER were members of the international escort screens for ALBION and MELBOURNE respectively. Their versatility was emphasised by rapid and accurate firing in both surface and anti-aircraft roles and by excellent A/S detection and attack. This ensures their active participation in most features of the exercise.

QUEENBOROUGH, a specialist fast anti-submarine frigate, was well suited to the predominantly A-S activities of Bangkok group. All three Commanding Officers of the Australian ships took their turn as screen commander of their respective screens.

After a three-day post exercise critique and relaxation period in Singapore, the R.A.N. ships sailed on Monday, May 16, to meet their various operational commitments.

Command Rotates.

Rear-Admiral W. H. Harrington, C.B.E., D.S.O., Flag Officer Commanding the Australian Fleet and one of the three senior National commanders, is flying his flag in H.M.A.S. MELBOURNE. The other two are Rear-Admiral Joseph D. Black, U.S.N. (U.S.S. YORKTOWN) and the overall director, Rear-Admiral V. C. Begg, C.B., D.S.O., D.S.C., (H.M.S. ALBION). Throughout the exercise tactical command of the Force rotated among these three officers.

Sailors from eight Seato Nations fraternised when on shore leave during "SEALION."

SPORTS DAY
During Operation Sealion

In Manila Harbour an athletic meet was held on board the Royal Navy Carrier, H.M.S. ALBION. Here a husky American sailor tries his hand at "tossing the caber". The carnival honours went to the team representing H.M.A.S. MELBOURNE.

June, 1960
Lieut. B. ORR (right), pilot, and Lieut. R. BLOFFWITCH, whose Sea Venom crash-landed into a nylon barrier on H.M.A.S. MELBOURNE. The champagne is a present from the Flag Officer Commanding H.M.A. Fleet, Rear Admiral W. H. Harrington. The flying fish, a present from the deck crew, crash-landed on the flight deck a short while before the Sea Venom.

NYLON BARRIER PROVES VALUE

In April, 1959, an aircraft signalled to her carrier H.M.S. EAGLE—"I am in trouble; my arrester hook has jammed.

An emergency crew set up the new "Spider Web" nylon elastic safety barrier, and the aircraft landed without injury to her pilot or damage to the plane. The first real test had been successful.

On March 16 a Sea Venom from H.M.A.S. MELBOURNE was damaged in attempting to land during night exercises. There was a long swell with intermittent rain squalls.

Piloted by Lieut. B. Orr, with Lieut. R. R. Blotwitch as observer, the plane damaged its nose wheel on the first landing attempt, failed to engage the arrester wires and overshot. Lieut. Orr’s Venom overshot on two attempts to land. The nose wheel collapsed and the deck hook failed to function. Moreover, fuel was by this time dangerously short.

The decision was then made to rig the nylon crash barrier—this being the first time that such an emergency procedure has been adopted in the R.A.N. As it was realised that fuel was practically exhausted, the crew of the plane were instructed to use their ejector seats during their final approach if the barrier was not ready.

But the flight deck crew were equal to their task and the crash barrier was in full readiness. Lieut. Orr made a skilful landing and the plane came to rest enmeshed in the nylon strands with both crew members uninjured.

While this tense drama was being played out, other Sea Venoms and the Gannets carried out their normal Combat Air patrol and Convoy Support duties.

Then, during the recent Sea Lion exercises a Sea Hawk, piloted by Lieutenant Marie Thomson, of Newburg, Eng., was unable to lower its flap fully. It came in to land at speed, and was brought to a stop by the nylon barrier and the usual arrester wire. Again the plane and its pilot were uninjured.

The Nylon Barrier had again proved itself, another aid with the mirror landing sight and the angled deck to make carrier flying so much safer.
TRIESTE's cabin has two portholesLe, one looking forward and slightly down, the other aft and upward. The ports are truncated right-angle cones of six-inch plastic, firmly forced into their metal seats by outside pressure. The two portholes give the observers a 90-degree field of vision.

Communications between TRIESTE and the surface are provided by special-purpose 15-watt battery-powered underwater telephones installed by the Navy's Underwater Sound Laboratory. This allows communication between the bathyscaphe and the motor launch which always accompanies it. The telephone unit in TRIESTE is constructed in a rectangular box with a cushion on top and is used as a seat.

As a rule, communications were excellent during a descent, on the bottom, and during the ascent, but at shallower depths, with the horizontal range greater than one-half mile, communications were poor. The telephone picked up sounds of noisy fish during the dives. An unexpected dividend was that the release of the ballast could be heard on the telephone and could be checked. Otherwise, it was necessary to turn on the outside lights and watch the ballast drop from the portholes.

Generally, the bottom of the ocean area explored was surfaced with a brownish grey mud and indented with numerous holes. These appeared to be about one-quarter inch in diameter, assumed to be inhabited by animals. On one dive, a large hole about four inches in diameter was photographed. One group of five holes arranged in the manner of a dog's paw was seen. This appeared to be the same formation noticed by observers in other bathyscaphe dives. While no occupants of these holes were discovered on the deep dives, a long worm was seen to disappear into one of the holes on an earlier dive.

Among the fish seen were several which appeared to have bodies covered with white down. They had a large brown eye with a blue semi-circle behind it and a tail with a V-notch. This variety was seen to swim vigorously for a short distance, and then lie on their sides on the bottom. They appeared to be undisturbed when the ballast was dropped, sending up a cloud of mud.

Most of the bottom fish that live below the penetration of sunlight showed little concern for the strong artificial illumination of the three mercury vapour lamps that lit up the ocean for the observers, although species of isopods accumulated in the light zone by the hundreds.

The sea was filled with minute suspended particles, looking like snow. However, there seemed to be no indication of a large population of plankton which may be responsible for the deep scattering layer.

At mid-depths, the noise level differed significantly from that at higher and lower depths. It also appeared that this noise came from a horizontal rather than a vertical direction. No one has figured out an answer to this yet.
A flight of high-speed jets screams to 30,000 feet from the pitching carrier deck... a magnificent test of pilot, aircraft and the Golden Fleece fuel which powers the jet aircraft of the Fleet Air Arm.

The same superb quality is available to you in every gallon of Golden Fleece Motor Spirit and Lubricating Oil, wherever you drive, look for the blue and yellow pump with the merino ram on top.

Floating wasps' nest...

A writer in the British magazine, "Navy", wrote recently:

It is clear that Britain is not going to plunge headlong into the exploration of outer space. I would like to think that sound judgment and not financial anxiety is the criterion, for the fantastic possibilities of the universe have a mesmerizing effect upon us.

We are inclined to think that man has discovered more about the planet in which he lives than he actually has done, forgetting that two-thirds of the earth's surface is covered by the sea—the fringe only having been seen by man.

Such thoughts as these undoubtedly prompted a Member to ask the Civil Lord in the House of Commons recently why the Admiralty declined an offer of the Piccard bathyscape which had been converted for use as an aircraft carrier, and in the following year he commanded the light fleet carrier, OCEAN, when she was first commissioned.

Yet we allowed others to dive into its dark mysteries because acceptance of the Piccard offer would have involved the cost of fuel to act as ballast and the expense of transport to the area—a small price to pay for the opportunity to lead in a new and fascinating region for discovery. The wealth which the sea may one day yield to man may far outweigh the advantages of space travel.

Fortunately we are to be given a second chance. The pro-British Piccard family is anxious to build another bathyscape if Britain wants it. This opportunity must not be missed. The sea is the element of which Britain has unrivalled knowledge and experience.

BRITAIN Refuses BATHYSCAPE

NEW FIRST SEA LORD

Admiral Sir Casper John, K.C.B., has been appointed First Sea Lord. He replaces Sir Charles Lamb, who resigned because of ill-health.

Admiral Sir Casper John, K.C.B., is a son of the famous artist, Augustus John, O.M. He was born in 1903, and is an officer with exceptional knowledge of Naval aviation, especially the supply of naval aircraft.

Between the two Great Wars he served in several aircraft carriers. In 1941 he became the Director-General and subsequently Chief Naval Representative for Naval Aircraft Development and Production at the Ministry of Aircraft Production. In 1945, he left for Washington to become the Head of the British Naval Air Aircraft Research and Development in the United States. He also served as Assistant Naval Attaché (Air), Washington.

In October, 1944, he took command of H.M.S. PROMETHEUS, which had been converted for use as an aircraft carrier, and in the following year he commanded the light fleet carrier, OCEAN, when she was first commissioned.

After World War II, he continued his association with Naval aviation. In 1948 he was appointed to command R.N. Air Station, Loosistoun, Scotland. Then he served in the Admiralty as Deputy Chief of Naval Air Equipment, and later as Director of Air Organisation and Training.

