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BOOK REVIEW

CARIBBEAN VAGABOND

By TOM CRICHTON


Review by "IKARA"

When the yacht-chartering season came to an end in the Mediterranean, Tom Crichton set off across the Atlantic in his 50-foot yacht "Jack London" to try his luck in the West Indies. This book tells of his adventures on the way, his experiences in the West Indies, and the return journey across the Atlantic.

As a straight-out narrative the book is superb. The author's crew on the way over were an American would-be bullfighter, an English Divinity student and two hard drinking seamen—a Finn and a Dane. (The dust-jacket, incidentally, calls them "two rumbustious Swedes"). The adventures of this little band are faithfully recorded by the author.

When he arrived at St. Thomas, in the Virgin Islands, Crichton, after an initial set-to with officialdom, settled down to the business of chartering his yacht to the tourists. His descriptions of the various islands in the West Indies which he visited are first class, evoking in me a strong desire to visit all these places. (A lot of the places mentioned appear in the January issue of the "National Geographic").

Crichton's descriptions of some of his paying guests are very telling. His first charter was fairly disastrous; the charterers were a ghastly group referred to as "The People from Sandusky". Other charterers were more likeable, and I am sure readers will be enchanted by the tale of the bibulous Mr. Thornton and the search for his misplaced motor cruiser.

I feel that the publishers have let Mr. Crichton down in their presentation of the book. For a start, the proofreading must have been rather slipshod, as there are many spelling mistakes and misprints. Again, the dust-jacket notes appear to have been written by someone who had not read the book very thoroughly (perhaps this is to make sure that book reviewers actually read the book and do not just rely on the dust-jacket).

However, this book can be recommended for its fascinating descriptions of the West Indies and of yachting generally. The author's acute observations of human beings in general and his fellow Americans in particular make the book a better than average travel or yachting book. One final thought—a map or two would add a lot of interest to a book such as this.

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OUR COVER

Naval nursing sisters at H.M.A.S. Tarangau, Manus Island, check the weight of a native baby girl named Nicola, after the former Chief of Naval Staff, Vice Admiral Sir Alan McNicoll, K.B.E., C.B., G.M.

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Nautical Notes from all Compass Points

CANADA
Supply Management Course

The navies of ten countries were represented on a United States Naval Supply Management course which visited Canada late last year. Some of the group members included representatives from Thailand, Korea, Chile, Germany, Philippines, Canada, Ecuador, Turkey and Brazil.

Whilst in the Montreal area the group of senior naval officers visited the Naval Supply Depot, Man and His World and the College Militaire, Royal in St. Jean.

For a two day visit to Ottawa they were welcomed by Major-General F. D. Armour, Deputy Chief of Logistics, Canadian Forces, and attended briefings given by other senior officers from the headquarters.

At the Capital visits were made to the Canadian Forces Rockcliffe and the Aeronautical Museum. The final two days of the tour were spent at C.F.R. Shearwater where the guests viewed facilities at H.M.C. Dockyard and other military installations in the Halifax area.

PEOPLE'S REPUBLIC OF CHINA
Hydrofoil torpedo boats for Commonwealth

The Navy of the People's Republic of China is reported to have a new class of hydrofoil torpedo boats designed in the country. Some 26 craft are believed to have been constructed since 1966. Particulars gleaned so far include a displacement of 45 tons with a length of 73 ft. and a draught of 3 ft. and an armament of two 21-in. torpedo tubes and two 127 mm. guns. In Communist China they are known as the 'Huchwan' class. One of this class is reported to have been transferred to the North Viet nam naval forces, but it is not known whether on a permanent or loan basis.

The boats are obviously the Osa class. The boats incorporate a number of AS 30 Kormoran components weighing 1.540 lbs. has automatic guidance and a range of 20 nautical miles. The missile rises initially to about 50 ft. then descends to 10 ft. and has a speed of Mach 1. According to a recent report which reached this column two escort ships of the Royal Navy class were transferred in the summer from the U.S.S.R. for incorporation in the Indian Navy. These little flush-deckers have such a squat funnel that a comparative lack of superstructure, and such a low-flying silhouette in general that they are said to be able to creep up over the horizon or through any sort of white-horse seas without attracting too much attention. But, as they are reputed to be capable of doing 30 knots, perhaps 'creep' is not the right word. Even at this speed, however, their reported engine power seems a bit high. They are said to have two diesels of 8,000 h.p. and two gas turbines of 15,000 h.p. each, with two shafts. (Photo next page).

FRANCE
Naval exhibition

France mounted a large scale naval exhibition last October. Two new classes of fast patrol boats were shown with launchers for a new surface-to-surface missile, called the MM 38, Exocete, made by Nord Aviation.

The boats are obviously the French version of the Russian Kormoran and Osa class. The MM 38 incorporates a number of AS 30 Kormoran components weighing 1,540 lbs. has automatic guidance and a range of 20 nautical miles. The missile rises initially to about 50 ft. then descends to 10 ft. It would appear to be a great advance on the Russian StYm which has a slow and travels at a considerable height. At only 10 ft. above the water a Mach 1 missile would appear to be able to creep up over the horizon or through any sort of white-horse seas without attracting too much attention. But, as they are reputed to be capable of doing 30 knots, perhaps 'creep' is not the right word. Even at this speed, however, their reported engine power seems a bit high. They are said to have two diesels of 8,000 h.p. and two gas turbines of 15,000 h.p. each, with two shafts. (Photo next page).

Order for Nord 242s

Reports from France suggest that up to 39 Nord 262 turbojet transports may be ordered by the French Navy and Air Force. The type, which has recently been ordered by the Navy for crew training and personnel transports, and the Air Force is said to be negotiating for six for short range liaison operations. Navy planning, however, involves a total purchase of 15 Nord 262s to replace SO-10 Brengues and C-47s by 1970, and the Navy may also acquire another 18 of the type to replace C-47s now used for liaison duties. The Turbomeca Bastin 6 engines powering initial military deliveries will later be replaced by Bastin 7s.

FRANCE
"Creepers" acquired from Soviet Union

Considering that India is still in the Commonwealth she is pretty cagey about her recent acquisitions from the Soviet Union. There was a time when all her warships were either former ships of the Royal Navy or British-built, but now that she has gone shopping elsewhere for her naval hardware she is keeping her light under a bushel.

According to a recent report which reached this column two escort ships of the Royal Navy class were transferred in the summer from the U.S.S.R. for incorporation in the Indian Navy. These little flush-deckers have such a squat funnel that a comparative lack of superstructure, and such a low-flying silhouette in general that they are said to be able to creep up over the horizon or through any sort of white-horse seas without attracting too much attention. But, as they are reputed to be capable of doing 30 knots, perhaps 'creep' is not the right word. Even at this speed, however, their reported engine power seems a bit high. They are said to have two diesels of 8,000 h.p. and two gas turbines of 15,000 h.p. each, with two shafts. (Photo next page).
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THE NAVY
February-March-April, 1969

ITALY
Maritime aircraft
Italy has been evaluating three
new types of long-range maritime
aircraft, the Breguet Atlantic, the
Lockheed Orion and the Hawker
Siddeley Nimrod. Late last year an
order was placed for 18 Breguet
Atlantic A.S.W. aircraft and deli-
civeries are scheduled to start in
1970. Price per unit has been
stated to be £3,200,000.
Italy at present uses Grumman
S2 Trackers, whose range is limited.
The advent of the Atlantic will
mean that Italy could cover very
nearly the whole of the Mediterrane-
ian.

NATO
New Naval Command —
MARAIRMED
Co-ordination of activities of
British, American and Italian land-
based maritime patrol aircraft in
maintaining and extending surveil-
lance of the Mediterranean sea is
the main function of a new NATO
naval command MARAIRMED,
which was set up at Naples late in
1968. Background of the NATO
decision is the increasing deploy-
ment of Soviet warships in the area,
the latest estimate of which lists one
helicopter carrier, one cruiser, eight
or ten destroyers, about an equal
number of submarines, and various
types equipped for intelligence mis-
sions. The U.S.N. already has a
maritime reconnaissance command
at Naples, known as COMUS-
FAIRWING, equipped with Orions

MALAYSIA
Exercise "Fortex 69"
Thirteen Royal Malaysian Navy
ships participated with vessels of
the British, Australian and New
Zealand navies in exercises in the
Straits of Malacca during January
and February.

NATO
Exercise "Fortex 69" ships
of the Royal Malaysian Navy,
Royal Thai Navy and the Royal
Navy carried out mine-sweeping
exercises (sponsored by the Royal
Thai Navy) off Phuket in Thailand.

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THE NAVY
February-March-April, 1969

THE NAVY
Page Seven
and Neptunes, and the U.K. uses two photo-reconnaissance Canberra squadrons based at Malta. Britain has agreed to send a squadron of Shackletons to MARAIRMED early this year, replacing them later with its new jet Nimrod type. Italy will later have Breguet Atlantics to assign to this role.

**Exercise 'Eden Apple'**

With the focus so much on the Russian fleet in the Mediterranean these days, it seems unfortunate that the large NATO exercise 'Eden Apple' recently carried out in that area did not receive more publicity. There do not appear to have been any press representatives embarked. Indeed, a television team which went out specially to cover the exercise returned empty handed.

The exercise, which had been planned for some time and was not laid on because of the recent Russian moves in the Med., took place from 5th to 20th November. It was conducted by Admiral L. Soitgu (COMNASOUTH), from his headquarters in Malta.

Forces taking part were drawn from the British, French, U.S., Italian and Greek navies together with a number of shore-based maritime patrol aircraft provided principally by the French. The R.N.'s contribution included two guided-missile destroyers, two destroyers, eight frigates, four patrol submarines and five R.F.A.s. In addition, Buccaneers, Sea Vixens and Gannets from Eagle, who is refitting, were deployed to Malta and Sardinia and carried out strikes and air-defence missions.

Amongst the French ships taking part were the aircraft carrier Foch and the cruiser Colbert. In all there were more than 50 warships.

The exercise was divided into three phases:

(a) 5th to 9th November Working-up.
(b) 10th to 16th November. Tactical.
(c) 16th to 20th November. Assembly and wash-up at Naples.

During the working-up period the forces were divided into two, British, French and Italian surface ships, including the Foch, tested procedures for air defence, replenishment at sea and anti-submarine warfare operating south of Toulon. The 'enemy' submarines were provided by the U.S., British and French; French Atlantic maritime aircraft carried out ASW patrols. All forces were under the overall command of Vice-Admiral de Serina and de Greische, the French C-in-C Med. at Toulon.

The second group operated east of Malta under the command of Vice-Admiral A. M. Lewis flying his flag in H.M.S. Hampshire. It consisted of ships from the British, French, Greek and Italian navies; it carried out surface and air gunnery exercises, including the bombardment of the rock of Filfola, the well known gunnery target off Malta.

