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**HOW TO GET ON WITH RUSSIANS**

BRITAIN’s Prime Minister, Mr. Harold Macmillan, is visiting Australia this month as part of a tour of British Commonwealth countries. In a BBC broadcast on January 4, Mr. Macmillan made it clear that the problem of Russian military strength would be in the forefront of talks which he would have with the Commonwealth Prime Ministers.

“Our work for peace is dominated by the problem of how well we can get on with the Russians,” he said. He made the following points:

There have been repeated proposals for the abolition of nuclear armaments, atom bombs and hydrogen bombs. If we worked out an agreement it would save us a great deal of money and effort.

But, if as a result of such an agreement we found ourselves decorating defectorless before the greatly superior weight of Russian conventional arms — men, guns, tanks, aeroplanes, surface ships and submarines — we would bitterly regret the loss of the nuclear deterrent.

The knowledge of the immense devastation which would follow a world conflict today does deter aggressors — for in a nuclear war, neither side could be victors.

There are two ways to preserve the peace of the world: they are complementary:

1. The first is to maintain the full strength of our allies. It would be fatal if we allowed NATO to be broken up. It is not just a military alliance; it also provides a moral basis for a large part of the free world.

2. The second way is negotiation and consultation. We should not be dismayed by the failures uptodate. We are going to go on with it.

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THE NAVY

CHOICEST CREAMERY BUTTER
ROCKET FUELS

The history of rockets and rocketry is an ancient one.

ROCKETS were used as missiles against Alexander the Great and, similarly, nearly two thousand years later in the American War of Independence, as attested to by the line in the American national anthem, “By the rocket's red glare...” referring to the Congreve military rockets used by the British.

Now, with intercontinental ballistic missile rockets and earth satellite launching rockets very much in the news it is timely to find out just what makes rockets go.

The principle of the rocket has been known to man for many thousands of years and originally it was used by the Chinese, who invented gunpowder, and was not merely a plaything but became quite important in ancient warfare.

Even in medieeval times it was used extensively, particularly in war, and many marksmen and soldiers became experts in rocketry.

The inability to fire rockets with any degree of accuracy led to their being used “en masse” against an enemy and, although this certainly would have had a suitably demoralising effect, it is doubtful whether it represented a very economical method of waging war.

When the rifled gun barrel was invented, the rocket began to disappear from the battlefield. Its recent revival has been due to two factors, the development of electronics enabling accurate guidance systems to be evolved for military purposes and the desire of man to explore beyond the stratosphere where at present the only known method of propulsion is the rocket.

To make this latter point clear, it should be understood that all internal combustion engines operate by the process of swallowing quantities of air and burning various fuels in suitable proportions with the oxygen in this air to produce heat and thus energy. A jet engine utilizes the release of the hot gases issuing at tremendous speed from the engine’s nozzle and thus achieve propulsion, but is not classed as a rocket because, by definition, a rocket is not dependent on any external source of air to consume its propellant.

Apart from interest in the use of rockets for launching vehicles into space for various purposes (the U.S.A. proposes to launch 200 during the International Geophysical Year), it seems evident that the future of the conventional aeroplane in the military scene will soon be purely a logistic one and the tactical role will be assumed by rocket-powered vehicles. The subject of fuels for rockets is therefore of great interest.

At the present stage of our knowledge of rocket propulsion, the most effective method known is the combination of a suitable fuel with an oxidiser to produce a controlled rate of combustion.

The issuing of the hot gases from a suitable nozzle produces the thrust or impulse which propels the vehicle forward.

All the older rockets used solid propellants, usually gunpowder. In this type the various components of the fuel are mixed together and require an external source of ignition to start off the reaction which is usually violent and of short duration.

The first large rockets to enter the modern scene were developed by Germany during the latter part of World War II. These were propelled by a combination of liquid fuels and oxidisers pumped into the combustion chamber at the desired flow rates to maintain the burning over a relatively long period. This type is still in the forefront of present-day rocketry.

The simplest combination, at least to understand, is kerosine or wide-cut distillate (petrol) together with liquid oxygen.

Many other fuels have been tried, with varying success, but the choice is based on a number of factors and depends to a great extent on the use to which the rocket is to be adapted.

The effectiveness of the propulsion combination is foremost and is expressed as “specific impulse,” which is simply defined as the pounds of thrust available per pound of propellant consumed per second.

Reference to Table I will show the effectiveness of various combinations. Those having a specific impulse of 250 are considered as high energy propellants.

It is not, however, just a matter of selecting the highest specific impulse combination without regard to other factors.

For example, it might be thought that oxygen would be the ideal, but the dangers of using ozone are extremely high, it explodes with extreme violence at the slightest provocation.

In addition, to obtain sufficient quantity in a volume of reasonable size, the hydrogen would need to be compressed under extremely high pressure. As the gas exerts a pressure of one square inch of hydrogen still weighs only .09 lb, which is less than one-twentieth the weight of a gallon of kerosine.

Other materials are difficult to handle; nitric acid, as is well known, is highly corrosive, liquid oxygen has to be kept at an extremely low temperature and cannot be stored indefinitely, while high test hydrogen peroxide (H2O2) because spontaneous combustion of many materials with which it might come in contact.

The chief problem connected with the various fuel combinations, but knowledge of these problems is not readily available.

Generally speaking, it can be said that most rockets built to date have specified a kerosine (JP1) as fuel, there being little to choose between the two except that the carbon/hydrogen ratio is more favourable in the latter.

The choice of oxidiser has mainly been liquid oxygen (LOX), hydrogen peroxide or nitric acid.

With the development of rockets designed either for use with intercontinental missiles (ICMRs) or satellite placement, other fuels are being examined closely. The propellants used to launch the Russian satellite are not known, but the American “Vanguard” is designed to use as a propellant in the first stage a special petroleum fuel which is basically wide-cut distillate (JP1), with liquid oxygen as the oxidiser.

This, as in most current designs, will be led to the combustion chamber by two steam-driven turbine pumps with the steam being generated by the decomposition of hydrogen peroxide. The fuel tanks will be pressurised by helium, to prevent the formation of a vacuum when operating outside the earth’s atmosphere.

The second stage uses a hydrazine-nitric acid combination. The reason for this choice probably is that nitric acid will ignite spontaneously with certain fuels, one of which is hydrazine (for the technically minded unsymmetrical dimethyl hydrazine) thus providing instant and reliable firing of the charge.

It is also known that nitric acid has better refrigerating qualities than liquid oxygen which could be important under the conditions of enormous speed in the atmosphere of the second stage.

The third and final stage uses a solid propellant which, is logical, as very high specific impulses can be obtained from volume from solid propellants without any attendant complication of pumps and fuel systems.

In fact, solid propellant development now appears to be making greater headway than liquid fuel combinations. This is claimed by its proponents to be due to simplicity which results in a very high degree of reliability.

Earlier solid propellants were hard to control and any extension of burning time appeared to be difficult to achieve. The way ahead is with the propellants used to launch the Russian satellite are not known, but the American “Vanguard” is designed to use as a propellant in the first stage a special petroleum fuel which is basically wide-cut distillate (JP1), with liquid oxygen as the oxidiser.

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SCIENCE IN THE SNOW

LAUNCHING of the Russian satellites, which, for a time, drove most other news off the front pages of the newspapers, has tended to overshadow the activities of the International Geophysical Year as a whole, of which such adventures in space are only part.

The surprising thing is not that the satellites were successfully launched, but that they were launched so soon. Both Russian and American satellites are part of the plans for the Year.

Whatever its ultimate implications - obviously very great - the satellite is primarily a "telemetering" device, a group of instruments for measuring at a distance, which automatically broadcasts a coded account of the conditions it encounters on its orbit far above the earth.

As such it belongs in the fantastic company of high-altitude rockets, which ascend straight from the ground, and "rocket" smaller rockets borne by balloons to altitudes of several miles before ascending under their own power.

All these things, although possibly a prelude to space travel and fraught with possibilities of splendid achievement or unparalleled calamity, are also the climax of centuries of meticulous observation of the earth's place in the world around it.

Observations on the scale we now know have become possible only with extraordinary scientific and technological developments during and since the Second World War, and the equally unprecedented amount of industrial and technical resources by the United States and Soviet Russia.

Brilliant minds have long been reaching out into space. Although Russia's little "moon" is the first "platform," it was the Greek, by a magnificent application of geometrical principles, measured the size of the earth with great accuracy from observations of the sun as long ago as the third century B.C. But only in our own time has it been possible to break free from the pull of gravity and to create an artificial moon.

The International Geophysical Year, in which more than 60 nations are taking part, is but the latest stage of a long international endeavor to find out the secrets of our earth and its place in the cosmos.

Seventy-five years ago the researches of the First Polar Year dealt largely with the Arctic region. After 50 years came the Second Polar Year, which included the Antarctic. The third great Year, now begun, has been given the broader name of International Geophysical Year because it involves not only the poles but the whole earth, including the land, the oceans, the atmosphere, and the phenomena of the sun's activity, on which our own world and all that is in it depend.

It is a year in name only, for it began on July 1, 1957, and it will end at midnight on December 31, 1958.

Australia has not only the general interest of all participating nations, but a special interest because much work is being concentrated in the neighboring continent of Antarctica. Here there is a long and splendid history of Australian exploration and scientific inquiry.

The own country was a leader in the activities of the "heroic" period of the Antarctic when skill and fortitude were matched against the blizzard and the ice floe. That period is largely over. Icebreakers, tracked vehicles, planes and electric snow-ploughs have made possible feats beyond the "early" explorers and their dog teams, although the same qualities of resource and hardihood are called for.

The vast Antarctic continent is as big as Europe and Australia together, a land not only of snow and ice but of mountains and lakes, of fascinating economic and political possibilities. These possibilities renew the interest in purely scientific achievement there.

OBSERVATIONS

The primary observatories which have been set up in the Antarctic are engaged in research in meteorology, geomagnetism, aurora and airglow, atmospheric physics, glaciology, cosmic rays, oceanography, seismology and gravity measurements. The general stations are concerned with meteorology, aurora and airglow, geomagnetism and atmospheric physics.

From their observations, scientists may be able to make an estimate of how much ice and snow there actually is in Antarctica and thus reach conclusions on their effect on climate.

As Australians are very well aware, the meteorological happenings in Antarctica frequently modify the weather in intermediate latitudes. We should learn much more about them. Expeditions have been

MINISTER GOES SPEAR FISHING

The Minister for Labour and National Service, Mr. Harold Holt, spears a trumpeter near his holiday house at Portsea, Victoria.
Territory, with an estimated area of nearly 25 million square miles, was legally established by the Commonwealth. An Order-in-Council dated February 7, 1933, placing under the control of Australia that part of the Territory in the Antarctic Seas which comprises all the islands and territories, other than the French segment. Adelie Land, situated south of the 60th parallel of south latitude and lying between the 160th and 180th meridians of east longitude.

**TRANSPORT PROBLEM**

As transport is of the utmost importance, the petroleum industry has naturally a part to play in all these projects. It has assisted both in the field of fuel and by the preparation of special oils and lubricants necessary to withstand extreme cold.

In July it was announced that 2,000 gallons of specially prepared 90 octane petrol produced at Kwinana refineries in Western Australia, had been shipped to the New Zealand section of the I.G.Y. party in the Ross Sea area.

The spirit is a special high-volatility quality which vaporises at extremely low temperatures and will not freeze at a temperature of minus 108 degrees Fahrenheit, considerably below the lowest recorded Antarctic temperature.

Petroleum products in use in the Antarctic include aviation spirit, petrol for the tractor, Weavels and Snocats, diesel oil for the electricity generators at the base camps, kerosene for heating and cooking and a wide range of lubricants and special products provide the fuel requirements for the British, Australian and New Zealand expeditions.

