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CONTENTS

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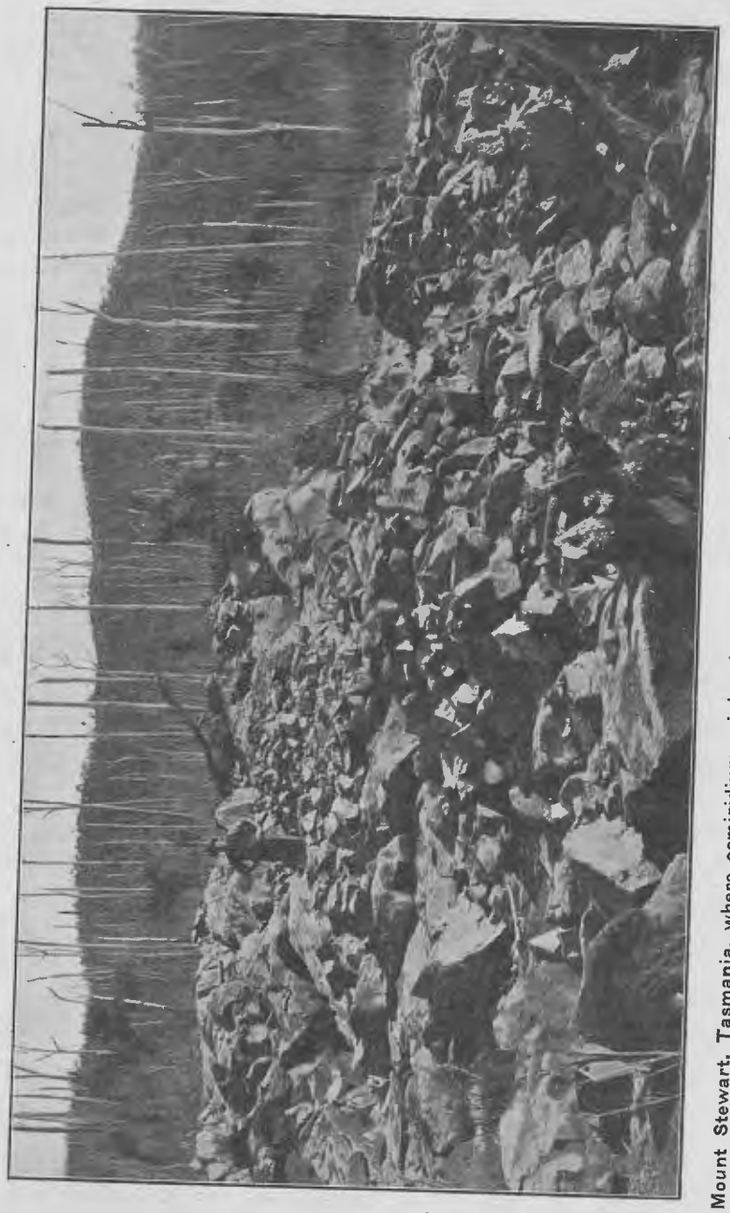

Mount Stewart, Tasmania, where osmiridium mining is carried on. In 1917 the mineral was found to occur here in such attractive quantities that a "rush" set in, and the whole of the area was soon taken up.

SEA LAND AND AIR
AUSTRALIA'S NATIONAL MONTHLY

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PRECIOUS METAL MORE VALUABLE THAN GOLD

BY

C. B. BLACK

This article relates some very remarkable occurrences in Tasmania in connection with this precious mineral, osmiridium.

FORTY-FIVE years ago osmiridium was first discovered in Tasmania, in the valley of the Wilson River, by Surveyor-General Sprent during one of his early expeditions through the wild western districts of the State. In the late 'seventies of last century, during the boom period of the Corinna goldfield, prospectors operating in the neighbouring White and Savage River areas, found an unknown tin-white, heavy, metallic mineral in association with gold in alluvial deposits. This mineral was so abundant in certain localities that steps were taken to have it scientifically identified, and to ascertain whether or not it was of economic importance. It was soon recognised as osmiridium, but as the demand was small for it at that time the discovery created very little interest. The diggers considered this mineral an obnoxious impurity, as it was difficult to separate from gold without the aid of quicksilver, and there was a penalty of seven shillings and six pence per pound imposed by the Mint for its removal. All osmiridium recovered in the sluicing operations was discarded, and most of it thrown away. If the diggers had only known what the future had in store for them!

Early in the 'nineties purchases of this formerly despised metal were made at twenty-five shillings per pound troy; in 1909 the price had advanced to £4 10s. per ounce, resulting in miners invading the country where the precious metal was to be found, and inaugurating an era of exploration and development which gradually brought about the highly satisfactory conditions of to-day. In March last year the local price reached £42 10s. per ounce. Probably the ultimate value at the present time is not less than £50 per ounce.

According to our authority it has been definitely established, as the result of the recent investigations of the Tasmanian fields, that the occurrence of osmiridium is intimately related to the chemical and physical characters of serpentine rocks derived largely from bronzite, rich in alumina, consequently the distribution of this mineral is determined by that of a particular variety of serpentine. In these investigations very important data has been gathered, not only regarding the obscure origin and occurrence of this metal, but in addition, provides material information of economic value. The investigations have revealed the presence of free platinum in the osmiridium deposits, and the mag-

matre origin of the gold in the olivine-bearing rocks of Bald Hill, probably the most important source of osmiridium in Tasmania.

Bald Hill, almost devoid of vegetation, is occupied by a mass of serpentised femic rocks, constituting one of a number of projections extending over an area of 30 miles north to south; and from three to five miles east to west. The area which contains osmiridium does not exceed 500 acres, yet all the metal found in the rivers and creeks in the vicinity was derived from the solid rock in this area, having been liberated by the agencies causing decomposition and denudation. Land where serpentine occurs is unsuitable for agriculture or any other purpose, because the soils resulting from the decomposition of this rock lack the alkalis so necessary for plant growth.

Associated with osmiridium are certain minerals which are authigenetic with the parent basic rocks. Such are platinum, gold, diamond, chromite, magnetile, neazlewoodite, menaccanite, zaralite, and picotite. There are, however, many minerals unrelated to these formations which are found, associated by account of position, with osmiridium. Some of these are quartz, zircon, garnet, cassiterite, bismuth, bismuthenite, monazite, galena, and chalcopyrite, platinum; others such as iridium, ruthenium, and platiniridium, had been repeatedly reported before, but the specimens submitted for identification proved in all cases to be varieties of osmiridium. The apparent absence of platinum in the Tasmanian deposits was regarded as a most singular phenomenon, as in other countries this member of the group invariably predominates. Mr. Reid obtained several specimens of free platinum and in all cases this metal was attached to gold.

This extraordinary mode of occurrence has been observed also in the Borneo deposits. This discovery is very interesting as it provides further evidence of the magmatic origin of the gold. No feature stands out more prominently in connection with these deposits than the constant association of gold with osmiridium. Not only is gold found in the free state, but also alloyed with osmiridium, though in a minor degree. Gold is found associated with osmiridium in various sizes from minute, irregular, thin scales to nuggets weighing several ounces. The proportion of gold to osmiridium is usually 1:2 or 1:3, but the ratio varies greatly in different localities. A few small diamonds have been obtained from gold and osmiridium bearing wash. These gem stones have a light yellow tinge at the apices, and are found in octahedral form from one-eighth to one-third of a carat in weight. Much interest has been manifested in the origin of these diamonds, and also the origin of the gold and osmiridium, which were probably derived from the same source. There is a strong tendency for osmiridium and gold to work downward through the gravels to the bedrock and become concentrated in the joints and fractures of the rock.

The heaviest nuggets of osmiridium recorded from any part of the world have been found in the West Tasmanian fields. Four of these nuggets ranged from 2 oz. 8 dwt. 8 gr. to 1 oz. 19 dwt. 7¼ gr. The last mentioned was purchased by the Mines Department for £30.

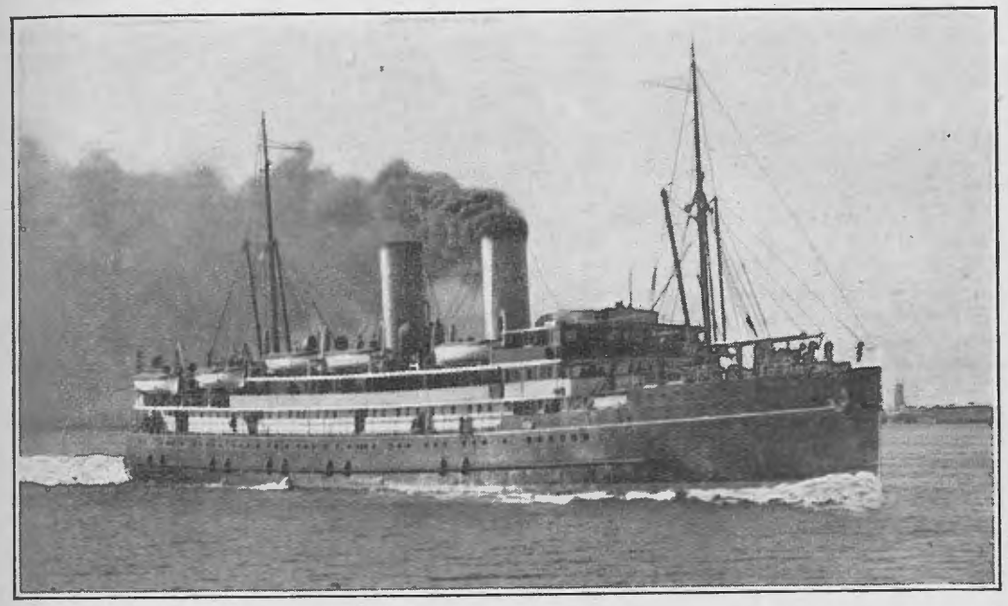
According to the author of the bulletin quoted, recent exploration and development have revealed enormous deposits of osmiridium and gold-bearing gravels in the valleys of the larger rivers of the Western Division. The bulk of this material is of fine grain size, but the proportion of the "point" metal (so-called because of its use in the tipping of gold nibs for fountain pens), increases as the workings approach the parent serpentine. The price obtained for point metal is greatly in excess of that obtained for the ordinary fine-grained material. Tasmanian point metal is in such great demand that, as indicated above, it commands extraordinary prices, its value generally being determined by negotiation and not by current rates for crude metal. The value of the fine-grain size material is governed by the fluctuation of the platinum market, which until recently was controlled by a body of financiers in Paris.

At the present time Tasmania is the most important osmiridium producing country in the world, and in no other country are deposits so rich that the mineral becomes the sole object of quest. The mineral in Tasmania, unlike that found in any other country, occurs always in a "free" state, and the platinum associate is very rare.

S.S. "NAIRANA"

NEW HUDDART PARKER STEAMER

Representing the first addition to the passenger fleets of the inter-State companies since the pre-war period, the new turbine steamer *Nairana* reached Melbourne last month. In charge of Captain G. Bates, one of the best-known Australian skippers, she steamed from Devonport, England, in 52 days, including calls at Mediterranean ports and Fremantle for bunker supplies. The arrival of the new vessel with her two yellow funnels, four decks, and cruiser stern, attracted a large number of sight-seers. A watchman was placed at the gangway to prevent the crowd from assembling aboard the vessel. The fact, previously published in the press, that the *Nairana* had acted as an Admiralty seaplane ship, seemed to accentuate the curiosity of spectators.

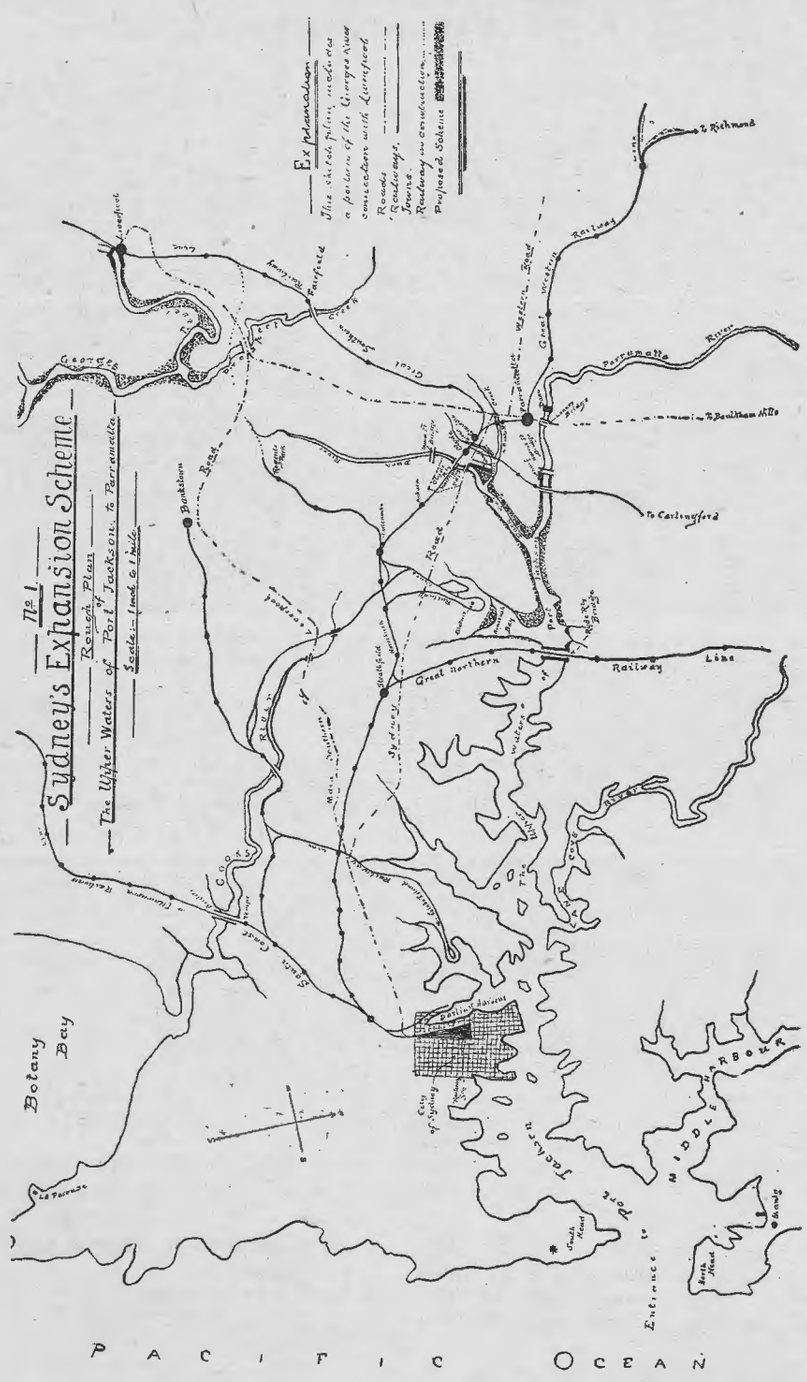


Huddart Parker's new Vessel the "Nairana" for the Trade Between Melbourne and Launceston.

Captain Bates reported a generally satisfactory trip. Members of the crew, which totals 44 men, said the *Nairana*, during her long passage, had proved a "good sea boat," and one well fitted for the fast Bass Strait mail service.

The chief engineer, who was on the *Nairana* when she was a seaplane carrier, stated the vessel had been employed in the North Sea, where she had run considerable risk of disaster, but had always escaped torpedoes and mines. A photograph at the saloon entrance depicted the *Nairana* as an Admiralty ship, entirely disguised in camouflage painting, with platforms for the 'planes and a huge crane at the stern.

The *Nairana*, especially built for the Melbourne-Launceston trade, has accommodation for 450 passengers, first and second class. The cabins are well lighted, there are spacious saloons, music and smoking rooms with swivel chairs to the tables. The first class dining saloon can accommodate 88 passengers at table simultaneously. Her decks include a boat, promenade and shelter deck. Various other modern fittings include the latest type of wireless telegraph installation. Four steam turbines drive the twin screws. On her trials she developed a speed of 20½ knots per hour. On this basis she could steam from Low Head to Melbourne in about thirteen hours.



SYDNEY'S CONGESTION

HOW IT CAN BE RELIEVED

BY

R. RACE LEWIS, J.P.

Following the previous review of the above subject, which appeared in the February issue of *Sea, Land and Air,* this article will enter more fully into the matter, which is one of most vital importance at the present moment to both the City, State and Commonwealth.

Firstly must be considered the environs of the waterways in and around Sydney Harbour, which are of such a character as to lend themselves to those who are not only seeking sites suitable to erect factories upon and open up industries, but for residential sites of the most picturesque nature, as the beauties of the scenery which surround them are second to none in New South Wales.

The magnificent country around Parramatta, with the lovely orange groves and orchards, for which central Cumberland is renowned, makes it of such a character that its equal could not be eclipsed in many of the countries of Europe. For rugged mountain scenery, which is within easy distance, by both road and train, the Blue Mountains cannot be surpassed. Central Cumberland, of which Parramatta is practically the business centre, is the home of the orange and citrus culture, besides most of the summer fruits, and if the Warrangamba Water Conservation and Irrigation Scheme is carried through, it will become the finest and richest fruit-growing country in the world. The climate which is perfect provides all the necessary requirements for agriculture and horticulture, and if this main waterway is opened up it will induce intense cultivation to be carried on, because the producers will have the means of being able to erect all necessary machinery, etc., to prepare their products for export in a more efficient manner, with only half the handling. The Hawkesbury Agricultural College at Richmond would then become one of the largest institutions of its kind in the Southern Hemisphere.