During the second phase, the NATO fleet continued to work in groups and both groups were attacked by Eagle's Buccaneers from Sardinia and Malta and Canberras from Malta.

A mock amphibious task force was formed and crossed the central Mediterranean to south of Greece, near Kithera, where it was attacked by Greek F.P.B.s.

Another group of ships simulated a convoy passing through the Sicilian Straits and was heavily attacked from the air and by submarines.

For once the usual Russian spotters seem to have been conspicuous only by their absence, a highly unusual occurrence.

Most of the ships taking part rendezvoused on completion at Naples and Gaeta on 16th November and a 'wash-up' was held at the NATO headquarters of C-in-C South at Bagnoi.

---

**NATO occasion at Naples. Admiral Sir John Bush (Allied Commander-in-Chief, Channel and Eastern Atlantic) last November visited the Commander-in-Chief, Allied Forces, Southern Europe, Admiral Horacio Rivero, who is seen here [right] introducing Italian Admiral Luciano Soitgi, Commander, Naval Forces, under his overall command.**
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While few facts have so far been released about the size and design of this base, which is claimed to be one of the best-equipped and safest of its kind in the world, it is understood that it has accommodation for underground basing and overland of a wide range of ships, including destroyers, submarines and torpedo boats. About a million cubic metres of rock have been blasted away to make adequately-sized tunnels and other service facilities.

For communications with the mainland, the military authorities have built a three-kilometer under-water tunnel, which was opened for traffic a few years ago.

NEW BRITISH FAST PATROL BOAT IS FAST AND HARD-HITTING

A new fast patrol boat — more powerful armed than any other vessel of its size — has been designed by a British Company. It will be more effective at a greatly increased range, with better sea keeping abilities and larger endurance, and will be an asset early in the summer of 1969. With an overall length of 142 feet and top speed of about 40 knots, the boat is available in both Rolls-Royce gas turbine and diesel engine versions. Armament includes modern, highly accurate light guns and 5 guided missiles both controlled by equipment which incorporates search and tracking radar for operating them separately or simultaneously by day or night. These weapons make the boat effective against both aircraft and major fleet units. The steel hull is basically a round bilge form, with a spray deflecting chine extending from forward to aft of the bridge, and a flat run aft. The superstructure is of aluminium alloy and the displacement of the craft is about 500 tons. Accommodation can vary according to the power fitted, but each arrangement provides for a captain and two or three other officers, 4-6 petty officers and 20-34 junior ratings.

First Type 42 ordered

The first of the Type-42 guided-missile destroyers was ordered from Vickers, Barrow-in-Furness, on 14th November.

This class was foreshadowed in the 1967 Supplementary Statement on Defence Policy and is a smaller version of the original Type 82 design, of which only one ship, H.M.S. Bristol, has been ordered. The Type-42 will have Seadart surface-to-air missiles — will the Bristol — but will substitute a helicopter for the Ikara anti-submarine system.

The ship will be a fast, all-gas-turbine ship with the principal task of providing air defence for the fleet. In addition she will have useful anti-submarine and surface gunnery armament and will be able to perform the wide range of normal peace-time duties required by warships.

The Seadart will be fitted from an improved type launcher forward of the bridge. Further forward will be a new type of 4-5-in. gun, with a high automatic rate of fire. Both Seadart and the gun will be linked to two tracker-illuminator radars and a controlling computer. Normal air surveillance radar will also be carried.

The helicopter will be the new Anglo-French WQ13, a twin-engined machine which is being developed jointly by Sud Aviation and Westland. It will carry an air-to-surface weapon for use against lightly defended surface ship targets, such as fast patrol boats. The WQ13 will be longer than the single-engined Wasp now carried by most frigates in the R.N.

The main propulsion will be provided by flexible gas turbines; Rolls-Royce Olympus, engines providing full power for high speeds, and the smaller Tyne engines being used for cruising. The twin screws will have reversible pitch for manoeuvring. Accommodation is being provided for a crew of 300, though the planned complement — thanks to increase study of this aspect — will be much fewer than this.

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Britain has developed an early warning device for the detection of chemical or biological attack. Known as LIDAR, it operates in conjunction with early warning radar and utilizes a ruby laser beam which projects its light onto any radar-detected aircraft to reflect from any chemical or biological cloud emitted by the evading aircraft. This development, still in the experimental stage, but showing “distinct possibilities”, was disclosed for the first time late in October at an “open day” held at the U.K. micro-biological station at Porton. It is explained that though the minute droplets of such a cloud are too small to reflect a radar beam, the much shorter wave length of a laser beam satisfactorily reflects its light from them, to be collected by a Newtonian telescope and focused on a photo-electric cell which works on oscillograph. Differentiation between the two types of cloud—chemical or biological—is not yet possible, but the wearing of similar protective clothing and respirators is now the accepted guard against both types of attack.

U.S.A.
Submarines’ future role

The U.S. Navy is giving serious consideration to the future role of the submarine. General Dynamics has been given a study contract to investigate the future of the nuclear powered attack submarine. The study is to cover both the design and system engineering aspects and its operational use.

The U.S. Navy is at present limited to a maximum of 69 attack submarines and both the Navy and Congress have expressed concern as to whether this number is sufficient for the long term future. At present only 33 of the U.S. attack submarines are nuclear propelled.

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The Navy Plans Mide-deep Laboratory
A conceptual contract has been awarded to the Electric Boat Division of General Dynamics Corpora-

tion for the development of a manned underwater station a mile beneath the ocean surface.

The Naval Civil Engineering Laboratory (NCEL) scientific station will provide a subsurface environment for five scientists at depths of more than 1,700 meters in the open ocean. It will be an operating platform from which scientists can accomplish work on the bottom and in the water column.

The station will be composed of two vertical cylinders, each 12 meters long, 14 meters high, and 8.6 meters wide. One of the cylinders will house a power plant using an umbilical cable to the shore or surface. The scientists will live and work in the other cylinder.

Laboratory space will be provided on two decks, and a third deck will be used for berthing and living quarters. A fourth deck is provided for station operation and control.

From the station, scientists will be able to observe underwater environments either directly through viewports or indirectly by closed circuit television. They will be able to collect samples with a manipulator and bring them into the station's pressure envelope through a lock-in/lock-out system.

In use, the station will be positively buoyant and tethered from an anchor. All equipment that could become entangled will be jettisonable. Additional droppable ballast also is incorporated in the design. A connecting sphere between the two hulls will provide an escape trunk feature similar to that used on modern submarines.

The manned underwater station project is tied in with other ocean engineering operations concerned with ocean exploitation. For example, the Deep Submergence Rescue Vehicle being developed and built for submarine rescue operations can be mated to the station.
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CODOG gearboxes for U.S.N.

The Gear Products Department of AFI Turbine-Generators Ltd. has completed work-testing at Rugby of the first of 11 sets of propulsion gearing for U.S. Navy P.G.M. class patrol boats. Our picture (above) shows the single reduction primary gearbox. This divides the input from a single 13,500 h.p. gas turbine between two output shafts which provide the input drive to the port and starboard secondary gearboxes. The ratio is 3,500:2,400 r.p.m. The diesel drive is taken to its own pinion in each secondary gearbox. S.S.S. clutches at both turbine and diesel inputs in the secondary gearbox provide automatic transfer of drive from one power source to the other.

Poseidon

Second test launch of a Lockheed Poseidon long range ballistic missile—the multi-warhead nuclear F.B.M. planned to replace Polaris missiles in 31 of the U.S.N.'s submarines from early in the 1970s—was carried out by the Navy from Cape Kennedy in late November, three months after the first test launching. The two-stage, solid-fuel missile, measuring 34 ft. long x 6 ft. diameter, was ramp-launched to splash down in an Atlantic Ocean target area. But results of the test were not announced. Sixteen of the missiles will be carried in each submarine, and the 3 ft. greater length and 1.5 ft. bigger diameter of the Poseidon will require modifications in the submarines to carry it. Each warhead can be individually targeted, with greater accuracy than the Polaris system permits.

A.S.W. Trainer

This A.S.W. student battle simulator, patterned after the attack centre on destroyers, brings together in a tactical situation information from sonar and radar to create a realistic situation. The $3.4 million device sets up two target submarines and a U.S. destroyer equipped with ASROC missiles, supported by two other destroyers or cruisers and three fixed-wing or helicopter aircraft.

Deepest Diver

The USS DOLPHIN (AGSS-555), launched at Portsmouth, N.H., on June 6, 1968, is the world's deepest diving operational submarine. The ship is 150 feet long, has a beam of 16 feet, displaces 900 tons and can carry 12 tons of oceanographic equipment. Capable of operating without the support of a mother ship, the DOLPHIN will be used for development of new equipment and basic oceanographic research.

Navy Develops 'Dog Fight' Missile

Control and propulsion sub-systems for the Navy's short-range, air-to-air, "dog fight" missile are being developed in-house, while an all-aspect infrared seeker is under study at Hughes Aircraft. The "dog fight" missile is comparable to the AIM-82 short-range missile (SRM) Air Force plans to begin studies on this summer. Both missiles are intended for use at ranges of between 1,000 feet and two miles. They would replace either the Sidewinder or Falcon heat-seeking missiles now in the inventory.

February-March-April, 1969

THE NAVY
U.S.S.R.
Ship-to-ship missiles
Considerable publicity has recently been given to the Russian Shaddock and Strela ship-to-ship cruise missiles. The former is reported to have a range of 300 miles and the latter 700 miles.

Whilst it is known that the Kresta and Kryda class of large guided-missile destroyers are fitted with Shaddock and the smaller Krapyuk and Kidd class with Strela, it is not absolutely certain that they are intended for use against ships; they might equally be intended for bombardment.

It is difficult to see how a 300-mile missile could be aimed against a ship target, unless the latter were known to be entirely on its own. The missile's homing device, whether radar or infra-red, would find it difficult to select the right target after a 300-mile journey.

It would seem more probable that an aircraft would be used to guide the missile in the final stages of its flight; in which case it would have to sit somewhere in sight of its target and probably maintain a fairly steady course. This again seems unlikely as it would be so vulnerable to the target's anti-aircraft armament or to fighters.

The Soviet missiles do not appear to be very fast and, as they will have to fly high, will be easily detectable by radar and a sitting duck for ECM or ship-to-air missiles.

It is difficult, therefore, to see exactly how the Russians intend to use these expensive weapons.

Helicopter Carrier?
A number of photographs have now been published of the latest Russian ship to appear in the Mediterranean—the Moskva (Moscow).

The ship gives the appearance of a cruiser with a large flight deck abaft the funnel, probably quite large enough to take VTOL aircraft and, although one photograph showed a helicopter on deck, it seems likely that the ship was designed with VTOL aircraft in mind.

The ship has two, 12 barrel anti-submarine missile launchers forward, probably to launch Gotas, anti-submarine missiles, and a further four guns, perhaps 3-inch, rest in twin mounts on the OI level.
The Irish Navy's MACHA which has been largely disarmed, refitted and relegated to fishery protection duties.