He was promoted Rear-Admiral in January, 1951. On promotion he was appointed to the command of the Third Aircraft Carrier Squadron.

In 1952 he became Chief of Naval Air Equipment and Chief Naval Representative at the Ministry of Supply. After a reorganisation of the arrangements between the Admiralty and the Ministry of Supply he became Deputy Controller of Aircraft Production at the Ministry of Supply. He was promoted to Vice-Admiral in March, 1954, and took up the appointment of Flag Officer Air (Home) in June, 1955.

Admiral John was promoted to his present rank in January, 1957—four months before becoming a Lord Commissioner of the Admiralty and Vice Chief of the Naval Staff. He gave up that appointment in February.

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Telegrams: "POOLSTEEL", BALMAIN, N.S.W.
AUSTRALIAN SEA CADETS IN NEW ZEALAND

Monday, 11th January, 1960:

Our Contingent came together on this day at Balmoral Naval Depot. We consisted of 2 officers and 21 cadets. One officer each from N.S.W. and Victoria, and 4 cadets from N.Z. New Zealand, 2 from Victoria, 3 from Tasmania, and one cadet from Darwin and Canberra. We were to spend four days in Balmoral, settling in as a contingent, kitting up, sightseeing round Sydney and a little instruction. At noon on Thursday, under the glare of TV lights, His Worship, the Lord Mayor of Sydney, received the contingent in his rooms at the Town Hall, a gracious gesture much appreciated by the contingent.

After this reception, cadets were granted leave until 1830—the first and only leave granted in Sydney.

Friday, 15th January:

After an early lunch, we made our farewells to the Staff at Balmoral, and thanked them for their cooperation before boarding the bus which took us to Admiralty Steps to board an M.L. for Sydney. The WANGANELLA arrived in Auckland on Saturday, 16th January-Monday, 18th Jan.

Our Contingent came together on this day with a Haka by the N.Z. cadets (40 in number), 10 from each Division; also we met the Canadian cadets (17 in number); and Mr. Deane, Dominion Secretary of the Navy League. The cadets had the afternoon free to settle in.

Wednesday, 20th January:

The cadets settled in well to ship board life, helping to organise and take part in deck games, taking tricks at the wheel and, of course, during Sunday Worship, the Lord Mayor of Sydney, received the cadets. The Captain and 1st Officer and Chief Steward all were most helpful, and allowed the cadets many liberties and privileges not normally available to passengers.

Friday, 19th January:

The WANGANELLA arrived in Auckland right on time, and we were met by the Naval Commissioner, Commanding Officer of Auckland Unit, and Lieutenant-Commander Ainslee, R.N.Z.N., Staff Officer, Reserve. A division, who accompanied us round to Admiralty Steps to board a M.L. for Motokai Island, the site of H.M.N.Z.S. TAMAKI, the R.N.Z. New Entry Training establishment. At TAMAKI we were greeted with a Haka by the N.Z. cadets (40 in number), 10 from each Division; also we met the Canadian cadets (17 in number); and Mr. Deane, Dominion Secretary of the Navy League. The cadets had the afternoon free to settle in.

Thursday, 21st-Saturday, 30th January:

During this period the camp progressed with the cadets becoming more finely tuned day by day. The undoubted highlight of the camp was the two parties that took out Navigator and R/Admiral Phipps, which sailed at 3 p.m. The cadets were well quartered in most comfortable cabins. The farewell was a typical Sydney one, lively and full of cheers, and the cadets set sail for Rakino Island, the second, due to weather conditions, went to Waihi—he was a far more hospitable site than Rakino. The first party went to Rakino Island, the second, due to weather conditions, went to Waihi—a far more hospitable site that Rakino. The first party was led by the U.K. Canadian, Otago and Christchurch officers. A small raiding group attacked the party during the night. Despite expansionist tales of havoc wrought the efforts were largely abortive, but, nevertheless, provided a colourful highlight. The second party was not raided. TAMAKI has three sailing cutters, which lend themselves admirably to such expeditions. The first party went to Rakino Island, the second, due to weather conditions, went to Waihi—a far more hospitable site than Rakino. The second party was not raiding. TAMAKI has only one 40ft. dhow, the TAMAHI, which can carry 15 whalers, hence little opportunity was available for cadets to get a chance to coxswain. P.O. McFarlane, one of the cadets, did some fine work in whalers, hence little opportunity was available for cadets to get a chance to coxswain.

Saturday, 16th January-Monday, 18th January:

Cadets settled in well to ship board life, helping to organise and take part in deck games, taking tricks at the wheel and, of course, during Sunday Worship, the Lord Mayor of Sydney, received the cadets. The Captain and 1st Officer and Chief Steward all were most helpful, and allowed the cadets many liberties and privileges not normally available to passengers.

Monday, 1st February:

Farewells, cheers, war cries and "Waltzing Matilda" were the order of the day. The first party went to Motokai Island (redolent of Maori memories) out in Lake Rotorua. That evening we attended a Maori concert.

Sunday, 10th February:

This day was spent on a visit to Waitomo limestone caves, and then on return cadets attended several local Rotorua dances.

Monday, 15th February:

An early start, to-day, for we are to visit Geysier Valley at Wairakai. Geysier Valley was more impressive than Rotorua as far as thermal activity is concerned and, of course, it also boasts one of the world's two Geo-thermal power generating plants, where steam from the earth is fed direct to huge turbo generators. After lunching at sumptuous Wairakai hotel, we moved on, past Lake Taupo, and on to the "Desert Road," round the base of extinct Mount Ngauruhoe; and Ruapehu, at the foot of which is the R.N.Z. Wireless Station, "Irirangi," and the Army Camp at Whakam Returned.

Tuesday, 16th February:

On to the R.A.N.Z.A.F. Station at Ohaki for lunch, and then by the Bristol freighter to Christchurch. The flight was enjoyed by some, disliked by others, for Bristol are not renowned for quiet and comfort. Once in Christchurch we were adopted by our hosts for the following week.
Wednesday, 17th-Sunday, 21st February:
Mostly billeted with local cadets or Navy League workers; all hands thoroughly enjoyed Canterbury's hospitality. The Navy League arranged a cadet dance at H.M.N.Z.S. PEGASUS, the R.N.Z.R. drill hall used also by the Sea Cadet Corps; also visits to a tyre factory, a newspaper office and the National Airlines Corp hangars and workshops at Christchurch airport. Most exciting was a jet boat display and joy ride on the Wairau River and an M.I. trip to Ripu Island on Lyttelton Harbour, which is used as a Sea Cadet Camp by the Sumner Redcliffs sub-unit.

Monday, 22nd February:
Time for farewells to our hosts and off over the Canterbury Plains to Dunedin, where we were welcomed by our hosts for one night only. T.S. Waireka, the Dunedin Unit, arranged a film night at their fine unit building, for us that evening.

Tuesday, 23rd-Thursday, 25th February:
A Mayoral Reception at the Town Hall, followed by a visit to Museums and lunch at T.S. Waireka, filled our forenoon, and then into the buses to visit farms in Central Otago, from where we returned on Thursday afternoon. The magnificent adventures enjoyed on the farms would fill many pages, and were well worth the great distance travelled. Thursday evening, after the only bus breakdown of the tour, we returned travel-stained to our Dunedin hosts.

Friday, 26th February-3rd March:
Friday found us pushing hard to return to Christchurch to again board our Brunel for the flight to Wellington, where we arrived at the new Rangotai Airport at 1000, and were met by our Wellington hosts, and so started another busy period, this time as guests of Wellington Navy League. Here a further dance was enjoyed at H.M.N.Z.S. OLIPHERT, the R.N.Z.R. Drill Hall, while visits to the Ford factory, and meat processing works, and also a civic reception, filled in different days. Most cadets also visited the old and new headquarters of the Wellington cadets at Petone, and most felt envious of the locals for their new building. Thursday found everyone back with their best parade ground manners, for we were received by the Prime Minister, Mr. Walter Nash, at Parliament House. Mr. Nash then took the cadets on a personally conducted tour of Parliament Buildings and presided at afternoon tea.

(Continued on page 24)
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GUIDED MISSILE SHIPS

The building of guided missile ships for the Royal Navy has not been neglected, and there are now four ships of this class at sea. H.M.S. DRYAD have been launched this summer. The hulls of H.M.S. LONDON and H.M.S. KENT are at sea, under construction and that of H.M.S. KENT was laid down in March. They will be armed with the Sealug missile for long range and Sensor weapons for short range attacks. They will also be able to destroy an Australian Margarine

bled to suit Australian conditions

an Australian Margarine

NISA TABLE MARGARINE

NI SA IS NICER

June 1960

Nelson's Prayer

Before Trafalgar

Monday, October 21, 1805

"May the Great God Whom I worship grant to my Country and for the benefit of Europe in general a great and glorious victory, and may no misconduct in anyone tarnish it, and may humanity after victory be the predominant feature in the British Fleet. For myself individually I commit my life to Him Who made me, and may His blessing light upon you all and may we all be the parents of Watson, as they supplied instructors and staff until Watson was able to provide qualified officers and staff from the Royal Australian Navy.