In addition to these industries, the mineral wealth of this district has not been touched. Merrylands, in the municipality of Prospect and Sherwood, has become notable for its tileries, while at Rosehill there is the "Fibrolite Works," the "Magnesite Works," the "West Coast Kalso-mine Works," the extensive "Sandown Meat Preserving Works," the "French Tileries" connected with Wunderlich's Ltd., besides many others, while Meggitts Ltd., and others, are waiting to open up large and extensive works when these waterways are opened up to enable them to expand their industries.

We will next consider the Government Railways, the channel by which the country is provided with a means of transporting products to the city and port. Owing to the narrow thoroughfares and the awkward approach to Darling Harbour, where the bulk of overseas shipping is carried on, the Railway Commissioners are at times unable to cope with the rapid increase in country production, notably wool and wheat. The problem of rapidly handling goods at Darling Harbour will have to be faced by the State Government to consider the best and most effective way to relieve these difficulties.

The railways will be mainly benefited by the opening up of the upper waters of Port Jackson than any other Department in the Public Service.

Fourteen reasons why the writer advocates the development of these waters are:

Because:

(*i.*) The Parramatta River, with its tributary, the Duck River, is part of Port Jackson.

(*ii.*) The City of Sydney has become so congested along the water frontages at Darling Harbour that it becomes imperative to make a move for expansion.

(*iii.*) By expanding the City of Sydney to the upper portion of Port Jackson, it will offer facilities to those who want to build factories for the advancement of industries.

(*iv.*) The areas between Ryde, Parramatta and Clyde, thence from Clyde by means of a canal 66 ft. wide by 10 ft. deep, following the course of Duck River as far as possible, completing its connection with George's River at the junction of Prospect Creek, by a cutting of about 3½ miles, thus opening up a waterway to Liverpool, will provide between 35 and 40 miles of land that is only suitable for factory sites.

(*v.*) The Duck River is one of the best suited rivers for dealing with the bulky goods which are marshalled at the Marshalling Yards at Clyde.

(*vi.*) All the wool, wheat, and other goods can be handled with perfect ease and comfort, direct off the Clyde Railway Marshalling Yards.

(*vii.*) By doing this it will be a big saving of time and expense in the transit of goods which have now to be delivered at Darling Harbour.

(*viii.*) All goods can be taken direct into the stores opposite the Ammonia Works and there sold, prepared for transit, and placed direct into the ship's hold.

(*ix.*) The scheme will be the means of bringing about "The Greater Sydney Scheme" quicker and easier than anything else could.

(*x.*) It is a reasonable scheme, and appeals to any right-thinking man, be he a politician, commercial man, or ordinary citizen.

(*xi.*) By opening up this large area of land for factory purposes, it will prove to either a Government or a private company one of the finest reproductive concerns that could possibly be undertaken.

(*xii.*) It will be a means of encouraging fruit-growing in central Cumberland, and if the Warrangamba Water Scheme for irrigation is taken in hand—as it ought to be—it will make this district the finest fruit-growing district in Australia.

(*xiii.*) It will find employment for thousands of our men at their own various trades and professions.

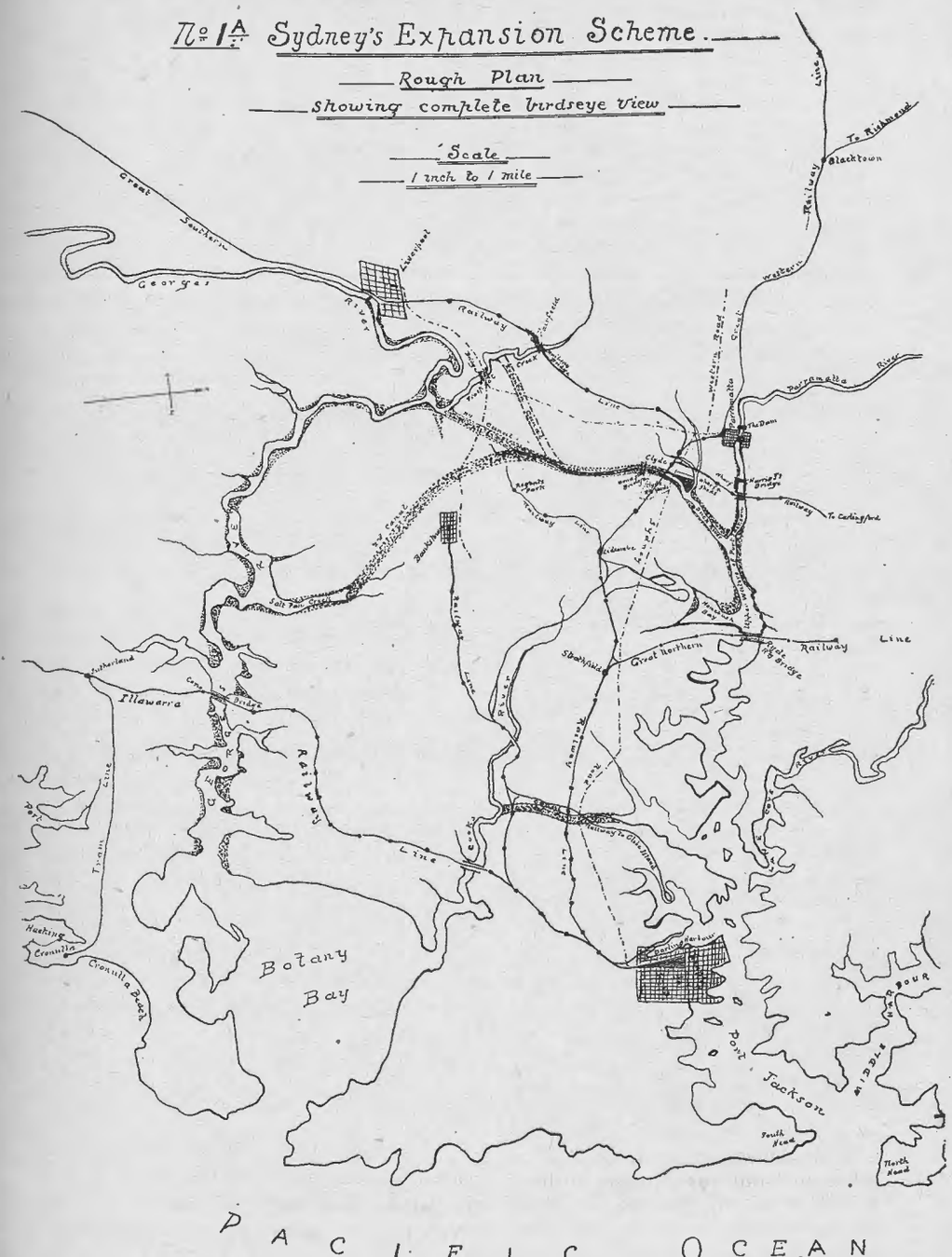
(*xiv.*) It will prove beyond doubt that those who have been placed in power have the interests of the State, and of Australia (as a whole) at heart, by opening up this national work—or encouraging those who have the means (and are ready to invest their capital) to take up this work—to enable these vacant lands to be turned into huge industrial centres.

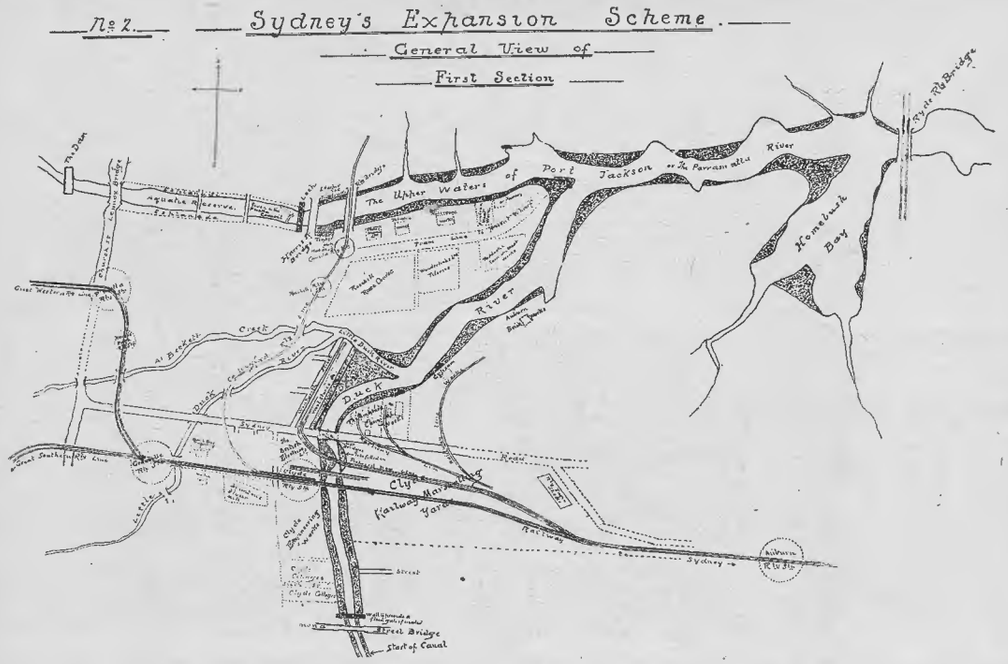
Plate No. 1 shows a bird's-eye-view of the upper waters of Port Jackson, giving the reader an idea of the proposed scheme in its first section. Plate No. 1A shows the full scheme when completed, linking up with Georges River to Liverpool, with an outlet into Botany Bay. By this being done it will be clearly seen that fully 40 miles of the finest country for factory and industrial sites will be opened out; while in and around this area is some of the finest land for the cultivation of the grape; and inducements for the investment of capital, thus providing work for the unemployed, and for the prospective immigrants who will be coming to this country. The problem has to be faced and solved, and the only way this can be done is to open out this main waterway, to provide the means for the expansion of the city, and give better facilities for hauling the bulky goods which come from the country, and thus relieve the city of its present congested condition.

The matter of facing such a scheme as this to open a main waterway, which will cover a distance of about 25 miles—thus opening up about 40 miles of country for factories and other industries, and which will yield, when completed, at least 100 per cent. return on the outlay—is, it seems, too big a proposition to face.

The writer would go further and include in this scheme the North Shore Bridge, as the whole can well be included in a rough total estimated cost of £20,000,000.

It may be interesting to the reader if a few figures, taken from the Official Statis-





tical Gazette of New South Wales for 1919-20, are quoted. These figures show that there were 1,999,581 bales of wool, valued at £45,052,792, for Australia, while the railways in New South Wales carried for 1919 811,293 bales, and 1920 764,296 bales. The value of the wool appraised in New South Wales for 1919-20 was £16,390,647. The number of bags of wheat forwarded to Sydney by rail for 1919, 19,139,787; and 1920, 8,078,953. The above figures seem quite sufficient to show the great need there is for expansion. These goods—which are the main products of the State—could easily be dealt with at Clyde, as shown in Plate No. 2, where it is proposed that the main wharf for the shipping of bulky goods shall be erected, together with extensive and commodious stores, into which the railway trucks will be run, thus breaking up the congestion of the city. In addition it will relieve the Railway Department of one of their great troubles, by releasing their trucks every 24 hours in any weather—and saving at least 24 miles haulage per truck, together with the engine, or engines, required.

Economy is one of the greatest factors of this scheme, and if Australia is to become an Empire *economy* must be the main rule in legislation.

Certain sections of the community are clamouring to use the public's money in building up a "bush city." It would be far more sensible if the money were put to better use, and spent with greater advantage to the interests of New South Wales in building up quicker and bigger *reproductive* works—which will in time provide *all* the money required for a Federal City.

The great need in Australia is to sink all personal fads and feelings—face these problems with an unbiased mind, and with a determination to make Australia what it should be, an Empire: or, the most foremost Dominion under the rule of the British Flag.

The writer will be pleased to receive any comments or suggestions regarding this scheme, if addressed care of the Editor, *Sea, Land and Air,* 97 Clarence Street, Sydney, N.S.W.

COPRA

A GIGANTIC TROPICAL INDUSTRY

BY

KAE McDOWELL

An Island Scene, taken from a Cocoanut Plantation.

COPRA, like practically all tropical industries, has been wrapped, by the more civilised world, in a glamorous cloak of romance. Bare mention of the word brings visions of green islands bathed in sunshine, and set in sapphire seas, of dark-skinned maidens adorned picturesquely, and sinewy men with ringed noses and scant attire, of immense profits and small toil. On such a vision, you may elaborate considerably in this case, and still be within the bounds of actuality.

The large majority of copra that comes to Australia is grown in the British Solomon Islands, but copra plantations are found in practically every tropical land, including Fiji, New Guinea, Tonga, Samoa, and the numerous other islands in the Pacific.

Approaching the blue Pacific Islands, across a smooth sea, caressed by the warm and heavy air of the tropics, the realities of civilised life seem to slip away. Like gems in an art setting these islands rise mysterious, luxuriant, sometimes sinister, always beautiful! Beautiful with the sweep of feathery palms rising from dense jungle; beautiful with brilliant birds and flowers and golden beaches, and sinister with a history of dark deeds, cannibalism, head-hunting; of mangrove swamps and sluggish streams where the deadly log-like crocodile lies supine.

The Solomon Islands were discovered in 1568 by Mendana, a Spaniard. Copra, however, was not produced there until about 1893, after the British Protectorate had established a certain amount of law and order.

When Mendana discovered the islands he was so impressed with their agricultural possibilities that he gave them the name of Solomon, with the curious idea that his countrymen might be tempted to colonise them, believing the islands to be the source from which King Solomon obtained his immense riches for the building of the temple. Little did Mendana know, however, of the characteristics of the natives, and the unhealthy nature of the climate.

Exactly two hundred years later, Monsieur Bougainville discovered the large island which now bears his name, together with Choiseul, which lies immediately to the south. Various attempts at colonisa-

tion followed one another, but, though some of the explorers of early eighteen hundred traded cautiously with the natives for sandalwood, beche-de-mer, and tortoise shell, death by violence, or malaria, followed practically every attempt at settlement.

The Solomon Islanders were particularly ferocious, coming out to the attack in their head-hunting canoes. These canoes, by the way, were marvellously and beautifully ornamental with inlaid ivory and the teeth of various fish and animals—often reaching a very high level of art.

In 1845 missionaries began to arrive, only to retreat before attacks by cannibals and malarial fever. In the early '60's, however, the recruiting of natives for work on Fijian and Queensland plantations began, and by '93 there were about 50 white residents in the southern Solomons. The whole of the trade, which included small quantities of copra, was carried on by means of small sailing vessels trading to Sydney.

A Cocoanut Palm Nursery.

Now, Lever's crushing mill at Balmain, N.S.W., alone demands a million and a half cocoanuts weekly, and yearly it can absorb the crop from nearly 25,000 acres.

During recent years a change has come over these Solomon Islands of our dreams. The hand of the native has reluctantly turned from the spear and battle axe to the plough-share and the cocoanut knife.

All labour on the plantations is black—the "boys" being indentured under strict Government supervision. They are recruited of their own free will for two years only, after which they are returned to their homes. Labour in the Solomons, strange to say, is somewhat scarce, the islander being a lazy customer, and loth even for a sum of money to give up his idleness. The difficulty is increased by the fact that, so far, recruits are not interchangeable between Bougainville (where labour is much easier to obtain) and the Solomons, the main reason being that previous to the Great War the former island was German territory.

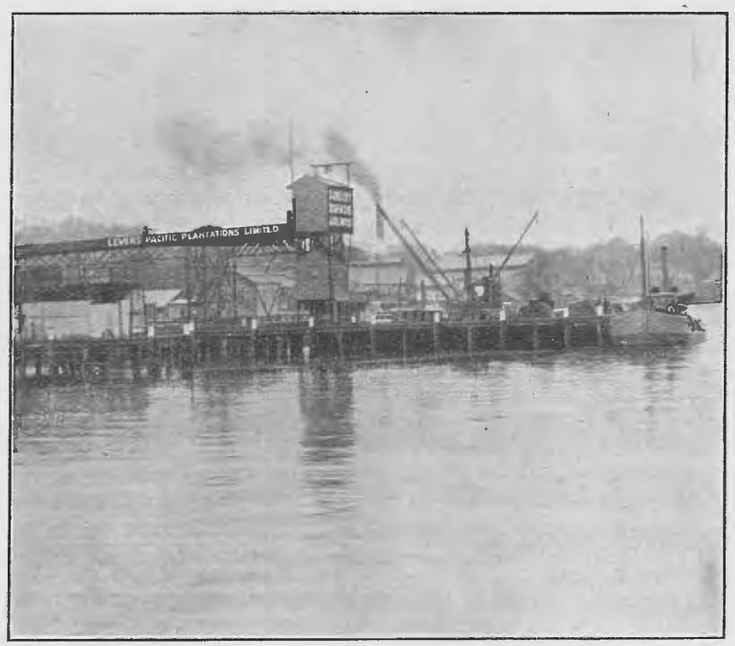
A cocoanut plantation is of comparatively slow growth when compared to such crops as tobacco, cotton, sugar, etc. The palm does not commence to bear until it is about five or seven years old, and is not in full bearing until it has been planted ten or twelve years. Then, however, it makes up for its tardiness by bearing all the year round.