Of the three small frigates or corvettes in the Irish Navy, MAEV (ex-H.M.S. Oslyp) has been taken out of commission and placed in a state of preservation, and her two sister ships, CLIOM (ex-H.M.S. Bellwort) and MACHA (ex-H.M.S. Borager), have been largely disarmed, refitted and relegated to fishery protection duties. Each of the two latter has lost her two-pounder gun, two 20 mm. Oerlikon anti-aircraft gun, 'Hedgehog' multiple anti-submarine mortar and depth charges.

This is not very surprising, since these former corvettes of the Royal Navy (re-rated as frigates after the war) were of the well-known 'Flower' class hurriedly designed on the outbreak of the Second World War, having been laid down in 1940, launched in 1941 and completed in 1941-42, and could fairly be described as somewhat ancient. A span of 26 to 27 years is fair enough for ships of this type. MAEV was built by A. & J. Inglis Ltd., Pointhouse, Glasgow, and CLIOM and MACHA by George Brown & Co. (Marine) Ltd., Greenock. Of 1,020 tons standard and 1,280 tons full load displacement, all three ships were also armed with 4-in. guns in addition to the other weapons mentioned above. Their propelling machinery comprises two boilers and triple-expansion steam reciprocating engines originally designed for a speed of 16 knots, but the best sea speed in latter years was about 14 knots and it is understood that none of them can now make more than a bare 10 knots. Their normal complement in full commission was 78 officers and ratings.

This laying up and demilitarization of the 'Flower' class virtually spells goodbye to the Irish Navy, for apart from these three old corvettes there are only three small tenders used as service craft, ferries and general utility, namely the John Adams, of 94 tons gross, launched in 1934, General Hardy, of 100 tons gross, launched in 1928; and Wyndham, of 93 tons gross, launched as long ago as 1903. The last is non-operational and quotations for the purchase of this vessel have been invited.

A few years ago the Irish Naval Service comprised three frigates, five motor torpedo boats and three other naval vessels, but the MTBs numbered M1, M2, M3, M4 and M5, all built by John I. Thornycroft & Co. Ltd., Southampton, with a displacement of 32 tons, an armament of two 21-in. torpedoes, two anti-aircraft machine guns and depth charges, and a speed of 40 knots, were discarded one by one.

The name of the Commanding Officer of the Irish Naval Service, a Captain, appears right at the bottom of the Irish list of Principal Military Appointments including two generals and 15 colonels, which is not surprising as his command at present appears to be very thin.

The formerly important naval base at Haulbowline Island off Queenstown in Cork Harbour, which has two large dry docks, now derelict, but built to take big British battleships, and which in more halcyon days used to cater for a large squadron of the Royal Navy, is now a collection of practically empty or thinly stored buildings. And with the preservation, reclassification or sale of the naval ships it looks very much like approaching finis for the Irish Navy, Ireland would, no doubt, be the last to admit that the naval defence of Ireland now devolves upon the Royal Navy, but that is what it boils down to, for the defence of the British Isles, necessarily, logically and integrally, includes them all.
The Cruise of the Emden
(July—October, 1914)

By the Governor General of Australia, His Excellency the Rt. Hon. Lord Casey, G.C.M.G., C.H., D.S.O., M.C. K.St.J.

His Excellency was an officer of the First Contingent, Australian Imperial Forces, on board the Australian troopship ORVIETO, bound for Port Said.

After the new historic battle between the Emden and H.M.A.S. SYDNEY, the captain of Emden and a number of his officers were transferred to the ORVIETO, for transport to Suez or Port Said as prisoners of war.

His Excellency, being one of the few officers on board the ORVIETO speaking a little German, was put in charge of the prisoners. During this time, he had considerable opportunity to discuss their recent and very successful raiding cruise in the Bay of Bengal and elsewhere.

This account of the cruise of the Emden is gathered from the translation of a private diary in shorthand belonging to a Petty Officer who, in the capacity of Signaller, was on the bridge of the Emden throughout her three months' raiding. The bald facts set down in his diary have been supplemented by conversation with those officers and men of the Emden who were conveyed as prisoners of war from Colombo to Port Said on the Australian troopship A3.

Until 28 July the Emden lay in Tsingtau harbour, the naval base of the German Navy in the East and the Capital of the State of Kiaochau. She was a light armoured cruiser of about 3,500 tons displacement, carried ten 4.1 inch guns and two 10 inch torpedo tubes, and was painted light grey colour. She had three funnels and two masts, and was described by those who saw her as a "very pretty little ship". Her speed was 23-25 knots.

On 28 July 1914, the Captain of the Emden received orders from the German Government in Kiaochau to clear for action. On this date it will be remembered, affairs in Europe were in a very unsettled condition but a state of war had not yet been declared between Germany and any other nation. On the following day news came to Tsingtau by cable saying that war had been declared between Austria and Servia and that Russia had started mobilising her troops on the German border.

This news was read in Tsingtau indicating the end of the wedge which would split Europe into two camps, and accordingly on 31 July at dusk the Emden put out to sea, having taken on board her full supply of food, ammunition and coal.

She steamed out of harbour with all lights out and her war guard posted, and for three days steamed between Nagasaki and Shanghai, keeping out of sight of vessels of all sorts in the endeavour to keep her position unknown. She was waiting for definite news by wireless from her base, of war declared between Germany and Russia. This arrived on the morning of 3rd August, and with it the news that France was mobilising and that England would probably be drawn into the conflict.

On 4 August, the Emden sailed through the Straits of Korea into the Sea of Japan passing Nagasaki and the island of Tsusuna just off the Japanese coast. Several steamers were seen on the horizon but as her objective at the moment was the Russian cruiser Askold she did not interfere with merchant shipping but on the other hand tried to keep her identity hidden.

The Askold had been lying in Shanghai harbour previous to the outbreak of war, but the Captain of the Emden concluded that she would now make for the Russian port of Vladivostock. After waiting for several hours in the track which the Askold would probably take—and seeing no signs of any warship, the Emden steered south, passing between the Island of Tsusuna and the mainland of Japan. Here smoke was seen on the horizon and it was evident that some vessel was bound for Vladivostock. The Emden gave chase whereupon the strange vessel made straight for land.

Gradually gaining on her, the Emden fired blank ammunition when at a range of about 31 miles in hopes of stopping her. The steamer however, believed the Emden to be a small gunboat of inferior speed, and kept on her course. The Emden now closed in to 11 miles and fired a dozen shots across her bows and, on seeing the shells fall in the water, the steamer stopped and was eventually boarded by an armed party consisting of an officer and ten men.

The boat turned out to be the Riasun, a Russian auxiliary cruiser but she had not yet been fitted with her guns and carried no ammunition, and moreover carried mails consigned to Vladivostock. The boarding party remained on board as a prize crew and took the vessel to Tsingtau, all lights being extinguished on the voyage.

On 5 August, while on her way to port, accompanied by her prize, the Emden received wireless news that "England had declared war on Germany" (sic). She replied to Tsingtau that she was returning and instructed the forts that she would arrive at 4 a.m. next day accompanied by another ship and that she was to be allowed to pass into the harbour.

She arrived at the appointed time on 6 August and leaving the Riasun at anchor in the harbour, the Emden went alongside the pier where she was again coaled and provisioned to her full capacity.

At 7 p.m. on the same day she again put to sea accompanied by
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The crew were transferred to the Kahinga and the vessel was sunk.

It was then decided to transfer the crews of the Indus and Killin from the collier to the Kahinga, presumably with the idea of despatching this vessel to the nearest port as the collier was becoming uncomfortably crowded and was a drag on the movements of the Emden.

The operation of transferring the crews was interrupted by the appearance of another vessel on the horizon. The Emden made off to intercept her and on finding her to be the Italian steamer Loredo, brought her back to the scene of operations, and asked her if she would undertake to take off all the crews which had now been collected on the Kahinga and transfer them to the nearest port.

The Loredo refused to do this and the Captain of the Emden was obliged to release her. As the Loredo was bound for Calcutta it was now realised that only a very short time would elapse before the news of the Emden's presence would be announced all over the Bay of Bengal. They afterwards read in Indian newspapers taken from captured steamers that on arriving at the mouth of the Ganges the pilot was informed of the presence of the hostile cruiser, and he, in turn, informed the Light Ship which sent on the news to Calcutta.

This was the first intimation at the ports of the cruiser's presence in the Bay.

As stated above the Diplomat was sunk on the night of 13 September in a position about 100 miles south of Calcutta. After despatching her another light was seen on the horizon.

The Emden asked her who she was by means of Morse signalling with a lamp at the masthead. Reply came that she was the Italian steamer Dandolo—and the Emden bid her goodnight.

On the 14th the Captain decided that his best method of evading pursuit was to adopt the unexpec ted course of steaming northwards towards Calcutta, and this was done soon in company with the collier, the Pontopores and the Kahinga, to a point about 150 miles south of Calcutta.

Here they got the British steamer Trumbull, a small unloaded freight steamer. Her crew were put aboard the Kahinga and the vessel sunk in the ordinary way.

The Kahinga now having the crews of four vessels on board besides her own, was sent off to Calcutta, the assembled crews giving the Emden three cheers as she sailed off.

On the same evening the Clan Matheson was captured. She was from England bound for Calcutta and carried a valuable cargo amongst which were several motor cars, various articles of machinery, and a racehorse. The horse was shot, the crew transferred to the collier and the vessel sunk.

On the 15th, Emden, still keeping her northward course, steamed to within 40 miles of Calcutta and then, altering her course sailed South East in the direction of Rangoon.

On the 18th, the Norwegian steamer Dove was held up, and the Captain given $100 (Mexican dollars current in Tsingtau) to transfer the crew of the Clan Matheson to Rangoon.

On the arrival of the Dove in Rangoon it was realised that the whole of the Bay of Bengal would be ringing with the news of the presence of the Emden. This was soon accomplished fact as the Emden picked up several wireless messages to this effect including one to the Hampshire.

It was now probable that the mouth of the Bay of Bengal would be paroled by British cruisers to prevent the escape of the Emden, but notwithstanding this, the Captain decided on the daring feat of a raid on the oil tanks at Madras. This was made possible by one of his crew having been employed in Madras and thus having an intimate knowledge of the situation of the tanks and the fact that the fort guns were old and that there were no searchlights.

The ruse of employing a dummy fourth funnel to hide her identity was employed for the first time on this occasion, but as its uselessness on this particular escape was doubtfull, the method employed will be described later, when, during the Penang raid it secured the success of the undertaking.

At 9.30 on the evening of 22 September, the Emden had reached a position some three miles from the oil tanks at the entrance to the harbour without being challenged. She immediately used her searchlights to get the exact position of the tanks, fired a couple of ranging broadsides, extinguished her searchlights and poured salvo after salvo into the tanks, the shells bursting well—soon converting the tanks into a blazing mass.
125 shells were fired in all, some of the ranging shots hitting some ships in the harbour and, it is said, some houses on land.