Activities in the Antarctic are only one part of Australia's participation in the Year. The scope of which, as a whole, is so immense and so full of material for the most fascinating speculation that it is possible to refer briefly only to some phases of it.

**IMMEDIATE PURPOSE**

The immediate purpose of the satellites is to increase man's knowledge of the conditions within the atmosphere and of its composition, of solar and interstellar ultra-violet light, cosmic rays, meteoric particles, etc. These are happenings at “the borders of space” where our atmosphere ends and the empty void (or empty as laymen think of it) begins.

How much of the knowledge gained will be of purely scientific interest and how much will be applicable in the practical developments of the future no one can yet say. Academic research and technological progress alike are racing ahead at such speed that the world as we know it may well be transformed before many years are out. The pace of discoveries is constantly speeding up.

If the man in the street is alarmed, however, by the new skills of the scientists and the apparent tendency of science to outrun man's power to govern himself, scientists themselves regard the International Geophysical Year as an inspiring example of international cooperation by nations of widely different training and skills.

**UNIVERSAL STUDY**

The president of the Commission for the I.G.Y., Sir Donald Chapman, F.R.S., points out that a vital principle of I.G.Y. is that all the I.G.Y. data shall be made universally available: it will be studied long after the I.G.Y. organisation has ceased to exist.

It seems extremely probable that knowledge of immediate importance to Australia will come from the various investigations in the Antarctic — it has been estimated that more than 100 million dollars will be spent there by all the nations concerned and a wealth of data should emerge.

What the Antarctic may have to yield in commercial terms we have yet to learn — scientists are not given to such speculation — but it is scarcely to be believed that this enormous continent does not hide riches, perhaps of kinds not yet thought of.

Meanwhile, we can take pride in the fact that Australian scientists, both in the Antarctic and elsewhere, are playing an important part in I.G.Y. and helping to increase the sum of human knowledge. Australian scientific reputation stands high in some fields, such as radio astronomy, we may claim equality with any workers in the world, or even leadership.

I.G.Y. — the “year of the satellite” — makes one of the great leaps forward in human achievement. Those of us who saw its dramatic manifestations to date, the passage of the Russian “Sputnik” over Australia, can consider ourselves to have been present at the birth of a new era.
RUSSIA'S ESCORT FORCES

By J. MEISTER — in London

How could the N.A.T.O. navies hurt Russia?

The main danger for the Soviets may come from Allied task forces with large escort carriers, from which H- and A/V-bomber-carrying aircraft can take off to bombhard Russian industrial centres.

The activity of Allied submarines against Russian convoys will be another threat.

Obviously, Soviet Russia's seaborne foreign trade was not very important in any case, will come to a standstill in case a war.

If one includes the satellites, the numbers are almost complete self-suficient and do not depend therefore on imported raw materials. But the inadequate development of the Russian railway and road network loses a large amount of trade and traffic in supplies to make use of coastal shipping as, during the last war, the Germans did from the Spanish border to the North Cape. The most important of all Russian lifelines lies in the Caspian Sea, where the oil from Baku is shipped to Astrakan and from there up the Volga to the industrial areas.

Besides local coastal shipping, the Soviets must also supply garrisons and bases in such outlying places as Novaya Zemlja, the North Siberian islands, Sakhalin and Petropavlovsk. Much can be done by air, but certainly not all fuel oil, for instance, must be carried in tankers.

Finally, there will be large commitments to supply Russian armies which may have undertaken amphibious operations against Turker, Japan, Ireland, Demark and Sweden, for example, and in the Arctic.

All these commands form ideal targets for Allied attacks with surface vessels, aircraft and submarines.

The amount of damage which might be done by surface ships and aircraft depends largely on the efficiency of the land-based Soviet Air Force, and therefore will not be further analysed.

The possibilities for Allied submarines are easier to estimate. The N.A.T.O. powers have at present altogether over 210 large and 85 coastal submarines. The amount of the then Commander-in-Chief of the Soviet Navy, were again not prepared to protect the supply lines and another 30 boats are building.

If one-fourth, or about 80 submarines, could operate simultaneously against Russian convoys, Soviet merchant shipping losses might soon reach very high figures and ultimately cut the supply lines between the homeland and isolated posts or advanced armies.

Russia has not much experience in convoy defence. In every major war, her foreign seaborne trade has collapsed immediately and some form of blockade-running only as continued, as during the Crimean War.

In the First World War even the trade with Sweden from ports in the Gulf of Bothnia was sometimes menaced by German action; and, although two Russian cruisers were stationed at Vladivostock, the German cruiser Emden was able to attack Russian shipping right off this port.

In the Second World War, Russian seaborne traffic and short-distance supply convoys were somewhat better protected; and the convoys which the Soviets ran during the autumn of 1917 between Hango, then under siege, and Kronstadt, were fairly successful, chiefly because the Germans and Finns had at the time no large, powerful warships available.

In the Black Sea the Soviet trade in military supplies to Odessa and Sevastopol in 1941-42 was subjected to Axis air attack only, and this traffic was always strongly protected. There were often several destroyers and small craft for each single freighter.

But in the summer of 1942 the Soviet Navy felt unable to attempt the evacuation of the remains of the garrison of Sevastopol; and in 1943, when the Russians landed near Etilingen on the Kerch Peninsula, the naval forces under the orders of the then Commander-in-Chief of the Soviet Navy, were again not prepared to protect the supply lines, and another 30 boats were blockaded by the Germans.

After one month of heavy fighting the Russian headquarters was destroyed, and this fact cost the Russians over 100 ships and 10,000 men.

Allied naval officers were doubtful as to the efficiency of the Soviet destroyers and escort vessels which participated in the Murmansk convoys. The judgments were confirmed by the results of Russian anti-submarine warfare.

Of the eight German submarines destroyed by the Russians between 1914 and 1917, six fell victim to Russian mines, one to gunfire, and one to an aircraft.

Strangely enough, the war of 1940-45 produced almost the same figures; five German submarines mined and three sunk by gunfire and depth charges.

Of the 15 Axis submarines in the Black Sea (three Rumanian, six German and six Italian pocket submarines) only one Italian pocket submarine was sunk by Russian minelayer, and many were able.

The aircraft carrier Sydney is to be laid up in "mothballs."

This follows a Federal Government decision to reduce the number of warships in the entire fleet.

The torpedo boats of "Shoem" type, built before the war, the first surface vessels constructed by the Soviets and originally designed for escort purposes, are now serving as training vessels.

The bulk of Soviet escort is at present made up of 10 wartime-built torpedo boats of the "Bird" class, about 200 units of the "Artillerist" and "Kronstadt" types, and several hundred launches of "MO" and similar, but more recent, designs.

After the war, Soviet Russia obtained seven German destroyers and some smaller escorts, five Italian destroyers and torpedo boats, and 24 Japanese escorts; but these vessels were either worn out, slow or only intended for coastal work.

The Russians needed a fast, modern escort ship, not ocean-going, but able to work in almost all weathers everywhere off the Russian coasts.

For these purposes they have recently built the 980-ton "Kola" class and the 1,200-ton "Riga" class vessels, which have elaborate radar installations, and which have been armed with anti-submarine and antiaircraft armament which seems somewhat weak.

It is interesting to note that these new vessels have still a few torpedo tubes, which are prob.
R.N. ECONOMIES

LONDON: The naval outlook during the past month has been heavily clouded by news of the effects within the Services of the Government's policy of economy.

For some time the fate of the Naval Reserves has been in the balance, and in the same direction the "axe" fell heavily. With one blow it swept away the cherished title of "R.N.V.R." In two wars a tradition was built up by those who served in this Reserve. It is natural that there should be misgivings. But the economy, pressure of times, coupled with the need to adapt naval reserves to the requirements of the future, made reorganisation inevitable.

This reorganisation, announced by the First Lord of the Admiralty at a Press Conference, takes into account the following points: (a) the requirement for reservists, mobilisation, to be ready to join the Fleet without further training, (b) the need to review the tasks which volunteer reservists can reasonably perform on mobilisation, particularly having regard to the approaching end of National Service with its two years' valuable active experience, (c) the ever-present need for economy.

The main feature of the reorganisation is the amalgamation under the title of "Royal Naval Reserve" of present Volunteer Reserves; the R.N.V.R. and the various Reserves having the letters "V.R." in their titles, with the one exception of the R.N.V.S.R. This, it is visualised, will simplify peace-time administration and mobilisation procedures and enable better use to be made of existing training facilities.

NEW RESERVE

Broadly speaking, the new R.N.R. will exist primarily to meet seagoing requirements such as bringing Fleet to war complement and bringing forward ships from reserve, and officers and ratings will be allotted to various classes of ships according to their training and experience.

For seagoing background will form one section, or Group A of the Reserve, and men (mainly specialists) training for appointments and not necessarily required for sea service will be placed in Group B.

Finally, there will be a Group C, composed largely of local men and women who can perform non-seagoing duties in their homes.

Economies in general training will, however, be insufficient to keep expenditure within acceptable limits," said an Admiralty statement, "and it has been decided, regrettably, to reduce the Sea Training Centre at Hull to one devoted solely to the training of communications personnel. Other economies will be effected by withdrawing most floating drill ships, which are expensive to maintain.

The measure of the economies is of the order of an ultimate reduction of £500,000,000.00 a year, and from present total of £1,800,000 spent annually on the Reserves.

THE FAR EAST

Other measures of economy made known recently are the intended closure of the Singapore Naval Base in January, 1959, of the Naval Dockyard at Hon Kong. This will not mean the ending of the Navy's 100 years' association with Hong Kong, though it will considerably reduce the labour force there. A number of ships are due to be handed over to the port and a small servicing yard will be maintained on Hong Kong Island.

For the first time since 1910, to reconstitute the Fleet in the Far East will visit Hong Kong from time to time, as in the past.

Apart from the need for economy, the operation of the carrier task group system, which will lessen the requirement for fixed bases, has undoubtedly influenced the Admiralty towards this decision.

In the Far East, also, further economy is to be effected by lapsing the appointment of the Flag Officer, Malaya Area, and the merging of the duties of this command with those of the Commander-in-Chief Far East.

Such economies are beginning to make it possible for the Admiralty to reduce the Navy's manpower, and about 950 long-service ratings and Royal Marine other ranks are to be discharged prematurely under the Compensation Scheme announced in July last. The announcement by the Admiralty of these retirements was the first public indication that the scheme is now operating.

NEW SHIPS

With so much talk of economy, it was more reassuring to learn shortly before Christmas that the ship strength of the Royal Navy was materially increased by the acceptance of four new anti-submarine vessels: HMS. Malcolm, Palliser and Exmouth, of the "Blackwood" class, and HMS. Tennyson of the larger and more expensive "Whithby" class. The names of the ships of the "Whithby" class have been esti-
FURTHER DEVELOPMENT AT KWINANA

W R K has begun on a \$1 million catalytic reformer at BP's Kwinana refinery, near Fremantle, W.A. It is hoped to complete the new plant by the end of the year.

The British Petroleum Co. Ltd. has already spent \$10 million on building the refinery, the largest in Australia.

In addition, there was the cost of dredging the entrance to Cockburn Sound, building Medina township, and the provision of electric power, water and sewerage services, all of which were undertaken by the Western Australian State Government. The project was almost wholly Australian, with a peak force of 3,500 men turning an area of low, sandy scrubland into an industrial plant unequaled in Western Australia.

The refinery came "on stream" in February, 1955.

Already work has begun on new oil storage tanks. These will increase the storage capacity of the refinery by 7,300,000 gallons and are part of a \$1,300,000 expansion scheme which calls for a catalytic reforming plant of the latest design.

This will upgrade low-octane motor spirit and enable the refinery to blend a greater number of products.

Kwinana was built in just over two years. Now tankers loaded with petroleum products are sailing from its jetties for many parts of Australasia, with occasional shipments to Southern Asian ports.