Picture a plantation in the making. Gangs of scantily clad natives working under white overseers; jungle everywhere that has to be cleared; still, moist, heat, snakes, huge rats, lizards of various kinds, and by river banks the sluggish, scaly length of the basilisk-eyed "cros." Yet beauty everywhere overshadowing everything, even the deadly malarial mosquito lurking in the swamps. Beauty of exquisite flowers and greenery, brilliantly splashed butterflies; beauty of bird-life amongst which are king-fishers, ospreys, and bush turkeys much like our own in Australia. This last-named bird lays an egg the size of a duck's, which it buries about two feet in the sand, leaving it to be hatched by the natural heat of the ground. On some of the islands the natives with poultry farming instincts turn this habit of the indolent turkey to their own profit. They keep patches of sand clear for the bird and collect the eggs. Sometimes a native will be seen digging out the eggs while a turkey is digging one in a short distance away. These laying yards are divided into portions by the boys, and belong to different owners.

To return to the embryo plantation, after the ground has been cleared and burned off, the young plants which have already germinated in the nursery, are planted at carefully measured intervals.

Then happens the comparatively slow process of growth, during which the plantation has to be kept weeded, drained, and free from pests.

During the fifth and sixth year the first marketable nuts are formed, which when young are very different in appearance to those we are familiar with in the fruiterers' shops in Australia. They appear to contain nothing but water, which gradually seems to congeal from the shell inward and becomes white. When the nuts are quite ripe they fall to the ground, and are then gathered up by the boys into big heaps.



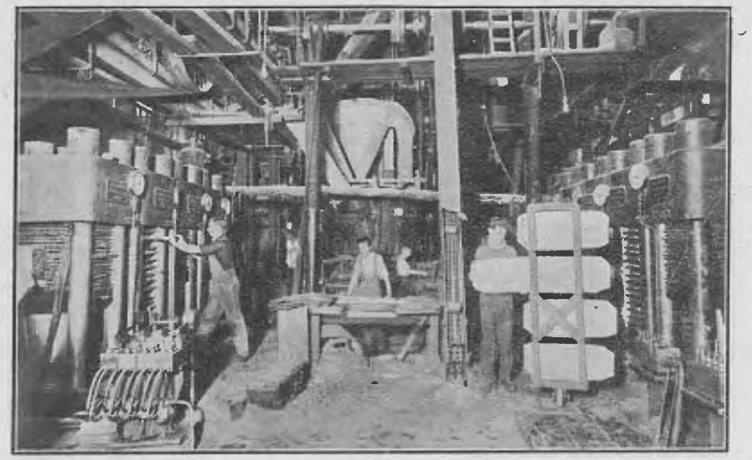
Wharf and Copra Store in Sydney.

The necessity of keeping the ground carefully weeded will now be apparent, otherwise the undergrowth would quickly reach waist high, and many of the nuts would be lost. In recent years many head of cattle have been imported into the cocoanut islands. They have proved excellent gardeners, and grow sleek under easy labour conditions, and, unfortunately, at times form a tasty change of diet for the wily crocodile. These brutes, which only occasionally manage to carry off a human victim, are much more successful with the cattle, creeping up out of the

mangrove swamps at night, and dragging them off to their mud flats. There they bury them in the slime until they desire to eat them.

Having gathered the ripened cocoanuts with one blow from an axe, the boys split the shells open, and then, deftly, with a curious kind of knife, gouge out the milky white interior, which, from this stage on, is known as copra. In this state it has to be hurried into a smoke house, or, in some cases, into the sun, for drying purposes, as fermentation sets in quickly if evaporation is not brisk, and fermentation means deterioration of the precious product.

Of the three methods of drying, the smoke-house (the native method) is the least successful, and the kiln-drying the most approved. It is, however, a delicate operation, "over-cooking" resulting in a loss of oil, and "under-cooking" in the rapid decomposition of the copra. Having been dried, the cocoanut is bagged and stored for shipment. Practically all that grown in these islands is brought to Sydney to be sold to the highest bidder, either for Lever Bros.' crushing mills, or European markets.



Interior View of a Cocoanut Oil Mill.

At the mill the copra is carried automatically to a machine where it is torn to shreds and discharged, as a coarse meal, to a device which wraps it in cocoanut matting and presses it lightly into cakes. These cakes are placed in tiers in a great hydraulic press, which has a pressure of three tons to the square inch, and which causes the oil to pour from every side into a well, from where it is instantly pumped into reservoirs to be casked and distributed as required, either to the soap works or for shipment to foreign and English markets.

Cocoanut oil has many uses besides that in soap-making. Copra, that vegetable fat now so extensively used in this country in place of lard and dripping, is in reality pure cocoanut oil consolidated by treatment by hydrogene. A similar product was very extensively used before the war in Russia and other European and Eastern countries, where the Jewish population was large. The reason being, of course that it is a vegetable fat, and cheap, and their religion forbade animal fats to be used in cooking. The present unsettled state of the European market has caused this trade almost to cease. Modern margarine also is treated cocoanut oil.

Bye-products of an earlier stage of the copra industry are dessicated cocoanut, used in household cooking, and the cocoanut oil cake now almost universally fed to animals and poultry. Earlier still is the coir fibre industry—the fibre being made from the longer husk of the cocoanut. Coir fibre has many uses besides being used for mats. In the early days it was a common substitute for horsehair; now it is made into carpets and rugs of great durability and fine effect. The fibre is long, elastic, springy, clean and odourless.

In regard to the copra industry of the future, authorities speak jubilantly, the present depression being, in their opinion, transitory, and the possibility of overproduction extremely remote, as soon as normal post-war conditions have been attained.

Natives Loading Boat with Copra for Conveyance to Trading Steamer.

NAVAL APPOINTMENTS

The following naval appointments have been announced:

Lieutenant-Commanders: Rupert C. Garsia, to *Penguin*, in command, April 1; Frederick A. P. Foster, to *Cerberus*, additional, while on passage to the United Kingdom for reversion to the Royal Navy, April 1; Herbert W. Goodchild, to *Platypus*, for *Huon*, in command, April 22.

Lieutenants: John H. Gill, to *Cerberus*, additional, while on passage to the United Kingdom, April 2, 1921; Horace J. H. Thompson, to *Franklin*, for R.A.N. College, April 16; Lionel C. Grimwade, John M. Farquhar, Alastair G. Davidson, Tom V. B. Thomas, to *Cerberus*, additional, while on passage to the United Kingdom for reversion to the Royal Navy, to date April 22, 28, and 16 respectively; Francis R. C. Riddell, to *Franklin*, for R.A.N. College, April 21; Harold B. Farncomb, to *Melbourne*, April 23; Paul H. Hirst, to *Sydney*, April 25; John A. Collins, to *Anzac*, for *Stalwart*, April 15; John Drinkwater, to *Platypus*, additional, for *J4*, in command, April 27.

Mate: Frederick C. Mott, to *Cerberus*, additional, while on passage to the United Kingdom for reversion to the Royal Navy, April 4.

Sub-Lieutenants: Gilbert T. Broadhurst, to *Sydney*, additional, April 15; Ian C. R. Macdonald, to *Anzac*, for *Stalwart*, April 16.

Engineer Commander: Llewellyn Howell, to *Cerberus*, additional, while on passage to the United Kingdom for reversion to the Royal Navy, April 23.

Chaplain: Rev. C. Hudson, to *Cerberus*, April 16.

Instructor-Lieutenant: John C. Slater, to *Franklin*, for R.A.N. College, temporarily, April 21.

Paymaster-Lieutenant: Frank E. Price, to *Cerberus*, additional, while on passage to the United Kingdom, April 6.

Shipwright-Lieutenant: Edward F. Head, to *Cerberus*, as Barrackmaster, April 16.

Commissioned Mechanician: John V. Corigliano, to *Penguin*, for *Huon*, April 6, and to *Platypus*, for *Huon*, on commissioning, April 22.

Signal Boatswain: John A. Coleman, to *Cerberus*, for signal school, April 16.

Warrant Engineer: Henry J. R. Gould, to *Cerberus*, April 18.

Warrant Writer: William J. Pearce, to *Cerberus*, April 18.

THE HISTORY OF ENGLAND

BY

ERNEST A. S. WATT

Henry VI. (1422-1461).

Henry VI.'s long reign falls naturally into two distinct periods, during the first of which our attention remains riveted upon the closing scenes of the long struggle with France, whilst during the last eight years of the reign the disastrous civil war makes aught else sink into insignificance.

Upon the death of Henry V., in accordance with the terms of his will, the Duke of Bedford, his brother and companion-in-arms throughout the war, succeeded to the command of the army in France; a younger brother, the Duke of Gloucester, assuming the reins of government at home, whilst the guardianship of the young King was, at his father's express wish, entrusted to the hands of Richard Beauchamp, Earl of Warwick, a famous soldier and a stern disciplinarian. The King's intelligence being of an exceedingly mediocre capacity, and Warwick determined to perform his duties to the letter, we may picture Henry's youth as being an almost incomparably unhappy one.

Bedford was a great soldier, and in France for some considerable time all went well, his marriage with the Duke of Burgundy's sister doing much to strengthen the alliance upon which England's supremacy in France chiefly depended.

Bedford was, however, greatly handicapped by the outrageous behaviour of his brother Gloucester, who actually persuaded the Pope to free Jacqueline, the heiress of Hainault, from her marriage with the Duke of Brabant, in order that he might marry her himself and thus acquire her vast possessions, which included the counties of Holland and Zealand. The Dukes of Brabant and Burgundy being closely related, the Anglo-Burgundian Alliance was seriously jeopardised, and it was only Bedford's infinite tact that prevented an open rupture.

Gloucester's quarrel too with Cardinal Beaufort, Chancellor, and half-brother of King Henry IV., seriously weakened the Government at home and greatly hampered the conduct of the armies in the field. Despite two brilliant victories at Vernbuit and Crevant, Bedford could in fact make no headway, and in 1429 he found himself compelled to raise the important siege of Orleans, the capture of which would have rendered Charles VII.'s position an altogether untenable one.

The English failure at Orleans was mainly due to the marvellous spirit of enthusiasm and devotion with which Joan of Arc had inspired the minds of her co-patriots.

The "Maid of Orleans" claimed that God had inspired her to bring about her country's salvation. Be that as it may, it is certainly beyond all doubt that she succeeded in persuading her fellow-countrymen once again to believe in themselves and in the sanctity of their cause. Fanaticism is a force of such incalculable power that against it the English were powerless, and by dint of thus proving, in the most practical manner, that the ruthless conquerors, who had devastated and downtrodden her unfortunate country, were not in reality invincible, Joan succeeded in rescuing France from the meshes of captivity in which she had so long lain dormant and helpless. Small wonder indeed that her name is to this day venerated and revered throughout the length and breadth of the land she served so nobly and loved so well. Born in 1411, the daughter of a poor peasant farmer, Joan was barely eighteen when, as the result of the King's tardy and half-dubious acceptance of her oft-reiterated assurance that God had selected her to lead the hosts of France to Victory, she found herself virtually in command of the French Army. At its head she not only compelled Bedford to abandon the siege of Orleaus, but succeeded in defeating his hitherto invincible army in the Battle of Patay, and in driving the English headlong across the Loire.

Charles VII. was now crowned at Rheims (his father having died in 1422), Joan of Arc being, of course, the central figure at this picturesque but simple ceremony. The young Monarch's gratitude at first knew no bounds, honours and rewards being lavished with an indulgent hand upon his miraculous deliverer and all her family. The feastings and carousings that followed, however, made no appeal to the mind of the heroic maid, whose soul was now burning to see Paris once again in French hands, and her King return in triumph to the capital of his fathers. The task was essayed, but long ere the path to Paris had been cleared of its obstacles, the King's patience and courage had failed him and the army, despite Joan's desperate entreaties and frenzied appeals, had been withdrawn from, what seemed to Charles, altogether too hazardous a venture. Long ere this the jealousy of the French nobles had poisoned the mind of the fickle King against the heroic girl to whom he owed so much, the result being that when Joan was shortly afterwards taken prisoner, whilst fighting against the Duke of Burgundy, Charles made no attempt to rescue her. The Duke passed on his illustrious captive to the English, by whom she was handed over to the blind, fanatical fury of the University of Paris, adjudged guilty of witchcraft and sentenced to be burnt at the stake. On learning of this terrible verdict Joan at first recanted, but shortly afterwards she withdrew a confession which she declared had been made only to save her life.

The atrocious sentence was now carried out at Rouen with great pomp and ceremony, the Bishop of Beauvais and Cardinal Beaufort being amongst those who considered it a proud privilege to witness the hapless maiden's death. Thus was perpretated undoubtedly one of the cruellest and most unjustifiable executions in history, one of the most hideous of the many hellish crimes committed in the name of Christ, and of His Holy Church.

In an age of loose morals and sordid ideals Joan of Arc stands out as a veritable oasis in the midst of a vast and arid wilderness.

Whether the military achievements, upon which her fame chiefly rests, were in themselves remarkable for any particular genius, need not concern us; for be this as it may, the fact remains that her nobility of character, her singleness of purpose, her magnificent ideals and the marvellous enthusiasm with which she was able to inspire all with whom she came in contact are in themselves amply sufficient to entitle her to a foremost place amongst the great national heroes and heroines of history.

The death of Joan of Arc reflects little credit on the humanity of the age she lived in, and neither the King of France, the Duke of Normandy, the English leaders, nor the University of Paris can escape their share of guilt.

With the "shimmering silver'd coat of mail, whose vision made an army quail" no more in his path, Bedford for some years longer was able to rather more than hold his own, without, however, making any material progress. Henry was taken to Paris and crowned King of France, the gorgeous pageantry of his coronation being in striking contrast to the simplicity of Charles' investiture at Rheims the previous year.

Bedford's death in 1435 proved the turning point of the war. His personal influence alone had for some time past maintained the integrity of the Anglo-Burgundian Alliance. The Duke's defection followed as a natural corollary upon Bedford's death, and swiftly now did the tide turn, with ever increasing rapidity, against the English. Especially was this the case after the Duke of York, who was appointed to succeed Bedford, was replaced by the Duke of Somerset.

At home meanwhile the differences between the Peace and the War parties had gradually become more and more acute. In 1444 the Peace Party, now headed by de la Pole, Earl of Suffolk, gained a temporary supremacy, and taking full advantage of his opportunities he concluded a truce with France, and, to make it more lasting and more effective, arranged a marriage between Henry and Margaret, the daughter of René of Anjou, one of Charles' staunchest supporters. By the terms of the Marriage Treaty, Anjou and Maine were, upon the completion of the marriage, handed over to the Queen's father.

Peace on such terms as these the nation could hardly be expected to swallow with avidity; but worse was to follow, for the French adjudging the truce broken, war again broke out, but war this time with the united French nation, the Duke of Burgundy's forces now fighting side by side with those of the King of France. The loss of Anjou and Maine was sorely felt, and Suffolk was now the most unpopular

man in England. So determined was the attempt made to secure this statesman's impeachment, that eventually, to smooth matters over, the King agreed to his banishment for five years. Suffolk was not, however, destined thus to escape the fate his enemies had decreed for him, for he was intercepted on his passage across to France, and summarily put to death—much to the delight of the nation. His successor as leader of the Queen's (or Peace) party, was the Duke of Somerset, a grandson of John of Gaunt (by his second marriage with Katherine Swynford), a nephew of Cardinal Beaufort, and grand uncle of King Henry VII.

About this same time, too, by the death of Gloucester, almost certainly murdered at the instigation of the Queen, York became at once leader of the war party and heir apparent to the throne. It is in the antagonism of York and Somerset that we find the origin of the Wars of the Roses, so-called for the simple reason that York's followers adopted a white, and Somerset's a red, rose as their respective badge or emblem.

The despatch of York to the chief command in Ireland served for a time to save the Government from the lashing venom of its most virulent opponent, but their glass was fast running out.

Rank misgovernment at home and a long succession of failures abroad had already excited a storm of indignation, one of the symptoms of which was the outbreak in 1450 of the men of Kent under Jack Cade.

The insurgents, it would seem, possessed no very definite programme, but one of their most insistent demands was for the dismissal of Somerset, and his replacement by York. Jack Cade was a noisy demagogue with no military experience, yet despite the fact that his followers were untrained, and many of them practically unarmed, he gained an astonishing victory over the King's forces—the majority of whom, needless to say, possessed no relish for the fight—at Sevenoaks and marched on London. The townsfolk at first opened their gates, but after a considerable amount of pilfering had taken place, they changed their tactics, and Jack Cade found his advance blocked at London bridge. Eventually, upon profuse promises of reform and a general amnesty, the majority of the insurgents agreed to retire to their own homes. Those who refused to do so paid the penalty for their obduracy, Jack Cade being killed in a skirmish, and many of the ringleaders put to death. Our only interest in the rising lies in the fact that it proves the vehemence and intensity of the popular indignation against the country's misgovernment. That it should have met with the success it did is certainly most remarkable.