The Emden now left the harbour at full speed in a North Easterly direction, coming under the fire of the forts, all of whose shells fell short leaving the Emden untouched.

The men on the Emden say that the glare of the burning tank could be distinctly seen 100 miles away.

On the 31st the Emden was still steaming in a North Easterly direction to create the impression that she was making for Calcutta, but when out of sight of all shipping she turned south and passed round the east coast of Ceylon. It was here that the Greek steamer Pontoporia, which had, been accompanying the Emden since she was captured, was lost sight of.

The inhabitants of Galie in the South East of Ceylon, on learning of the approach of the Emden red inland, throwing a racial to that on Madras.

On 25 September at a point about 130 miles south of Colombo, the small British steamer King Edward was captured and sunk, her crew being transferred to the Emden. She had come from Suez and was without cargo.

On the night of the next day (26 September), the Emden took up a position 40 miles west of Colombo. The Captain told the writer that he considered that it would have been courting disaster for him to have attempted to raid Colombo harbour, as the fort searchlights swept the horizon all night and the fort guns were far superior to his own.

His decision was to cruise about some distance outside and intercept all shipping bound for or leaving Colombo. Acting on this, in his position all miles out from Colombo, and whilst the fort searchlights were visible on the horizon, he captured the British steamer Gritjare, with a cargo of sugar from Colombo bound for England.

She was sunk and the crew placed on the collier.

The collier was again becoming crowded and the Captain had some anxieties as to the disposal of the accumulated crews. On sailing a little closer to Colombo on the 26th, the British steamer Gryfevale was captured. She carried no cargo and was made to accompany the Emden, subsequently serving the purpose of riding the Captain of the Emden of the accumulated crews of 5 vessels.

On 27 September, after having reached a position some 300 miles west of Colombo, the British steamer Buresk was captured. She was laden with 6,000 tons of Cardiff coal for Singapore.

Leaving the Captain's steward, two engineers and some Chinese workers on board, the remainder of the crew were transferred to the Gryfevale. The men left on the Buresk were paid at their usual rate by the Captain of the Emden. A prize crew were put on board and she was made to accompany the Emden, her coal being a welcome addition to their own supply.

On the night of the same day, while steaming in a westerly direction the British steamer Ribera was captured. She was bound from Port Said to Colombo. Shortly afterwards, on the same night, the British steamer Forre was also captured. Both these steamers were sunk and their crews transferred to the Gryfevale.

A third steamer was sighted and stopped on the night of 27 September, but as she turned out to be the Dutch steamer Djocja she was at once liberated.

On 28 September, the Gryfevale was released and told to proceed to Colombo with the crews of five captured vessels on board.

Realising that the arrival of the Gryfevale at Colombo would be the signal for a thorough search for the Emden on the part of whatever warships might be available, the Captain decided that the time had come for him to make for the open seas.

He accordingly steamed practically due south towards the Chagos Archipelago, accompanied by the British collier Buresk and his own collier Marcommania. The latter was now sent off to some unknown destination, presumably having transferred all her coal and thus being no longer of any assistance to the Emden.

Having successfully avoided all shipping en route, the Emden and the Buresk arrived off the Island of Diego Garcia on 10 October. The island is inhabited by only a few European families and had not yet heard of the outbreak of war, owing to their communication with the world being limited to a steamer calling every three months with supplies.

Here the Emden cooled all day from the Buresk. She got into the good graces of the inhabitants by reason of her engineers having repaired a motor boat belonging to the island, in return for which baskets of coconuts and supplies of fish were sent aboard the Emden. Fresh provisions of this character were much appreciated, and with every expression of goodwill the
Emden sailed the same evening, steaming to a position about 500 miles west of Colombo.

She arrived at this point at midnight on 14 October and at 12.30 a.m. on the 15th she intercepted the British freight steamer Clan Grant bound for Colombo with a cargo of general merchandise. She was temporarily manned with a prize crew but during the transference of her own crew to the Buresk, smoke was again seen on the horizon and the Emden went to investigate. The newcomer in the distance had the appearance of a war vessel, but turned out to be the Pourahbel (Bon Reveil), a dredge built to order of the Tasmanian Government. She was captured and her crew as well as that of the Clan Grant put aboard the collier Buresk, when both captured vessels were sunk, the dredge turning turtle completely before sinking—and, it was said by one of the Emden's officers, presenting a very curious appearance.

Shortly afterwards the British steamer Benmohr was sighted, captured and sunk.

Her crew went on board the Buresk. The Spanish mail steamer Fernando Po was held up on 16 October and of course at once released.

Steaming in a northerly direction the Emden on 18 October encountered the Blue Funnel liner Troilus on her maiden voyage from Hong Kong to England. The Troilus was fitted with wireless which she attempted to use, but on being threatened by the Emden she had no option but to be captured in the usual way and sunk. Her crew were transferred to the Saint Egbert where those of the Troilus were now quartered—and the Saint Egbert despatched to Quilon, a small town on the South West coast of India. This town was closer than Colombo and was safer, as far as the Emden was concerned, as it was not a Naval Station.

The Emden was now nearing the end of her raid on merchant shipping. She had up till this time intercepted 26 vessels in Indian seas, of which she had sunk 14 and released the remainder either on the ground of their neutrality or for the purpose of ridding her of the crews of sunken vessels.

She was now free of all encumbrances—and with the Buresk, she steamed for Penang, taking a good southerly course to avoid hostile war vessels. It was again her plan to avoid being sighted by any shipping, to steam with no lights visible at night and when smoke was sighted on the horizon to avoid recognition by flight even if her course was thereby lengthened.

It seems that the success of this great raiding cruise was due to the ability of the Emden to move quickly from one point, where she was known to an unexpected quarter without the knowledge of those at whose door the safety of merchant shipping lay.

The objective of the Emden was now a raid on Penang harbour where she expected to fall unawares on the British and Japanese cruisers which, she learnt from newspapers, had been intercepting German merchant shipping in the vicinity of Penang at the beginning of the war.

The Buresk was left to wait for the Emden in a position midway between Penang and Ceylon, since her limited speed of 10 knots might hamper the Emden in any action
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Arriving at 4 a.m. on 28 October at a point 10 miles outside Penang, the extra funnel was rigged and the German flag hoisted. The Captain of the Emden strongly denies that anything but its own flag was hoisted on this occasion.

Steaming up to the northern entrance of the Penang Roadstead at 5 a.m., the Captain of the Emden could see that a good deal of shipping was lying there and in the forefront a cruiser whose nationality he could not yet distinguish. Approaching to a range of about 600 yards, he found that she was the Russian cruiser Jemtchug. She showed no sign of life and it appeared that all her crew must be asleep. Having manoeuvred into good position, the Emden fired a torpedo at a range of 400-500 yards hitting the Russian just beneath the after funnel. This was quickly followed by another, at even closer range which struck a point just below the bridge. The first torpedo caused the Russian to sink several feet deeper in the water, and the second caused a terrific explosion and heeled the vessel over on one side. The Emden was during this time pouring broadsides into the Russian, sweeping her decks at point blank range. 100 shots in all were fired by the Emden. The few shots fired by the Russian had no effect on the Emden.

The account of the engagement which appeared in the Ceylon Observer is as follows:

"The Emden . . . . had been lying outside Penang on Tuesday, 27 October, and about 5 a.m. the following morning when the light was still faint and deceptive, steamed into the man-o’war anchorage and took up position. She was seen by the Jemtchug but as the morning light was still faint and as she had rigged a dummy fourth funnel, she passed for the British ship Yarmouth just long enough to enable her to manoeuvre into position for a sudden and effective attack on the Russian. Just as the latter became aware of the Emden’s identity, a torpedo from that vessel struck her and the Germans swept her decks with a terrific broadside from about 300 yards range.

"The Jemtchug had no chance of defending herself, but replied gamely. It was no use, for it could be seen through the flames and smoke, that she was listening so badly as to make her replies futile. Two other broadsides followed from the Emden and a terrific explosion ensued. A second torpedo having been successfully launched from the Emden, great rents were torn in the doomed Russian vessel, and she sank amidst a great cloud of black smoke.

"Just 15 minutes elapsed from the opening of the cannonade to the sinking. About 100 men went down out of 335. Several French torpedo boats were close in, but like the Jemtchug had no steam up.

"Having sunk the Jemtchug, the Emden moved slowly round and opened fire on the oil tanks—none of which were hit.

"The Emden left the harbour by the North Channel."
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The Captain of the Emden denies having fired on the oil tanks as he was unaware of their existence. Otherwise—as he said—he would certainly have bombarded them.

The Jermynia was a superior ship to the Emden and, if an efficient look-out had been kept, the Penang raid might have had a different ending.

As mentioned above, the Emden left the harbour at full speed after destroying the Jermynia. She was fired at from an unknown quarter whilst leaving—possibly a shot from one of the several French boats in harbour, but as the shots did no harm and as the Emden could not readily make out the position of the hostile craft, he continued on his way.

When some little distance outside Penang, the Emden met a strange vessel which as he approached hoisted the red flag, indicating that she was a powder steamer—and which turned out to be the British ship Glen Turret. She had signalled to land for a pilot and he had just reached the Glen Turret when the Emden appeared.

On the approach of the cruiser, he returned to his launch which made off at full speed for Penang. The Emden did not interfere with him in any way but proceeded to transfer the crew of the Glen Turret to the Emden.

While this operation was in progress, a war vessel of some description appeared on the horizon, making for Penang. The Emden at once recalled her boats which were in the act of transferring the crew of the Glen Turret, and made off to meet the approaching ship. At 6,000 yards she appeared much larger than she really was, owing to the deceptive early morning light, but as they closed in to 4,800 yards, they found her to be the French torpedo boat destroyer Mousquet.

The Emden opened fire at this range and struck the engine room with her opening shot.

She fired several broadsides at the Mousquet, practically all of which found their mark. She then ceased fire, expecting the Mousquet to be a total wreck and to surrender. She, however, gamely replied with about ten shots, none of which reached the Emden.

The Emden again opened fire and very shortly the Mousquet was seen to be sinking by the bow. The Captain of the Emden then ceased fire and stood by to pick up the survivors who numbered 36—three of whom subsequently died of their wounds on the Emden.

The French prisoners said that the Mousquet had fired two torpedoes but these were not seen by the Emden. They also said that they had seen the Emden the previous night when they were patrolling the coast, but believed her to be a British cruiser.

The Emden, having lost a lot of valuable time on account of his engagement with the Mousquet, now saw another torpedo boat approaching from Penang. She at once set out for the Indian Ocean at full speed with the torpedo boat in chase but managed to elude her after a four hours run in heavy rain.