We have just heard that the two parents at the end of the message addressed by General Eisenhower to the Allied Expeditionary Force on June 6th, 1944, which is entrusted me to deliver.

"Soldiers, sailors and airmen of the A.E.F., you are about to embark on a great crusade to which we have striven these many months.

"The world's eyes are upon you. The hopes and prayers of liberty-loving people everywhere march with you.

"The tide has turned. Free men of the world are marching together to victory.

"I have full confidence in your courage, devotion to duty and skill in battle. We will accept nothing less than full victory.

"Good luck, and let us all beseech the blessings of Almighty God upon this great and noble undertaking."
on the old charts of her waters and those of her dependencies in the Pacific.

From ships and other sources comes reports of new dangers not appearing on the existing Admiralty charts. These must be investigated and their existence or non-existence confirmed. This work can sometimes be done by the larger surveying motor launches, but in many cases LACHLAN carries out this task.

A recent example was the investigation by the ship of a shoal reported in mid-Tasman.

MUD COMES IN HANDY

So the bottom of the ocean is covered with mud? Who cares?

The Navy cares and, at times, is glad of it. The California Academy of Sciences, while engaged in an oceanographic survey, sponsored by the Office of Naval Research, reported that not far off the coast of California the ocean bottom was covered with large areas of thick, gooey mud. Since the ocean's depth at that point was some 500 fathoms, this appeared to be further fascinating information—to be filed.

Then some unsung genius connected this sticky fact with the problem of disposing of large quantities of radioactive waste.

Now, the waste is loaded into steel drums, carried to muddy-bottom areas, and heaved overboard. The drums sink far into the mud long before they disintegrate, and the mud absorbs the radiation. This avoids contaminating large volumes of sea water, which would happen if the drums happened to be dropped on a sand or rock bottom.

The moral? Basic research is a fine thing whenever applied.

During the recent visit of Mr. Wilkinson, Minister for Defence to the United States, the Air Correspondent of the London Financial Times said that he paid particular attention to the Skybolt and Polaris Missiles.

These missiles, says the correspondent, could take the place of the cancelled "Blue Streak" missile.

Skybolt missile is a two-stage, solid-fuelled ballistic missile capable of carrying a nuclear warhead over distances of between 1,000 and 1,500 miles. It is designed for launching from aircraft—the U.S. plans to use Boeing B-52Hs, but almost any large aircraft could be modified to act as a launching platform.

Total cost of the project over the next five to six years, which is the time it will take to develop Skybolt to operational status, is estimated at not much less than 1,000 million dollars. An estimated 80 million dollars is to be spent on the project in the next financial year, beginning July 1.

The big advantage in Skybolt is its mobility, due to the type of aircraft launching platforms used. The U.S. expects to form the first Skybolt B-52H squadron in 1965, with another 23 B-52H squadrons being formed thereafter.

STRATEGIC AIR COMMAND

Many of these squadrons will be based in the U.S., but some of them may be based with the outlying posts of the Strategic Air Command through the world—possibly even in the U.K.

POLARIS MISSILES

Polaris is the U.S. Navy's Fleet Ballistic Missile — again a solid-fuelled weapon with a range of around 1,500 miles, which is intended primarily for firing from submerged submarines, although smaller versions of it could be developed for firing from mobile land-based platforms, such as trucks and trains, or from river-vessels or offshore barges.

At present, seven nuclear-powered submarines are under construction specifically for the Polaris, each capable of carrying 16 missiles. The whole cost of the Polaris programme is also put at around 1,000 million dollars, but this is expected to be increased substantially as current plans for more Polaris-carrying submarines come to fruition.

Polaris is an earlier missile than Skybolt, and it is already undergoing test firings, prior to joining the fleet later this year or early in 1961. Recently, the U.S. Navy opened a new 27 in-dime dollar Polaris assembly depot on the Cooper River near Charleston, South Carolina.

Further developments of Polaris, extending its range capability to 2,500 miles, could be in service by 1968, according to Rear-Admiral William F. Raborn, head of the Polaris programme.
A push button control system will be installed for the operation of the Dock, and the main pumps for controlling the raising and lowering of the Dock will be capable of dealing with over 200 tons of water per minute. Instruments will be fitted to record for the Dock master's information the strains on the structure during the docking operation.

Four main generators and two auxiliary generators supply 1,320 kw. for the main pumping machinery, lighting, etc. This power supply is sufficient for the domestic load of a vessel in the dock and power and lighting for repairs in addition to the dock services.

The Dock will be equipped with special sliding keel blocks for the docking of submarines. A 71 ton travelling crane is provided for the lowering and raising of the main pumps for controlling the docking operation, and the Dock will be capable of dealing with over 200 tons of water per minute. Instruments will be fitted to record for the Dock master's information the strains on the structure during the docking operation.

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An electronic camera with a magazine holding 300 shots photographed the scene on the screens as the underwater camera, with its coupled spotlights, began the slow work of examination and identification. This examination continued through Christmas Day, broken at intervals by the painful necessity of recovering and relaying the moorings. Finally, Petty Officer F. Brady dived on the morning of Boxing Day. He found visibility limited to two feet—he could not see his diving boots—but he made an examination of areas of the hull by touch.

After this dive, television examination was continued until, by 27th December, sufficient information was obtained.

**H.M.A.S. QUADRANT UNDERGOES TILTING TEST AT GARDEN ISLAND**

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

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or The Secretary, Room 8, 8th Floor, 528 Collins Street, Melbourne, C.I., Victoria.
or one of the Hon. Secretaries at:
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July, 1960

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Patron: His Excellency the Governor of New South Wales.
President: Rear Admiral H. A. Atkins. R.A.N.R.

Victoria Division:
Patron: His Excellency the Governor of Victoria.
President: Capt.-Comdr. A. N. Bertram. R.A.N.R.
Secretary: Miss R. M. Shorrocks. Room 11, 308 Collins Street, Melbourne.

South Australian Division:
Patron: His Excellency the Governor of South Australia.

Tasmanian Division:

Western Australian Division:
Patron: Hon. Sec.: Miss E. C. Shorrocks. Room 11, 308 Collins Street, Melbourne.

Queensland Division:
Patron: His Excellency the Governor-General of Queensland.
President: Comdr. R. A. Stiles. R.A.N.R.

Northern Territory Division:
Patron: His Excellency the Governor of the Northern Territory.
President: Rear Admiral H. A. Atkins. R.A.N.R.

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[AB13/8/3]
BATTLES have been lost for want of a horseshoe nail, but many more have been lost through lack of communications or because of faults of breakdowns in this important part of our organisation.

In 1942, for example, our communications won a battle for us. The outlook was grim enough for the worst of pessimists. France out of it, Italy and Japan against us, the latter having proved to be a well-organised, capable and ruthless enemy. They had captured half a world, including our impenetrable fortress at Singapore. They had hit the U.S.A. a crippling blow and had sunk our best ships—Prince of Wales and Repulse, Perh and Houton, Yarra and Vampire, and dozens more. The New World in the U.S.A. was not yet strong enough to save the Old, but it was willing to try. Singapore was bombarded by seventy ships and thousands of men, assisted by H.M.A. Ships Australia, Canberra and Hobart to re-capture the capital of the British Solomon Islands and Guadalcanal. This latter was important because the Japanese had almost completed an airstrip there, from which they could have successfully bombed the East Coast of Australia. With the ports of Newcastle and Kembla out of action, Australia might be practically finished. The invading armada had succeeded in landing the Marines, though they were fast being hunted. We were ready for them, and perhaps try to knock a few out.

Our gallant little Force of Coast Watchers, hiding on these islands in close proximity to, and hunted by, the Japanese, never staying in one spot more than a few hours, now came into the picture.

They did not know of our operations, of course, but one of them, Paul Mason, Esq., heard what he considered to be forty heavy bombers pass close to him, heading south. He, therefore, called up a certain call sign and made the following appeal:

"FORTY HEAVY BOMBERS FLYING SOUTH 1030 MAISON," which was received on the mainland of Australia.

The message was then passed to Brisbane, from where it was relayed to Sydney, then to Pearl Harbour, in mid-Pacific. Pearl Harbour transmitted it to Canberra Radio Station, who transmitted it to Pearl Harbour, in mid-Pacific. Pearl Harbour transmitted it to the ship broadcast, and we received it on H.M.A.S. Australia at 1057. That message, which took twenty-seven minutes to reach us was a very valuable one. We knew how far North Mason was, and we knew roughly the speed of heavy bombers. We, therefore, knew the Japanese would arrive overhead at about midday.