Meanwhile England's French possessions were being one by one torn from her, till in 1453, after Talbot's defeat at Châtillon, Calais alone remained, England's supremacy in France being now reduced to the mere vista of an empty dream.

It was at this point, whilst the nation was tingling under the mortification of defeat, that York re-appeared in dramatic fashion, with a well-trained army at his back, to enforce his demands, which, of course, primarily consisted of the dismissal and punishment of Somerset.

Henry's first attack of insanity now suddenly intervened, and the barons, taking matters into their own hands, proclaimed York Protector during the King's indisposition, whilst at the same time relegating Somerset to the Tower. Such a solution promised well, but, unfortunately, a few weeks only had elapsed ere the King completely recovered his senses, whereupon York's supermacy immediately came to an end, and Somerset was once again restored to power. Civil war seeming now almost inevitable, York greatly strengthened his position by enlisting the support of the father, the Earl of Salisbury, and the son, the Earl of Warwick, were destined to play leading parts in the great drama now to commence.

The first engagement of the civil war took place at St. Albans (1455), where, after a desperate encounter, the royalist forces were overwhelmingly defeated, the Duke of Somerset being killed and the King taken prisoner.

We do not propose to follow the civil war in detail. Suffice it to point out that the combatants throughout the struggle were the various members of the great aristocratic houses and their dependents, and that the rest of England took little or no interest in the settlement of a question in which they felt no concern. Industry and commerce went on much as before, and the majority of Englishmen would appear to have faced the question as to whether the Lancastrians or Yorkists should rule the country with almost complete apathy and indifference.

After the Battle of St. Albans, the King again showing signs of madness, York once more became Protector. Shortly afterwards, however, Henry recovered, and upon the King again taking over the reins of government a great show of reconciliation was made, both parties attending divine service at St. Paul's as a token of the general pacification.

Peace, however, lasted but for a few months. The birth of a son to Queen Margaret of course materially altered York's position, but it was not until four years after that event had occurred that he first laid claims to the throne. The war had meanwhile alternated first one way, and then the other, but in 1460 the Lancastrians met once more with a crushing defeat in the Battle of Northampton, the King being again taken prisoner. It was now that York first claimed the throne, his argument being that as the descendent (through his mother) of the Duke of Clarence, Edward III.'s second son, his title was superior to that of Henry, whose great grandfather was Edward III.'s third son, John of Gaunt.

The Lords, who listened to York's argument with wrapt attention, disliked the idea of making a change during the lifetime of the present King, and a compromise was accordingly agreed upon whereby Henry should remain King until his death, and York be then his successor.

To an arrangement which entirely cut her son out of his rightful inheritance, Queen Margaret was not likely to be a party, and she straightway set to work, with characteristic impulse and vigour, forcibly to upset it. Raising a powerful force in the North she met York's army at Wakefield (1460) and gained an overwhelming victory. York had apparently grossly underrated the force at her command, at any rate he allowed his army to be greatly outnumbered. The Duke himself was amongst the slain, whilst the Earl of Salisbury was taken prisoner and executed.

It seemed a crushing reverse for the Yorkist arms, but shortly afterwards its effect was in great measure minimised by the victory of the Earl of March, now Duke of York, over the army of Jaspar Tudor at Mortimer's Cross.

Both the victorious armies now pressed on towards London, but Edward was the first to arrive, and the welcome he received left no doubt as to the feelings of the Londoners, who had of course found the civil war highly unremunerative, and now turned to Edward as their one hope of obtaining a sound and stable government. Queen Margaret's army had made itself intensely unpopular by its acts of pillage during the march south, the truth being that the Queen had no other means of paying her soldiers than by allowing them to plunder and pilfer at their will.

Finding that London to a man was at his back, a fact largely due to the Queen's foolish announcement that she intended to exact a gigantic indemnity from the capital for having so far sided against her, Edward now summoned a council of the greater barons and declared himself King of England. Edward at the time was barely twenty years of age. It is a somewhat significant fact that Parliament did not meet until nine months later, when both Houses promptly proceeded to ratify and confirm Edward's action.

Several more battles were fought, including Towton, the bloodiest of the war, but the tide had now definitely turned in Edward's favour, and his arms were everywhere successful.

The reign of the unfortunate Henry VI. had been a stormy one throughout. The King was a kindly man, of admirable domestic qualities, but, at the best, totally deficient in strength of character and completely lacking in all the other essential attributes of kingship; whilst he was at times wholly insane, the result being that throughout his reign there was a continuous and undignified scramble for power on the part of the greater barons.

Throughout his long tenure of the throne, the country had been shamefully misgoverned, and England was well nigh at the end of her resources when the accession of Edward at last put an end to the long chapter of mismanagement, misery and suffering. Under the circumstances it is not surprising to find the nation so eager to prevent any possible recurrence of the civil war as willingly to entrust the new King with practically unlimited power and leave his position untramelled by all constitutional ties so long as he was able to safeguard the country from a repetition of the appalling pestilence from which it had suffered so long.

In one respect at least Henry VI. earned the respect and veneration of all posterity, for he was ever a generous and

enthusiastic patron of the new learning, and it was owing to his efforts that Eton College, King's College, Cambridge, and New College, Oxford, owe their origin.

His wife, Margaret of Anjou, is one of the most picturesque figures in English history, and the courage and buoyancy with which she fought for her husband and her son did in fact much to redeem the sordid age she lived in. She was, however, totally lacking in tact, a creature of wild impulse, and restless impetuosity, whilst to her discredit too, stand many flagrant cases of the most brutal ferocity. Always intensely unpopular with the great bulk of the people, she never even remotely understood them, nor they her.

Although Henry's reign was undoubtedly an age of great men, Bedford, York, Salisbury, Warwick and Cardinal Beaufort being all men of far more than ordinary ability, the fact remains that the nobility as a whole were throughout the chapter actuated by purely selfish motives, and were at all times ready to sacrifice the interests of the nation to those of their class. Warwick "The king maker," whose unswerving support was so largely responsible for the Yorkist triumph, stands out as the most romantic figure of the age, of whose virtues and knightly qualities, as of its vices and failings he may well be considered the personification. The full story of his career is to be found in Lytton's "The Last of the Barons," the most brilliant historical novel in our language.

NAVIGATION ACT, 1912-1920

EXCERPT OF DIVISION 6a

WIRELESS TELEGRAPHY ON SHIPS

231. (1) Except as prescribed, every foreign-going ship, Australian-trade ship, or ship engaged in the coasting trade—

(*a*) carrying more than twelve passengers, or

(*b*) being of sixteen hundred tons gross registered tonnage or upwards,

shall be provided with a wireless telegraph installation, and shall maintain a wireless telegraph service, as prescribed, and shall be provided with one or more certificated operators and watchers, as required by the regulations.

Penalty, on master or owner: Five hundred pounds.

(2) The Minister may exempt from the provisions of this Division any ships or classes of shops on which, having regard to the nature of the voyages on which the ships are engaged, or other circumstances of the case, he is of opinion that the provision of a wireless telegraph apparatus is unnecessary and unreasonable.

(3) The Governor-General may make regulations, not inconsistent with this Act or the *Wireless Telegraphy Act* 1905-1915, prescribing any matters necessary or convenient to be prescribed for carrying out or giving effect to the provisions of this Act with regard to wireless telegraph installations and services on ships, and in particular in regard to—

(*a*) the nature of the wireless telegraph installation to be provided;

(*b*) the services to be maintained; and

(*c*) the number, grade, and qualifications of the operators and watchers to be carried.

(4) A surveyor, or any person authorised by the Minister, may, in the execution of his duties, go aboard any ship at all reasonable times and inspect the wireless telegraph installation and the certificates of the operators and watchers required under this Act.

(5) If the surveyor, or other person inspecting, reports to the Deputy Director that the ship is not properly provided with a wireless telegraph installation and certificated operators and watchers in conformity with this Act, the Deputy Director shall give, to the master or owner, notice in writing pointing out the deficiency, and indicating what is requisite to remedy that deficiency, and thereupon the ship shall be detained until the deficiency has been made good.

(6) The master of a ship required by this Act to be provided with a wireless telegraph installation, shall not take her to sea, and the owner of the ship shall not permit her to go to sea, unless the requirements of the Act have been complied with.

Penalty: Five hundred pounds.

NEW ZEALAND AFFAIRS

BY

HENRY BATESON (Our Special New Zealand Correspondent)

Probably the most important event in New Zealand aeronautical, naval and maritime circles during the past month has been the appointment by the Government of a Naval Board. With the coming of the H.M.S. *Chatham* and the expected formation of a small New Zealand naval squadron the setting up of the Naval Board was to be expected. The Board will be composed of the Minister of Defence, who will act as president, the Commodore commanding the New Zealand station (first naval member), the Chief Staff Officer as a temporary member until such time as the Commodore commanding vacates the command of the *Chatham* or other ship relieving the *Chatham*. The secretary to the Commodore commanding will act as secretary to the Board.

The Board will be charged with the control of all matters relating to the naval forces, upon the policy directed by the Minister, and shall have executive command of the naval forces. The Governor-General may delegate to the Board the functions, and commission it to execute, the office of Commander-in-Chief of the Naval Forces.

Viscount Jellicoe.

Viscount Jellicoe, New Zealand's new Governor-General, was entertained recently by the Wellington United Services' Club at a complimentary dinner. Colonel R. St. J. Beere, President of the club, presided. Among those present were: Major-General Sir Edward Chaytor, Brigadier-General G. S. Richardson, Commodore A. C. Hotham, Commander Williams and many others.

Viscount Jellicoe, in replying to the toast of "Our Guest," referred to the work performed by the Army, the Navy and the Air Force during the late war and paid a tribute to the manner in which they had stood united. He believed that it was largely due to this perfect unity that victory was achieved. Viscount Jellicoe confined himself to the work done by the three services during the war and covered familiar ground in the course of his speech.

The Governor-General was also recently entertained by the Christchurch branch of the Navy League. At this "at home" Viscount Jellicoe also mentioned the work done by the navy and said the Navy League had great work before it. The Empire would have to realise, he said, that, unless the sea communications be made safe in time of war, the Empire might just as well go out of shop. He particularly stressed the point—the future of the Empire lay in the safety of its sea communications during war time.

Civil Aviation.

An interesting return relative to civil aviation in New Zealand has just been made. The return, which is official, covers a period of eleven months—to March 5 last. It shows that only one fatal accident occurred for 152,096 flying miles or 2,509 flying hours. The sole fatality took place at New Plymouth in November, and resulted in the death of Captain R. Russell, the pilot, and the two passengers.

There are now four companies carrying on operations in the Dominion. The Canterbury Aviation Company, with headquarters at Sockburn, the New Zealand Aero Transport Company, with is aerodrome at Washdyke, Timaru, the New Zealand Flying School, situated on the shores of the Auckland Harbour, and the New Zealand Aerial Transport Company, a new company recently formed at Hastings, are the four companies. Of these the Canterbury and the Auckland ones are subsidised by the Government, while the Timaru venture only commenced operations on December 1 of last year. The Hastings company did not start operations until March 1.

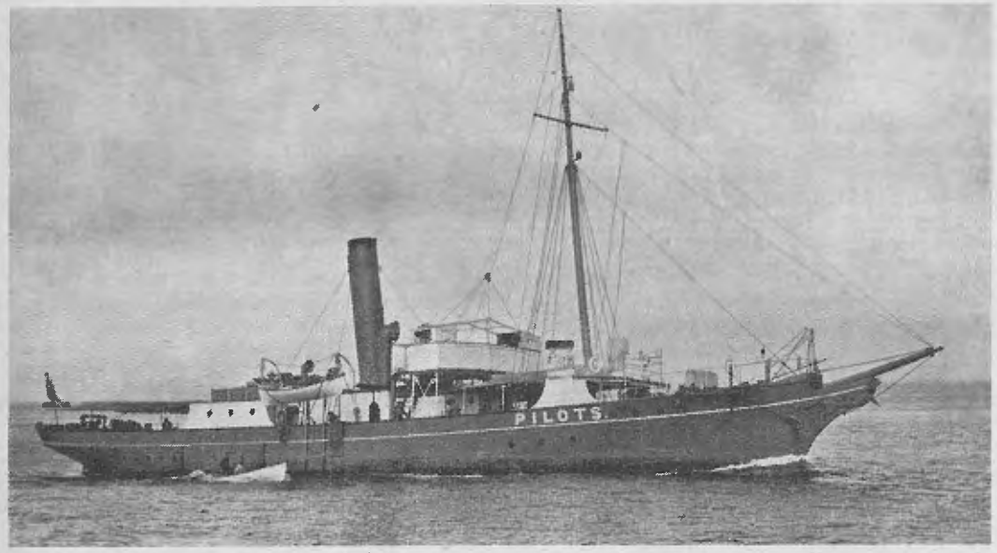
The official return is summarised thus:

	No. hours flown.	Approx. machine mileage.	No. passengers carried.
Canterbury Aviation Co.	427hr. 27min.	25,657	3055
N.Z. Flying School ..	1913hr. 57min.	116,257	1610
N.Z. Aero Transport Co. ..	163hr. 4min.	9,857	1183
N. Z. Aerial Transport Co.	5hr.	325	36
Totals ..	2509hr. 28min.	152,096	5884

PILOTS AND THEIR WORK

BY
E. J. HILL

When, from the deck of some 10,000 ton liner approaching Sydney Heads inward bound from a distant foreign country, one sees a trim little craft swing out from between the giant headlands which guard *our beautiful* and drop a boat from her davits into any sea that is running, one is thankful to be on the liner. In that small cockleshell of a boat sits a gentleman in mufti whose work—like that of his other nine colleagues—is to pilot overseas vessels safely into the harbour, thence to their berths at Circular Quay, Darling Harbour or Woolloomooloo; or to see them safely anchored in the stream according to instructions previously received.



Sydney Harbour's Pilot Steamer the "Captain Cook."

He is not adorned with gold lace, brass buttons, or any badge to denote to the passengers lining the rail of the steamer that he is anything more than some private individual who prefers to board the vessel by means of a monkey ladder than wait until she is snugly berthed with a comfortable and roomy gangway let down for his convenience.

Once the gentleman in mufti has ascended the bridge the passengers probably forget his very existence, being far too busy in having a parting drink or collecting their kit to realise the fact that they are entirely in his hands, for once on the bridge the pilot is absolute master.

The same, of course, applies to out-going vessels bound for foreign ports, but in these cases the passengers do not generally see the arrival of the pilot at all. They only see him descend into that small boat and then rowed across to the waiting *Captain Cook* outside the Heads.

Not so very long ago, the writer heard a Sydney man point out the *Captain Cook* lying at her moorings in Watson's Bay, explain to a friend that she was the home of the pilots. "Ripping life they have too," he said. "See them strolling about any hour of the day on deck. They only have to work now and then when a vessel comes in or goes out."

Had the speaker put in any day or night the previous week on board the *Cook*, when wild seas and wilder rain, with the wind blowing "two hurricanes lashed into one" outside, and mountainous seas roaring in between the Heads were the conditions, he might not have spoken so lightly and thoughtlessly of those with whose real work he was totally unacquainted.

On an average the pilots handle over 200 vessels a month, from the 18,000 ton *Ceramic*, of the White Star Line—the largest passenger ship entering the port—down to American schooners of only 500 tons. This average was not so high in years gone by, but recently, owing to the change of the port of registration of vessels belonging to what once were Australian ports to English ports or ports in other oversea countries, an additional 650 ships per annum are now being brought in or taken out of Sydney Harbour.

The charges for pilotage are 2½d. per ton, in or out, with a maximum of £25 and a minimum of £5. If a vessel is in ballast the charge is 1¼d. per ton each way, with a maximum of £25 again. The larger the vessel, the less she has to pay once she is above the maximum. This means that for every ton above the maximum pilotage is free. Vessels in distress or going into dock are only charged half-rates, foreign war-ships are on the free list, being piloted in and out of the harbour as an act of courtesy on the part of the Government. Warships of the Imperial or Royal Australian Navy carry their own navigating officers and do not call on our services at all.

"Once you are on the bridge of a vessel," said one pilot, "piloting her in or out you are entirely on your own. There is an officer jotting down every order you give, the captain beside you, and a quartermaster at the wheel; the first mate for'ard and the second aft.

"Bringing a vessel down the harbour one day," he continued, "a steamer bumped a rock not shown as existing on any of the charts. The captain of that vessel said she was only 150 feet from the buoy marking certain charted rocks; the officer, who was on the bridge at the time, said she was only 100 feet from it and the man at the wheel said it was even less. The pilot stated, when an inquiry was held, that the rock was 300 feet from the buoy. Subsequently, a diver was sent down and discovered that what the vessel had bumped was a 50-ton boulder 271 feet from the buoy. Allowing 30 feet as half the width of the vessel, the pilot was only one foot out! Judging distance on the water requires long experience, but that just illustrates an instance of what pilots are up against when it comes to a question of who is right or wrong. But though the pilot was right, the department suspended him until it was proved that the captain and the others on the vessel were wrong."