Proceeding on the way to her collier Bureski, the Emden met with the British freight steamer Newburn on 30 October. She was laden with general merchandise for Singapore. All the surviving French prisoners were placed on board and she was ordered to sail direct for Sabah in Sumatra.

The Emden reached her collier on 31 October and then sailed company with her to the Cocos Islands, which were reached on the evening of Sunday, 8 November. She sailed round the islands to see that all was clear and, at 3.30 a.m. on Monday, 9 November, proceeded to Direction Island with her dummy funnel rigged for the third time.

Her object was to destroy the wireless station and cut the cables—and with this in view, the Captain landed a force of four officers and about 40 men, taking with them 4 machine guns.

It appears to the writer that the fatal mistake made by the Captain of the Emden was the unshipping of his dummy funnel before his landing party had actually landed. This gave the wireless operator on land the information that the vessel was in all probability a hostile one which turned out to be the British cruiser and gave him the requisite few minutes grace necessary to send the S.O.S. signal which brought the Sydney to the spot.

It is superfluous to give here a detailed account of the ensuing engagement as it has been described with great minuteness by people who were in a position to get all the details. An account has, I believe, been published giving the effect of practically every shot fired during the engagement.

It has seldom been possible to get such a complete record of a naval engagement in the words of the two vessels conferring afterwards on board the Sydney and piecing together their relative positions and movements as the action proceeded, made it possible for a most detailed report of the fight to be arrived at.

A few notes on aspects of the encounter which may not have been previously published may be of interest.

Firstly, the presence of the Emden so close to the Australian Convoy was altogether fortuitous. Captain Von Müller told me that he knew that troops were to be sent from Australia to Europe but he could not find out their route or date of sailing.

As has been mentioned elsewhere, on the appearance of the Sydney on the horizon, the Emden was under the impression that it was the New-
castle and it was not discovered that the oncoming ship was not the Newcastle until it was too late, in the words of Captain Von Müller, 'I had no alternative but give battle'.

The Emden's now famous first shot, fired at the Sydney at a range of 10,000 yards from one of her 4.1 inch guns, was naturally a shot at absolutely extreme range. This shot missed the Sydney striking the water about 500 yards beyond her. The gun was elevated at the absurd angle of over 30° in order to throw her shells this distance—over 45 miles. Normal long range for the Emden's guns was 6,000 yards—under 3 miles.
At no time during the fight did the Sydney allow the Emden to come closer to her than 5,000 yards—comfortable range for the Sydney, fairly extreme range for the Emden.

In describing the fight, Captain Von Müller expressed a rather depressed surprise that the Sydney had, when she returned from her chase after the collier, "opened fire again on our wreck".

The answer would seem to be a combination of two reasons—that the Emden's flag was still flying, and that the Sydney had no reason to believe that the torpedo flat on the Emden was out of action.

As a matter of fact I understood from the Captain of the Emden that, although it was not in the portion of the ship that was utterly destroyed, it was nevertheless put out of action and Lieutenant Prince Von Hohenzollern, who was torpedo officer, took up his position with the Captain in the conning tower half way through the engagement.

It seems as if the Emden wished to capitulate, but wanted to avoid striking her flag and that her rather strange action was due to this and not to any sinister intention of torpedoing the Sydney when she approached to take off the survivors.

The Captain said that his International Code Book had been burnt and that he could not understand the Sydney's signals calling him to surrender.

Their flag was eventually hauled down by the Captain's servant, Werner, who at great personal risk managed to get over the intervening deck space under fire, climb the mast and unwire the flag.

The Captain denies that anything like 1,500 shots were fired by the Emden, as has been said in one account of the fight. His ammunition supplying arrangements were damaged early in the fight, and he thinks it improbable that more than 700 shots could have been fired.

Captain Von Müller says that in the whole engagement he could only see the effect of one of his shots on the Sydney. This was a shot which set fire to a heap of cordite which was on the deck and which burned up in a blaze, doing very little other damage.

Dr. Luther who was on the Emden told me that the condition of the men who swam ashore from the Emden to the Island was terrible. Their wounds were irritated by the salt water and those who were not drowned in the surf went through a night of agony on land, without shelter, water or food. The short intervening stretch of surf between the ship and the shore was rough and the bottom was sharp-edged coral. Several attempts to get a line ashore were made but it was found impossible, with the result that many were drowned in attempting to swim the breakers in their weakened condition.

The survivors were taken off the Emden and from the Island by the Sydney, who transferred the unwounded to the Empress of Russia in mid-ocean. The latter boat had been called to the scene by the
Sydney, as her own accommodation for the prisoners was altogether inadequate. Both vessels now made for Colombo where the badly wounded were left in hospital and the remainder taken on board the Australian troopships Orvieto, Omrah and the New Zealand ship Munaputu, on which they travelled to Port Said. At the latter port all the prisoners were transferred to the Hampshire in which they were taken to their place of internment.

When on the Sydney, the officers gave a limited parole on which they were allowed certain liberties on their word not to harm or attempt to injure the ship in any way. The four officers who were on the Orvieto, the Captain (Fregattenkapitan Karl Von Müller), Lieutenant Prince Franz Joseph Von Hohenzollern, Dr. (Stabsartz) Martin Luther, and Lieutenant Zur See Fickencher, refused to give their parole and were consequently interned in four cabins on the promenade deck under an armed guard. They were given their meals in the Children's Saloon and exercised on the deck, which was cleared for the purpose, for two hours daily.

The men, of course, gave no parole and were interned in a lattice off portion of the stern of the ship under a strong guard. They did physical drill twice daily on one of the lower decks under instruction from their Warrant Officers.

Both officers and men expressed satisfaction at their treatment on board the troopship. Thus ended what has been described as 'a raiding episode such as Eastern waters have not witnessed since the days when these particular trade routes were subject to continual depredations.'

The Emden has, this same source continues, created a bigger stir in British commercial circles than the rest of the German Fleet put together.

FOOTNOTE:

"In finding this account of the cruise of the Emden that I wrote 55 years ago, I am reminded of what a fine person Captain Von Müller was. He was a gallant gentleman in the real sense. In all the seizures and sinkings that the Emden achieved I do not believe a life was lost. We posted a guard on the quarter in the Orvieto occupied by Von Müller and his officers and men. The guards were all 6 ft. 3 ins. or more, which created the impression that all Australians were as tall and well built as this.

When occasionally at meals one of von Müller's officers made a remark to or about me that von Müller regarded as out of place in the circumstances, he would bark at him in rapid and corrosive German and the officer subsided in embarrassment.

When it came to von Müller and his officers leaving the Orvieto at Port Said, he asked me if he could have the privilege of leaving the ship in civilian clothes as he regarded it as contrary to his dignity as a German officer to be photographed as a prisoner of war in uniform. I agreed and had some ready made clothes got quickly from a store in Port Said, which turned out to be abominably ill-fitting, and with a fancy felt hat and yellow boots. However it was the best that could be done in the circumstances."
OFFICIAL OPENING OF T.S. PARRAMATTA

A Photographic Record by the R.A.N. Photographer

Headquarters in Rydalmere of T.S. PARRAMATTA, which was granted Naval Board recognition in 1965, was officially opened on December 21.

The Guard and ship's company were inspected by Rear Admiral H. A. Showers, State President, Navy League of Australia. He was escorted by Commander L. Mackay-Cruise, R.A.N.R., Senior Officer, Naval Cadet Force, New South Wales, and the Commanding Officer, T.S. PARRAMATTA, Sea Cadet Lieutenant A. Stevenson.

The dedication service was carried out by the Senior Chaplain of the Mission to Seamen, the Rev. Colin Craven-Sands.

After the dedication the building was officially opened by Mrs. L. Mackay-Cruise.

Official guests included Mr. Nigel Bowen, QC, Federal Member for Parramatta, the Mayor of Parramatta, Alderman Wilde, Commander K. Graham, M.B.E., R.A.N. Staff Officer Reserves, the President and Committee members of Guildford R.S.L.

The band of the Royal Australian Naval Reserve, Sydney Port Division, was on parade.

During the afternoon the unit's first boat, a 14-foot dinghy, was delivered, much to the surprise and delight of the officers and cadets.

Light refreshments were served by the Ladies' Committee of T.S. PARRAMATTA.

The Official Opening Ceremony by Mrs. L. Mackay-Cruise. L to R: Lt-Cmdr. L. Mackay-Cruise, Senior Officer, N.S.W.; Mrs. K. Graham, Lt. A. Stevenson, CO, T.S. Paramatta; Mrs. L. Mackay-Cruise, Mr. Colin Craven-Sands, Alderman Wilde, Mayor of Parramatta; Rear-Admiral H. A. Showers and Commander K. Graham, M.B.E., R.A.N.

The Unit Headquarters. At left: Cadets of the Unit. At right: The R.A.N.R. Band.

At the conclusion of official proceedings, Officers and Cadets were surprised by the unexpected delivery of the Unit's first 14 ft. boat.
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Sea Cadet Corps News

Efficiency Award

TS MELBOURNE has been awarded the Navy League of Australia Annual Efficiency Trophy. The award is presented annually to the most efficient unit in the Commonwealth.

TS MELBOURNE (Sea Cadet Lieutenant D. McGillivray) is a Frigate class unit at Albert Park and was recognised by the Naval Board in 1951.

It is the first occasion that TS MELBOURNE has been selected as the most efficient unit in Victoria. Units selected as the most efficient in other states were: TS PALUMA, Queensland; TS TOBRUK, N.S.W.; including the A.C.T.; TS LEVEN, Tasmania; TS FLINDERS, South Australia; TS BEDFORD, Western Australia.

The Director of Naval Reserves, Captain R. C. Savage, R.A.N., who inspected the units, said:
"I was pleased indeed with the high standard of dress. I feel that each unit I inspected merited the honour of being custodian of the Sea Cadet Colour for that State."

"The Darwin unit, TS WARRAMUNGA, was considered on the Naval Officer-in-Charge North Australia Area's report, and merits special mention on this occasion.

"I enjoyed inspecting the units and commend all those responsible for their efficient organisation."

SEA CADETS JOIN
H.M.A.S. CRESWELL
Three former Sea Cadets from New South Wales units joined the Royal Australian Naval College as Cadet Midshipmen last January:

Acting Cadet Petty Officer Anthony Drover, formerly of TS Sydney.

News of these successful applications must have been most gratifying to the Senior Officer and Officers of the N.S.W. Division.

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

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

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

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

DIVISIONS

Victoria — Room 8, 8th Floor, 528 Collins Street, Melbourne, 3000.
Queensland — Box 376E, G.P.O., Brisbane, 4001.
Tasmania —
South Australia — Box 1529M, G.P.O., Adelaide, 5001.
Western Australia — 182 Coode Street, Como, 6152.
Northern Territory — C/- K.M.A.S. Melville, Darwin, 5790.

THE NAVY LEAGUE OF AUSTRALIA

Application for Membership

To: The Secretary,
    The Navy League of Australia,
    ( Division).