We set about making preparations to greet them, and hoped they'd bring their own lunch since we hadn't very much. We stopped the unloading of the convoy, got it under way in a compact little fleet, with the warships in a tight circle about it, and had them going at full speed and zig-zagging.

When the Japanese arrived we were ready for them, and no ship was hit. However, though several were damaged by torpedoes and one by a suicide pilot.

However, without that message from Mr. Mason we might have had such serious casualties as to cause our withdrawal from the venture. Hence, you may see the importance of the efficient Communications Organisation. Now, the way the Communication Organisation works is as follows:

Admiralty, in London, has what are called "FIXED SERVICES" with each of the Naval Commands. Each Command has Fixed Services with WHITEHALL, and with the neighbouring Commands.

London: SINGAPORE, WELLINGTON (N.Z.), PEARL HARBOUR.

If we want to pass a message to, say, MALTA, we pass it via CANTERBERRY and LONDON. One for WASHINGTON, could go via PEARL, while a message for a ship at sea on the Far East Station would go via SINGAPORE.

Each Naval Command has its own internal organisation. Australia's nerve centre is at CANTERBERRY, which is connected by a Teleprinter Network to Sydney and Melbourne, as well as to the R.A.A.F. and Army Network.
NAVAL COMMUNICATIONS (Cont.)

Tape Relay Station, as well as our Main Radio Stations, Sydney and Melbourne are Minor Tape Relay Stations, and they each have many tributaries running off to outlying stations. For example, Sydney serves The Flag Officer-in-Charge, East Australia, the R.A.N. Air Station and the Australian Joint Anti-Submarine School at NOWRA. H.M.A.S. PENNISN, H.M.A.S. WATSON, The Dockyard, and many other Naval Establishments. Each of these is connected by teleprinter or some other means to Sydney Signal Centre, but if a ship has sailed, she must be reached by radio—close to the port she would be reached on the local coastal frequency, but if proceeding far from port she will have set watch on the Area Broadcast and will receive her messages via CANBERRA NAVAL RADIO. Each message is numbered and the ship makes sure her numerical sequence is complete so that no messages are missed. She must ask for the missing ones.

Radio Messages go by Automatic Teletype

The messages passing between LONDON and CANBERRA are usually by Radio Automatic Teletype (RATT), and many of the ships are fitted to receive RATT as well. This is automation entering into the game, for it is not read by a man using a pencil or typewriter. A teleprinter operator types the message out by teleprinter perforator, which makes a tape somewhat after the fashion of the old pianola roll. The perforated tape, when put in a transmitter head, passes the message out over the air by means of radio signals, which, as they are picked up in the receiving ships, works the teleprinter there to give a replica of what was originally typed.

Ships in harbour obtain their messages via Sydney Signal Centre. Urgent signals are passed at once, either by visual signalling, by telephone or by radio. Non-urgent messages are usually collected twice daily by the orderly or postman. On receipt, the messages are copied and delivered to the necessary officers or offices, and are filed in the correct logs so that they may easily be traced or referred to.

Confidential or secret messages are, of course, never made in plain language. These must be dealt with by the cryptographic team, who are skilled in the art of encrypting and decrypting messages. So skilled are they that sometimes nobody at all can unravel what they have done!

The Communications Department is the eyes and ears of Her Majesty's Fleet, and they are never closed. For twenty-four hours every day, and for 366 days in 1960 they watch and listen, and they provide the means whereby the Admiral may receive information and pass his orders to the ships and authorities under his command.

Mercury was the Messenger of the Gods, and the Royal Navy's Signal School is called H.M.S. MERCURY because we communicators are the messengers of the admirals and we will put a girdle round the earth (by radio) in about a fifteenth part of a second.

C. H. NICHOLLS.
H.M.A.S. HARMAN

At an Imperial Conference held in London in 1926, discussions on Empire Defence took in a long range plan of Empire Communications. The then relatively new technique of long range communications using short wave was to be exploited fully and a chain of wireless stations was to be established throughout the Empire to ensure satisfactory defence communications.

The Australian Commonwealth Naval Board decided to have its major Shore Wireless Station nearby and under its direct control. Even in the 1930's it was planned to have the Headquarters of the three Defence Services in Canberra. Accordingly suitable transmitting and receiving sites were selected in the districts of Belconnen and Woden in the Australian Capital Territory.

Work commenced in constructing "HARMAN" in 1938. The first message was received from Singapore Radio on 19th December, 1939. Before that date, however, spent many hours digging holes for trees and shrubs at both stations from which have grown magnificent windbreaks. The present occupants are grateful for this foresight.

H.M.A.S. "HARMAN" was named after the Director of Naval Communications and assistant of the time, Commander E. H. Harvey, R.N. and Commander J. B. Newman, R.A.N.

There was a first "official" message received "of the blue" from a Walrus amphibious aircraft from H.M.A.S. "ALBATROSS." The aircraft was flown from Jervis Bay to look at the station and dropped a good luck message as it flew across. With "HARMAN" going on the air a considerable load dropped from Garden Island and Flinders Naval Depot Wireless Station, which up to this time had taken the brunt of Naval Communications since the outbreak of war.

WRANS first appeared in the form of 12 girls who were part of a private (but public mind) organisation called the Women's Emergency Corp. These girls had been trained in Morse code by a Mrs. McKenzie of Sydney who had been far-sighted enough to realise the value of such operators. Her trained girls, when offered to the Navy, were sent to "HARMAN" on approval, where they proved themselves rapidly. They subsequently merged into the WRANS. From the outbreak of the Japanese War there was a steady build-up in personnel and equipment to a peak of 600 in 1943/44.

The station represented quite a mixed bag of men and women, R.A.N., WRANS, and U.S. sailors, Army providing guards for security purposes.

On 15th May, 1946, in addition to Naval Communications, "HARMAN" provided broadcast facilities for Merchant Ships in the Antarctic Area. This was part of a world-wide scheme sponsored by the Admiralty to provide safe and efficient communications for British Commonwealth Ships. It is not generally known that all long-distance radio telegrams to and from merchant ships in and out of Australia, pass through H.M.A.S. "HARMAN" in some form. This work is carried out by the WRANS, free of charge.

It was not until the end of 1954 that WRANS were not replaced by WRANS previously the only long range communication system in operation had to be constant vigilance to ensure that all long-distance radio telegrams to and from merchant ships in and out of Australia, pass through H.M.A.S. "HARMAN" in some form. This work is carried out by the WRANS, free of charge.

are grateful for this foresight. The present occupants are grateful for this foresight.

"HARMAN" is the only non-stop operational "ship" in the RAN, working 24 hours a day throughout the year. This has been the case since the first Morse code in London, the WRANS being well trained and the present day equipment could be well twisted into "We never close."

THE NAVY

July, 1946
R.A.N. W/T STATION H.M.A.S. HARMAN

DURING the period since 1955, Standard Telephones and Cables Pty. Ltd. have been engaged in the modernisation and enlargement of the facilities at the Naval Wireless Station, H.M.A.S. HARMAN. H.M.A.S. HARMAN includes an administrative centre and signals centre at Harman, and receiving and transmitting stations at Bonshaw and Belconnen respectively.

All point-to-point communication, that is, communication between shore establishments of the R.A.N., and with shore stations of the Royal Navy, the Royal New Zealand Navy, the United States Navy, etc., is carried out by means of automatic printing telegraphic equipment. Automatic telegraphy is also being adopted for communication with ships at sea, although manual Morse Code is also used, and will continue to be used for this purpose.

The majority of R.A.N. communications pass through the Signals Centre at Harman, which serves as a central exchange. Thus all communications with remote R.A.N. stations and with overseas organisations, and with ships are sent from the originating stations by radio or by landline to Harman, where they are automatically received and then relayed over the appropriate radio circuits. Likewise, incoming signals are fed to Harman, whence they are relayed to the address stations.

All traffic passing through Harman is handled in the form of punched paper tapes through the central exchange, the Tape Relay Centre. These tapes are automatically punched by telegraphic receiving equipment, and after manual receiving bays to the appropriate transmitting bays, the messages are automatically re-transmitted. The only departure from this automatic routine is in the case of communication with ships not fitted with automatic telegraphic equipment, in which case messages manually received are transcribed by operators on to punched tape, and outgoing messages are sent in Morse Code either manually or by means of electronic code converters.

Associated with the sending equipment in the Tape Relay Centre is automatic Dating. Timing and Numbering equipment, which adds that information to each outgoing signal prior to transmission.