"Another thing that must be considered, and which even masters holding exemption certificates are probably unaware of," said another pilot, "is that Sydney Harbour is full of currents. By exemption certificates, I mean the certificate enabling the man holding it to pilot his own vessel in or out of the harbour as long as that vessel is registered in Australia or New Zealand. People generally imagine that currents do not exist in Sydney Harbour, but we know from experience that from Woolwich to the Heads there are strong currents running all the year round. When a pilot is berthing a large vessel at one of the wharves he has to reckon on these currents and the wind that happens to be blowing at the time if he doesn't want to pile her up. The tug boat masters do everything possible to oblige us and to carry out our orders.

"It must be remembered that Sydney Harbour is the seventh port of the world and its enormous amount of shipping needs tugs of the most modern type to handle the big vessels. One of the most-heard-of tugs in this harbour was built in 1884, but would take longer to do a sweep and start nosing a vessel in, than it would the pilot steamer *Captain Cook*. What is required here are some twin-screw tugs capable of turning in their own length and high-powered enough to be able to carry out a pilot's instructions in the least possible time, such as the two Natal Government tugs in Durban Harbour. Sometimes, when we call for the aid of a tug here we have got to nurse the tug and that is hardly what a tug is for."

Another pilot said: "The actual troubles of pilots in Sydney Harbour are very small. For its size Sydney Harbour is freer of accidents than any harbour in the world, and this is entirely due to the splendid work of the pilot service. There is an old Chinese proverb," he added, "which states that if you don't

blow your own horn no one else will do it for you,'' and with a broad smile he nodded to his brother pilots and strolled aft.

''We are on duty six days a week,'' remarked another pilot, ''and there is always two of us on board the *Cook* night and day. One of my fellow pilots worked it out recently that his earnings brought in the Government between £500 and £600 alone. This is an average month's work for any of us.

''We are called out for all sorts of excuses,'' said the O.I.C. Pilots. Some one sees a fishing boat throw up a bit of spray, and it's 'ring up for the *Cook* and say a boat is in difficulties off Maroubra.' Then after someone has suicided and the body is reported to be floating around off Suicide Point, Coogee, or Narrabeen, we have to go out to sea, search for the body and bring it in.''

''We are on the job all the time, our work and experience being varied and at times exciting.''

OVERSEAS MOTORING NEWS

Automobile Week at Monaco.

The Mont-Agel Hill-Climb, over a steep and difficult course of 6⅝ miles, was held on March 12. There were six classes, covering all types of motor vehicles, including motor cycles.

In the open class, for cars of unlimited engine capacity, a standard 40/50 h.p. 6-cylinder Rolls Royce (1920 model), with full touring equipment, owned and driven by Mr. A. Sanderson, made fastest time and gained first prize.

The ascent was made in 16 minutes 16⅕ seconds, averaging approximately 25 m.p.h.—a remarkable performance when one considers the nature of the course.

Motors for Russia.

The ''Daily Herald,'' London, is informed that an agreement has been entered into between M. Krassin, on behalf of the Russian Soviet Government, and the Slough Trading Company, for a large number of motor lorries specially constructed and rebuilt for service in Russia. The contract, by clearing off surplus war lorries, will assist the British motor trade back to normal conditions.

Delhi Motor Show.

The above Exhibition was opened on February 14 last, by the chief of the General Staff, General Sir Claude Jacob, K.C.B.

As has already been reported, the Exhibition unfortunately caught fire and was totally destroyed on February 17.

Accounts of the fire now to hand show that the conflagration was extremely fierce and rapid, as the whole Exhibition, which was crowded with visitors at 5.30 p.m., was a charred ruin at 6 p.m.

WIRELESS COMMUNICATION AND AIRCRAFT

During the war some of the most notable scientific developments occurred in connection with the perfection of means of wireless communication, telegraphic and telephonic, between aeroplanes in flight and observers on the ground. So far, although Australians in Melbourne and Sydney have been able to sample the wonders of ordinary wireless telephony between land stations, and are familiar enough with the use of wireless telegraphy, nothing much has been done in connection with wireless telephonic aeroplane communication here. The military authorities, however, have not overlooked the matter, and when the Air Force comes into being, experiments in this mode of communication will be regularly carried out. Included in the gift aeroplane equipment handed to Australia by Great Britain are complete outfits and apparatus for wireless work with aeroplanes, and these will be duly installed and used when they come to hand. At present, however, the whole equipment has not been received, and essential parts are still required before the experiments can be carried out as part of the ordinary work of the flying corps.

THE TRAGIC AUCKLAND ISLANDS

BY
HENRY BATESON

Few groups of islands lying in Australasian waters have such a grim record of lonely tragedies to their credit as the Auckland Islands. This lonely, uninhabited group stands to the south of New Zealand, in the same longitude as Stewart Island, but 200 miles further south. The group was discovered in 1806 by Captain Bristow, in command of a whaler. They are of volcanic origin, with rocky, treacherous shores, but one or two good harbours.

The list of ships that have piled up on the lonely shores of these dreary islands is not very large, but is rich in tales of tragedies of solitude and starvation. Probably the saddest of all is the story of the dual disasters of 1864, when two castaway crews lived on the island unaware of one another's presence. Of one company of twenty-five only three survived to be rescued and carried back to civilisation, while the other party lived in comparative luxury a few miles off.

The 1100-ton ship *Invercauld* left Melbourne on February 21, 1864, bound for Valparaiso, in command of Captain Dalgarno. On March 3 she piled up on the Aucklands during a fierce storm and became a total wreck. Six of her crew of twenty-five failed to reach the shore and were drowned. Those who succeeded in struggling ashore found a dreary, desolate waste, without visible means of sustenance, and so they divided into parties and scattered over the island. The captain, with the mate and four seamen, managed to reach Port Ross, where they lived on fish and shell-fish, varied by an occasional sea-lion. Every seal skin they got was carefully dried and put away and at length they were able to construct a piragua, using the dried skins and the branches of trees. In this rude craft they crossed the strait to Enderby Island, where rabbits abounded. Shortly after their arrival three of the party died, but the remaining members built a rough and ready shelter of dried skins and lived there for twelve months. Every now and again, when they became sick of rabbit and ordinary fish food or required more seal skins, they would visit Port Ross. At last, when they had given up all hope of ever getting back to civilisation, a Spanish brig was forced to shelter in the lee of the island, and the three castaways were taken aboard. The brig was bound from China to Chili.

What happened to the other members of the *Invercauld's* crew has never transpired, except in the case of one man. Probably, however, they died of hunger and starvation or sickness, or in an attempt to reach some other isle were drowned at sea. One man, probably the last survivor of one of the small parties, struggled down to Port Ross, at the time when the Spanish brig was picking up the castaways on Enderby Island. His record was found by the crew of the sealer *Grafton*. This schooner of 70 or 80 tons was chartered in Sydney, under Captain Thomas Musgrove, for a voyage of exploration among the southern islands. She left Sydney in November, 1863, and came to grief in Carnley Harbour on January 3, 1864. The whole crew made the shore, and lived on the island for several months. They erected rough huts with timbers from the schooner and lived on birds, fish, and seals. They explored the island, erecting prominent signal posts to attract the attention of passing ships. Rescuers, however, failed to come and a small party set off for New Zealand in a roughly-built cutter, which safely reached its destination on July 23, 1865. A vessel immediately left to rescue the remaining survivors, and it was while they were searching the islands that they found the semi-decomposed body of a man, lying on an improvised bed in a rude shelter at Port Ross. On the bed was a slate, with a closely written message, unreadable except for the name ''James Rigth.''

One of the largest wrecks at the Aucklands was that of the *General Grant*, a ship of 1,200 tons, which came to grief on May 13, 1866, when on a trip from Melbourne to London. She had about 100 souls aboard, 80 of whom were passengers, mostly lucky diggers returning home. The vessel is said to have ''plunged headlong into a cave 250 yards deep.'' Only 14

men and one woman reached the shore safely. After a search of three weeks they found a refuge. Ship after ship went past the island, but they all held off and steered clear of the treacherous and rocky shores. After weeks of hope and despair, of starvation and exposure, a party of five set out in the roughly-repaired pinnace for New Zealand, but nothing has since been heard of them. Death took its toll of the remaining survivors and the few castaways still alive moved to Enderby Island, where they erected rude shelters and signal-posts. It was twelve months before a vessel arrived to take them back to civilisation. When the *General Grant* went down £30,000 worth of bullion went with her, and all efforts to discover the lost treasure have failed. The small vessel *Daphne,* which went to try to recover the treasure, was lost with all hands in the attempt.

To endure hunger and exposure within the sight of plenty was the unenviable experience of the castaways from the barque *Derry Castle,* 1,300 tons, wrecked in 1887 on the reefs of the northern island while on a voyage from Geelong to London. Only seven persons were washed ashore and for 90 days they endured the horrors of starvation and exposure within sight of the provision depot at Erebus Point. Every day they worked at constructing a small boat out of the wreckage and at last their labour was completed and they crossed to the depot, where they lived in the huts built by the survivors from the *General Grant* until they were rescued by a sealer.

A wreck which resembled that of the *General Grant* in some respects was that of the four-masted barque *Dundonald,* 2,235 tons, which was wrecked on Disappointment Island on March 6, 1907, shortly after midnight. The *Dundonald* was bound from Sydney to Falmouth and with a cargo of wheat. She hit a ledge jutting out from the base of almost perpendicular cliffs, and drove into a chasm in the cliffs stern first. This was the same kind of thing that happened to the *General Grant.* Of the *Dundonald's* crew of 28 only 16 gained land. As the vessel lay in the chasm the waves swept over her from stem to stern. One gigantic wave carried a railing and ten of the crew, including the captain and his son, overboard. One man managed to find a footing on the cliff and he saved the remaining members of the crew, who were clinging to the foremast by means of a rope. When the men had revived they started looking for the provision depot and after one unsuccessful attempt they reached Port Ross, where they were found by the *Hinemoa* when she visited the island later in the year.

Such are the tales of hardship, of solitude and of starvation which are told of the Auckland Islands, dreary, desolate isles, inhabited only by sea-lions and birds. Even the Chatham Islands, with their treacherous tides and hidden rocks, cannot boast such harrowing stories.

CABLE THAT WIRELESSES THE WAY

World-wide interest has been aroused in the working of the "radio" piloting cable laid at the bottom of the channel leading to Portsmouth, says the London *Daily Mail,* which enables fog-bound vessels to steer by sound an accurate course into the harbour.

"There is no connection between the ship and the cable other than the magnetic waves that are radiated from the cable," said an expert to a *Daily Mail* reporter.

"The cable is laid beneath the exact course to be followed by shipping, and its 'free' end is out at sea—the Portsmouth cable being about 20 miles long. The high-frequency electric current in the cable emits a certain note in Morse code.

"On board ship the navigating officer wears a set of ordinary wireless telephone receivers. These receivers are connected to a battery, a set of 'amplifiers' similar to those used in wireless telephony, and two coils, the latter being hung over the side of the ship above the water-line one on each side.

"Approaching the harbour the officer adjusts his earpieces and listens first through one coil and then the other for the 'note' of the guiding cable. It may come to him through the right, or 'starboard' coil; if that is the case he knows his vessel is to the left of the cable. As soon as he hears the note equally loud through both 'port' and 'starboard' coils, the officer knows that his vessel is directly above the cable, and is able to feel his way along the correct channel."

SHIPPING NOTES

H.M.A.S. "Tingira."

It has been reported that the days of H.M.A.S. *Tingira,* which is stationed in Sydney Harbour as a naval training ship, are numbered.

Many years ago the *Tingira* was under Devitt & Moore's flag, being a well-known clipper in the London-Australian trade, and for twenty years was also a passenger ship between Sydney and Melbourne. Subsequently she was purchased by the New South Wales Government to take the place of the *Vernon,* and arrived in Sydney during February, 1891. The ship was dismantled at Cockatoo Island where she was utilised as a training ship by the State Government, subsequently being requisitioned by the Federal Government, reconditioned for training purposes, and was permanently moored in Rose Bay, Sydney Harbour. Her fastest trip to Australia from England was 69 days to Melbourne.

At the present time there are about 100 cadets on board, being trained for the Royal Australian Navy, and as the *Tingira* is old her timbers not as sound as the days when she ran before a gale, it is likely that the trainees will be transferred to a more modern vessel, possibly in about three months' time.

"Bellata's" Rough Trip.

Last month the Commonwealth steamer *Bellata* left Newcastle, N.S.W., bound for Fremantle, W.A. Shortly after clearing Nobby's, the vessel ran into a gale. Fierce squalls and rough seas severely tested the seagoing capabilities of the vessel, which was swept by big seas, the decks being awash at times. Several of the crew were knocked about, fortunately no one being seriously hurt.

The day after leaving Newcastle the *Bellata* was fighting every inch of her way southward against the storm, when the unexpected happened. A gigantic wave swept down on the ship and tore the rudder adrift. Captain Irvine lost no time in getting the vessel off before the wind and sea, and by means of twin screws manouvred his ship along a safe course to Sydney Heads.

In the meantime the Captain reported the mishap by wireless, and asked for tugs to meet the vessel at the Heads, and on arrival she was safely towed to an anchorage in the Harbour, looking little the worse for the very exciting experience.

As one of the officers remarked: "Twin screws saved the ship. Without them the vessel would probably have met with disaster in the terrific gale that was raging."

Canadian Line.

The Canadian Government Merchant Marine steamer *Canadian Importer,* from St. Johns, N.B., is the first steamer to inaugurate the new service of the line between Australia and the Atlantic Coast, via N.Z. ports.

SHIPPING NOTES—(Continued).

Training the Australian Youth.

Speakers at a recent luncheon of the Ancient Mariners' League, held in Sydney recently, referred to the necessity for more efficient methods of training young Australians for sea-going careers.

Proposed by Captain Banks, the following resolution was adopted, and was conveyed to Mr. Walter Marks, M.H.R., for transmission to the Federal authorities.

"That an effort be made to induce the Federal Government to secure sailing training ships for boys for the mercantile marine; one ship to represent each State of the Commonwealth, and each ship to accommodate from 50 to 60 boys, with necessary instructors; the sailing training ships to trade to different parts of the world, and thus be almost self-supporting and be little or no expense to the country."

Captain F. H. C. Brownlow (District Officer for N.S.W.) stated that since he had been connected with recruiting for the Naval College and for the Navy, there had been 12,000 applicants. That showed that the Australian boy wanted to go to sea if there were opportunities. At Jervis Bay they sent in only 30 a year, and there were 500 applicants yearly from New South Wales alone.

Fate of Barque "Antiope."

The barque *Antiope*, one of the best know Australian traders, has been gutted by fire at Lorenzo Marques, Portuguese South Africa, and abandoned by the underwriters as a total loss. News of the disaster to the vessel has been brought to Sydney by the crew, who arrived here recently.

The *Antiope* had gone to Lorenzo Marques with a cargo of timber from the Baltic, and on February 13, when she had almost completed discharge, a fire broke out in the sail locker and storeroom. It was 3 o'clock in the morning when the fire was discovered, and by daylight the vessel had been burned out.

Captain Broadhurst remained by the vessel pending a settlement of claims on the underwriters, and five apprentices and two seamen, who shipped in New Zealand, were sent on to Delagoa Bay, and thence to Australia.

The *Antiope*, in her early days, was identified with the trade between London and Australia, and had a record of many fast passages. She was an iron vessel, built at Port Glasgow, in 1866. She had a net register of 1,380 tons, and measured 243 feet 3 inches in length, 38 feet 4 inches in breadth, and 23 feet 7 inches in depth. The vessel was rescued from a perilous position after stranding at the Bluff, N.Z., some years ago, and was owned by the Otago Iron Rolling Mills Company, Limited, of Wellington.

Fire on "Tahiti."

The Union Steamship Co.'s Royal Mail steamer *Tahiti*, with a full complement of passengers, left Wellington on Saturday, April 2, bound for San Francisco, *viâ* Island ports. The next morning, when the vessel was about 200 miles from Wellington, the sensational discovery was made that a somewhat serious fire had broken out in No. 1 hold, containing wool, flax, and general cargo. Prompt measures were taken to suppress the fire, but it resisted all efforts, and it was deemed advisable to take the steamer back to Wellington. There was no panic on board, the passengers behaving splendidly.

The great value of wireless telegraphy was once more demonstrated. Wireless messages were continually exchanged between the shore and the ship, constant communication thus being kept up between the *Tahiti* and the Union S.S. Co. in Wellington.

By the time the vessel arrived in Wellington the fire was well under control, although still burning.

After the fire was suppressed the cargo in No. 1 hold was discharged, and after the vessel had re-loaded made her departure again for San Francisco, *viâ* ports, without further incident.

14,000 ton Motor Ship.

The largest motor ship that has visited Sydney is the *Glenapp*, which arrived last month. This vessel is the second of six 14,000 ton dead-weight capacity vessels ordered by the "Glen" Line. The first being the *Glenogle*.