Near the refinery is the completely self-contained township of Medina. Attractive homes, schools, modern shops and everything that goes to making a happy community are now found where not so long ago bushland ruled supreme.

The refinery comprises three major sections: the jetty, tank farm and oil processing units.

In addition, there are the utilities such as the steam generating plant, cooling water and separating system, laboratory and the maintenance workshop.

Ocean-going tankers use the jetty to discharge crude oil, while other tankers load refined products.

Products are sent by pipeline to bulk installations at Fremantle.

Kwinana has a designed throughput of 3 million tons of crude oil a year.

Schweppes
D R Y
GINGER ALE

In a glass by itself
—or with a kindred spirit

Not a scene from a science fiction film, but a photograph taken at the BP refinery at Kwinana. The two spherical pressure vessels, known as Halutonespheres, are for storing liquefied butane.

THE NAVY

They hitch-hiked a ride from the ocean

By RONALD CREASEY

O N E night not long ago, an apprentice on the Australian ship River Norman cooled off in a canvas swimming pool and climbed out of its seaward side. Seconds later he swam to Burnie's shark-infested waters. Under such circumstances one's expectation of life dwindles at an alarming rate.

The River Norman steamed on with none on board aware of the incident.

But conservation rocketed when the Hawse awarded: "Have picked up an apprentice who fell from your ship half an hour ago."

The Hawse's lookout had heard Gyles Bridson, of Cantery, Melbourne, calling for help. Being a good swimmer he kept the lad safe until he exchanged ships at sea.

Christmas Day, 1955, was a wet one for Arne Nicolaisen. At midnight on Christmas Eve he fell from the Hoegh Silver Spray off Florida.

His ship searched unsuccessfully for him.

Feet of being Christmas dinner for sharks prompted ideas of drowning deliberately, but the will to live is strong and Arne changed his mind.

Ships passed, but his cries were futile until after a 30 hours' waiting. On Boxing Day the tanker British Surveyor lowered a lifeboat.

Prestige weighs more than the man's "drowning" had reached Osdo and whitened his mother's hair.

An unexpected naval draft occurred in 1920 when Japan's Philippine Sea typhoon. An American battle-ship steaming from Manila to Tokyo wallowed heavily in true battle-ship style. The Minnesota's wet deck was as walkable as an ice rink.

James Wilkinson was on it when his floating home shipped a "green one." It covered the warship to the superstructure before floating the naval rating overside.

His frightening misfortune was seen, but rescue efforts in such weather are suicidal. The man was abandoned.

Hurtled up and down by giant seas, struggling as only desperate men can, he was suddenly struck by something solid. It was the battleship Vermont, whose crew dragged him to safety.

Late in the sailing ship era a rough sea ditched an apprentice. Unable to rescue him, his ship eventually sailed on and berthed.

No sooner was the gangway rigged than the other apprentice paled and screamed that he'd seen his friend's ghost.

The lost boy was the first person to board. Saved by a faster ship which was bound for the same seaport, he awaited arrival of his own ship.

In 1920s I was in the Mexican oil port Tampico in the tanker Scottish Borderer. A day later a ship of equal speed arrived. A man on her told us we had passed a speedy schooner in moonlight off Key West.

Puzzled, we asked him how he knew.

He had hoped to attract attention of either one from the sea surface. We had passed a hundred feet from him, but swallowing a little salt water at a critical moment prevented him from shouting.

He had fallen ahead of us from the tanker Swiftarrow and hitch-hiked on a following ship.

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January, 1958
Men's endurance in frightful plights is amazing. In 1955 the Columbian destroyer Calda lost ten men in a storm. Twelve days later, clinging to a piece of timber, one was found semi-conscious on the coast near the Caribbean port of Turko.

He, too, lived to tell the tale.

Some who go overboard put neither themselves nor others to any trouble. They re-board effortlessly.

The barque Inverness, in a Cape Horn gale, had a man blown from the main royal yard (perhaps this is an unclaimed high diving record).

Cape Horn gale, had a man effortlessly.

Caribbean port of Turko.

During the First World War the Royal Navy submarine Fiona.

The Royal Navy submarine Fiona.

The Royal Navy submarine Fiona.

After collecting an aboriginal patient an aircraft got lost in drizzling rain. She had been heading circle above Queensland's sugar port of Lucinda, and radio requested ships to keep a lookout.

A watchkeeper on the Fiona was climbing to the standard compass to take bearings when he thought he heard the whimper of a baby.

He threw a lifeline with attached light, stopped the ship, and a boat's crew cruised around. Pilot and patient had been lost with the aircraft, but, white from long immersion, the patient's attendant was saved.

SHIPS AGROUND

A 100-mile-an-hour gale off the English coast on January 9 drove three ships aground and sent others running for shelter.

The Royal Navy submarine Fiona.

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THE NAVY

THE NAVAL SITUATION

Today

THE NAVAL SITUATION

The naval situation today is, of course, part of the world strategic picture. To get the naval situation in proper perspective we must first of all look at the general defence situation, the ships and the power fits in and finally where the Royal Navy comes in.

The ground work of the defence picture is familiar to everyone, but it is as well to recall some basic facts.

First, the Communist powers aim to dominate the world. Their leaders have said so quite plainly in their writings and every more they have made since the last war confirms that they have not abandoned this basic aim.

The Soviet leaders say they do not want war. I for one believe them. I am quite sure they would like to achieve their aims by other methods. But at the same time they have built up and are maintaining huge, fully mobilized land, sea and air forces which are ready to attack at any moment if the Kremlin gives the word.

It was the fear of those forces which caused the countries of Western Europe, Canada and the United States to band together under N.A.T.O. for Turkey, Iran, Persia, Pakistan and Britain to form the Baghdad Pact and for the eight countries of the South East Asia Treaty Organization to get together in the Far East.

Our strength gradually began to build up, and it was by military measures — sometimes by one power, sometimes by more than one — by standing up to the Communists with military forces, that we prevented them from achieving success in the various thrusts they have made in the last few years.

N.A.T.O. put a physical barrier of land and air forces in Western Europe.

The Baghdad Pact and N.A.T.O., are agreements for mutual military support in the event of any member being attacked.

The Berlin air lift was a military operation which might have led to war.

Military measures and intense fighting mellowed the Communist advance in Indo-China and Korea, and who knows what the military position of Soviet Russia might now be in the Middle East if Britain and France had not intervened, and stopped the fighting between Israel and Egypt.

EFFECT OF H-BOMB

The advent of the hydrogen bomb ushered in a new state of affairs. It looks as if both the Communist powers and the free world have the power to do vast damage to each other and that even sudden aggression with nuclear weapons could not prevent devastating retaliation by the other side.

And so, as the last Government White Paper on defence said quite frankly, as at the present time we cannot defend ourselves against nuclear attack, our policy must be to prevent war.

In this policy the main deterrent to war is strategic air power armed with nuclear weapons — power that is mainly wielded by the United States, but in which Britain takes a small though increasing share.

With nuclear war beginning to look more and more like mutual suicide, the dangers of a third world war seem to have receded, but this makes it more probable that the Communists will try to achieve their aims — which they can do, again by methods short of war, by nibbling tactics whenever they think the West will not be provoked into nuclear retaliation.

(Please turn to page 24)
FROGMEN’S UNDERWATER INSPECTION

MOUNTAINEERS
"Makulu," by Jean-Francois, published by Cape (U.K.)

This interesting book is the log of a party of French mountaineers who in 1951 made a reconnaissance of the glamous Himalayas.

Their object was to prepare the way for an ascent of Makulu, the fifth highest peak in the world, nearly 10,000 feet up.

As a result of the reconnaissance the summit was scaled by the entire party in three days.

Although no great dramas nor tragedies befell the climbers, the author himself more than makes up for that lack by the direct and intelligent way in which he describes the personalities not only of his own party but also of the natives whom he met en route.

There are one or two charming and amusing encounters, and some useful information about the culture of the local inhabitants.

Unlike many diarists, the author does not pad his narrative with imaginary dialogue and irrelevant descriptions. As a result, the subject speaks for itself: and its voice is emphasised by a number of excellent photographs. This is a first-rate specimen of sober reporting.

—J.H.B.P.

SECRET MISSION
"The Ship with Two Captains," by Terence Robertson; published by Wren (U.K.)

This very readable book deals mainly with the important work carried out by the British submarine Seraph before the Allied invasion of North Africa in November, 1942.

After a fortnight’s reconnaissance of the proposed landing beaches, Seraph successfully landed Major-General Mark Clark and a party of United States and British officers near Algiers, where they discussed with friendly Vichy France leaders the cooperation they could give to the Allied landing forces.

A few days later the submarine embarked General Giraud at a rendezvous off the South Coast of France.

The General insisted that he would have nothing to do with the British and to overcome this unexpected difficulty a United States naval officer was placed in nominal command of the Seraph for the occasion.

The author, a well-known journalist, naturally enough takes full advantage of this unique state of affairs, though in fact Lieutenant Jewell remained in operational command throughout the operation.

—G.P.

OLD SALTS
"The Elizabethan Seamen," by E. R. Callow; published by Pelham (U.K.)

It seems that these "Outline" books are a "reference library" for boys and girls; but surely if the others are anything like the volume before us, "The Elizabethan Seamen," they must appeal to many adult readers also.

We are taken behind the scenes of the Navy at that time when, as Hawkins showed, the shipwrights and dockyard officials swindled the Queen wholesale, charging her for timber she had already bought and committing various other crimes.

In that age of insecurity it appears that a trader of any size always carried guns.

Trade had its vicissitudes; when the Muscovy Company’s unwise monopoly of the North-West was abolished a hard-up and hard-bitten sea captain called Protheroe set out for the unknown Arctic with three ships whose tonnage totalled 60.

He brought back an odd piece of black rock which was said by some optimists to contain gold.

So the Queen, less well advised than usual, subscribed to the company, provided a vessel for the next voyage and ordered it to load up with gold ore.

What happened in this case and in many others will greatly entertain the readers of this book.

—H.B.

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First, there would be the navy’s part in nuclear retaliation. It would be the task of the allied carrier striking fleet to reach a position from which it could launch nuclear attack on enemy targets, concentrating principally on the ports, bases, airfields and arsenals from which the threat to the allied shipping would emanate. In this way, an offensive strike at the enemy would be combined with a valuable contribution to the defence of our convoys. In addition to these strategic tasks, the carrier force can use its striking power to hold up the enemy’s advances and support allied land forces defending their homeland.

At the same time, the ports of the United Kingdom and Western Europe would be full of ships. They must be brought under control, put into convoys and shepherded away from the threatened areas. It would be vital to preserve them for the later cargoes which alone would enable the allied countries to survive. These would be the ports for Exercise “Sea Watch” and Exercise “Stand Firm,” which took place at the same time as “Strikeback.”

ORGANISATION SOUND
Admiral Gerald Wright, the Supreme Allied Commander Atlantic, is well satisfied that in general the organization is sound, the communications are excellent, the carrier forces are well handles and the allied ships work excellently together. Nothing is more important than that our naval organization and maritime air forces should be able to work together with the unity of a single force.

It is, of course, patent that we have not the resources to play a role of such size as the Navy League should take the financial rulings of the government of the day so far as to agree which is concerned with all aspects of all matters to meet approval. Human beings are as they are, and it is sad that the non-meat get the most attention in a hotel or shop.

Behind closed doors the Admiralty fight like tigers for the money to enable them to do the job. As the naval advisors of the government, it is their duty to do so. But only a body such as the Navy League can do the Admiralty up in public, can work on public opinion and find expression in Parliament in reminding our countrymen that we live in an island. From the successful launching of ships across the sea to the launching of ships in space, our capabilities have increased, and we must realize this to be our strength.