Also associated with the Tape Relay Centre is the Control Room, where the engineering control of the communication circuits takes place, and, for example, frequency (wavelength) changes for the radio circuits are originated to conform with changes in transmission conditions, and the quality of the circuits is supervised. The Control Room also contains the channelling equipment which permits the transmission and reception of several channels of traffic simultaneously on one radio circuit. Likewise, all the outgoing radio traffic to the transmitting station, 10 miles distant, is stacked by means of similar channelling equipment on to a very short wave bearer group and sent to Belconnen through highly directional aerials. At Belconnen the many channels of signals are sorted out automatically and fed to the appropriate radio transmitters.

The Belconnen Transmitting Station contains a Very Low Frequency transmitter of 200 kilowatts power output, operating at 44 kilocycles per second (a wavelength of almost five miles), four 40 kilowatt short wave transmitters for the most important overseas fixed services, 23 5 kilowatt transmitters for fixed services, broadcasts to ships and ship communication, and three 20 kilowatt transmitters for ship communication.

The 200 kW transmitter, which was originally built 20 years ago, has now been overhauled and modernised, and is believed to be the most powerful radio transmitter in the Southern Hemisphere. It is particularly valuable because of its great wavelength and power permit communication with ships to be maintained even during solar disturbances and magnetic storms which disturb short-wave communication.

Associated with the transmitters at Belconnen is the necessary control and monitoring equipment, directional and broadcast aerial systems, and aerial exchanges which allow any transmitter to be connected to almost any aerial.

The Bonshaw Receiving Station likewise has a comprehensive system of directional and non-directional aerials which permit reception from any direction with a minimum of interference, and aerial exchange systems, which allow any receiver to be connected to any desired aerial. The exchanges feed the fixed service receivers, which operate without attention, and are connected directly with tape perforators at the Tap Relay Centre, and also the ship-shore receiving positions, which are manned by telegraphists.

The communication system at H.M.A.S. HARMAN is one of the most modern in the world, and it probably the largest shore wireless station in the British Commonwealth.

Harman's activities are supplemented and backed up by the other major R.A.N. station, Coonawarra (Darwin), which is similar but on a smaller scale and which has also been completely modernised by Standard Telephones and Cables.

A technician from S.T.C. checks the transmitter coil. The coil is housed in a sealed, air-conditioned room. Anyone entering the room during transmission would be killed instantly, but should entry be necessary, a special safety device cuts off the power.


THE NAVY

July, 1960
NAVY APPRENTICES PASS OUT

Before a large gathering, which included the First, Second and Third Naval Members, the 38 apprentices who have completed their training passed out officially at a ceremony in H.M.A.S. "Nirimba" on Wednesday, June 15.

The original intake of 50 youths began their training on July 1, 1956, and Commodore F. L. George, at that time Captain of H.M.A.S. "Nirimba", was present at the graduation ceremony.

Three of the apprentices already entered were recruited during their course for training as Cadet Midshipmen at the Royal Australian Naval College. The impressive ceremony was attended by many of the parents of the apprentices and by representatives of the N.S.W. Dept. of Technical Education, the Apprenticeship Commissioner, the Department of Supply and various organisations and firms, all of whom assisted materially in the development of the Apprentice Training Scheme.

For a few who have been glad to talk to, while ships in the W.R.A.N. today, not only the technical needs of the Service, but also the fact that she enjoys work-record her words.

Turning to the Naval side of communications, we find that, in his instructions to his cap-

tains, ordered: "If I hoist a

bucket at my mainyard arm, close and I will speak with

you."

From such a simple beginning sprang the elaborate and efficient

system of visual signalling

as used in Her Majesty's Fleet at the present time.

Naturally, this was not done

in one stride, but is the result

of a gradual building up through the centuries.

Of the earliest flag signals, which was used to the end

of World War II in a slightly altered form, was the "Enemy"

flag.

In its original form it was

the French ensign, and hoisted by the Main, any ship indi-

cated "Enemy in sight."

Hoisted at the foremost by the Admiral of the enemy, it meant "the enemy. If, however, the

Admiral wished the chase dis-

continued, he hoisted this flag at the main mast. This is now flag T (for Tongo).

THE CODE OF LORD HOWE:

The oldest Signal Flag in the world is the British Church

Pennon, and it is still used for its original purpose, that is, to
denote that the ship's company is at Divine Service.

It originated when the

British and Dutch were enemies, and both sides being Roman

Catholics it was considered a truce should be observed whenever the Mass was being celebrated by either side.

The ensign of the two coun-

tries were sewn together, and the flag of Britain, a red St.

George's Cross on a white field, occupies the part of the Pen-
nant next to the Mast, while the Dutch Colours, red and

white and blue horizontal bars, is at the "Fly" or part farthest

from the mast.

Flag signalling developed but slowly, until the middle of the 18th century, when several codes were designed, notably by Kempenfeldt and Lord Howe. It was the latter's sys-

tem of signalling which was used so successfully by our beloved Nelson.

This code included a small English dictionary, and the whole of the signal code was allotted a combina-
tion of figures, a phrase section, where each of the various orders in common use, such as "Make sail. "Tack together," etc., were also indicated by groups of figures, and a Ge-

ographical section whereby names of places could be sig-

nalled in the same manner.

Lord Howe's code consisted of only 12 flags, which represented the numbers one to

eight and two substitutes, so naturally enough it was not very comprehensive.

As an illustration of the evolu-
tion of flag signalling, it may be said that the British Naval code in use to the end of the last World War consisted of no fewer than 80 flags, each having its own sev-

eral meanings in different cir-
cumstances, and yet again dif-
f erent meanings when used in conjunction with one another.

In fact, it may be said that learning of flag signalling is as complex as the learning of a foreign language. This is the main system of visual signalling from a "war" point of view, and the speed at which messages can be passed by an Adm-

iral by this means is really amazing.
At the present time all N.A.T.O. nations use the same Code of flags which has been reduced to 70 all told.

**VALUE OF HELIOGRAPH.**

Flag signals are hoisted at the masthead of a flagship, certain ships repeating the signals, the remaining ships merely answering.

When the Admiral wishes his order to be executed, the signal is hailed down, although, in some cases, flag signals are obeyed on sight.

It must not be presumed, however, that flag signalling is the only method of conveying orders. When the distance is great, or visibility poor, the signalling projector (or search-light) is brought into use, the Morse Code being employed.

Other systems in use are semaphore for short distances, flag waving for longer distances, and sirens or whistle for signalling in a fog.

At night, communication is effected by means of flashing lanterns. The heliograph is an ingenious arrangement of mirrors whereby the light of the sun is utilized for flashing the Morse Code over immense distances under favourable conditions.

The greatest distance to which the heliograph has transmitted messages is something like 120 miles.

This system is used only by signalmen in a landing party, the reason being that the movement of a ship prevents the accuracy required in directing the rays of the sun to a distant station.

**EYES OF THE FLEET.**

The importance of efficient and precise signalling cannot be too greatly stressed, as the following story from Greek Mythology amply proves:

Theseus, a legendary hero of Attica, was determined to slay the Minotaur, a monster with the head of a bull and the body of a man, who lived in the Cre- tan Labyrinth, where he devoured the Athenian youths and maidens sent as a tribute every nine years.

Before sailing away in his black-sailed ship, Theseus told his father, Aegeus, that, should the ship return bearing white sails instead of black, it would indicate that the mission had been successful.

With the aid of Ariadne and a reel of cotton, Theseus slew the Minotaur. Unfortunately, the ship’s company were so elated that they omitted to change the sails. Aegeus, standing on the cliffs of Attica, sighted the black sail returning, and forthwith cast himself into the sea in despair.

Thus was named the Aegean Sea, and thus is proven the necessity for attention to detail in signalling, as Aegeus never fully recovered from the result of this error.

The Signalmen are the eyes of the Fleet, and they never cease watching, although “Automation” in the form of radar gives more timely warning of the approach of objects which may prove to belong to the enemy.

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**NEW RATINGS’ BLOCK AT HARMAN**

The Minister for Works, Mr. Preth, has released details of the new accommodation blocks for ratings to be built at H.M.A.S. “HARMAN.”

Costing nearly £200,000, construction has just begun on the new quarters which will consist of three interconnected blocks of modern design. A three-storey block will house ratings, catering for the new living scale conditions... four men share each large room, with private stowage for clothes and personal gear for each occupant.

A two-storeyed block will house Chief and Petty Officers in single berth cabins. The central two-storied block will contain all communal facilities — galleys, dining halls, reading and recreation rooms, toilets, bathrooms and laundries.

Heating will be provided throughout the new quarters, which will be of brick, faced externally with face-brick. The walls will carry the load, eliminating supporting internal pillars. For added fire protection,floors will be of concrete, and an automatic fire sprinkler system will be installed.