Sir,

I am desirous of becoming a Member of the Navy League of Australia with whose objects I am in sympathy.

(Mr.)

Name (Mrs.)
(Miss)
(Rank)

Please Print Clearly.

Street
Suburb
State
Post Code
Signature  Date

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

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JOIN THE AUSTRALIAN SEA CADET CORPS
If you are between the ages of 13 and 18 years

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

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

Uniforms are supplied free of charge.

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

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

The interesting syllabus of training covers a wide sphere and includes seamanship, handling of boats under sail and power, navigation, physical training, rifle shooting, signalling, splicing of wire and ropes, general sporting activities and other varied subjects.

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

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

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

TO: The Senior Officer,
Australian Sea Cadet Corps
I am interested in joining the Australian Sea Cadet Corps and would be pleased to receive further information.

NAME ____________________________
STREET ____________________________ SUBURB ______ STATE OR TERRITORY ________
PHONE No. ____________________________ AGE ______

(Please print clearly)

Please address your envelope to the Senior Officer in your State or Territory—see list of addresses above

THE NAVY
MISSILE BOATS AND THE ROYAL AUSTRALIAN NAVY

By R. G. MILLAR

All through last year large numbers of the new 100 feet patrol boats have joined the fleet and from every corner of the country there are screams for more of them to be made available.

It is probably too late to ask this question, as it appears the full number of 20 will be completed, but what naval advantage do we gain by having these vessels?

They are definitely good patrol boats, their limited armament, good seagoing ability and relatively fast speed, make them ideal for this type of work, especially in protecting our country's fishing grounds, but if any major threat to Australia's security developed, all these vessels would be hard put defending themselves against any passing MiG let alone inflicting any damage on the aggressor.

At a time when the Australian navy is hard put getting new vessels of any type, it is a crime to spend such large sums (over 400,000 dollars a boat) on vessels of such limited use.

Nevertheless, the boats are with us to stay, but it is still interesting to examine one of the better ways this money could have been employed or might in future be.

In October of last year the Israeli destroyer "Flath" was sent to the bottom by "Styx" missiles (1000 lb warhead, 15-18 miles range) and if they are supplied to the North Vietnamese shore batteries, which it appears they will be, it is quite possible that all shore bombardments will come to an end, as these missiles far outrange the standard destroyer gun and the larger ships will be forced back to the limit of their range from the coast.

There are several other cases (North Vietnamese MTB's got within 3 miles of the U.S.S. Waddox and U.S.S. Turner Joy in August of 64. Had they been armed with missiles?) which all point to the effectiveness of this weapon, and it cannot be argued that the country possessing these missiles possesses a weapon of unlimited defence value.

HMAS Bayonet, the last of 20 patrol boats to be launched for the R.A.N., moves down the slipway at the Maryborough shipyards of Walkers Ltd. She was launched during November by Mrs. William Purves, wife of the Third Naval Member and Chief of Naval Technical Services, Rear Admiral F. W. Purves.
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February-March-April, 1969
THE NAVY

February-March-April, 1969
THE NAVY

February-March-April, 1969
THE NAVY

HMARS ATTACK 100
ft. patrol boat, is stationed at Darwin.
### COMPARISON

#### RAN 106' Patrol Boat

<table>
<thead>
<tr>
<th>Displacement</th>
<th>140</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed</td>
<td>20</td>
</tr>
<tr>
<td>Range</td>
<td>27</td>
</tr>
<tr>
<td>Engines</td>
<td>2 diesel</td>
</tr>
<tr>
<td>Dimensions</td>
<td>107' x 20' x 7'</td>
</tr>
<tr>
<td>Crew</td>
<td>3 officers, 16 men</td>
</tr>
<tr>
<td>Missiles</td>
<td>2.5 Browning MG, 1, 2in Rocket flare launcher, 140/60 mm Bofors, .50 Browning MG</td>
</tr>
</tbody>
</table>

#### Russian Osa Class Patrol Boat

<table>
<thead>
<tr>
<th>Displacement</th>
<th>160/200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed</td>
<td>35</td>
</tr>
<tr>
<td>Range</td>
<td>4, 15-25 mile range two stage solid propelled missile, 1,000 lb warhead</td>
</tr>
<tr>
<td>Engines</td>
<td>3 diesel</td>
</tr>
<tr>
<td>Dimensions</td>
<td>131' x 23' x 6.5'</td>
</tr>
<tr>
<td>Crew</td>
<td>5 officers, 20 men</td>
</tr>
<tr>
<td>Missiles</td>
<td>Able to perform each others jobs, 3.25mm Fully automatic radar controlled AA</td>
</tr>
</tbody>
</table>

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Attention Navy Men

A number of Sea Cadet Units are in need of additional adult personnel with Service background to instruct Cadets. Anyone who may be prepared to give of his time on Saturday afternoons is asked to please contact the Cadet Liaison Officer, Lieutenant McPherson, H.M.A.S. Watson, telephone 37-1311 extension 250 between 0800 and 1530 for further particulars.

The Units concerned are—

<table>
<thead>
<tr>
<th>Unit</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>T.S. Albatross</td>
<td>Wollongong</td>
</tr>
<tr>
<td>T.S. Hawkesbury</td>
<td>Gosford</td>
</tr>
<tr>
<td>T.S. Parramatta</td>
<td>Rydalmere</td>
</tr>
<tr>
<td>T.S. Sirius</td>
<td>Arncliffe</td>
</tr>
<tr>
<td>T.S. Shropshire</td>
<td>Canterbury</td>
</tr>
<tr>
<td>T.S. Warrego</td>
<td>Hunter’s Hill</td>
</tr>
</tbody>
</table>

Cadets range from 14 to 19 years of age and Units parade on Saturdays.

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Newcastle: 16 Watt St. — Tel. 2-4711
Cairns: 18 Abbott St. — Tel. 2-5462
Ballarat: Conc. Lydiard & Malr St. — Tel. 2-5462

The NAVY

February-March-April, 1969
NEWS FROM BRITAIN

(The Editor is indebted to the officers of the Information Service of the British High Commission in Australia for their ready assistance in the compilation of this article).

ADVANCED ANTI-COLLISION RADARS

Potential collision risks can now be evaluated with great speed and simplicity on a true motion display by the use of new anti-collision radars which include for the first time ever, Relative Motion Marker systems.

The unit offers the navigator a unique and practical means of simultaneously displaying relative information on a true motion presentation which shows the overall navigational picture. By superimposing 'electronic' markers on a true motion presentation it is possible to see simultaneously the true and relative movement of other vessels in an encounter. Keynotes of the system are its operational and technical simplicity which have enabled high reliability and low cost to be achieved. These advantages, combined with the advanced operational capability of the equipment, make it suitable for all types of merchant and naval vessels.

Up to five Relative Motion Markers can be used simultaneously to monitor separate collision risks. The markers are painted continuously by a new 'inter-scan' technique and are independent of the rotating main scan paint of the radar picture.

Fixed All markers extend inwards towards 'own ship' from the bright spot, and once set, remain fixed at the same range and compass bearing to 'own ship', moving across the true motion display with it. If a marker is positioned on an echo, a collision risk exists if the echo closes 'own ship' along the marker line of constant bearing. If the echo moves off the line, its relative motion is shown from the bright spot and its closest point of approach can be seen.

The five markers, which are entirely independent of each other, are operated from simple controls mounted on the true motion panel. The controls include range and bearing adjustment, brightness, an amber operating range indicator and five switches, one for each marker.

ANOTHER NUCLEAR-POWERED SUBMARINE JOINS BRITAIN'S ROYAL NAVY

HMS Repulse, another of the nuclear-powered Polaris submarines to join Britain’s Royal Navy, leaves Barrow-in-Furness, north-west England, recently, having previously been commissioned into the 10th Submarine Squadron. After acceptance trials off Scotland and in the North Atlantic, the submarine—she carries 16 Polaris missiles and is also armed with six 21-inch torpedo tubes—will undergo a normal “work-up” period before crossing the Atlantic to test her missiles and bring system on the Atlantic range. With a displacement of some 7,000 tons, the Repulse, one of the largest submarines in the world, was completed three months ahead of schedule by her British builders and should be fully operational by mid-1969. Built by Vickers Ltd., Shipbuilding Group, Barrow-in-Furness, Lancashire, England.

February-March-April, 1969
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NOW THEY GO TO SEA ON BIKES

Two British ship's officers, Captain B. L. Baker (left) and First Officer David Broughm, try out an idea for making their duties easier, by using suitable equipped bicycles to cover the long deck of their vessel, the 170,000 ton ESSO MERCIA — seen here in dock recently at Belfast, Northern Ireland. It was claimed that on her recent maiden voyage, the 1,610 ft. long oil tanker was the biggest and almost the longest ship (the Cunard QUEENS beat her by a few feet) ever to have entered British waters. The ship's length — nearly a fifth of a mile — of this enormous vessel, prompted the ship's owners to buy the bicycles for use on the tanker during her 12,000-mile voyage between Northern Ireland and the Persian Gulf. Now it seems that although bicycles may seldom have been used like this before, the time-saving idea will probably spread.

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SIMPLE, SAFE, ROBUST

A fibre glass variable frequency marine aerial developed by a British firm is claimed to have a unique construction which simulates an odd number of exact quarter waves on selected frequencies.

- Resonance — is achieved on any tank circuit is correctly tuned. The variable frequency glass fibreglass aerials is robust and simply constructed in a manner that makes the fitting of whip aerials impossible.

- The aerial is particularly suited to lifeguards and similar devices are of a design which greatly reduces the risk of blockages.

- The valve, called the Crewsaver, is robust and simply constructed in chemically inert and non-toxic materials and is intended for shrink-fitting into the P.V.C. tube of a lifeguard.

- Its body houses a valve shuttle with a built-in sealing ring of synthetic rubber and an 18K stainless steel spring. It is reused by a snaplock base cap. Body, valve shuttle and base cap are moulded from polypropylene, which will not deteriorate or deform even under extreme tropical conditions — 24 hours at 55 degrees C. and at a relative humidity of 95 percent and is unaffected by sea water.

- Flutes on the valve shuttle give it a self-centering action, and consequently the sealing ring built into it always locates correctly on the valve seat. The position and shape of the ring tend to cause deflection of any solid particles that enter the mouth of the valve.

- There are four radars in the new 12 inch range, offering a choice of 10kW or 25kW transceivers and 18 ft. or 9 ft. aerials.

- A fibre glass variable frequency marine aerial developed by a British firm is claimed to have a unique construction which simulates an odd number of exact quarter waves on selected frequencies.

- This results in the signal coming out of the TX at low impedance on any selected frequency providing the tank circuit is correctly tuned. The firm says that a very high 'Q' value — resonance — is achieved on any selected frequency including the marine 2 megacycle band, medium frequency and into the high frequency bands.