NUCLEAR RETALIATION
Some people think that with our limited resources, Britain should not attempt to play a part in the nuclear retaliation, but as the Navy League claim that they had no air defenses which could completely protect their country from bomber attacks, we must have ballistic missiles which could launch-tomorrow if necessary to obliterate cities on the other side of the ocean.

The Russians claim that they have launched an intercontinental ballistic missile which can hit any target in the world accurately, but their statement was studiously vague.

The successful launching of the Earth Satellite indicates that they have solved the launching problem, but the accurate hitting of a target when the missile comes down is most difficult to achieve.

There is no fundamental change in the strategic position. We have always been the infantry soldier and the merchant ship — and it is only fantasy to think that there will be any fundamental change in the way we get our bulk supplies of food and such things as oil and tea.

As long as ships sail the seas they will need warships to protect them. And in this task the Navy has to think of the dangers of the next year or next year after as well as those of the years further ahead. How convenient it would be if we could make sure about the immediate future and could concentrate on what we can be sure we will need in ten years' time. But it is for the critics to say that this or that type of ship is out of date and should be scrapped.

We know we are moving to the guided missile ship which will take place of our present cruisers and destroyers, but as the Parliamentary Secretary of the Admiralty explained not long ago, the “Tiger” class cruisers which are now being completed will vaporize any gap in the years immediately ahead.

Again, it is far too convenient for military commentators to assume that the so-called position of nuclear stalemate has been reached, that holes have ballistic missiles which they could launch-tomorrow if necessary to obliterate cities on the other side of the ocean.

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As long as ships sail the seas they will need warships to protect them.
people, not as big or as strong as Soviet Russia with her 250 million. Of course, we are not alone, but among those who are determined to stand up to any one who threatens us, it's very useful to have more than one who has good nerves and can shout straight.

Such a partner is even more valuable when, as in Britain's case, he is outstandingly expert in making good "equalisers." It is good to know that two very fine new aircraft, the Scimitar and the Sea Vixen, will be in service in our carriers within a year, aircraft that have the performance for nuclear war.

In my recent visit to the Fleet I found plenty of confidence about the future so far as the quality of our equipment is concerned. Our people feel pretty pleased with themselves as they see all the American carriers fitted with the three brilliant British devices which have revolutionised the operation of carriers — the steam catapult, the angled deck and the mirror landing sight. In addition to the greater efficiency, there has been a very great increase in safety, for which we can all be very thankful.

The Ark Royal, for example, has had well over 1,000 consecutive landings without a single mishap. There are plenty of other safety devices for these valuable young airmen of ours and they are supremely effective.

**GRADUAL CHANGES**

Changes in the Navy are bound to be gradual. When you go to sea with the Fleet after a lull of a few years you don't notice any drastic changes, though I must say there were one or two peculiar-looking ships about like the Daring.

One wonders how the trends will go in the future. Guided missile ships, American ones, are already on the sea but they, of course, are merely adapted cruisers.

How long will the carrier remain? Obviously, some of its present functions will in future be done by missiles such as the bombardment of shore targets or ships and anti-aircraft defence. But I can't see how some of the functions can ever be done except by an aircraft with a human in it — things such as reconnaissance and close support for troops; indeed, nearly all the tasks of air support in land battles.

My last ship in the Navy was the Duke of York at the end of the war. We had just won then, and we had the enchanting prospect before us of England, home and mother. Morale was sky high.

During the last two months, I had ten days in the Mediterranean Fleet and a fortnight with the Home Fleet. So far as the spirit in the ships was concerned, I must say I didn't notice much difference from my Duke of York days. I got the very strong impression that if there is a job to be done, it will be done.

During Exercise "Strikeback," our ships were badly hit by an Asian tif but they treated it in the same way as any other type of casualty — a difficulty to be overcome.

The Irigateunda had so many men on the sick list she couldn't man her engines, but an engine room staff was sent over and we had the Irigateunda up and running.

On board the carrier Bulwark there weren't enough hands to work the flight deck, our people turned out on the job and Bulwark's aircraft continued to fly.

In the Ark Royal, they had well over 100 casualties at one time — a fifth of the ship's company. But everybody lent a hand where it helped most and the flying continued.

The Navy will only flourish if it has the support and affection of the whole country, and I'm sure it is our job, each one of us, to do everything we can to see that the Navy gets that support and affection.

—From the London "Navy"—

**THE NAVY**

January, 1958

**LINKS WITH THE PAST**

ALTHOUGH they came late in the story of Australia's development, the four great oil refineries of the Commonwealth have arrived with the vivid past. All are in localities whose histories go back to the earliest days of colonisation — in one case well beyond it.

This is, not of course, only coincidence. Australian refineries, dependent on sea-borne petroleum, are naturally situated at ports, or within easy distance of them, and the ports were the first centres of population developed by our pioneering ancestors.

Of the four sites the most historic, if not the best known, is the Kurnell Peninsula, on Botany Bay, New South Wales, location of the Australian Oil Refining Pty. Ltd.'s plant.

The name Botany Bay was once almost synonymous with Australia, not certainly in a very happy connection: the convict who were "bound for Botany Bay," as the song reminds us, had no reason to look forward to their arrival in New South Wales with any particular enthusiasm.

It was rather unfair that Botany Bay, a very innocent and until recently largely undeveloped place, should have this odium attached to it. Thousands of air travellers have looked down on this great sheet of water: on one side there are the Bumberong power house and important paper and chemical plants, on the other side there is the long curve of the Kurnell Peninsula, until recently a remote and rather inaccessible region. The name still has power to arouse our interest. Refiners of the Commonwealth have arrived with the vivid past.

Kurnell's first association in our own history is with the greatest of all our navigators, James Cook. It was in an April dawn of 1770 that Cook, in the Endeavour, beat up against an outblowing wind into Botany Bay and landed on a date which is still a matter of conjecture.

His ship's log shows it as April 29, but allowance had not been made for the crossing of the dateline. As it turns out, Cook landed there on May 6, 1770, and the name Kurnell was derived from the Customs house ship that was there on the date.

The landing was commemorated as long ago as 1822 when Governor Brisbane affixed a tablet in a beeching rock 25 ft. from the shore. The landing was commemorated as long ago as 1822 when Governor Brisbane affixed a tablet in a beeching rock 25 ft.
GEOLOGY'S CLAIM

Geelong has always felt that it had better claim than Melbourne to be the capital of Victoria. At one stage it appeared that Williamstown would indeed be the capital. Its status was indicated by the fact that Governor King, on his visit to Williamstown, in honour of King William IV, the Monarch, whereas Melbourne was merely called after his Prime Minister.

Lack of fresh water, however, forced a move up the Yarra River to Melbourne, though Williamstown still remains the port and is still an important maritime centre.

By 1816, Williamstown, called Koort Boork by the natives, had attained some eminence with its weatherboard houses and a few fine sandstone buildings. Also it stood on a hill, and indeed survived a second sinking later, following a collision with an iceberg. She was built of teak at Moulmein, Burma, celebrated for the old pagoda of the famous ballad.

The great gold rushes of the 1850's, Williamstown became a place of extraordinary activity; many reminiscences of those days in the form of old brick buildings still remain. Many a joke had to be told about the largest block of sandstone ever quarried in Australia, incidentally, measuring 7 ft. x 7 ft. x 3 ft. 6 in. It was sold to a quarry at Newport and hauled by 26 horses to South Melbourne, where it was cut into six hundred stones for the public offices in Perth.

The gold rush brought not only wealth unprecedented but many old lags, as the convicts were called, from Van Diemen's Land. The criminal elements of the mushrooming community were accustomed in five prison hulks, the Success, Sacramento, Deborah, Lysander and President, anchored off Williamstown.

It was the prisoners from these hulks who built the celebrated old stone breakwater, to accommodate the tankers bringing crude oil for piping to the refinery at Altona. There are grim associations with the breakwater, for it was while impounding it that John Price, the stern prison hulk, was set on fire by the convicts, seven of whom were hanged.

With the building of the Pentridge Stockade, the prison hulks were taken away. The last of them, the Success, was converted by the Government into a large school for offenders, has never been solved. In 1837, Joseph Tice, of the Port Phillip Association, and his hardworking friend, George Brooke Legrew Hesse, left Point Henry on the Barwon River, built the first house... of weather-boards of Van Diemen's Land timber. In 1838, Geelong was proclaimed a town by notice in the Government Gazette in which it was stated that it is still "the pivot" of the rich Western District, one of the great areas of Australia.

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It was the prisoners from these hulks who built the celebrated old stone breakwater, to accommodate the tankers bringing crude oil for piping to the refinery at Altona. There are grim associations with the breakwater, for it was while impounding it that John Price, the stern prison hulk, was set on fire by the convicts, seven of whom were hanged.

With the building of the Pentridge Stockade, the prison hulks were taken away. The last of them, the Success, was converted by the Government into a large school for offenders, has never been solved. In 1837, Joseph Tice, of the Port Phillip Association, and his hardworking friend, George Brooke Legrew Hesse, left Point Henry on the Barwon River, built the first house... of weather-boards of Van Diemen's Land timber. In 1838, Geelong was proclaimed a town by notice in the Government Gazette in which it was stated that it is still "the pivot" of the rich Western District, one of the great areas of Australia.

With the great gold rushes of the 1850's, Williamstown became a place of extraordinary activity; many reminiscences of those days in the form of old brick buildings still remain. Many a joke had to be told about the largest block of sandstone ever quarried in Australia, incidentally, measuring 7 ft. x 7 ft. x 3 ft. 6 in. It was sold to a quarry at Newport and hauled by 26 horses to South Melbourne, where it was cut into six hundred stones for the public offices in Perth.
A FORMER Royal Navy man, after 60 years of research, is trying to explode as a myth one of the Navy’s most cherished anecdotes — Nelson’s message before Trafalgar, the “Sailor” (South Africa) reports.

Mr. Ernest George Walder, 78, a former seaman of signals, maintains that Nelson could not have signalled “England expects every man will do his duty” before going into battle in 1805 to defeat the French.

“In any case it could not have hoisted, would have taken an hour to send, and longer still to pass round the fleet,” he says. “In any case it could not have been seen.”

Mr. Walder began his investigations in 1897, while serving in Nelson’s own flagship, the Victory. He has checked the logs of some of the 20 other British ships at Trafalgar over the years, and has found no reference in any to the “England expects” signal.

Mr. Walder retired from the Navy in 1921, and spent another 20 years working in a signals establishment as a civilian.

The present commanding officer of the Victory — now a museum piece in Portsmouth Dockyard — defended the signal as being “mentioned in all the narratives of the battle.”

The Admirals later weighed in with still heavier salvoes. They quoted Flag Lieut. John Pasco, signals officer in the Victory at Trafalgar. They say: “Mr. Pasco described it all. Nelson told him: ’I wish to see the fleet that England confides that every man will do his duty.’”

“Mr. Pasco suggested substituting ‘expects’ for ‘confides’ to save time.”

Lieut. Alfred Rowe, of the Navy League, said: “We hoist Nelson’s signal on Trafalgar Day each year. With good signalmen it takes seconds to hoist. And we need only four hours.”

But Mr. Walder brought his personal experience into play. “I have hoisted one such signal myself. In Nelson’s Victory, too. That was Trafalgar Day, 1897.”

“We used the methods of Nelson’s day for fixing the flags to the ‘lanyards. It took an hour.”

This new controversy shows signs of reaching the proportions of the Shakespeare did not write Shakespeare problem.

Continuing...

RUSSIA’S ESCORT FORCES

RUSSIA’S ESCORT FORCES

From page 15

ably meant as a deterrent against eventual attacks by allied surface forces.

Altogether Russia may have taken almost any large and several hundred small escort vessels, submarine chasers and patrol launches, 400 of which are said to be in the Baltic.