The machinery of the *Glenapp* comprises two 3,200 I.H.P. Harland & Wolff Diesel engines, giving a loaded capacity of 12½ knots, with a total fuel consumption of from 18 to 20 tons of oil daily.

At Sydney the *Glenapp* loaded 10,000 tons of wheat for the United Kingdom.

SWIFTEST THINGS ON EARTH

IT is interesting indeed to compare some of the slowest moving things on earth with those which travel the fastest—the fastest thing we know, of course, being radiant light, and one of the slowest things, the human thumb nail which grows 2/1,000,000,000ths of a yard per second.

Next, we may here consider tree growth, the bamboo tree growing at the extremely slow rate of 27/10,000,000ths of a yard per second. Now comes the proverbially slow snail, which moves at the average rate of 15/10,000ths of a yard per second.

The Fastest Thing in the World is possibly the Cannon Ball, with a velocity of 2,000 miles per hour. One of the Slowest Moving Things is a Tree growing, or also the Human Thumb Nail.

A man has walked in a record test, one mile in 6¼ minutes, equivalent to the rate of 9¼ miles per hour. A man can run, as records show, at the rate of one mile in 4¼ minutes, or at 13½ miles per hour. A man has skated at the surprising speed of one mile in 2⅕ minutes, or about one-half as fast as an express train.

The Fastest Boats.

Next, we come to fast boats. One of the fastest vessels we know of, is the naval destroyer. Recent high-speed tests have demonstrated that one of these ultra-powerful submarine spotters and destroyers can tear through the open sea at the rate of 42½ knots, which is equivalent to 48 statute miles per hour. The gasoline-engine propelled motor boats of the hydroplane type have gradually outdistanced all other vessels which propel themselves through or over the surface of the water.

During the past year, *Miss America* eclipsed all international rivals and established a new world's record with an average speed of 76.655 miles per hour. This was the average of six tests—three with and three against the stream current. This remarkable motor boat was built just large enough to carry the engineer and pilot, and was powered with two 450 horse-power Liberty motors. This may seem like tremendously high horse-power just for the sake of demonstrating high speed in a race, but it is only one-half the horse-power developed by the *Maple Leaf V.*, which not only was 50 per cent. longer in hull measurement, but carried four 450 horse-power *Sunbeam* engines.

The best speed attained by the *Maple Leaf V.* was during her trials, when she attained 62.4 miles per hour. *Miss America* has a one-step hydroplane hull, and reached a maximum speed in some of her runs of 77.698 miles per hour, or almost 80 miles an hour.

One of the fastest things in the world capable of carrying a man, is an ice boat. Well built ice boats have attained a velocity of two miles a minute, or 120 miles an hour on the Shrewsbury River course. These glide over the ice on runners, propelled by the wind blowing against a large sail. It is an exciting and adventurous sport. Our large ocean liners attain a speed of 26 to 30 miles an hour, but the average of the smaller passenger-carrying vessels is from 10 to 20 miles an hour.

High Speed Railway Trains.

Railway trains, strange to say, have not shown us anything new in speed, even those of the present day! It is peculiar indeed to note that (as pointed out by one of the consulting engineers of the largest locomotive concerns in America) it is not considered or shown to be economical or practical at all, to drive a modern steam railway engine and train at a speed in excess of 100 miles per hour. Probably the fastest speed at which a steam engine and train ever flew over the rails, was in 1901 over a five-mile run in Florida, when an engine and train attained a speed of 120 miles an hour, or 2 miles per minute. This speed record has never been exceeded, and has not even been approached by the far-famed "20th Century" railroad flyers connecting New York and Chicago and other large cities to-day. These flyers develop speed in the neighbourhood of 70 to 80 miles an hour, but average considerably lower than this.

Sixty miles an hour, or a mile-a-minute speed has been proven and is now considered the safe high speed limit for passenger trains, whether on short or long runs, for the past ten years, and those who have travelled by rail to any extent, know that this is about the highest speed rate on the average, though the writer (in *Science and Invention*) has travelled between Philadelphia and New York, and clocked the speed with a stop-watch, when a mile was made in 34 seconds, or at the rate of 108 miles an hour for a distance of a few miles.

The fastest speed attained by electrically driven trains, either with locomotives or with motors on the coaches themselves, is 130 miles an hour, recorded in the tests made some years ago on the German electrified railway between Berlin and Zossen. The trains were tried with various shapes of wind-shields fitted on the forward car in an endeavour to reduce the terrific wind resistance encountered at such high speeds, and finally the train showed a speed of 130 miles per hour over a measured distance, the highest speed ever attained by a railway train so far as we know.

Automobiles have carried men over the face of the earth at next to the highest speed ever attained. Tommy Milton, during the past summer, in his famous Duesenberg racing car, clipped several seconds from the former world's motor records, including those of De Palma, and flew over the measured course at the terrific rate of one mile in a little more than 23 seconds. This brings the speed of man's travel on earth up to 156 miles per hour, and to travel any faster than this, at least at the present time, we have to consider the airplane.

Airplanes the Fastest Carriers.

Although the United States sent one of the fastest and highest-powered airplanes ever designed to compete in the recent James Gordon Bennet Trophy aerial meet, the American entrees broke down and never finished the race owing to engine and other troubles, and Sadi Lecointe, the French aviator, won the International Airplane Race by covering the course of 300 kilometres (equivalent to 186.45 miles) in one hour, 6 minutes, 17⅕ seconds. This is equivalent to a rate of 2.81 miles per minute, or 168.6 miles per hour. This is a little faster than the high speed limit attained by Tommy Milton in his automobile, but Lecointe's speed is the average for an ultra long run, and not the greatest airplane speed attained.

The highest official speed attained by an airplane, is that reached by de Romanet, the French aviator, who attained 193 miles an hour on November 4. It has been reported several times that airplanes, both in this country and abroad, have reached a speed as high as 230 to 235 miles an hour.

The velocity of sound is 10.88 feet per second, at zero degrees Centigrade, at a pressure of 1 atmosphere. A cyclone rushes at the rate of 585 yards a second, and about the fastest material thing on earth is the projectile from a gun, the velocity of which is 975 yards per second, or at an equivalent velocity of 2,000 miles per hour. The next succeeding fastest thing we know of is the velocity of the earth itself, as it speeds around its orbit about the sun at the rate of 65,533 miles per hour. Finally, we come to the highest speed thing we know of, which is credited with having the ultimate speed attainable in the universe by any object or agency—that of light and electricity, which travel at the marvellous speed of 186,000 miles per second. This is also the speed of the Hertzian waves used in radio-telegraphy and telephony, so that a high-powered radio wave sent out from the station at a point on the earth's service, will theoretically pass around the earth seven times in one second.

TWO NEW TYPES OF AIRCRAFT

America is the home of two new types of aircraft which have only recently been patented, and which promise to attract considerable attention. An airplane with wings that flap like a bird has been patented by Thomas J. Bird, formerly of Johnson City, Tennessee. The machine is reported to have been tested and has proven its ability to fly. The motive power is supplied by a small gasoline engine of low horse-power. The principal mechanism is the universal joint bearing boxes which connect the wings of the machine to the body, wherewith the wings are caused to swing, flapping like those of a bird in the air; and the wing gliding disc that causes the wings to move downward and upward in an oblong-circular movement similar to that of an oarsman rowing a boat. The wing construction is also reported to consist of overlapping slats which automatically close on the downward and forward thrust, and open as the wings rise again. The inventor claims that it is possible to attain a speed approaching ninety miles per hour.

Final secret tests have just been completed successfully on a flying machine invented by a Chicagoan. After sixteen years of experimenting by four members of the Leinweber family a screw-propelled flying has been developed in which the lifting is accomplished by two pairs of horizontal blades revolving in opposite directions. Victor, Curtis and William Leinweber, the three brothers, witnessed this triumph of science. Their father, Herman Leinweber, who originated the idea, never lived to see the invention perfected. Patents have been obtained from every country in the world protecting the secret which Caniel Roesch, professor of mechanical engineering at Armour Institute, says marks a tremendous forward step in the science of aeronautics. The machine is devoid of the fragile wings characteristic of airplanes. There are no wings to make large hangars and airdromes necessary.

NEW AERO ENGINE.

Messrs. Napier & Son, Ltd., have designed and constructed an aero engine developing normally 1,000 h.p. The engine is known as the Napier *Cub*, and it has been built for the British Air Ministry. It has four sets of four cylinders each—16 cylinders in all, X-shape, not absolutely diagonally opposed, but with two top sets of cylinders at a smaller angle than the two lower sets. The unit is a development of the well-known Napier *Lion*, of world-wide fame, from which the 40-50 h.p. car also evolved.

COSTLY SMALL CAR.

A certain English concern decided to produce a model much smaller than their present high-powered chassis to conform with the trend of the times. The designer, a man of great repute, set to work and turned out a really beautiful job; highly efficient, neat, beautifully sprung, with every modern characteristic and device that the heart of a motorist could desire. And then the first model was put through the works. Directors were highly satisfied with its road performance, but when they priced the job it cost nearly £100 more to produce than did the big car!

DAILY LIFE ON A PACIFIC ISLE

BY

WYNFRITH REVELL

Sunrise in the Tropics.

When the soft, velvet-black, star-studded curtain of the warm tropic night is lifting, the east pales with a ghostly light, almost imperceptible, poetically known to the natives in some of the islands of the Pacific as the "shadow of morning." Anon this glimmer disappears again into the darkness, till presently the real dawn splashes the sky with rarest tints of rose and amber, crimson, gold and chrome; a harmony of colour blending on the heaven's palette of egg-shell blue, all softly reflected in the mirror of the calm lagoon. In the west the morning star bids a twinkling good-bye to day; the sun, still invisible, tips the clear-cut mountain peaks, and the fleecy night mists resting there, with pink and gold, then seems to leap the great circle of the fickle ocean with a bound, and a Pacific day is born.

With the coming of the morning the roar of the huge breakers on the encircling reef sinks almost to a murmur, whereas in the still night those breakers boomed, and shook the frail island as though jealous of the peaceful shore.

Fitfully and timidly the morning breeze springs up to ripple the surface of the glassy lagoon, and to waken the shining, sleeping palms which fringe the shore, and they, with seeming pleasure, lazily wave their long green fronds to caress the first rays of their friend the sun.

The various native-owned roosters which long since heralded the day, now vie with each other until the medley of their various tones is encircling the whole island, linking village with village; the natives are stretching and yawning, while the "Pati," or native wooden tom-tom, is being beaten through the village, effectively killing sleep, and calling a few to prayers at the white-washed mission church near by.

The members of each household, or "Kainga," breakfast casually and frugally on native-made bread, store biscuits, and tea or coffee, with probably a banana or two from the bunch which hangs up ripening beneath the eaves, or some cold concoction of taro and arrowroot roasted in leaves over-night; perhaps a little cold, and sad to say, more or less tainted fish of yesterday's cooking.

Then garbed with only a gay loin-cloth and cotton singlet, a wreath of flowers, or berries, on their glossy black hair, a cane-knife in hand, a cigarette of native tobacco rolled in the dried leaf of banana between their lips, accompanied by equally gaily-decked girls, these laughing, cheerful, philosophical children of the sun and flowers wander in twos and threes down the shaded road to their semi-cultivated patches of plantation which lie hidden in the narrow valleys that cut into the hills. Here and there one may gallop off, mounted on a scraggy island pony guided by a single head rope, or the rider's foot applied with considerable dexterity to the head of the patient animal.

The road down which they loiter is still sweet with the dewy scents of night; it is a fairy-land bordered with bushes and trees. Overhead the delicate flamboyant trees rich with their crimson blossom and delicate lacery of leaves form a perfect arch; the coral-sand road is carpeted with fallen petals, and the sun, still low in the sky, shines up this wonderful avenue where Nature is as dumbly eloquent as these grown-up children are noisily gay.

A Typical Island Belle.

Beneath the palms, or half-hidden amid the foliage, are little white huts of cement; a small fire smouldering under a well-blackened pot or kettle, tended, probably, by some swarthy, soft-eyed maid or matron.

Before the heat of the day has become too intense, the young girls and women will be away to their favourite washing pool at the creek which runs clean and cool from the mountain slopes, that the well-beaten, and more or less buttonless results of their labour may be dry before sundown. Here, sitting on their haunches, often waist-deep in water, they exchange the village scandals, love affairs, births and deaths, and the incidents arising from each lose nothing in the telling, as the laughter, or occasional notes of sorrow "Aue!" "Aue!" betoken.

A hunt for fresh water prawns may terminate the morning's washing, and having donned their gowns, they return to the village with the damp bundles of washing on their heads.

Noon will bring the toilers back from their lands driving before them a pony laden with bunches of plaintains (cooking bananas), bananas; cocoanuts, green for drinking, ripe for the home; taro, and a bundle of water grass for the pony itself. Failing the pony they will be loaded themselves with such articles nearly their own weight.

During the torrid heat of midday the village takes its siesta; even the village dogs forget, for the time, their bony disputes; the pigs will even refrain from grunting, and the very surf appears to break more languidly.

Among these pleasure-loving people, a nearly oriental and mysterious race, there is no talk of equal rights; they have long been established, possibly a survival of some ancient civilisation which was theirs without a doubt, or the outcome of many centuries of wandering and adversity, when the help of all was necessary. There are few things which the men do at which the women are not equally efficient; canoeing, planting, fishing, surfing, spearing, swimming, riding and driving, fruit-picking and packing. There may be a few exceptions—I have never seen a woman climb a cocoanut tree, though at times they do, also go flying-fish fishing, or kill a pig. The women appear to hold as much authority as the men in the home, and exert a petticoat influence in the government behind the scenes. If a husband is unfaithful the wife soon equalises and all is serene. It is truly said that they art not immoral, but unmoral. To my way of thinking they are more fundamentally modest than the majority of their white, and more begowned, sisters.

With the declining sun the settlement again comes to life. The women, girls, and younger boys in scanty raiment, with club, spear, and basket, betake themselves to the reef, hunting for small fish or to

The Islanders Spear Fish.
This shows a native fisherman with his spear.

bathe; others in the shade of their verandahs have dresses to run up on the modern sewing machine; clothes to iron, baskets to weave; while the men get busy binding the dry cocoanut fronds into torches ready for the night's flying-fish fishing, and prepare the ovens for to-morrow's food, or the evening meal. Gathered on the coral-sand road are dozens of happy, dark-eyed little ones, decked in gay coloured apologies of garments, playing the various games of their fancy, filling the air with their careless laughter.

Serious toil for the too-short tropic day is over, except for those who are going fishing when the moon pales the east.

At the setting of the sun a calm settles upon the land; humanity and Nature appear to sigh with relief at the approach of the cooler hours. The still warm air becomes filled with the subtle aroma of the many lovely flowers—scents elusive, penetrating, and amorous—while mingling with them is the pleasant tang of some smouldering wood fire.

The stars peep out one by one to admire their rod-like reflection in the lagoon. The tangi-iti, or little-whistler, as they name the cricket, is calling shrilly from every thicket; the torches of the flying-fish fishers flare in the open sea, casting a rain of golden sparks upon the rolling waves. Here and there comes the peculiar and gutteral singing of the men and women through the trees, its lonely cadences softened by distance.

The mantle of night enfolds the enchanted land in silence presently, and only the chattering of the flying-fox, or the shrilling of the little whistler is heard; even these will condescend to silence, at times, to betray some dusky Romeo stealthily picking his dark way to his waiting, brown, and flower-crowned, Juliet.

SPEAKING OVER 6,000 MILES

NEW TELEPHONE MARVEL

It was reported in the Press recently that the Washington correspondent of the *Times* exchanged greetings from the Pan-American Buildings with a friend in Havana; and also with the wireless operator at Catalina Island, near Los Angeles.

The voices were quite distinct, passing over 115 miles of deep sea cable, 5,500 miles of land line wires, and thence by wireless to Catalina Island, automatic repeaters operating simultaneously.

The *Times* correspondent forecasts that the time is coming quickly when commercial men in London will be able to hold daily conversation with business men in the Dominions.

This long distance speaking was made possible by use of the Thermionic Valve. The main function of which is to magnify electrical effect which, in the case of the telephone, magnifies sound.

The telephone instrument which was specially made for Mr. Hughes, the Prime Minister, to enable him to hear debates in the House of Representatives while sitting at his own desk in another part of the building, is fitted with a valve similar to that used in this recent demonstration of long-distance telephony.

BERRIMA, N.S.W.

BY

FRANK WALKER, F.R.A.H.S.

Few of the early townships of New South Wales possess the attractions that are to be found at Berrima, nor the historic interest which this township keeps to itself. Here, one may literally and figuratively step back into the past, and whilst inspecting some of the existing relics of a day that has long vanished, find time to admire the scenic beauties of the surrounding district. In the early 'thirties and 'forties Berrima was an important place. Here the Assize Courts were regularly held, and a solid and substantial Court House, flanked by a row of massive stone columns, still exists to remind one of those strenuous times when crime was rampant, and magistrates worked overtime.