The new accommodation will house 174 Chief and Petty Officers and ratings.

The new quarters, together with the new “Winnepeg,” opened in September last, will make HARMAN the most comfortable and up-to-date shore establishment in Australia.

With the bright colourful cottages nestling around the new buildings and its natural setting in undulating plains with the backdrop of the nearby hills, HARMAN will, indeed, make an attractive sight by the spring of 1961.

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**WINNS**

“The Big Friendly Stores”

Courtesy and service give a pleasant glow to Business, and WINNS like to do Business that way. In that spirit they are happy to serve you.

WINNS, Oxford Street, Sydney
& Branches
The Navy to-day the overwhelming weight of man-power, ships and aircraft is concentrated, directly or indirectly, in the anti-submarine role. Some 60 frigates have been converted or built expressly to cope with this aspect of defence, and the whole face of the sea-going Navy has changed over the past two decades. The most logical, and potentially the most lethal adversary to the modern submarine is only now coming to the fore. This weapon! Another submarine—the anti-submarine submarine. A brief historical survey of the development of this facet of submarine warfare will help to underline the point. The Submarine Branch is considered an unmasked bogey; a menace, but course, speeds, even a grand total of 17 months, and a grand total of 17 during the war. These were not, however, A/S submarines engaged in the modern sense. Detection and attacks were carried out on surfaced targets and certainly required the target submarine to be visible.

The final stages of the war, however, saw the production of the "K" class—the first purely A/S submarines. These were unique little craft, and it had been built by 1916, so great was the urgency. They displaced a mere 500 tons, were 140 ft. long, and had a complement of 22. They could rely on their superior speed and range and enhanced listening capabilities, is, indeed, a formidable anti-submarine weapon.

The history of submarine operations, as of any other
WRANS in the News


Lieutenant B. Dunn points out features of a Gannet anti-submarine aircraft to W.R.A.N. officers and ratings from the aircraft carrier Melbourne, in Darwin recently.

—Courtesy S.M. Herald.

Commander F. L. Georgr, A.D.C., R.A.N., and First Officer E. Ekert, W.R.A.N.S., cut the Birthday cake at the party given by the W.R.A.N.S. at Flinders Naval Depot to mark the nineteenth anniversary of the formation of their Service.

Soviet Naval Policy has changed sharply once again, the fifth time in the history of the 42-year-old Soviet Navy. For some years Western observers have noted that work on the hulls of several of the "Severdho" class cruisers had stopped, and it was obvious from many Soviet statements that they did not know to what use to put these new cruisers, except for training and for carrying V.I.P.'s abroad. Nobody, however, expected such complete confirmation as Khrushchev pronounced during his trip to the United States, that 90 per cent. of Russia's cruisers would be scrapped in the near future. This would leave her with about three or four, probably one for each of her main fleets in the Pacific, Arctic, Black Sea and Pacific; and these survivors are to be employed for training and probably as peacetime flagships only.

Among vessels to be built under the "new attack" programme, submarines are to receive top priority, followed by minewinders, motor torpedo boats, patrol craft and large destroyers. This trend was confirmed in Khrushchev's speech to the Soviet Assembly in January, 1960. As the Russians had been building from 50 to 80 submarines a year, besides many cruisers and numerous other warships, tankers and miscellaneous merchant vessels, this concentration on submarines and small craft will no doubt enable them to launch even more submarines and some of them nuclear-powered. The Western navies have also come to the conclusion that battleships, and perhaps even cruisers, have no raison d'etre in the nuclear age; although it is hard to see why the aircraft carrier, for instance, should have a better chance of surviving an attack by missiles with nuclear warheads, and thus not be another victim of the time neither the British nor the U.S. Navies would take such radical steps as the Russians and scrap cruisers only a few years old. In peacetime and in limited war, cruisers are still of an important role, and it is surprising that the Russians do not seem to contemplate converting some of their cruisers into missile-launching vessels or light aircraft carriers. They intend to rearm their modern destroyers with missiles as soon as possible (most of these vessels carry at present conventional armament, which is weak and obsolete); but a cruiser hull can obviously carry more and heavier missiles than a destroyer while offering at least some armoured protection, better seagoing qualities, and wider cruising range. For these and many other reasons the Soviet decision seems revolutionary—putting all its eggs into one basket so far as the Soviet Navy is concerned. In a few years the Russian Navy will resemble that of Germany in 1944-45—with many submarines and some coastal forces, but no surface ships which might tie up superior N.A.T.O. forces.

The disappearance of the Soviet cruisers will ease the task of the N.A.T.O. Navies which may now concentrate almost exclusively on Soviet submarines and mines, and on countering amphibious assaults over somewhat short distances. For the time being, however, the said cruisers are still quite active and towards the end of 1959 the ADMIRAL SENJAYIN, belonging to the Pacific Fleet, paid a visit to Indonesia. This beautiful vessel and her escort of two heavy destroyers certainly did more to impress the Pacific nations than a whole flotilla of Soviet submarines. It is tempting to conclude that if the Russians really scrap their cruisers and concentrate even more on submarines than they have done so far, they contemplate either total war or total peace, but certainly not limited war. For the latter their Navy, composed exclusively of submarines, is the best solution. Even if the cruisers were quite unsuited, especially if the war were to be waged far from the Russian coasts. As for total peace, to build a submarine fleet of 720 craft, nearly 500 of them already in existence, hardly seems to be the best solution. Unfortunately, there are other indications too that the Soviet Navy is trying to secure new bases abroad, both in the Mediterranean and in the Persian Gulf, and to develop its influence in the Pacific. Hand in hand with this goes a worldwide increase in underwater research work and spying in coastal areas.
**SCIENTIFIC ACTIVITIES**

While it seems that Russia is concentrating her ambitions at present on the Near East and Africa, it should not be forgotten that Soviet research and surveying vessels as well as submarines are still very active all over the world. Surveying goes on on a tremendous scale in the Pacific and Atlantic, probably in connection with the trials of long-range missiles. Sightings of Soviet submarines are reported from Canada, the Caribbean Sea, along the coasts of Argentina, Brazil, and Chile (in some cases surface vessels of these countries have reported depth-charging unknown submarines) and many other places, and some of these reports are almost certainly correct. Soviet "scientific" activities in the Antarctic, and even more in the Arctic, are designed ultimately for military purposes as well as peaceful ones, and in this field the Russians deploy more means and obtain more results than the Free World.

Altogether, the situation may be summed up as follows: While the Soviet is increasing the numerical strength of her navy, acquiring new hardware and testing improved weapons, the Western navies decrease in strength, close down more and more bases, and are also declining in manpower. As long as this situation continues, it will be clear that the political initiative and by one means or another secure still more friends, while the Free World loses them. We have already lost so many that we cannot afford to lose many more!

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**SENA CADETS in DARWIN**

Captain Marks, Director Naval Reserves, visited Darwin recently to inspect the Northern Territory Division of the Sea Cadets, whose ship is T.S. "WARRAMUNGA". They were very seamenlike in their drill, and after the inspection he presented the cadets with a framed picture of H.M.A.S. "WARRAMUNGA" at speed.

These same cadets received congratulations from the former Governor-General, Sir William Slim, when he visited Darwin last year. They paraded a guard for him at the Darwin Show and His Excellency commented very favourable on the appearance and bearing.

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**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 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 numbers so that the Navy League in Australia may be widely known and exercise an important influence in the life of the Australian Nation.

For particulars, contact The Secretary, 66 Clarence Street, Sydney, N.S.W., or The Secretary, Room 8, 8th Floor, 528 Collins Street, Melbourne, C.I., Victoria.

**THE NAVY**

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**SEA CADETS in the News**


The Governor of New South Wales, Sir Eric Woodward, with Commodore F. G. Lander, Commodore of the Royal Motor Yacht Club at Point Piper, inspect the new floating dock on the occasion of the official opening of the dock. The Guard was provided by the Sea Cadets.
The Royal Canadian Navy is celebrating its 50th anniversary, Canada's Navy officially came into being when, on 4th May, 1910. Royal assent was granted to the Naval Service Act. That same year two protected cruisers, the NIOBE and RAINBOW, were acquired from the Royal Navy.

Ships of the Royal Canadian Navy have served in three wars. During the First World War the Canadian naval contribution was about 9,600 officers and men and 100 ships. During the Second World War the Royal Canadian Navy expanded to 392 armed ships and 85,000 officers, men and Wrens. Canada's major naval effort being devoted to the Battle of the Atlantic. Canadian destroyers served in the Far East throughout the Korean War.

This 50th anniversary year, 1960, finds the Royal Canadian Navy at its greatest peacetime strength, with 62 warships in commission and with 20,604 officers, men and Wrens on full-time duty, and 3,550 in the active Royal Canadian Naval Reserve. Some 49 per cent. of the Royal Canadian Navy personnel are at present serving on board ship.