Compared with pre-war days, therefore, the situation has much improved both in types and in numbers. But, owing to complete lack of any real experience of submarine hunting on a large scale, and of handling losses under heavy attack and repeated submarine attacks, spots of the Soviet Navy.

The Soviet and satellite merchant fleets of about four million tons would not last long under heavy Allied attacks, and the loss of several hundred thousand tons per month would soon cripple the Soviet supply system.

If the Allies were also to find means to destroy Soviet tanker tonnage in the Caspian Sea by air attacks, mines and perhaps other weapons, Russia might soon be deprived of her main supply of oil, and find herself on the surest and fastest road to the loss of the war.

The more submarines the N.A.T.O. powers have available, the bigger are the chances that they cannot win a third world war. And if the Soviet leaders will not have to face a barrier in his landings and that he can go round again if necessary. The intend to give him a constant and stabilised visual aid in his approach to the deck, of which we have written elsewhere, to avoid the old propeller type, that allows him a splendid view.

The combination of the three has reduced landing intervals to about 20 seconds.

Henry, who could not long ago declare the carrier as being out of date and quite impracticable for the operation of modern jet aircraft have had to eat their words. It is well that this should be so, for the defence of the free world, under N.A.T.O., rests on this remaining of the Soviet forces, that they may have enough in the Baltic.

The Soviet and satellite merchant fleets of about four million tons would not last long under heavy Allied attacks, and

LANDING ON—THEN AND NOW

By CAPTAIN R. S. D. ARMOY, R.E., R.M. (Retd.)

WHILE watching deck-landing training in an escort carrier during the war, an Admiral, whose name will always be associated with the Fleet Air Arm attack on the Italian Fleet at Taranto, turned to me and said: “If you go on watching these deck-landing ships you will go round the bend with an anxiety complex one day. I never used to watch them more than I could help.”

Well, as he had been a Glamorgan officer and I am an aviator, our views on this sort of subject are apt to differ. But next day I began to think he might be right.

A young pilot in a Corsair lighter arrived over the ship from a nearly naval airfield, to make his first six deck-landings in this aircraft, well recognised as a difficult one for the purpose.

This was in 1941, when deck-landings had to be made with the crash barriers, as they were then called, in the raised position across the flight deck. This applied even when training new pilots.

In came the Corsair at such a high approach speed that the pilot knew that normally he would not have to face a barrier in his landings and that he can go round again if necessary. The intend to give him a constant and stabilised visual aid in his approach to the deck, of which we have written elsewhere, to avoid the old propeller type, that allows him a splendid view.

The combination of the three has reduced landing intervals to about 20 seconds.

There were those Fairey IIIFs and the landing rate in carriers is less now than it has ever been, and 5,000 consecutive landings were made recently without mishap of any kind. With the angled deck, the pilot knows that normally he will not have to face a barrier in his landings and that he can go round again if necessary. The intend to give him a constant and stabilised visual aid in his approach to the deck, of which we have written elsewhere, to avoid the old propeller type, that allows him a splendid view.

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LANDING ON—THEN AND NOW

By CAPTAIN R. S. D. ARMOY, R.E., R.M. (Retd.)

The landing accident rate in carriers is now less than it has ever been. So there have been over 5,000 consecutive landings made recently without mishap of any kind. With the angled deck, the pilot knows that normally he will not have to face a barrier in his landings and that he can go round again if necessary. The intend to give him a constant and stabilised visual aid in his approach to the deck, of which we have written elsewhere, to avoid the old propeller type, that allows him a splendid view.

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Before the era of palisades—the inclined boundary fences on either side of the flight deck—there could be exciting moments towards the end of the aircraft's run when theudder control had gone, and of its own volition it might after course 90 degrees to port or starboard—sometimes ending up at the deck edge, and sometimes in the "drink."

On some such occasions the observer and telegraphist air gunner could be seen "abandoning ship" while the issue was still in the balance. In one rather lurid landing, however, the pilot decided to leave and the observer to stay!

"Scoring a D" was another pastime with the pilot who came on a little too fast but decided he would just make it. He might (but sometimes did not) come to rest forward of the bare top after a stern chase by most of the flight deck party, who were often in full combat kit.

The U.S. Coast Guard Air Station New London had one such small-harbor vessel Yatu Lau, which in difficulties after being battered by a hurricane. While he was still rolling along the deck forward of the forward after to 90 degrees, he caught up with the intercom conversation to the pilot—"Take the situation, and find himself out of it!"

When the after-hatch windows were shot, the ambulance driver arrived in 1931, "scoring a D" could also be achieved by hooking the last wire at speed. This pilot could testify that in a night landing this variation of the game was much overrated.

Before ending this soliloquy on the "good old days," it is only fair to add that several times exposure was enjoyed by all, and not least by the large party of "goofers" inseparable from the aircraft. The loss of life and Government property was extremely high when compared to to-day, in spite of the aircraft being easier to fly.

The latest apparatus and flight deck drill, therefore, have not only overcome the formidable problems associated with much heavier and faster aircraft, but have also brought the safety of the crew inside the aircraft, into the orbit of the average pilot, and within a much more acceptable tolerance in regard to accidents.

August 5 this year saw the 60th anniversary of the first deck landing made on a British aircraft carrier. Though it may be impossible to prophesy another four decades' existence for the Fleet Air Arm in its present form, its immediate future must surely be seen as a very bright one.

--From the London "Navy"

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MARITIME NEWS

ORION TO RESCUE

The Orient liner Orion on January 9 interrupted its Pacific crossing to rescue and land a Russian pilot from a small Yatu Lau, which was in difficulties after being battered by a hurricane.

The U.S. Coast Guard Air Station New London had one such small-harbor vessel Yatu Lau, which in difficulties after being battered by a hurricane.

PAMIR INQUIRY FINDING

A MARITIME board at Hamburg has found that the sail manoeuvres of the merchant Pamir when she foundered were "contrary to the accepted sailing rules."

The Pamir, a 5,020-ton four-masted, sank in an Atlantic hurricane on September 21, 1957.

The maritime board held a 10-day inquiry at Lueneburg, near the loss of the ship.

Giving the findings, the chairman, Mr. Eckart Luhmann, said: "The possibility exists that the lack of familiarity of the captain, Johannes Diebitsch, with the particular sailing conditions and the stability of the Pamir and the limited sailing experience of the first officer may have had adverse effects."

Mr. Luhmann said that Capt. Diebitsch was standing in a master of the Pamir on a voyage of the regular master, Capt. Hermann Eggers, who was ill.

Served Since 1912

Captain Diebitsch had been at sea since 1912, and had served 17 years in sailing ships, including a year and a half as an able seaman in the Pamir before World War I.

The first officer of the Pamir, Rolf Koehler, had had no previous experience on sailing ships when he went on board the Pamir in 1955.

Mr. Luhmann said: "Respectively, one could say that the Pamir had nowhere to go on September 19, 1957, or taken a different course, she might have avoided meeting hurricane Carrie.

"The course she took was not contradictory to the accepted sailing rules, even if we assume the hurricane warnings were known to the master."

"Her sailing manoeuvres and the position of her sails in the last few hours, however, were contrary to these rules, and had a very adverse effect."

"She was carrying her foretopsail well to windward when the hurricane Carrie was in her vicinity."

Mr. Luhmann said that after the Pamir met hurricane Carrie she was carrying her foresail, all her topsails, several jibs and staysails.

The board said there was no indication that the condition of the ship or of her rigging was in any way responsible for her loss.

It said that the Pamir, on account of the wind force, wind pressure on the sails, unstable cargo of loose barley and lack of ballast, was not stable enough to weather the hurricane.

She developed a heavy list to port and the barly cargo probably shifted to port.

The board said that the Pamir was hampered severely by the fact that most of the lifeboats were damaged, and the provisions in them were also lost.

"Much of the signal equipment in the boats failed."

The board made these recommendations:

Only captains and officers with long experience on sailing ships be appointed to sail training ships.

New skippers and mates should be given full information about the stability of ships.

Grain should be stowed loosely but loaded in bags.

Lifeboats should be made of unbreakable plastic, painted waterproof, lined with metal radar reflectors and have waterproof radio equipment.

RSNN NAVY "MOVING INTO THE MEDITERRANEAN"

A North American News paper Alliance correspondent claims that Russia is creating a Mediterranean naval squadron — the first in Soviet history.

The correspondent says that behind the move is an attempt to neutralise the political impact in the Middle East of the powerful U.S. Sixth Fleet.

He adds: "The recent extreme Communist toughness about Western military and civilian air flights near Albania is almost certainly due to the expansion of the Soviet naval base at Saseno, at the neck of the Adriatic, according to North Atlantic Treaty Organisation officials."

"Expert Allied naval opinion here is that the Russians have undertaken a major expansion of the Saseno base."

"It may already be the largest, most heavily fortified submarine facility anywhere in the Mediterranean."

"Strong suspicion also exists that Syria has given Russia permission to construct a modern naval base at its port of Latakia, not far from the Turkish frontier."

January, 1958
TIME at Sea
MEANS more than MONEY

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

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

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

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

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

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

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

AUSTRALIA goes to next month's SEATO meeting with shamefully empty hands.

To this military treaty organisation of nations we will appear virtually as a disarmed country. Our Navy has been cut to practically a token force; our Army is an insignificant, although expensive, war machine; our Air Force is still saddled with obsolescent aircraft, and decision about re-equipping it with modern first-line planes seems as unlikely as any long-sighted Government thinking about the last-vanishing Navy.

We can bring little to this important meeting except words. We certainly cannot offer any assurance that we can build our treaty obligations if called upon to do so.

SEATO has a very real significance for Australia. The Communist bloc has been showing significant interest in South-East Asia. An obvious target for Communist pressure is Indonesia, and a Communist Indonesia would offer to Australia the greatest threat since World War II ended.

It could place us within easy striking distance of Communist aircraft, and, perhaps most importantly, it could bring Communist submarine bases almost at our door.

In a "local" war, who could claim Russian or Red Chinese intervention if unidentified submarines cut our sea-lanes or acted as platforms for rocket bombardments of our coastal cities?

If we are to remain active members of any military pact we must urgently review our defence set-up.

We must never forget that Australia is a maritime nation; that our security lies principally in our defence at sea.

We may not be able to contribute much to this important meeting with shamefully empty hands.
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JANE'S "FIGHTING SHIPS"

By A. HAGUE — in London

FIRST published in 1897 as a small recognition manual with coded annotations of major details, Jane's has grown throughout the years into what is now accepted as the premier naval handbook of the world, if that term can be applied to the massive tome that yearly presents itself to the naval mind. In this, its anniversary edition, it takes pity on those who use it and appears in a vertical form somewhat suited to handling than its original shape.

This seemingly simple transformation has involved more work on the part of its producers than ever before, and it is pleasant to note that the First Sea Lord in his introduction tenders the Royal Navy's congratulations and good wishes to a volume that has faithfully recorded the fortunes of the world's navies for the last 60 years.

As usual, Jane's gives us as up to date a review of naval strength as is possible consistent with the time lag inherent in printing so large a volume.

Devoted to cold fact, it relies on the foreword to point out the salient details and differences and leaves the reader to make his own discoveries of the routine changes. He is aided this year by the disposals in the last 12 months being noted in the text somewhat more fully than has been the case before. This is a practice to be commended and extended where possible in the future.

Turning to the fleets themselves and commencing with the Royal Navy one finds a somewhat brighter picture of new construction and refurbishing of old, not so much as could be desired and some of it still only in the projected stage but nevertheless an improvement.

Pictures and plans of the Victorious, shortly to commission after a seven-year spell in dockyard hands, reveal her as the most British carrier in appearance for many years. Replete with new ideas and equipment she at least will present no recognition difficulties for years to come.