In 1830 it was intended to form a township some few miles lower down the river, but a picturesque and beautiful bend in the stream being discovered, the resolve was formed to fix the township at this spot, to which the native name of Berrima was given. In the dialect of a tribe of natives which formerly roamed the locality the aboriginal word for "emu" is "Berrimal," so, possibly, we have here the origin of the present name of the town. A large gaol and court-house were soon afterwards erected and, later on, the new southern road, avoiding the Mittagong Range, was made under the supervision of Major (afterwards Sir Thomas) Mitchell. Berrima proved a fortunate choice so far as building material was concerned, as an abundance of good stone lay close at hand, with a never-failing supply of fresh water. A large ironed-gang was employed for a considerable time on these works, and a detachment of soldiers, under Lieutenant Joseph North, guarded prisoners whilst at work. Lieutenant North, like most army officers who came to the colony at this time, resigned after a while, and turned to pastoral pursuits. He took up a selection in the Wivenhoe district, of what was then known as the Moreton Bay settlements, which later became part of the State of Queensland.

The beautiful little Holy Trinity Church, with its curious stone belfry and delicately traced "hood-moulded" windows, was erected in 1849, and here the Rev. James Hassell officiated for about twenty years, taking up his abode in the charming rectory, which, surrounded by a well-kept garden, and almost hidden amongst its great maple, beach and elm trees, is one of the show places of the district.

For a long time the huge gaol (which during recent times, was used as a place of internment for enemy aliens), was only used as a lock-up for prisoners brought to trial at the Assizes. The fine gateway in the high wall surrounding the building was erected in 1866, as the date on the keystone of the arch testifies, but from all accounts the huge building was never brought into full use, for in 1860 it was taken into occupation for invalid prisoners, and at a later date men were sent there to undergo the first period of their imprisonment, afterwards concluding their term of imprisonment at Parramatta. The gaol, in fact, became a separate treatment and solitary confinement establishment, prisoners receiving sentences of five years and upwards having to serve their first year at Berrima.

Relics of the former military establishment in the town exist in the shape of a large stone building in ruins, some little distance beyond the church, which is all that is left of the military barracks. Here, in 1861, a company of soldiers from Sydney were quartered for the night during their journey to the gold fields at Lambing Flat, where a riot was in progress.

In the centre of the township is the celebrated "Surveyor-General Hotel," a building which is contemporary with the establishment of Berrima. It has undergone some minor alterations since that day, but the interior fittings, all of cedar, the low ceilinged rooms and massive doors, are all eloquent of a day when building was a "fine art." It was named after Sir Thomas Mitchell, then Surveyor-General, and formerly boasted a fine cedar sign-board, on which a half-length portrait, in full uniform, of this distinguished

soldier, swung to and fro in the breeze. It would be interesting to know what has become of this historic relic, which well deserved a place in that long-talked-of museum of Australian antiquities. The present owner of this establishment, which has the reputation of being one of the best conducted hotels in the State, informs the visitor with pardonable pride that he is a representative of three generations of owners, all of whom have had charge, without a single break.

About three miles from the township stood, until recent years, a fine specimen of one of the early roadside inns, known as the "Three-legs-of-Man" hotel. It was a two-storied structure, surrounded by a low stone wall, and after being in use for many years as a house of call, was converted into a private residence. Many exciting stories are told of this old caravansary in the days of the bushrangers, one of which is connected with the notorious "Captain Starlight," who raided the place on one occasion and helped himself to a valuable horse, without going through the ceremony of asking or paying for it. When the writer visited the old building some few years ago it was empty and deserted, the only piece of furniture remaining in the upper rooms being a fine four-poster bedstead, with mahogany pillars, and an ancient musical instrument, known in the early days as a "Spinnet."

A mile or so across the paddocks from the site of this old dwelling place is "Oldbury House," one of the most interesting buildings of early Australia. It was erected in 1815, and has passed through many vicissitudes, being once attacked by bushrangers, whereof the bullet holes in the window sashes still remain, and the complete story of this fine old mansion, if the scattered strands could be collected, would prove more interesting than many a tale of fiction.

It is difficult to credit the statement vouchsafed for as perfectly true. that within a short three miles of Berrima, along the southern road, no fewer than five public houses flourished in the coaching days. Extensive establishments these would have been, with large stabling accommodation, etc., yet to-day not a vestige remains to mark even the original site of any one of them. They have vanished as utterly as the times that once called them into being. On this particular portion of road, however, there is an old-time relic in the shape of a small stone culvert, constructed at the time when the road was made in the early 'thirties, which for simplicity and design and excellence of workmanship, could not be excelled. The opening which carries the water under the road is a perfect circle, of about 4 feet in diameter, each stone forming the circle from end to end being fitted into its place with wonderful accuracy. A low stone parapet, with six quaint rounded stone buttresses, at equal distances apart, completes an object which, though nearly 90 years old, is as solid and substantial as the day it was built.

At Paddy's River, some considerable distance from Berrima, the traveller may see the ruins of another of the old roadside inns, built entirely of cut and dressed stone, but now wearing a melancholy air of ruin and desolation.

The early formation of the great routes to the interior and the rapid spread of population and settlement which they encouraged, may always be looked upon as an epoch in Australian history. Such men as Mitchell, Oxley, Hume, Sturt, and many others, by their splendid achievements in the way of exploration, made it possible to start a system of roads leading out from the metropolis to hitherto unknown places, and as fast as these were constructed there was never wanting of hardy pioneers to settle upon the land, and eventually were the means of forming the prosperous and thriving towns that appear upon our map to-day. In whatever direction we turn, the fine old-fashioned homesteads, well and faithfully built, and surrounded by extensive gardens and orchards, are continually met with, and every one of these possess a story which, some day, will be eagerly sought after.

Such then is Berrima, now one of the most popular resorts of those broken in health and desiring rest and change for their jaded nerves. Here there is peace and quietness, restful scenery, and, as an added attraction to those historically inclined, the little township contains some of the most interesting and visible links with a past which, by contrast with these strenuous and unsatisfying times, it does no harm to recall.

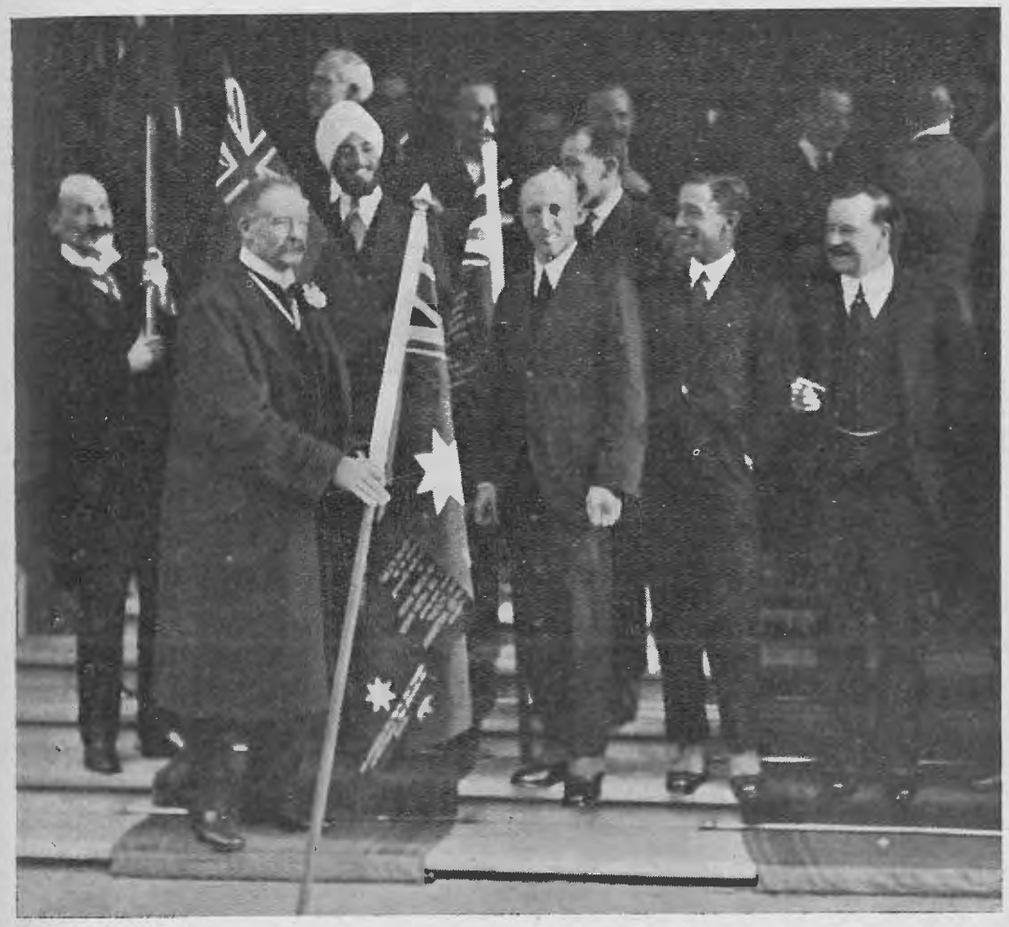
ENGLAND-AUSTRALIA FLIGHT

HONOURS FOR AUSTRALIAN AIRMEN

SIR ROSS SMITH, K.B.E., and his brother, Sir Keith Smith, K.B.E., who both succeeded in the great flight from England to Australia in the Vickers-Vimy-Rolls aeroplane, were entertained to lunch at Connaught Rooms, London, on February 24 last, by the Imperial Air Fleet committee.

Lord Desborough, who occupied the chair, in a merry speech, recalled the early days of flying, and spoke of the work of the Imperial Air Fleet, finally proposing the health of their guests.

In replying, Sir Ross Smith paid graceful tributes to the Vickers "Vimy" and the Rolls-Royce engines, and also pointed out the wonderful organisation of the Shell Petrol Company.



Photograph taken outside Connaught Rooms, London, after luncheon. Names, reading from left to right:—Fairfax Scott, Lord Desborough, Lieut. H. S. Malik, Sir Ross Smith, Sir Quinton Brand, Sir Keith Smith, Sir Joseph Ward.

Sir Keith Smith also replied, and described the enthusiasm and excellent work of their mechanics, Lieutenants Bennett and Shiers.

Among the visitors was Lieutenant H. S. Malik, the first Indian to pilot an aeroplane in France during the Great War.

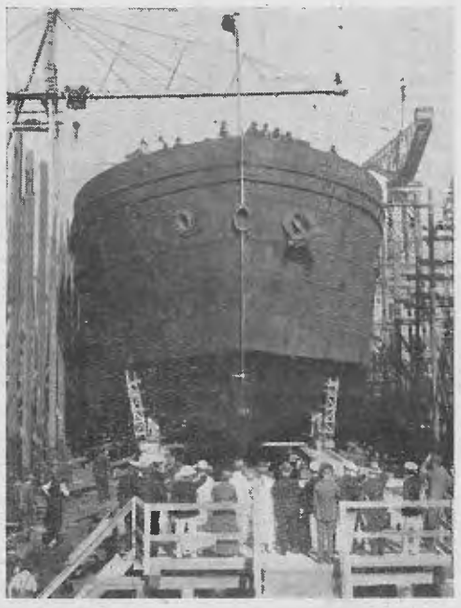
NEW COAL STORAGE VESSEL

LAUNCHING OF THE MOMBAH

THE latest addition to the Auxiliary Fleet of the Royal Australian Navy was launched on April 23 last at Cockatoo Island, by by Mrs. Edwards, wife of Commodore H. McI. Edwards, R.N., Commodore of H.M.A. Naval Establishments, Sydney.

The general particulars of the vessel are: Length between perpendiculars, 303 ft. 6 in.; length overall, 315 ft.; breadth at upper deck, 50 ft.; depth moulded, 28 ft.

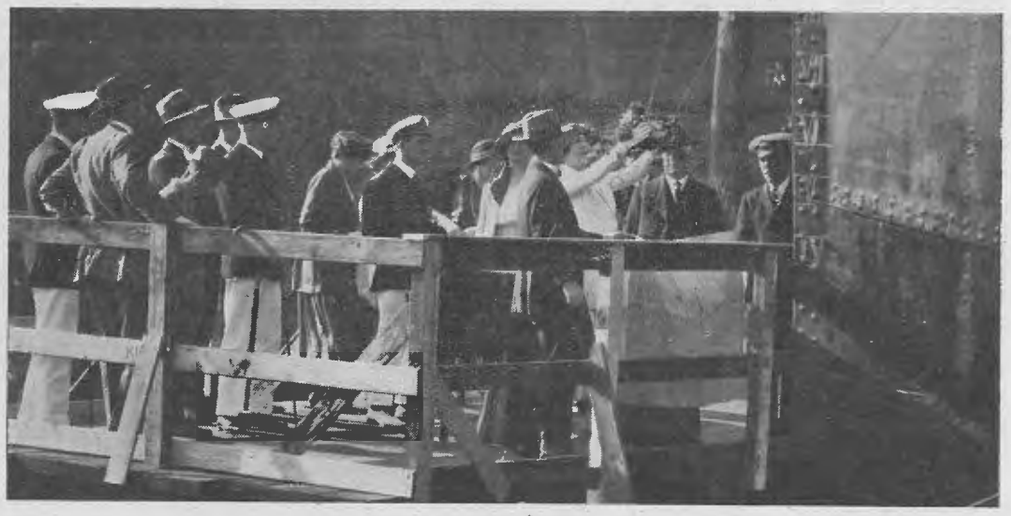
The leading features are three large holds for the stowage of coal, rapid discharging arrangements, for which include 18 50 ft. derricks, together with eighteen winches, each capable of lifting thirty hundredweight at high speed.



The Mombah Leaving the Slipways.

Construction is exceptionally strong to meet the requirements in which the vessel is to be engaged.

A single bottom has been built, and power for working the winches and other services is supplied by two marine type boilers, 11 ft. 6 in. x 10 ft. 6 in., working at a pressure of 110 lbs.



Mrs. Edwards Christening the Mombah.

WIRELESS TELEPHONE

WONDERFUL DEVELOPMENTS

In the realm of science wireless telephony has already developed in a marvellous fashion, and there would appear to be no limit to its possibilities. The high degree of perfection to which it has attained was successfully demonstrated recently at Marconi House in connection with the gathering of newspaper correspondents, representing the Press of the world, at the first Conference of the League of Nations at Geneva.

The event was invested with special interest owing to the fact that Dr. Alexander Graham Bell, the distinguished American who invented the Bell telephone nearly half a century ago, sent a wireless telephone communication from London to Geneva. Viscount Burnham was also present, and addressed a message of cordial greetings to the newspaper representatives. Both speakers used an ordinary desk telephone in a director's room at Marconi House, the instrument being connected by a post office line direct to the wireless apparatus at the Marconi Company's Chelmsford station. This apparatus automatically and instantaneously relayed the message to Geneva, so that in effect the speakers were in direct communication with Switzerland, operating the wireless plant by means of their voices, a distance of between 400 and 500 miles. Lord Riddell and Senator Marconi also sent messages, which were spoken on their behalf into the transmitter at Chelmsford. All the communications were afterwards repeated in French.

The message from Lord Burnham was in the following terms:

"Fellow-journalists: Your minds and pens have almost been 'fed-up' in the last few years with international conferences, in which you have had to make many records and to cover up many tracks. Your present task possesses this specially journalistic merit, that you have to make the best of a great idea which at present is trying to emerge under the antenatal conditions of sore distress. No man can predict the future of the League of Nations. But if it can secure the growth of a healthy public opinion among nations, and can grow with it to the exercise of moral influence firm based on such opinion, it will have conferred a boon upon humanity which will be, in the literal acceptance of the word, ideal. Will civilisation achieve this end with the machine of which you have seen the first imperfect working? No man can say with any certainty. But at least you are fortunate to have witnessed the beginning of a great effort, and to be able on your return to your own lands to assist its future growth by suggestion and criticism founded on the personal observation of trained minds. May your labours not be in vain is the wish of every good citizen of the British Empire. I am glad to know that the marvels of science are making it easier for us all to work together by sea and land. Good luck to you."

Astonished Journalists.

Dr. Alexander Graham Bell expressed "heartiest greetings to the journalists of the world assembled at Geneva in connection with the first conference of the League of Nations."

The message from Lord Riddell was as follows: "To the journalists at Geneva: This looks like causing a revolution in journalistic methods. Think of the profound joy of the foreign correspondent in being in constant touch, day and night, with the head office! The revolution may take time, but it is bound to come, and will make life more interesting, even though more strenuous. Mankind will have to develop a new sort of nervous system, to make full use of these new privileges. Good luck to you all.

FLIGHT IN AUSTRALIA

A PROGRESSIVE MOVEMENT

Commercial aviation in Australia has passed the development stage. It is in its infancy, but it can walk—or fly, is it? Aeroplanes are far from being unknown quantities, even in the remote areas, and the evidence is that their use must expand fairly rapidly. That is the opinion of one man who has done a great deal to develop locomotion in the air. He is Lieutenant F. S. Briggs, who is pilot for Mr. C. J. De Garis, of Mildura, who is the owner of a De Haviland four 'plane, equipped with a 375 h.p. Rolls Royce engine. The machine has established a record for service. It has flown 16,000 miles, but now requires rest and overhaul. Mr. De Garis and Lieutenant Briggs recently flew to Perth. The pilot arrived at Adelaide last month from Fremantle in the steamer *Katoomba,* which also carries the De Haviland in a dismantled state. The 'plane was shipped back from Perth to Melbourne in a case 30 ft. in length, 10 ft. 6 in. in breadth, and 9 ft. in height, and weighed between four and five tons. The 'plane will be thoroughly overhauled in Melbourne, and will be utilised for a flight in June to the Arltunga goldfields, in Central Australia.