- When carefully tuned on installation, the aerial gives a substantially complete transfer of radio frequency power on the fundamental frequency only. There is virtually no wastage in the form of harmonics.

- Extremely compact and robust, the aerial is completely waterproof and connection is to a downlead in a waterproofed compartment in the aerial base. Up to 1kW of power can be used. If necessary, two V.F. aerials can be used with less inter-action.

- The aerial, the Partridge Marine Variable Frequency Aerial, is 8 ft. in diameter and is 11 inches.

- A fibre glass variable frequency marine aerial developed by a British firm is claimed to have a unique construction which simulates an odd number of exact quarter waves on selected frequencies.
The guided missile destroyer HMS Hampshire (foreground) and the anti-submarine frigate HMS Undaunted (upper right) lead two columns of warships of Britain's Western Fleet during a recent exercise off the coast of Scotland. Some 50 ships — about half the Royal Navy's Western Fleet — gathered at Rosyth for their annual assembly. The ships ranged from guided-missile destroyers, submarines and a commando ship, coastal minesweeper and small survey vessels to frigates.

The purpose of the assembly is to allow Flag and Commanding Officers to meet and discuss current matters and for ships to take part in a very full training programme.

Changing Conditions

To meet changing sea and wind conditions, the amount by which the pointer deflects can be adjusted from the control panel. With the 'rough' setting, the pointer's full scale deflection is 40 degrees on either side of the lubber line and at 'calm' to 20 degrees.

The master compass, housed in a brass binnacle coated in nylon, is 4½ inches in diameter and 6 inches high. It weighs 4 lb. Two versions are available. One, for sailing yachts, is gimbal-mounted; the other, for power boats, is on a resilient mounting to minimise the effects of vibration.

The control unit, connected electrically to the binnacle, measures 4½ inches in diameter and 6 inches high. It weighs 4 lb. Two versions are available. One, for sailing yachts, is gimbal-mounted; the other, for power boats, is on a resilient mounting to minimise the effects of vibration.

The makers say that trials have shown that steering errors made by a helmsman of average skill are considerably reduced with the aid of the instrument. Typically a reduction of mean steering error from 12 degrees to 4 degrees saves two miles in distance run for every 100 miles sailed. It is said that in high speed power boats, the compass remains stable even when the craft is pounding heavily.

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FIFTY BRITISH WARSHIPS ATTEND WESTERN FLEET ASSEMBLY

The guided missile destroyer HMS Hampshire (foreground) and the anti-submarine frigate HMS Undaunted (upper right) lead two columns of warships of Britain's Western Fleet during a recent exercise off the coast of Scotland. Some 50 ships — about half the Royal Navy's Western Fleet — gathered at Rosyth for their annual assembly. The ships ranged from guided-missile destroyers, submarines and a commando ship, coastal minesweeper and small survey vessels to frigates.

The purpose of the assembly is to allow Flag and Commanding Officers to meet and discuss current matters and for ships to take part in a very full training programme.

February-March-April, 1969

THE NAVY

February-March-April, 1969

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inches by 31 inches by 22 inches and weighs 11 lb. It is also connected to the ship's power system and is available in 12V, 24V, 32V or 36V D.C. versions.

The indicator, available in 4 inch or 21-inch diameter versions weighing 3 lb. and 1 lb. respectively, is fitted with Beta lights for night-time illumination.

MARINE WATER-COOLED DIESEL ENGINE
A new marine water-cooled diesel engine rated at 15 b.h.p. at 2,000 r.p.m. is a four stroke two cylinder unit suitable for a wide variety of commercial and pleasure craft, claim the British makers.

Cooling is normally by a thermostatically controlled direct raw water system, though the engine can also be cooled by the keel pipe method if desired.

Standard equipment includes a manually-operated reverse gearbox, though a hydraulically-operated gearbox is available as an alternative.

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ROTATABLE ENGINE WILL DRIVE WITH STEER CRAFT IN ALL DIRECTIONS
A motorboat with a rotatable engine that will drive and steer the craft in all directions, even backwards, has been developed by a British firm, Michael Garade (Selby) Ltd. of Yorkshire.

Claimed to be unsinkable, it has a four-stroke, 2 h.p. engine which is enclosed in a cylindrical glass fibre container that slides into a housing in the stern, without any fastening.

The craft is called the Water Beetle Mk. II motorboat.

AUSTRALIAN SEA CADET CORPS
& R.A.N.R. SCHOOL CADETS NEWS
NEW SOUTH WALES DIVISION
Report on training and activities undertaken by the Australian Sea Cadet Corps and the R.A.N.R. School Cadets for the quarter ending 31st December, 1968.

A continuous training period of 7 days duration was carried out by the Scots College, R.A.N.R. School Cadet Unit in H.M.A.S. Creswell from 24-11-1968 to 26-11-1968. Weekend training for Sea Cadets and R.A.N.R. School Cadets took place in the following weeks and establishments:

H.M.A.S. Vendetta, 11-13 October.
H.M.A.S. Anzac, 18-20 October.
H.M.A.S. Creswell, 18-20 October.
H.M.A.S. Stalwart, 18-20 October.
H.M.A.S. Creswell, 8-10 November.
H.M.A.S. Watson, 15-17 November.
H.M.A.S. Creswell, 6-8 December.
H.M.A.S. Stalwart, 13-15 December.

Officers, Instructors and Cadets attended the services held at St Andrews Cathedral and St Marys Cathedral on Sunday, 6 October to mark the conclusion of Navy Week.

Cadets were used as ushers and to hand out the Order of Service.

On Sunday 27 October, 100 Cadets played an active part in the Annual Sailing Regatta held in St Andrews Cathedral in that they acted as flag bearers.

The Annual Regatta Regatta was held on Sunday 17 November and the courses were laid off Snapper Island. T.S. Sydney acted as the host Unit. Major trophies were won by T.S. Sydney and T.S. Warrego.

A party of three from the T.S. Sea Cadet Unit T.S. Jervis Bay comprising one Petty Officer Instructor and two Instructor Cadets arrived during November in the Shaw Savill M.V. Ionic. These personnel were billeted in H.M.A.S. Watson and the comprehensive programme arranged for them included amongst other items a visit to H.M.A.S. Creswell, H.M.A.S. Nirimba and to the Town Hall to meet the Chief Commissioner.

Activities included drawing up plans for a building commensurate to the attractive site. However, notwithstanding the many offers of physical assistance there still remains the problem of finding sufficient financial means to erect an adequate headquarters.

The official opening and dedication of T.S. Paramatta headquarters building took place on Saturday 21 December.

L. Mackay-Cruise, Commander, R.A.N.R., Senior Officer.
Periscope on Australia

MALAYSIAN NAVY TEAM

December, 1966, and began training at H.M.A.S. Torongau, Manus Island in January, 1967. They each completed six months common apprentice training plus 18 months as engine room artificer apprentices (see photo next page).

Their specialised training will make them senior engineering sailors on the division's five Australian-built patrol boats.

MINE HUNTER — H.M.A.S. CURLEW

The former mine-sweeper H.M.A.S. Curlew commissioned last December in her new role of mine-hunter, for which she was extensively modified at Garden Island Dockyard—the first mine-hunter in the R.A.N. The mine-hunter is the latest advance in mine-countermeasures and is a significant addition to the Australian Fleet.

Using a high definition sonar set, the vessel locates mines ahead of the ship to clear a channel. Clearance divers aboard the mine-hunter are used to destroy mines which are located. Vessels of this type may also be used for locating crashed aircraft or missiles.

Other modifications made to Curlew are the fitting of twin active power rudders which give her increased manoeuvring capabilities at low speeds.

The mine-sweeper H.M.A.S. Snipe is currently being converted to a mine-hunter.

NEW YEAR LOOK FOR R.A.N. SHIPS

From 1 January all R.A.N. ships carried new-style hull numbers on their bows and on each quarter.

The new form of numbering requires that they be square instead of rounded, thus improving visibility at sea: prefix letters have been omitted except for auxiliary vessels which retain letters, but of a smaller size. Numbers have been omitted...
Our photograph shows HMAS YARRA receiving her final touches.

Petty Officer G. Cunningham, issues football boots to artificer apprentices A. Linga, R. Heni (centre) and G. Aiede.

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THE NAVY

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Melbourne returns to fleet

New barrels for Perth

Tens flew above the ship during the commissioning ceremony. Melbourne is currently carrying out flying exercises with her new aircraft (see photo).

New barrels for H.M.A.S. Perth

The barrels of both 5 inch automatic guns on Perth were changed at the U.S. Naval Base in the Philippines (Subic Bay). The old barrels had each fired some 4,000 rounds and were 92% worn (see photo).

By mid-January, Perth had destroyed or damaged 86 enemy bunkers, 184 structures, 28 sampans, one small cargo vessel, four bridges, three trucks, killed six Viet Cong, cut or damaged six roads and silenced three artillery sites.

Now switched to other duties with the U.S. Seventh Fleet, Perth is scheduled to complete her tour in Vietnamese waters at the end of March.

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When the R.N. Tactical School moves from Woolwich to H.M.S. Dryad in 1970 is to have a brand new Action Speed Tactical Trainer. This is now nearing completion of development at Ferranti Ltd. and was shown to the Press for the first time on 8th November.

With modern weapons, missiles and aircraft now coming into service the faithful old A.S.T.T. at Woolwich has got out of date and indeed in many cases is incapable of simulating modern conditions. This was realised some years ago and a staff requirement was raised for a much more sophisticated and versatile trainer. The Digital Systems Department of Ferranti were awarded a contract to develop one in conjunction with the Admiralty Surface Weapons Establishment and work started in August 1964.

The designers were determined to come up with a unit which not only met present day requirements, but which would be sufficiently versatile to meet all future requirements for at least the next 10 years, and they have produced a really first-class system which they claim is the most advanced tactical trainer in the world.

The core of the whole trainer is three Ferranti digital F1600 computers. These incredible machines can store up to 100,000 words, automatically perform all the various functions, produce the tracks of all the units taking part in a game and carry out a thousand other computations in a fraction of a second.

The trainer itself consists of 20 cubicles, with provision for a further four, each of which can be programmed to represent any type of unit, seaborne, airborne or submersed. In each cubicle are a number of P.P.I. type of displays, which, although not identical with similar displays found in ships, between them produce to the Command exactly the same information that would be available in a modern operations room of a ship.

There is a large, 24-in. cathode-ray tube on which are displayed all the detections made, together with alphabetical-numerical symbols indicating their track number, category, speed, etc. In addition there is a P.P.I. display, very similar to that found in a ship, and one, or in some cases two, other filtered displays.

The cubicles are fitted with keyboards by means of which the students can give various instructions to the computer. For instance, if it is desired to alter course to 040 turns to the new course with all the correct delays for wheel-over, etc. imposed. It is even possible to differentiate between 'hard over' and only a few degrees of wheel; a rate of turn control being provided.