Sketches of the final form of the "new" cruisers are shown, though the prospect of the much vaunted new wine of modern six-inch and three-inch guns in 17-year-old hulls with no prospect of replacement in the foreseeable future is not pleasant.

In this, its anniversary edition, we see properly the giant vessels of the Royal and American fleets illustrated, some of her new ships and some excellent photographs of her most recent frigates and destroyers. In the submarine pages, France furnishes sketches of some of her new ships and some excellent photographs of her most recent frigates and destroyers.

The two new intermediate carriers, one of which was floated recently, are shown. They are the first such ships to be designed and built in France, their predecessors being conversions or purchases abroad.

The new helicopter carrier, a type also projected for the Royal Navy, appears as a vessel of unusual appearance displaying some of the liner-like characteristics of the Jeanne d'Arc which is to be replacement as a training cruiser.

In frigates and escorts 17 completed and projected vessels show a healthy realization of the vital A/S role and also the differing approach of British and Italian constructors to the same problem when one compares the excellent photographs of the two classes in the relevant sections. In the submarine pages, France displays the largest building programme outside the U.S.A. and Russia, an endeavour to make up for the loss "holiday" since 1940 in submarine construction.

In this edition we see properly for the first time the new German Navy, the Rendesmarche, arising phoenix-like from the ashes of its predecessors. Literally in this instance, for a major part of its craft consist of salvaged or recovered remnants of the wartime navy. It is ironic that the larger ships of this force will soon consist of war built ships of the Royal and United States Navies.

Italy shows the southern version of anti-submarine ships in her new destroyers and frigates and the light cruiser conversions to killer ships. In so doing there is illustrated one of the less usual methods of mounting a twin gun, with the barrels vertically paired.

Also shown in some of these ships is the new Italian A/S weapon akin to our own Limbo, although the presence of depth charges in the most modern A/S ships seems to indicate a slight lack of faith in the new weapon or a very specialized use thereof. Our own new frigates, and most existing ships, have long abandoned the depth charge.

That annual headache to the Editor, and many others, the Russian section, produces some excellent photographs of new construction that if nothing else underline the fact that the Soviet Fleet is no longer content to keep its surface ships screened off in its own bases but ventures forth on longer cruises than for many years. The text of this section can only reflect the difficulty in obtaining accurate information to supplement the photographs.

The third large national section of Jane's, the American, must also embarrass with information, but too much rather than too little. An excellent series of photographs in these pages displays the extent to which the U.S.N. has turned to all types of guided missiles for all, or nearly all, warships.

Good photographs also illustrate the giant vessels of the
This year the enormous task of completely re-setting the book has resulted in more than usual appearing, no doubt this will be rectified in the next edition when the numbers will be of a less amount to work done in rearranging material.

Photographs and illustrations, of which over 800 have been inserted in this edition, are generally good, some are excellent. But it must be recorded that a few are not, due probably to hurried preparation in the days before going to press.

The producers of the book are to be congratulated on their great value, especially in view of the number of identical small craft now seen off our ports which can only be individually identified by their numbers.

In this respect it is regrettable that the main list prefacing the British section could not include the number of British small craft now seen off our ports, which can only be individually identified by their numbers.

One regrettable point is the inclusion of the 'Forester' class and here even the Editor has had to admit defeat and turn the book on end to get the plan in. The photographs of Thetis Bay show the first practical application of a ship for helicopter land assault troops as demonstrated in the Marine Commando landings at Suez. Very full illustration is given of the new A.S ships, while the other side of the picture is shown by the impressive list of nuclear submarines built, building or projected.

In this edition two data lists, old friends of former years, re-appear. Captain Manning's historical index of ship names is well known and its reappearance will be of interest to many. The revised pennant list shown for all NATO countries will be of great value, especially in view of the number of identical small craft now seen off our ports, which can only be individually identified by their numbers.

In this respect it is regrettable that the British section could not include the European NATO. numbers as well, the difference between a French and British C.M.S. is small enough to warrant their numbers being listed together for easier reference. A new venture this year in the British and American sections is a calculated list of the number of aircraft of each service with its basic details, a very welcome feature now that aircraft are a prime arm of the naval service.

The U.S. section also lists guided missiles, as yet the same cannot be done for the Royal Navy as there is insufficient information regarding its only weapon in that category.

In a volume of this size with its attendant burden of proof reading the mistake categorized as "a printer's error," misplaced or missing letters and figures, is inevitable.
PRESENTED TO THE QUEEN MOTHER

At Canberra, Queen Elizabeth the Queen Mother at Government House received five outback children. Pictured with Her Majesty are, from left, Rosee Magnoli, 11; Judith Hurna, 9; Paterni Forderwood, 9; and Mrs. Hurna, the children's chapwoman. The others were Ruth Daylight, 14, and Peter Lacey, 12. The children were from the Australian Inland Mission Hostel at Hall's Creek.
The Antarctic isn't Lonely
Any more

By SIR HERBERT WILKINS
In an A.B.C. Guest-at-Honours talk

THIRTY-NINE years ago, when I first visited the
Antarctic, conditions of living there were not as they are
today.

Then Antarctica was a lonely place. Then, for company, you
might find yourself talking to yourself and even answering
yourself in no uncertain terms. And, if you stayed there
long enough, you might even get to the point of passing
yourself by without speaking.

But today things are different. Thousands of people have cir-
cumnavigated the Antarctic Continent. Hundreds of men,
but no women, have visited the South Pole — and that brings
up a question.

Are you at the Pole when in an aeroplane 100 feet above
the snow, when you are actually standing on the snow, when you
are living in a dugout 100 feet beneath the surface, or must
you be on the land which, at the South Pole, is 8,200 feet
beneath the surface of the snow?

You figure that one yourself.

More than 1,000 men will spend next winter on the great
white continent. About half that number will be Russians.
But, as far as I know, the only significance of that is that the
Russians, among 15 other nationalities, are engaged in
co-operative scientific inves-
tions.

What the future will bring forth in the way of occupation
of Antarctica no one knows, but of one thing I am certain —
Australians should steadfastly
maintain their claim to sover-
ignity of that section of Ant-
arcia. Why? Because the
economic potential of the Aus-
tralian sector is more promising than in any other sector.

Icebergs, you must know, vary in shape and size. The
largest iceberg I have seen was 120 miles long and
30 miles wide. But the
Americans, who do everything
in a big way, reported having
passed along one side of an
iceberg for more than 200 miles.

Now that iceberg would have quite an effect on a city like
Adelaide if it was stranded on a beach nears. But there is
no chance of that.

However, ice does have a great deal of influence on the
weather, especially in Australia. It is well known that the
distribution of ice in Antarc-
tica has an effect on the weather
in Australia, and a knowledge of ice influence as it changes from year to year
will not only help us to know

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February, 1958
what to expect in the type of weather, but after a long period of study it might make possible the forecasting of climate.

Climate is what may be the long-term average of weather. Weather itself is what happens yesterday — what is today and what will be tomorrow. Knowledge of forthcoming weather is valuable, but a knowledge of forthcoming seasons would be more so.

As to living conditions in the Antarctic today, they need not be any more unpleasant than they are elsewhere.

Today we have mechanized conveniences for keeping homes warm or cool as the case may be, and while in the Far South you may find extremely low temperatures, you need not necessarily feel cold.

Feeling cold will depend on how well you are provided with proper housing, how long you stay that way for a minute or so without any trouble, but if you stay that way for fifty minutes, you would probably freeze to death.

Of course, there are many people who ask: “Why live in the Antarctic? What good is it?” Well, you might answer: “What good is a newborn baby?” It has potentialities of unknown and possibly of great importance. We must not be impatient, but must wait and see.

In the case of the lab, it may take generations before we know how influential it may become. It may take centuries — 500 years of observation at least — before we will know the advantages of the collected information about the Antarctic. We should not expect too much too soon.

In both cases, we should comprehend that the facts of today are not necessarily the facts of tomorrow, or even next day. In Captain Scott's and Sir Douglas Mawson's time, they didn't even see snow, ice and snow. I suppose you remember that Sir Douglas described in his book the heroic feats ever performed in the Antarctic. When his companions were lost one after another on the ice, he returned home — falling into one crevasse after another. But realizing and fulfilling his responsibility to live and deliver the information we need, he did not give up.

It would have been so easy to have given up and stay in despair, but Sir Douglas won through and, still living, carried on with his important work.

Today, men on the Antarctic continent depend mainly on their mechanized inventions to travel. The responsibility for success is not so much upon the leader, but upon the skill of his mechanics.

The same condition applies more or less in the matter of reaching the coast of the Antarctic continent. I believe it will soon be possible to do that at any time of the year.

In the past, with wooden ships, the passage through the pack ice was slow and difficult. It was impossible to reach the Pole. They stopped, or their engines were shut down, with engines of tens of thousands of horsepower, we harge against the pack ice, but not always conquer cold.

This year in the biggest and strongest icebreaker of the U.S. Navy, a great hole seven feet long and two inches wide was gouged in the hull of the ship by the ice. Fortunately, the ship forced itself upon the ice and stayed there until the hole was patched.

It was much more safe and simple would it be to avoid the ice by going beneath it in a submarine! The possibility of this was known more than 300 years ago. Then it was thought to be in the realm of fantasy.

Twenty-seven years ago when I wrote the first submarine under the Arctic ice, it was thought to be suicidal, or ridiculous at least.

But in 1955 we did take the submarine to within 350 miles of the North Pole, and in 1957 the American Navy took the submarine Nautilus to within 150 miles of the pole, and thus proved submarine travel to be a reality.

In neither case were the vessels stopped because it was impossible to reach the Pole. Theorems of scientific investigations. I predict that within the lives of men who are listening to me today, there will be submarines in the Royal Navy to the home of the Blizzard and that tourists will be tramping around among the penguins in their native state.

I recently visited all of the stations in the Ross Sea area. The American station is at McMurdo Sound. This is the distributing area and from there planes fly to the inland stations.

Near McMurdo is Scott Base, the home of the New Zealanders, and the headquarters of Sir Edmund Hillary, the leader. There is Little America — Little America V. This is near the sea but near the sea where the ice is not much ice and the water is not much water. There is an ice of 100,000 feet deep. This Base Station lies further inland and is above sea level, and beneath the base there is 10,000 feet of frozen sea water. It was quite a surprise, which might indicate that Antarctica is a continent but a group of islands.

There are some books which, although devoid of literary merit, command respect because of their subject matter. This is such a book.

It is very much an escapist book, in the main dealing with under-water adventures by the author in the open waters of the Great Barrier Reef.

Primarily a photographer "Shooting commissioned subjects,” Mr. Monkman invests his successes with a scientific aura which has the trappings of high drama in the piscatorial and underwater worlds. The book is recommended, if selective, reading for those intrigued by the mysteries of the depths of the warm water seas and the super-heated jungles — if you should ever want to catch a crocodile and this is almost always mistered alligator.

B. J. H.

THE NAVY

February, 1958

The REEF ADVENTURES

"Escape to Adventure." By Noël Monkman. (Angus & Robertson)

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B. J. H.

ESCAPE OF THE AMETHYST

"Escape of the Amethyst." By C. E. Lucas Phillips (Heinemann)

In reply to Mr. Monkman's signal that he had reached the safety of the open sea and the company of units of the Fleet, the C-in-C, in his "Welcome Back" signal ended with the following:

"Your hearing in adversity and your daring passage to-night will be epic in the history of the Navy."

To which I am sure that every reader of this book will echo with me a most sincere "Hea.

While it was the most dramatic escape that quite rightly, in my opinion — caught the imagination of the whole world at a very dramatic period of our national history, this book emphasizes what was far greater, i.e., the truly splendid conduct of all Amethyst's officers and men under intolerable conditions of discomfort, of mental strain and mad-tening activity.

It shows only too clearly the Communist mentality, the lies, the Spanish charges, the incomprehensible, the incomprehensible, and the complete impossibility of negotiating with such men.