R.C.N. JETS TESTED.
Six Banshee jet-fighters of the Royal Canadian Navy, armed with Sidewinder missiles, convincingly demonstrated their destructive power by shooting down five target-aircraft in an exercise designed to test the effectiveness of the Banshee-Sidewinder combination.

The firings took place over the sea on the missile range of the Royal Aircraft Establishment at Aberporth, Wales. The targets were Firefly VIII aircraft, flown by remote control. Six missiles were fired at as many targets and five of the drone aircraft were splashed.

The operation was carried out by aircraft of Fighter Squadron 870.

The circumstances surrounding the award to Lieut. Titcombe were:

On April 21, 1959, a chopper operating from Portland (England) ditched about 9 miles south-east of the Shambles Light Vessel, in a depth of 170 feet.

To determine the cause of the crash it was essential to recover the helicopter, but the strong tides prevented the recovery by wire sweeps and standard divers.

Lieutenant Titcombe, then in charge of the Clearance Diving team at H.M. Underwater Detection Establishment, was consulted on the use of clearance divers. In such depths, with further complications caused by the swift tides, operating time for the divers below would be very short.

Still further, the ascent must be a matter of no more than 5 minutes, making decompression in a special chamber a matter of urgent necessity.

The necessary equipment including special inflatable dignity capable of operating in rough weather were available, and so Clearance Diving history was made.

It was the first operational occasion that Clearance Divers had performed at such great depths and that surface decompression had been used, and the team effort was the main factor in the successful recovery of the chopper.

The success of the operation was largely due to the intelligent appreciation of the situation, the leadership and the fine personal efforts of Lieutenant Titcombe.

NEW RATE FOR R.N.
Among the points that Mr. Orr-Ewing, Civil Lord of the Admiralty, recently discussed in the House of Commons was the suggestion that a Master Rate, above that of Chief Petty Officer, be introduced in the Royal Navy.

This rate would bring the Navy in line with the status and pay of Warrant Officers in the other services.

Mr. Orr-Ewing said that the problem is now under consideration.
NEW TYPE SONAR
Significant Advance in Submarine Detection

A new type of Sonar, known as Variable depth sonar, has been manufactured in Canada. This new system will enable warships to lower their sonar gear through the ocean's thermal layers, thereby overcoming the ability of submarines to escape detection in or below these temperature strata.

Variable depth sonar is the result of more than 10 years research and development by Defence Research Board scientists and anti-submarine specialists of the Royal Canadian Navy. During the Second World War, the upper levels of oceans usually contain layers of varying temperature which form a horizontally uniform pattern many miles in extent. These layers may completely resist penetration by sonar transmissions from hull-mounted sets.

The problem was of particular concern to the Royal Canadian Navy because of the presence of such layers off the coasts of Canada.

Defence Research Board scientists and anti-submarine specialists of the Royal Canadian Navy, working on the project together, discovered that the problem could be substantially overcome by placing transducers in or below the layers of varying temperatures.

Applied research and development followed, and the result was an equipment consisting essentially of a transducer enclosed in a streamlined body which can be towed at varying depths. The towing ship's sonar display and also carry electrical power from the ship to the transducer.

The concept which led to the development of variable depth sonar was initiated almost simultaneously in Canada and the United States. Close liaison was maintained with the Royal Navy and the United States Navy, who also sought improved detection methods along similar lines. Information was shared throughout by the associated countries, with Canada concentrating on specified possible methods as the other countries explored different but allied techniques.

H. M. G. S. "NEW L.I.S. K. E. R. A.D.," originally an Algerine" class ocean minesweeper subsequently reclassified as a coastal escort, and now again re-rated as a survey ship for bathymetric duties, was the first ship to be used for experimental trials. Repeated testing and modification resulted in improvement in the performance of the equipment, and a more sophisticated version of variable depth sonar, built by Canadian firms, was installed in H. M. S. "CRUSADER," a former British destroyer now rated as a destructor escort.

Intensive evaluation produced effective results and the equipment was accepted for service in the Royal Canadian Navy.

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SUB. VERSUS SUB.
(Continued from page 15)

form of warfare, has been a succession of temporary advances on each side of the battle. Now, however, the nuclear submarine has temporarily outstripped all conventional forms of surface and air A/S methods, leaving only another submarine (preferably nuclear) as its logical opponent.

What advantages does a submarine hold over its surface and air colleagues? By its choice of depth it can penetrate the density layers which are the under-water equivalent of the smoke screen or rain storm to shelter a huddled submarine. It can chase its quarry under the polar icefields. Its invisibility, even in these days, gives it a good chance of operating in enemy held waters, and particularly in the approaches to submarine bases—where the most fruitful hunting ground of all. Such areas, with their inevitable enemy air support, are unsuitable, to say the least, for patrol by frigate groups or slow A/S aircraft. As well as using the ability to remain unseen, the submarine can stay on patrol for weeks or even months, maintaining full alertness and making the best use of intelligence reports covering a large area.

Finally, though it may not effectively "quench" the activities of surface ships and reduce their speed superiority over a conventional submarine, the chances of detection and chase against a 20-knot nuclear vessel are still decidedly slender, even using a combination of air and surface forces. Another nuclear submarine, equipped with homing torpedoes, has both the speed and the detection equipment to deal with its visiting opponent.

The U.S.S.R. is quietly but surely distributing her new medium-sized seagoing patrol submarines all over the world, either based in fellow travellers' countries or actually incorporated in, leased or loaned to foreign navies with communist sympathies.

No fewer than 30 "W" class submarines of the Soviet Navy have been deployed in this way. A whole squadron of eight units are now based in Albania.

Eight of the nine former Russian seagoing types of submarine now incorporated into the Egyptian Navy are reported to be of the "W" class. It is not generally known that two Russian submarines of the "W" class have been allotted to the new Indonesian Navy.

Of the 24 ex-Russian submarines now incorporated into the Chinese Communist Navy, twelve are new vessels of the "W" class. These are all operational, and another nine submarines of this same type are being or are scheduled to be built at Shanghai and Wuchang dockyards at the rate of about six to eight each year.

The modern Russian "W" class submarines in Indonesia and China alone more than offset the two midget British submarine squadrons based in Singapore and Sydney, and rival the number of American submarines based on Pearl Harbour, and in emergency or all out war would require hundreds of anti-submarine frigates in the China and Java Seas to count them.

There are also 35 ex-Russian submarines of other classes now in the navies of Bulgaria, China, East Germany, North Korea, Poland, Romania and Rumania.
THE W.R.N.S. COMES OF AGE

The Women's Royal Naval Service is 21 years old. It was in the uneasy summer of 1939 that the organization, which was to attain a distinctive niche in naval history, was born. Although in the First World War it is from the date that the Service was reformed by the late Dame Vera Lengsdin, that the official recognition.

The first women to serve in the W.R.N.S., who were aboard the H.M.S. "Cambria" in 1944, grew by 1944 to a peak strength of 75,000.

Today, members of the W.R.N.S. serve in 25 categories of the Royal Navy. In 1939, the first women to serve in the W.R.N.S. were to arrive in the uneasy summer of 1939.

Before 1921, the Royal Navy was not able to operate aircraft with speeds in the 1,300 to 1,500 m.p.h. range. The W.R.N.S. will be able to operate aircraft with speeds up to 20,000 tons displacement and will take place at home and abroad throughout this year.

One of the first women to serve in the W.R.N.S. was to attain a distinctive niche in naval history, and was recognized in the Royal Navy as all who have served since.

For 21 years the W.R.N.S. has become an integral part of the Royal Navy, as essential as any of its branches.

U.S. ATOM CARRIER

The year 1960 will be notable for the U.S. Navy as well as the Royal Navy. Across the Atlantic, I am told, preparations are now being speeded up for the launching of the first nuclear-powered aircraft carrier, ENTERPRISE.

This ship will be of 85,000 tons displacement and will operate aircraft with speeds in the 1,300 to 1,500 m.p.h. range. Although the ENTERPRISE will be similar in many respects to the big carriers of the FORRESTAL class, the ship's water-cooled reactors will give her far greater endurance. She will be able to circle the globe several times without re-fuelling. As she will not have to carry heavy oil which conventional carriers need for their main boilers.

The following condensation is from the "Navy":

The W.R.N.S. is 21 years old.

The Royal Steamship Owners' Association discuss Nuclear Power

THE Liverpool Steamship Owners' Association annual report contained some very interesting facts and figures on British Merchant Shipping. The comprehensive review of the previous year's performance includes a detailed examination of the financial results, with particular emphasis on the trends in the shipping market and the impact of the 1959 recession.