Changes of speed are similarly simulated and it is possible to order a zigzag or to sinuate, a blown-up portion of it, or any display in any cubicle. They also have arrangements for driving up to 100 units themselves, but since 100 would be too many for H.M.S. Dryad to programme all the units to do what they require, press a switch and leave it to the computer to drive them. Thus the directing staff can manoeuvre a convoy, insert a submarine, or an aircraft, or shore-based missile, in fact anything that their ingenuity can devise.

The whole playing area covers 2,048 square miles and is all displayed on vertical panels where all the tactical movements are recorded so that spectators can watch the progress of the battle.

A very useful innovation is a separate Wash-up Room where the
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game can be replayed so that it can be seen by all the participants, thus allowing the main area to be used simultaneously for another game with a fresh list of students.

Considerable trouble has been taken to ensure that each ship’s sensors detect realistically: horizon effect, jamming, size of target are all taken into account. In addition it is possible to simulate any form of enemy electronic countermeasure. The directing staff can insert various reductions in radar or sonar ranges, to represent adverse conditions, simply by making a switch.

Game preparation of the directing staff is simple and needs no special skill. All that they have to do is to complete a form to define the units wanted in the game, their starting positions and the entry time and manoeuvres required by the units which they themselves are controlling. The forms are converted onto tape, and fed to the computers which assemble them and print out a ‘scenario’ for use by the directing staff. Changing from one game to another takes only a few minutes.

There is no doubt that the new A.S.T.T. is a great advance on the existing one at Woolwich. Ferranti claim that, in spite of its complexity, maintenance will be no problem, only six maintenance engineers being required.

As regards the remainder of the staff, apart from the directing staff itself, one Wren will be required in each cubicle whose principal function will be to type into the computer the various orders given her as to own ship movements by her ‘captain’.

Ferranti are naturally looking for export sales and have already been in touch with two Commonwealth and two NATO navies. Since the R.N. trainer started development the state of the computer art has steadily improved and Ferranti have now developed a much smaller and cheaper computer using microminiature techniques. It is known as the FM 1600B and it is their intention to embody this in all future A.S.T.T.s for export. The computer has a bigger capacity, so fewer will be required, thus there will be a considerable saving in space as well as cost.

Whilst the R.N.’s 20-cubicule system is ideal for playing large games, it is not essential to have such an elaborate set-up and one can easily reduce the number of cubicles and allow the directing staff to drive more units. Hence the system is extremely versatile and can be designed to suit any navy’s requirements.

The export versions are expected to cost anything between £100,000 and £1m., depending upon the complexity required, but an average medium-sized trainer should cost about £400,000.

Tactical trainers fulfil a much-needed role in teaching naval officers how to handle their ships and squadrons in war; something which would cost a fortune to learn at sea in peacetime. When one considers the large number of officers which can be put through a trainer in the course of a year, the initial outlay would appear well worth it.
HELICOPTER-DESTROYERS FOR THE ROYAL AUSTRALIAN NAVY

By Cadet Midshipman G. J. DICKKENBERG, R.A.N.

This article is a further reply to the feature by Mr. R. J. Hallett which appeared in the May-June-July, 1968 edition of "The Navy", page 25. Mr. John Mortimer also replied to the feature, see page 63, August-September-October, 1968 edition.

In reply to Mr R. J. Hallett's article on helicopter-destroyers for the R.A.N. I would like to make the following points and suggestions.

Mr Hallett assumes that the age of these ships is not too great to make such a conversion worthwhile, and that this is the first doubt in this project exist. He is going to build virtually new ships from them, but is going to keep in the machinery that has already gone through twenty years service.

In addition he is going to alter their appearance dramatically, to make these vessels appear new and modern, but this expensive change achieves little in the way of their self defensive and detection capabilities. After all, the purpose of these conversions is to supply a relatively inexpensive source of new ships. He is devoting a very large amount of money to equipping his ships with the latest in submarine detection equipment and yet his armament lacks our best anti-submarine weapon, the IKARA. Admittedly, he intends carrying helicopters, however these are not the effective weapon IKARA is, especially in heavy seas. In addition, he hopes to carry two of these aircraft, large Seaking helicopters, no mean task considering their size and the limited room available on these ships. On re-reading his article I seriously doubt the feasibility and worth of such a conversion.

If we are to refit these ships to such an extent, why not build new vessels altogether, a move that appears to me would cost little more and leave us with a far greater lifespan to expect of these ships. If indeed we wish to make these vessels worthwhile submarine hunters we must make provision for the refit to include the fitting of the IKARA system. We cannot possibly hope to carry two Seaking helicopters and must either reduce this to one or adopt much smaller, less effective aircraft.

As to the problem of increasing the size of the R.A.N. I can see several solutions. We could for instance order or build a number of the new escort ships such as the Leander Class frigates, ships which meet our limited manning ability. On the other hand, we could still modify to a limited degree our Battle class destroyers and type 15 frigates. Within these limited conversions I would have these vessels equipped with the IKARA missile system and a helicopter. The modified ships could be expected to emerge from refit as follows:

**BATTLE CLASS DESTROYERS**

- **Dimensions:** Length 379' Beam 36' Draught 13' 6''
- **Weapons:** 1 Ikara launcher 1 Seacat launcher 40mm A. A. guns
- **Aircraft:** 1 Seaking Helicopter
- **Conversions:** The layout of the type 15 frigates would be very similar to that of the Battle class destroyers, except for the absence of the 4.5" gun. The third rotor in this case would be located forward of the superstructure. The unfortunate fact about the type 15's is their lack of defensive armament in the way of guns and surface to surface capabilities. The three rotors are hardly sufficient as defensive weapons, however, sacrifices must be made and calculated risks taken to ensure the maximum efficiency of these ships as anti-submarine vessels.

Whether or not the Australian Navy needs expanding and whether or not these old ships are worth converting is a matter for the Naval Board and Government to decide but I do believe it is important for ships of today's navies to carry some system of long range detection, none of this in the form of helicopters, and the best the Allies can supply in the way of anti-submarine weapons.

**TYPE 15 FRIGATES**

- **Dimensions:** Length 358' Beam 40' Draught 13' 6''
- **Weapons:** 2 4.5" Dual purpose guns 1 Ikara launcher 1 Seacat launcher 40mm A. A. guns
- **Aircraft:** 1 Seaking Helicopter

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Italian Navy comes up with another First

Italy is showing quite a lot of interest in the Harrier, the world's first operational VTOL (Vertical Take-Off and Landing) fighter aircraft, designed and built by Hawker Siddeley. Just as the Italian Navy was the first navy in Europe to have a cruiser armed with missile launchers, so it looks like being the first navy in Europe to have a ship capable of operating VTOL aircraft.

The Italian Navy has already proved to its satisfaction that a VTOL aircraft can be operated from quite a small cruiser. This was when a Harrier completed a two-day demonstration, watched by Italian Service chiefs, with a vertical landing on the small helicopter platform of the Italian guided-missile-armed escort cruiser Andrea Doria, which has a displacement of only 5,273 tons at standard and 6,426 tons at full load and the flight deck of which is only 981 by 521 feet.

She and her sister ship, Caio Duilio, were designed to carry four A/B 204B ASW helicopters, and in addition to the substantial hangar aft the after funnel quite a lot was contrived on ships of the size. With an overall length of 489 feet and a beam of 561 feet they are armed with a twin launcher forward for Terrier surface-to-air guided missiles, eight 3-inch anti-aircraft guns and six 12-inch anti-submarine torpedoes in two triple banks. Their propelling machinery comprises four Foster Wheeler boilers supplying high-pressure superheated steam to two sets of double-reduction geared turbines aggregating 60,000 shaft horsepower and turning two shafts, equal to a speed of 31 knots. They have a capacity of 1,100 tons of oil fuel, giving them a range of 6,000 miles at a speed of 20 knots, and withal they have accommodation for 53 officers and 425 men. These handsomely designed ships might be called portmanteaux of all the military properties. If ships of this size and conventional appearance can also operate a VTOL aircraft it wants little imagination to envisage only a slightly larger ship with the capacity for carrying VTOL aircraft designed and built in from the start.

A bigger G.M. cruiser

Actually a bigger Italian guided-missile-armed cruiser, Vitorio Veneto, is being completed, although at the time she was designed and laid down VTOL aircraft in ships of her size and type were hardly envisaged. With a standard displacement of 7,500 tons increased to 8,850 tons at full load, she was designed to carry nine A/B 240B ASW helicopters, with a consequent larger flight deck aft, sponsored out from her beam. She is obviously even more suitable to
operate VTOL aircraft than her smaller half-sisters. She has an overall length of 557 feet with a beam of 63 feet, and an extra deck from the break of the forecastle to the transom thus giving a higher flight deck which is also the deck-head of the hangar below. She has thus taken her helicopter stowage and servicing below decks like an aircraft carrier, instead of as an addition to the superstructure which is the usual practice in cruisers, destroyers and frigates. But from the after funnel to the forecastle she is still very much a cruiser, and she has the same punch as—in fact a little better than—Andrea Doria.

Vittorio Veneto is also very much a missile ship. In addition to her twin Terrier guided-missile launcher forward which is also capable of launching anti-submarine rockets (Asroc) (the combined mounting also being known as Aster), she has, according to official information, experimental arrangements similar to those in the larger cruiser Giuseppe Garibaldi for launching medium-range ballistic missiles comparable with Polaris tubes of which provision has been made for four. She also mounts eight 3-inch single dual purpose guns and two triple tubes for anti-submarine torpedoes. Her propulsion plant is basically similar to that in the Andrea Doria class but with more powerful turbines of 73,000 shaft horse power designed for a speed of 33 knots. And the complement has been increased to 550 officers and men.

First surface-launched I.C.B.M.
Giuseppe Garibaldi was converted from an orthodox cruiser into a surface-to-air guided-missile ship, with a twin Terrier launcher in 'X' position, and she also has four large vertical tubes in 'Y' position for launching inter-continental ballistic missiles, the first ever mounted in a surface ship. But she is a bigger ship than Vittorio Veneto with a displacement of 9,800 tons standard and 11,335 tons full load with a heavier battery comprising four 5.3-inch guns and eight 3-inch anti-aircraft pieces.

A sister ship of Vittorio Veneto was projected, to have been named Venice, but the plans were modified to provide for a better ship and later the specifications were changed to give a hybrid amphibious cruiser. The building of this ship has been halted for the time being, and taken out of the new-construction cruiser programme, while the design is being re-cast. It is said that if she materializes she will be even more of a carrier than Vittorio Veneto. She is expected to be a helicopter carrier and commando ship in the full sense, but with a missile armament. She will turn out at least 10,000 tons and could possibly operate a flight of VTOL aircraft.

The potentialities of this type of helicopter-cruiser for operating VTOL aircraft have doubtless already been realized by the planners and constructors responsible for the conversion of the British Blake-class cruisers.
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