In contrast, the assistance given by the Nationalist Army at the start of the episode was outstanding.

This book shows up the Service at its best, and I strongly recommend it. Younger readers will be inspired by it, and — in addition — for the older "China birds,” there are passages that will bring back nostalgic memories of the China Station and the Yangtse River in happier days. Not least of all to you, my reader, who had commanded the Con- cord only a few months previous to the date when we had this dramatic dawn rendezvous with the Amethyst at the mouth of the Yangtse.

— W. S. D.

AMETHYST

—  W. S. D.

(from the London "Navy")
WHAT'S HAPPENING ABROAD

By "GEIGER"—in the London "Navy"

It seems now that the defence run-down is not likely to affect naval manpower quite as severely as was first thought. When the Minister of Defence announced his five-year plan in the spring of last year no precise figures were given to show what he had in mind for the Navy. An overall figure of 375,000 for the three armed services was given and on this basis it was roughly estimated that the ultimate goal for the Navy was likely to be around 85,000 officers and men.

A statement by the First Lord of the Admiralty now suggests, however, that this was a pessimistic estimate. In a speech on Clydebank shortly before Christmas the Earl of Selkirk is reported as saying that by the end of the five-year period the Navy will be rather bigger than it was just over 20 years ago.

In saying that it would be "rather under 100,000" the First Lord was, however, referring to the period 1929-1935 when the active regular manpower of the Royal Navy never rose above the 100,000 mark and on one occasion (1933) dropped as low as 90,000. Exactly 20 years ago the strength was about 112,000 and by 1939 it had risen to 133,000. It is now intended to confine the use of the Union Flag to the usual public occasions, and to use the Museum Flag on days which have a special maritime or Museum importance.

Flood Victims

Although no H.M. Ship was present to give a clear indication of what was about 112,000 and by 1939 it had risen to 133,000. It is now intended to confine the use of the Union Flag to the usual public occasions, and to use the Museum Flag on days which have a special maritime or Museum importance.

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March 1958
**German Shipping**

**FOLLOWING** the sale of the French liner Pasteur a few months ago to the Norddeutscher Lloyd, it has now been announced that a recently formed Hamburg company has purchased the Empress of Scotland, which the Canadian Pacific withdrew from service after their two new vessels came in at last year.

The Empress was built in 1950 by Fairfield as the Empress of Japan for the Line's Pacific service but renamed in 1912 after Japan entered the war.

The new owners are the Hamburg-Atlantic Shipping Line, which is understood to be a joint venture of the Hamburg-America Line and the Italo-Greek Home Lines.

The Empire is to be refitted in Hamburg and is expected to go into service in June of this year. German reports say that she will sail under the German flag, will be managed by the Hamburg-America Line, and will maintain a service between Hamburg and American East Coast ports in conjunction with the Home Line vessel to Italy, also managed by the Hamburg-America Line but flying the Panamanian flag.

The purchase price is stated to have been £1 million, and the cost of refit is estimated at about £1 million, to be financed by a loan from the City of Hamburg.

This is another step in the re-entries of the German Lines to the North Atlantic passenger trade and it forms an interesting parallel to the re-establishment of the Hamburg-America Line passenger services after World War I, when it was the American capital which provided the ships for the Line to manage.

The present move, involving the link with the Home Lines and the Panamanian flag, is however, causing some misgivings in Britain.

- From the London Evening News
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"THE NAVY"

March, 1958

NUCLEAR POWER FOR SHIPS
By LIEUTENANT COMMANDER L. A. WINTLE, R.N.—in London

"The transition from oil to atomic fuel at sea is as inevitable as was the change from sail to steam..."

The first step on the downward path to comparative oblivion is taken when a maritime nation begins to ignore its ships or fails to make full use of them. The truth of this dream, fact has been demonstrated by nation after nation throughout the last 1,000 years. "Historic" ship still, not applicable in this day and age? Not so. Today the maxim has greater point than ever, and to Britain more than any other in the past. In maritime affairs we have come to a fork in the road, and have to decide whether to be moved along the primrose path by our friends (who must naturally be allowed to decide whether to stop, go or even cast off altogether) or whether to use our native skill in order to reap the benefits of the new marine age.

Nuclear power is already at sea, though not in Britain, and the transition from atomic fuel at sea is as inevitable as was the change from sail to steam: the effect will be equally far-reaching.

The Nautilus has been at sea with the U.S. Navy for three years, and in exercise her range, speed and performance have delighted her supporters and confounded the sceptics. She is virtually uncatchable, yet can catch virtually anything that floats — no longer can the "Queens" rely on their speed to cross the Atlantic unscathed.

Yet the Nautilus is only the prototype, and practical, thinking men are already working in terms of underwater speeds of 60-70 knots.

With its ability to stay submerged for an unprecedented length of time, and while submerged to travel vast distances at high speed, the atomic submarine has assumed the role of the world's most formidable fleet.

 Rockets do not need air or firing, and a submerged vessel provides a far steadier pattern than does the already anachronistic surface missile ship.

The inevitable conclusion is that not only against ships, but against land targets as well, the atomic submarine is supreme, and may rightly be regarded as the ultimate weapon.

Learning from the Kaiser's near success with unrestricted U-Boat warfare, Hitler designed his navy as a raiding force, with no fewer than 57 submarines in commission when war began.

The Russians, as quick to take a point as anyone, have built up a raiding force of more than 300 submarines, and on December 5 their first atomic fuel ship, the ice-breaker Lenin, was launched.

She will be fitted with a reactor of similar type to that in the Nautilus.

Can we doubt, or, if doubting, can we afford to risk that they have not also got atomic submarines? Without subscribing to the suggestion implied by the Russians in launching their satellite that anything we (the West) can do, they can do better, it is nevertheless beyond the bounds of reason to suppose that their flair for scientific achievement has not been allied to their predilection for submarines.

The menace, therefore, is an armada of atomic-fuelled submarines, against which, on account of their great speed and endurance, the only effective defence is the smaller, faster, atomic-fuelled "killer" submarine — the "destroyer" of the new era.

Without our defences secure, we can not only avoid losing a future war through immediate starvation. We can also protect ourselves against atomic bombardment from the sea — a natural line of attack against an island by a country having command of the sea.

PRECAUTIONS against bombardment by land-based rockets and planes remain an obvious necessity, but if we cannot catch and kill the atomic submarine, the United Kingdom will be found to be another Singapore, with all its defences pointing the wrong way.

Indeed, it would appear most sensible for the Russians to concentrate on frightening us with their threats of nuclear bombardment from their country, giving us ample proof (with Sputniks) of their ability to make good their threats, while preparing to attack us more cheaply and effectively from a comparatively short range at sea.

Neither the Distant Early Warning System, nor any other of N.A.T.O.'s elaborate, expensive and lurid anti-missile, aircraft defence systems have the ability to detect a submerged rocket-launching vessel.

Despite the expense incurred in the development of a military weapon by this direct reply by the com-
cercial benefits which ensure, but the ship-borne atomic reactor is a classic example of how a virtue can be made out of a necessity.

The merchant ships of the world are waiting for atomic power, for eventually only those having it will be an economic proposition. The huge demand will reduce the initial cost, and work now put in on development and operational experience in the cause of defence will produce the unit the world will want to buy.

Even if we are content institutionally to rely on others for the development of our arms, surely we must draw the line at being dependent on them for the production of a product that we wish to sell in competition with them.

Britain has started research on a nuclear reactor for ships which the Atomic Energy Authority believes will be superior to that in the Nautilus. Not only, in performance but in adaptability and cost.

Its nickname is "Neptune," and not long ago it became "critical." We are a long way (four years plus) behind, but the price is not always to the first in the field.

For example, America produced the first "clipper" ship design, but we beat the world with it. On the other hand, we were first with the railway train.

The opportunity (exemplified in "Neptune") is there, and the Admiralty has been quick to see it both from a defence and commercial point of view. But there are snags.

The (very reasonable) cry in the N.A.T.O. countries is for "interdependence," or "all for one and one for all." We are also striving to economize.

The suggestion has, therefore, been put about that we should be content (if allowed) to copy the Nautilus and drift in tow down the primrose path, rather than go ahead with trying to produce something better.

The dangers here are two-fold: that interdependence must rapidly result in complete dependence on our friends — not only for rockets, but also for the ships and equipment from which they may be fired — and that not only ourselves, but the whole Western World may well be thrown in the development of a machine which has become the prime factor of militaries and commercial maritime progress in this atomic age.

There is no doubt of our ability to exploit this opportunity to the full. With the "Calder Hall" type of reactor, we lead the world, and although the initial cost was high, success has bred demand at home and abroad (where they are already selling, to our considerable profit), so that in one year the cost has been halved.

Money for development and experiment will be forthcoming, not necessarily at the expense of other vital items, provided that a sufficiently large section of the public is convinced that it would be a false economy not to invest.

Indeed, the problem of finance is not so much a question of "Where is the money coming from?" as of "Where is it going to?"

Since the war we have spent more than £230 million on various atomic schemes, including £51 million worth of enthusiasm for V-African groundnuts, £30,000,000 for development of a marine gas turbine (abandoned), and £10 million for development of Swift lighter aircraft (not to be used).

Last year we imported peas from America for which we paid £1 million in dollars; we also spent £12 million in subsidizing potatoes, in spite of the fact that a special organisation exists to avoid this sort of thing.

Currently we are faced with an expenditure of £17 million for further extensions and improvements to the recently completed London Airport. The North-Eastern Tube from Victoria to the north-eastern suburbs of London is to be built at a cost of £50 million, although it is known beforehand that it will run at a loss. None of the above can compare, in terms of national priority, with the need to get atomic power to sea under the British flag, whether considered from the defence or the commercial viewpoint. But if any of them were axed, there would be an immediate outcry from large sections of "public opinion," because the public knows about peas, potatoes, airports and tubes. Moreover, it wants them, and what the public wants, it gets.
WHAT IS BRITAIN'S ZETA?

A great deal of information has just been released in Britain and the United States on a subject which will be new to most people and which seems to offer startling possibilities — the control of thermonuclear energy or fusion.

Great interest has been aroused by some work done at the present time we get out of it only about one millionth of a millionth of the power we put in.

Zeta itself is a kind of very large doughnut, called a torus, but instead of the ring being about half an inch in diameter, like an ordinary doughnut, it has a diameter of just over a yard.

In this machine the scientific achievement which has aroused such great interest is that temperatures of about five million degrees centigrade, roughly a third of those at the centre of the sun, have been produced and have been held for a few thousandths of a second.

These temperatures have been repeated every 10 seconds for very long periods of time.

This has been done by inducing electrical impulses in a gas inside the torus and causing it to contract to a very small space in the centre of which is in fact a continuous cylinder.

These conditions have been calculated by our scientists to be those in which we could expect fusion to take place, and when this happens the power is released.

Zeta stands for "Zero Energy Thermonuclear Assembly," and it really is zero energy because in the present time we get out of it only about one millionth of a millionth of the power we put in.

In the Cavendish Laboratory 25 years ago, we discovered that the nuclei of heavy hydrogen, speeded up by high voltages, could join with other nuclei of heavy hydrogen to form helium, producing other atomic particles and energy in the process.

We know that processes of this kind provide the energy and the heat of the stars, and it has long been the ambition of scientists to emulate the stars and to produce in the laboratory temperatures so high that useful energy can be produced from power reactors.

But is the first stage of a long and promising programme.

If we increase temperature from five million to 75 million degrees we will increase the power perhaps a million times, and if we get up to 100 million degrees we could almost break even.

The next stage will be to design further equipment based on our experience with this machine which will have the objective of breaking even.

Then we might go ahead to the stage where we can produce much more power than we put in.

At that stage is going to take a long time — perhaps 20 years or longer — before there are so many stages of development which we will have to go through.