The report notes that the number of vessels under British registry decreased slightly in 1959, with a corresponding increase in the average size of ships. This trend continued in 1960, with a further increase in the size of vessels.

The report also highlights the importance of nuclear propulsion in the future of the shipping industry.

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R.A.N. SEARCH
for
AIRCRAFT WRECKAGE

The Royal Australian Navy recently played a vital but unenviable part in the search for the wreckage of a Fokker Friendship aircraft which crashed into the sea off Mackay on the Queensland coast on the 10th June.

H.M.A.S. "WARREGO" which had just arrived at Townsville was immediately ordered to the scene of the crash and having located and buoyed the wreckage used her divers, who were joined by the Clearance diving team from H.M.A.S. "RUSHCUTTER," in Sydney, to obtain most of the vital wreckage which would assist the investigation committee to ascertain the cause of the accident.

Because it was feared that some of the wreckage might be too heavy for the gear in H.M.A.S. "KIMBLA," who was refitting in Sydney, with most of her crew on leave, was also ordered to assist.

Salvage was delayed for many days because of bad weather and the operation was not completed until the 26th June.

Officers and men from the "WARREGO" played their last part in this sad accident in which 29 persons were killed when on Sunday June 26th they took part in the Guard of Honour at the unveiling of a memorial on the mainland near where the plane crashed.

SEACAT MISSILES FOR R.N. SHIPS

A substantial order for the Seacat surface-to-air guided missiles, which will replace short range anti-aircraft guns, is, it is reported from London, shortly to be placed with Messrs. Short Bros. of Belfast.

At first the Seacat will become part of the armament of the four County Class C.M. destroyers now building and some of the more advanced frigates.

The test vehicle of the Seacat was first shown at the Karnborough Air Show in 1957. Since then there have been many predictions as to the lethal qualities of the missile even at wave top height.

The primary purpose of the Seacat will be to strike attacking aircraft which may evade the outer defences of the fleet fighters and long range guided missiles.

REAR-ADMIRAL HARRIES RETIRES


His first ship was H.M.S. "CONQUEROR" from which he went to H.M.S. "WARSPITE." At the outbreak of World War II he was in command of H.M.S. "SEAGULL" and for a brief period in 1940 he was Senior Officer, 4th Minesweeping Flotilla, in H.M.S. "STRIKE."

Late in 1941, he was Naval Attaché to Washington and then became Executive Officer of H.M.A.S. "SHROPSHIRE." Then he became, in 1944, the Deputy Chief of Naval Staff and in April, 1946, in command of H.M.A.S. "HOBART."

In later years he had command of H.M.A.S. "SYDNEY" and subsequently was head of the Australian Joint Services Staff in Washington.

Admiral Harries on his return to Australia became Flag Officer Commanding the Australian Fleet in 1956 and in 1958 Flag Officer in Charge East Australia Area.

He has been succeeded by Rear-Admiral G. J. Oldham D.S.O., whose last appointment was Captain, H.M.A.S. "WATSON," the Navigational Direction and T.A.S. Training Establishment in Sydney.

THE NAVY

July, 1960

ADMIRAL ROWED ASHORE

Rear Admiral D. H. Harries is rowed ashore to his official residence, Tresco. The whaler's crew were five of his senior Captain (left to right): Captain G. D. Tancred, D. S. C., Captain B. W. Munnert, Captain T. K. Morrison, D.B.E., D.S.C., Captain C. E. Stevens, R.N.Z.N., and Captain W. F. Cook, M.V.O.

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New "Super-Tanker" to be Built at Whyalla

THE keel for Ampol's new "super-tanker" was laid at the B.B.M. shipyards at Whyalla, South Australia, on Wednesday, April 27.

"This marked the birth of the biggest ship and the biggest oil tanker ever to be constructed in Australia," said the Managing Director of Ampol Petroleum Ltd, Mr. W. E. Walkley.

"Of 32,250 tons deadweight, the tanker will cost an estimated £4 million, and is due to be ready for sea trials in July-August, 1962.

"The new tanker will be 670 ft. long and 87 ft. across the beam.

"She will be Australia's first 'super' tanker when they are over 30,000 tons.

"The Broken Hill Proprietary Co. Ltd will build the new tanker for Ampol."

Mr. Walkley emphasised that when the new "super" tankers come into service, Australia will be using.

C.M.A. QUEENSLAND FACTORY COMMENCES PRODUCTION

A new £250,000 copper cable manufacturing factory established at Strathpine (Queensland) by Cable Makers (Australia) Pty. Ltd. is now in production. In its initial stages the plant will employ a staff of about 50.

The new factory represents a combined venture, as Cable Makers' electric cable manufacturing plant and a wire drawing and stranded factory of Metal Manufactures (Queensland) Pty. Ltd. have been established in conjunction.

At a function to celebrate commencement of production, Mr. M. Dillon, general manager of Cable Makers (Australia) Pty. Ltd, said that the new factory would be staffed and operated by Queenslanders; would use copper from Queensland mines, and, as far as possible, would draw all its materials and services from Queensland sources.

Mr. Dillon further stated that the buildings and equipment at Strathpine, where the two companies had acquired 25 acres of land, had been specially designed and erected to give the most effective and efficient layout of plant and equipment.

The plant, which had been installed, was composed of the most modern automatic machines available in the world. Although the new plant is not large compared with other smelting and refining operations, Mr. Dillon said that it was most modern and efficient, economically, but we must go on trying until we got an economic unit.

SHIPBUILDING

With the concurrence of both sides of the industry, a special sub-committee is to be set up by the Transport Commission to consider the future of the shipbuilding industry. Shipbuilding has been under fire recently from Lord Hailsham of St. Mary's, and in the House of Commons, Mr. Nerdrum, depend, of course, on government subsidies in the countries concerned.

The last month has seen the launch of the CANBERRA, which will be Australia's first nuclear-powered ship. She will be the first in the world to be operated by the Commonwealth Government. She has already sailed more miles than were thought possible for service experience with such a vessel, and Mr. Nerdrum says that the nuclear-powered ship will not be economically attractive until we got an economic unit.

"The venture," he stated, "has been undertaken in conjunction with our associated company, Metal Manufactures (Qld) Pty. Ltd, and also with the other manufacturers of copper supplies, electric cable manufacture, selling and distribution, which will prove very beneficial to the user of our product and enable us to give the ultimate in service to our customers.

"Mr. Dillon said that the new building at Strathpine, where the two companies had acquired 25 acres of land, had been specially designed and erected to give the ultimate in service to our customers.

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FRENCH SHIP VISITS SYDNEY

The French ship, LA CAPRICIEUSE, visited Sydney from the 13th to the 27th June, for the purpose of docking and overhaul.

She has a length of 258 feet, a breadth of 28 feet, and a draft of four feet, with a complement of 18 officers and 94 men.

She is propelled by 2 Diesel Sulzer engines, 2,000 h.p. each, giving 16 knots as a maximum speed.

She was built in France in 1943 and is going back to France.

Main duty of LA CAPRICIEUSE is to visit all French Territories of the South Pacific, and give assistance to the inhabitants of these islands. On these tours, she is based either on Noumea or Papeete. She has already sailed more than 19,000 miles around the South Pacific islands.

In addition, LA CAPRICIEUSE takes part in hydrographic work in the South Pacific.
CRITICISM OF DARING DESTROYERS

Senator J. G. Gorton, recently replied to criticism of Australia’s Daring Class destroyers.

H.M.A.S. VOYAGER, he said, had recently blown a boiler, and had to be repaired in a Hong Kong dockyard.

This was the fourth time that either one or the other boilers had given trouble.

Mr. Gorton said that the cost of repairing the boilers in Hong Kong was significantly less than in Australia, even though tubes had had to be air freighted to Singapore.

Two of the Daring Class destroyers had also had trouble with their turbo generators, which were complicated machinery.

Senator Gorton said the bringing together of these troubles, which occurred in a period of almost three years, into one set of allegations was designed to make things look bad.

The reports said that the three Darings had been built in Australia at a cost of £9 million each, when they could have been built in the U.K. for about £3 million each.

Senator Gorton said this was untrue. The average cost of the three destroyers had been £8.75 million each, and at the time that they were built they could not have been bought in England.

It was also true, said Senator Gorton, that the Royal Navy had put its Daring Class destroyers into reserve.

Of the Royal Navy’s eight Daring Class destroyers, four were in service with the fleet and four were undergoing modifications, some of which had been incorporated into the Australian Darings when they were built.

H.M.A.S. "KIMBLA," a Boom Deton ship who assisted H.M.A.S. "WARREGO" in salvaging the wreckage of the Fokker Friendship aircraft which crashed into the ocean off the Queensland coast.

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