We shall have to build a successor to Zeta and possibly other machines, and then we shall have to design something which will be an engineering machine and on which engineers will be able to carry out improved designs.

That stage is a long way off, but when we get to it we shall have reached a stage where the world will have an inexhaustible supply of fuel which can be taken from ordinary water.
OUR VANISHING NAVY

A steady stream of senior naval ratings, carrying out their demobilisation procedure, now flows through R.A.N. shore establishments in Sydney, Melbourne and Brisbane. It will swell as 1958 proceeds to cause the Royal Australian Navy one of its biggest problems since the end of World War II.

These are the men who signed on for 12-year engagements in 1946, or for six-year engagements at the time of the Korean war. Their departure, depriving the Service of many senior able seamen, is forcing the Royal Australian Navy to re-engage. An urgent one, and concerned mainly with increasing the re-engagement rate of senior naval ratings. It seems an inescapable conclusion that the authorities need more money to do the job.

The problem, therefore, is an urgent one, and concerned mainly with increasing the re-engagement rate of senior naval ratings. It seems an inescapable conclusion that the authorities need more money to do the job.

The Navy already has done something to make life more pleasant for the sailor. It was forced to.

Examples include the new rating blocks recently finished at H.M.A.S. Watson, the highest attempt to provide a Fleet Canteen near Garden Island, and the replacement of bunkers in ships by bunks. Other efforts at new mess kits, emptying service in colours in ships. Iced water drinking fountain, etc. The Navy has to face a great human problem which the authorities need more money to solve.

Recruitment figures compare favourably with those of the other Services. But recruitment alone will not solve the difficulties. Amenities at shore establishments should be extended. The Navy has already done something to make life more pleasant for the sailor. It was forced to.

Examples include the new rating blocks recently finished at H.M.A.S. Watson, the highest attempt to provide a Fleet Canteen near Garden Island, and the replacement of bunkers in ships by bunks. Other efforts are not as apparent as the above.

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The main reason for the manpower problem is the failure of senior ratings, who are the backbone of the Service, to re-engage. In the Army and the R.A.A.F. the re-engagement rate is reasonable; in the Navy it is negligible.

In peace-time, fundamentally, the Navy leader has an urgent and great human problem which the other Services encounter only to a small extent. It is that two ship classes were in Far Eastern waters all the time, and even those ships based on Australian ports carry out prolonged cruises. Seagoing personnel are separated from their time, sometimes as long as a family's lives for long periods of the year, and they are confined on board in relatively cramped and uncomfortable quarters.

As a result, the A.F. personnel, on the other hand, can take their families with them, and have some kind of continuity, while the Navy suffers the problems of a ship's family and seagoing personnel. The main reason for the manpower problem is the failure of senior ratings, who are the backbone of the Service, to re-engage. In the Army and the R.A.A.F. the re-engagement rate is reasonable; in the Navy it is negligible.

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The Navy in March, 1957. She has a complement of about 500 and a total displacement of 16,500 tons. She is armed with 16-inch guns, anti-submarine mortars, torpedoes, and torpedoes. The Navy has not modernised her, although it is certain that she is fit to go into reserve; it is unlikely that she will be. She is a training ship for sea men, skippers and other ratings. The Navy also has a complement of about 170, which are armed with two 5.5-inch guns and very modern anti-submarine mortars. The Navy has converted them at a cost of 3 million each, from World War II vintage Q-class destroyers.

The aircraft carrier HMAS. Anzac, having undergone a major conversion and modernisation, is now in reserve. In about 1947, Admiral R.A.N. has modernised them at a cost of about 500,000 between 1917-1956, was never completed. She will be ready until 1959. Australia could have bought these converted Q-class destroyers for about half the cost here in Australia——and they could have been available much earlier.

The R.A.N. has, in addition to the ships already described, smaller craft including ocean minesweepers and minelayers. These command a reserve, at the moment (but soon to be joined by Sydney, Warramunga, Anzac, and probably, later on, Hobart) the two Tribals, Arunta and Bataan, the cruiser Hobart, and (mentioned before) Quadrant, Hobart, and (mentioned before) Quadrant. The cost of 150,000,000 between 1917-1956, was never completed. She

The Navy should sell her, too. Those, then, are the main ships of the R.A.N. Their total complement adds up to close on 4,000 officers and men, as against about 4,000 in the Royal Navy; their torpedo and gun control equipment are only modern, while a small number of modern anti-submarine equipment and weapons are equal to the best in the world. But the recent announcement that the Navy is to go into reserve shows that the Navy is under the gun, and it is in the interests of the R.A.N. to sell her.

Other ships in commission and complementary to them, the Cossack, converted for training cadets from the Royal Australian Naval College; and HMAS. Warrego, a surveying trawler doing valuable work in the Cape York Peninsula area. Ships building for the R.A.N. are two more Daring class vessels, Vendetta and Vampire, and the two more Q-class destroyers.

The building of these Daring class ships in Australia does not seem to be justified. Originally, in about 1937, when they were estimated their cost at less than 2 million each in fact each, each has cost 18 million. Originally, all were to be completed by 1952; in fact, they will not all be ready until 1959.

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FOLLOWING the publication of these articles, the "Australian" published a letter to the editor from Engineer Rear-Admiral (ret.) Alec B. Doyle, which stated:

In the articles on "Our Disappearing Navy" ("Australian" Jan. 22-23), your special correspondent has done a national service in publicising the serious shortages of men and ships in the Royal Australian Navy. But, with respect, I suggest that in some matters of policy he has expressed opinions which indicate inadequate knowledge of those matters. I shall deal only with one of those, about which I have particular knowledge.

Being then Third Naval Member of the Naval Board and Chief of Construction, it fell to my lot in 1944 to discuss with Admiralty officers proposals for a naval shipbuilding programme for Australia, and to submit a programme to the Naval Board which was approved by all authorities concerned and adopted by the Australian Government.

In brief outline, the facts justifying this programme are given below: they could be amplified and supported were they available.

1 Developments in World War II and the nearness of Britain to enemy countries, made it clear that naval shipbuilding and repair facilities must (in common with other

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NISA TABLE MAGARINE
PACT EFFECTIVE IN JULY

Commonwealth and State legislation will be necessary to implement in Australian waters the International Convention for the Prevention of Pollution of the Sea by Oil, the Australian Department of Primary Industry's "Fisheries Review" states.

AUSTRALIA signed the Final Act at the inaugural conference in London in May, 1954. The conference was held on the invitation of the United Kingdom. Thirty-two Governments were represented by delegates, and 10 countries, the United Nations and F.A.O. sent observers. Australia sent four delegates.

The coming into force of the convention was made dependent on its ratification by ten Governments. Article XV also stipulated that five of these must be Governments of countries each with not less than 500,000 gross tons of tank tonnage. The convention was to become effective twelve months after these conditions were fulfilled.

Belgium, Canada, Denmark, West Germany, Ireland, Mexico, Norway, Sweden and the United Kingdom ratified, and when France did so last July, the coming into force of the convention was secured for July 26, 1958.

The convention is expected to be effective in perpetuity, but contracting Governments may withdraw after having participated in it for five years. The five countries with the necessary tanker tonnage are Denmark, Norway, Sweden, U.K., France.

Large quantities of persistent oils, such as crude oil, fuel oil, heavy diesel oil and lubricating oil, are released into the sea when the oil tanks of tankers are washed and when dry cargo ships discharge oil ballast water.

Sheets of oil persist for long periods on the surface of the sea, are carried considerable distances by currents and winds, and are frequently deposited on the shore.

Fish are killed when their gills become clogged with oil. It is also probable that oil affects marine organisms on which fish feed.

The objective of the convention is to prevent oil pollution by preventing the discharge of oil into the sea by ships under the jurisdiction of contracting Governments, which are obliged to enforce the provisions of the convention.

The convention does not provide for the establishment of a commission, but a bureau, provisionally set up and mainained by the United Kingdom, will serve as an administrative centre.

The discharge of oil, or any oily mixture which leads the surface of the sea, is prohibited in zones defined in the annex to the convention.

The prohibitive zones in relation to tankers are all sea area within 50 miles of land, with certain exceptions such as in the Adriatic 10deg. North Sea and parts of the Atlantic (where the zone is 100 miles). The Australian zone for tankers extends for 100 miles from the coast, except between the point opposite Thursday Island and the point on the West Australian coast at 20deg. S. Lat., where the general 50-mile zone applies.

Ships other than tankers are to discharge oily ballast water or tank washings from tankers and dry cargo ships when they pass through an oily-water separator.

From July 26, 1959, all ships registered in a territory of a contracting Government (and being ships to which the convention applies), are to be fitted with installations to prevent the escape of fuel oil or heavy diesel oil into bilges, the contents of which are discharged into the sea without being passed through an oily-water separator.

From July 26, 1961, facilities are to be installed in main ports for the reception of residues from oil ballast water and tank washings from tankers and dry cargo ships.

The object of the Navy League in Australia, like its older counterpart, the Navy League in Britain, is to insist by all means at its disposal upon the vital importance of Sea Power to the British Commonwealth of Nations. The League sponsors the Australian Sea Cadet Corps by giving technical and financial assistance.

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requirements for the defence of the British Commonwealth be developed in other Commonwealth countries, and not be confined to Britain.

The history of shipbuilding in Australia prior to World War II was one of boom and bust: several over-ambitious attempts had been followed by collapse and the dispersion of the skilled personnel that had been built up. Skilled personnel became scarce; for the industry promised little scope. Supporting industries for the provision of machinery, equipment, guns, torpedoes and special stores did not exist; neither did the special skills and knowledge necessary for the rapid development of these industries in an emergency.

Consequently, when World War II came, Australia found not only her own small Navy but also large allied fleets drawing on her utterly inadequate repair and maintenance facilities. We did not have even a reasonable nucleus. An adequate nucleus of skilled personnel, and the minimum requirements of repair and maintenance facilities and their widespread supporting industries, cannot be developed and maintained without at least a small and continuous naval building programme. A merchant shipbuilding programme will not supply them satisfactorily for naval work.

It was essential that a programme be arranged that would (a) permit continuous building without excessive demand on our resources, or giving us unnecessary ships (b) (c) give Australian shipyards and supporting industries experience of the new and very different techniques and materials that were being adopted in post-war naval construction.

**OUR VANISHING NAVY**

The Daring destroyers provided all these requirements.

You correspondent's figures and statements, purporting to show the extent of excess costs and delays through building in Australia instead of in Britain, are dangerously misleading, because grossly over-simplified.

Excessive costs and delays in naval building in the post-war period occurred in both Britain and Australia because priority was given to almost any peacetime requirement, and materials and labour were scarce. It cannot be emphasised too often that once an orderly building programme has been approved and begun, any subsequent hold-up in its progress (whether for political or financial reasons) inevitably increases costs; and excessive delays cause excessive costs. Any builder knows that.

The building of destroyers in Australia produced excellent ships but it did much more than that — it also trained personnel and developed supporting industries and a capability to service any fleet that could not have been developed (and cannot be maintained) without a continuous naval building programme.

Australia can build the ships she requires in reasonable time if the work is given the necessary priority and funds, and if orderly progress is not interfered with.

**FRANCE'S NEW CARRIER**

Clemenceau, the aircraft-carrier recently launched at Brest, is the third ship to bear the name of the Prime Minister of France in 1917-18. The first one was a battleship of the "Richelieu" class, laid down at Brest in 1939, but destroyed prior to the arrival of the German troops in 1940. The second was a light aircraft-carrier of about 16,000 tons whose first elements were assembled at Brest in 1951, but her building had very soon to be cancelled, owing to a new crisis of "cuts."

The third one is at last afloat, and her trials are expected to take place in 1959. Tartu, the last of the modified Stroud type Fleet Escorts, has undergone her trials.
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