So much for the machine. Now for the man behind the levers. Lieutenant Briggs has his home at Prospect (Adelaide) when he is at home. He was born at Calcutta in September, 1897, and is, therefore, in his twenty-fourth year. He served in the war with the 3rd Light Horse, but Pegasus appealed to him. He went to France, and later graduated for his commission in the Royal Flying Corps. Then he became not only an aeronautical observer, but an aviator instructor. He twice conveyed the Prime Minister (Mr. Hughes) from armistice deliberations in Paris to London. Lieutenant Briggs is a somewhat difficult man to induce to talk. Asked for his opinion, he said that commercial aviation in the Commonwealth must appeal because of the ability to cover vast distances in little time by aeroplane. In the Eastern States he had found that much more was known about actual aviation than in South Australia and Western Australia.

"What have you done in the way of commercial flying?" was another question put to him by a representative of the Adelaide *Register,* and by way of answer he pulled out of his pocket a record of his flights since July, 1920, up to last month, and tendered them without comment. So the documents must speak for themselves. At the beginning Lieutenant Briggs and Mr. De Garis employed a Boulton & Paul machine with a 90 h.p. stationary engine. It did good work. It travelled from Sydney to Melbourne (500 miles) in six and a half hours, despite a strong head wind, which was the first time the route was covered in one day. The aviators changed over to a 110 h.p. *Sopwith Gnu,* with a rotary engine. One journey from Melbourne to Mildura (330 miles) was performed in five and a half hours, and the 'plane climbed up through 5,000 feet of cloud to cross the Dividing Range at Macedon. At another time the 'plane flew from Mildura to Melbourne (via Birchip) in 3 hours 50 minutes, which was claimed to be a world's record non-stop run for a rotary engine. The *Gnu* did 60 miles an hour between Mildura and Pyap and back again in spite of having a rough head wind to contend with. This machine also travelled from Adelaide to Melbourne in 4 hours 10 minutes on a non-stop run, and thus established another record.

It also journeyed from Adelaide to Naretha, in Western Australia (1,105 miles) in 8 hours 45 minutes, and next day went on from Naretha to Perth (580 miles) in six hours, truly an astonishing feat. It must be mentioned that this flight had begun in Melbourne, and it was the first occasion on which the distance (2,169 flight miles) had been covered. One other trip only needs mention, and then figures can be abandoned for the generalisation that, with such incentives to work upon, no fear need be felt as to the expansion of aviation as a business proposition. The trip was that from Brisbane, via Grafton, Cootamundra and Sydney, a distance of 1,150 miles. It was done in 10½ hours, in the face of very bad weather conditions. The railway miles between Brisbane and Melbourne are set down at 1,300.

DIVER'S FIGHT WITH MONSTER OF THE DEEP

A TRUE STORY

BY

L. ROBINSON

A GHASTLY adventure that befell a diver while engaged in blasting out rock to deepen the passage into the Moyne River, at the mouth of which stands Port Fairy, Vic., only happens to most of us in a nightmare. Diver Smaile was attacked by an enormous octopus. Unseen and unaided, one free arm against eight more powerful ones, he managed to escape with his life.

The work of removing the rock to facilitate the navigation of shipping, was almost completed, only two more blasts being needed. Diver Smaile went down into about twenty feet of water and walked along to a ledge of rock upon which he was operating. His crowbar was still standing in the mud where he had left it some time previously before returning to the surface for a breath of fresh air.

While in the act of fixing the last plugs of dynamite in the holes he had drilled, something tugged at his arm. His first thought was that he had caught the signal line with his elbow, and that his colleagues above water were sending him a message, but in trying to move his arm he made the disquieting discovery that it was firmly pinned to his side. He then attempted to turn round, but was terrified to find that something was holding him with a grip of iron. Almost at the same instant he felt what seemed to be a rope slip round the same arm below the elbow and encircle his waist. Without knowing why, he held his right arm out straight, and it was due to his instinctive movement, coupled with an iron nerve and a cool head, that he lived to tell the story of his exciting experience.

Peering into the ever-increasing gloom, for the afternoon light from above dimly illuminating his surroundings was waning, he saw that an octopus, malevolent looking and sinister, was attached to the ledge underneath which he had been boring. Smaile braced himself against the rock and tried to detach himself from the monster's clasp. His efforts were in vain—as two sinewy tentacles held him like steel bands. It was terrible enough in all conscience to have to battle single-handed against so formidable an opponent, but added to the diver's agony of mind was the fear that his mates on the barge above would become alarmed at his prolonged stay below, and attempt to pull him up. On the verge of collapse from straining to free himself, and the horror of his position, Smaile still retained his presence of mind and by edging sideways, managed to get near enough to his crowbar to grasp it. Those on top, who had now become somewhat anxious, pulled at the signal rope, but the diver signalled back that he was not yet ready to return to the surface. He then endeavoured with his crowbar to prise himself free from the octopus's grip, his efforts, however, had practically no effect upon his antagonist. It was urgently necessary to

try something else, and he now prodded savagely at the body of the octopus which he could just see dimly in the deepening green twilight, flattened against the rock. The octopus, fiercely angry at the struggles of its prey, wound a third tentacle round his legs.

The diver, now unable to move, was sick with terror, every instant expecting that the grisly denizen of the depths would get a strangle-hold on his free arm, or that it would grip the air pipe. His doom would then have been sealed. There came another tug at the signal line. It inspired him with fresh courage. Once again he signalled "all right," and his comrades above water sat back waiting for the "haul-up" signal, theorising meanwhile as to the probable cause of Smaile's lengthy stay below.

The diver had almost decided to give the word to "pull up" and trust to the ropes to tear him free, but refrained from doing so, as the chance that the ropes would stand the strain was too small. If they broke all would be over with him.

As a last resource, it occurred to him that as he could not get the octopus to release its hold on him, he might be able to force it to relax its grip on the rock. He commenced to strike at the body of the animal with, unfortunately, little effect, but after digging at one of the tentacles this left the rock and coiled round him. The octopus now had four tentacles round the diver and clung to the rock with the other four. Prodding away at the remaining tentacles, one by one they joined those already wrapped round him. Smaile's one great fear now was that his free arm would be put out of action or that the air pipe would be fouled. Luckily, however, neither calamity overtook him, the last remaining tentacle leaving the rock eventually and joining the seven coiled about him

His colleagues above now thoroughly alarmed, once again signalled urgently. Giving the "pull-up" signal, the diver was drawn to the surface, where the sight that met the astonished eyes of those on the barge was the most weird in all their experience. Diver and octopus seemed one conglomerate mass; a new and fearsome kind of ocean monster.

The octopus, which had to be cut away from the diving dress, was one of the largest ever seen on the coast, its tentacles measuring twelve feet in length.

THE MARTINSYDE TYPE "A" AEROPLANE

In designing the Type A as their first purely commercial type aeroplane, Martinsyde, Ltd., have carefully considered the *pros* and *cons* of various types and sizes of aircraft and have settled upon what may properly be described as a happy medium. Believing, as the firm does, that, until the multiple-engine type has been developed to a much greater degree of reliability than at present the single-engined machine is the more reliable, they naturally have confined themselves to this type.

As engine reliability is *sine qua non* for such purposes as this is desired for, an engine of round about 300 h.p. was indicated as roughly the limit—not that there are no reliable engines of greater h.p., but, at about that power there existed a number of tried and trusty engines. A larger power had involved a more restricted choice and a greater chance of failure of engine supplies.

This machine was designed specifically for high-speed passenger- or freight-carrying work, and is of the smaller class of commercial aircraft. Martinsyde, Ltd., for whom the Larkin-Sopwith Aviation Co. of Australia are local agents, do not believe that at present the multiple-engined type of aeroplane has been developed to a stage at which it can compare in reliability with the single-engine type.

This fact and the desirability of designing for an engine h.p. which could be provided by two or three different types of tried and proved engines limited the power to the neighbourhood of 300 h.p., and—high speed being the essential feature of aerial transport—the power limit imposes a limit to the machine dimensions.

Actually there would appear at the present time to be more immediate useful employment for a machine of about this size than for either much larger or much smaller types, and with the combination of high performance and good load-carrying capacity which it possesses the type A Martinsyde should prove to be one of the most generally useful machines yet built.

It can be built as either a passenger-carrier or as a freight machine, carrying pilot and either four pasengers or freight to a total of 1,300 lb., or any intermediate combination of freight and passengers, together with 80 gallons of petrol and 8 gallons of oil—sufficient for a range of 500 miles or more.

The machine is fitted with the 300 h.p. Hispano engine, and is equipped for pilot and four passengers. A separate and interchangeable float under-carriage for the same machine can be supplied in addition.

The type A is of the normal tractor biplane type, with staggered, equal top and bottom planes, having two rows of interplane struts aside. Passengers or freight are accommodated within the *fuselage* from beneath the centre section to well aft the wings, with the pilot's cockpit nearly half-way to the tail. The tail contains the normal organs, a tail plane with divided elevators, the whole being in plan of a truncated trapezoidal form, a nearly triangular fin, and a rudder which can be most nearly described as a quadrangular affair with two corners and two rounds-off.

In the construction of this machine very great attention has been given to the accessibility of the engine and all such other parts as may need inspection, and to the ease of replacement of damaged parts. All fittings throughout are standardised and are drilled to jigs—spare parts are therefore certainly interchangeable.

The *fuselage* is built of spruce throughout and is of the usual braced girder type. It is unusual in that it is made in four sections; the nose with engine bearers, which extends to the forward under-carriage strut, the cabin section extending thence to aft the main planes, and the tail portion, containing pilot's cockpit and extending to the tail post. Each section is readily removed and can be replaced by a complete new section or minor repairs may be carried out with ease. One great advantage of this form of construction is that anything of the nature of sharp bends in the *longerons* is avoided, the portion within each section is practically straight, and spruce can be used throughout without fear of weakness at bends.

Aft the pilot's seat all the *fuselage* fittings are of a single type, which is standard throughout the range of Martin-

syde machines. This fitting embraces the *longeron,* which is not pierced by any bolt.

The front section and the cabin section of the *fuselage* are three-ply covered, and not wire braced, the three-ply glued and screwed to the framing and reinforced at each joint by external duralumin fish-plates. The engine bearer brackets are substantially built-up duralumin affairs which, like all the other fittings, are built to jigs and can therefore be replaced from stock. The top rail of the *fuselage* throughout is nearly horizontal and is approximately at the level of the airscrew shaft, the whole of the structure above it being of the nature of a fairing.

The wings are built on laminated spruce spars, the laminae glued together and bound with doped fabric. All the interplane strut fittings are of the type which pass right round the spars, and they are located by a single bolt on the neutral plane thereof. On the face of the spar to which the struts approach the projecting tongues of the strap surrounding the spar have between them a duralumin packing block butting upon the spar and formed into a tongue over which the forked terminal of the struts fits. The main bracing wires are taken from lugs on the main fittings in such a manner that the intersection of the centre line of the strut and of the bracing wire coincides with the neutral plane of the spar. The "incidence bracing" is carried by an extension of one of the tongues which carry the strut packing block.

The general dimensions and performance of the type A, Mark 11, are given hereafter:

Specification of the Martinsyde Type A.

Machine Type: Martinsyde Type A, Mark 11.
Purpose: Passenger transport.
Capacity: 4 passengers.
Engine: 300 h.p. Hispano-Suiza.
Span: 43 ft. 4 in.
Length overall: 29 ft. 1¼ in.
Height (less airscrew): 10 ft. 6 in.
Chord: 6 ft. 6 in.
Total wing surface: 520 sq. ft.
Fuel and oil capacity: 88 gal.
Weight loaded: 4,000 lb.
Load per sq. ft.: 7.75 lb.
Load per h.p.: 14.5 lb.
Maximum speed: 115 m.p.h.
Cruising speed: 100 m.p.h.
Landing speed: 40 m.p.h.
Endurance at cruising speed: 5 hours.
Range: 500 miles.

HOW TO KEEP AN AQUARIUM

BY

L. ROBINSON

The scientific principle to be observed in keeping either a salt or fresh water aquarium is the same. This is to maintain a proper balance between the oxygen given off by plant life, ad the carbon exhalations of the tank's animal occupants, or, the union, in glass box or bowl, of plants and living animals, each producing the element required for the sustenance of the other.

A square-shaped tank is preferable to a round one, as specimens seen through glass that is curved have a distorted appearance. If separate sheets of glass are used in the construction of the tank, care must be taken to see that all joints are watertight. Square glass tanks ready for the reception of specimens can be purchased from any bird and animal dealer so cheaply that little is to be gained by purchasing the material necessary for constructing one, which unless skilfully made, is bound to prove unsatisfactory.

Sand and small stones should be spread on the bottom of the tank before it is filled to form a foundation for the roots of water-weeds, and to make water creatures feel more at home.

It is also essential to provide finless specimens—those that only spend a portion of their time submerged and the rest on land—with a means of leaving the water when inclined for a sojourn ashore.

An artificial island in the centre of the tank, made of stones cemented together to ensure stability, and projecting just a little above the surface of the water, fulfils all requirements in this respect; or one big stone of the right size and shape will answer the purpose equally well. Tortoises, frogs, newts, leeches, and other amphibians, will then be able to dry and meditate, whenever they feel that way inclined, as they are accustomed to do in their lotus-eating, creek and waterhole, every-day lives. The secret of keeping wild creatures contented in captivity is to make their prison a miniature reproduction of the actual surroundings they have been accustomed to.

Gold fish, silver fish, gudgeons, tadpoles (gold tadpoles for preference), pond and river creatures, in infinite variety, will take more or less kindly to captivity. The submarine-like water-beetles, for instance, are lively customers, and prehistoric-looking small tortoises, are both interesting and amusing. Leeches are said to give warning of storms and other impending changes in the weather by their liveliness, or torpidity, and by their habit of emerging from the water occasionally to clamber round the glass walls and perforated zinc lid of the tank.

Small crayfish—usually to be found underneath stones and projecting rock ledges in pools of bushland streams—like freshwater shrimps, are timid at first, feeling the loss of their freedom most keenly, and seem stupified with wonderment at the strangeness of their surroundings, which is shared by all new arrivals in an aquarium. The human eyes, big with curiosity, every now and then peering in upon them, add considerably to their disquietude. In the need for self-preservation—endangered by obstructing the wanderings of more self-possessed specimens—the bewildered ones soon begin to realise that their immediate surroundings are actual and not merely part of some fantastic and awe-inspiring dream.

If the aquarium is to be a success, all specimens should be carefully chosen.

Selecting specimens haphazardly is a common cause of failure. In a small enclosure, large creatures take up too much room and get in each others way, besides keeping the water constantly disturbed, thus preventing their smaller brethren from darting hither and thither, slithering, groping, burrowing, and otherwise endeavouring to enjoy life. The large creatures pounce upon all food long before the smaller occupants of the tank get a chance to secure a share. A fair-sized perch, or a young eel, for instance, will make short work of smaller specimens. A tortoise if placed in the same tank as mosquito *larvæ* or other similar insects, will, in a very short space of time, wear a most gracious smile, while the insects will be nowhere to be seen!

All specimens should be small and amicably inclined towards each other. Those that are predatory, quarrelsome, likely at all to disturb the peace and harmony of the tank should, of course, be kept out of it. The specimens one buy are not generally as robust as those caught in creeks and waterholes. It is advisable to confine collecting to local creeks and waterholes, as specimens caught in far away creeks, or rivers, where climate and temperature of water differ widely from conditions in those respects in the aquarium keeper's immediate neighbourhood, are not nearly so likely to thrive.

Regarding food, the eggs of ants and spiders are relished by fresh-water fish. *Larvæ*, especially mosquito *larvæ*, is an excellent diet, and far easier to obtain than ants' or spiders' eggs. A bucket of water left standing in the open for a week or two will accumulate thousands of mosquito *larvæ*. On no account should bread crumbs, scraps of meat, etc., be given to the occupants of the tank, as this is not natural diet for them, and for that reason it is likely to kill the specimens.

In changing the water, which must be done frequently, the aquarium should on no account be emptied and then filled with a fresh supply. The proper method of effecting the change is to use a jug, and for every jugful of the stale water taken out replace immediately by one jugful of fresh water, until the body of water in the aquarium has been entirely renewed. By this gradual process shocks to the specimens are avoided. It is more satisfactory

to fit a small tap to the bottom of the tank and a fresh supply of water at the top, and thus ensure a constant supply of running water.

Although it is alleged that fish have been known to live in artificial sea-water, the writer has never experimented in that direction, and does not believe the fish would live very long. However, he intends to experiment with it in the near future, and would be most interested to know from anyone who has already tried it, whether salt-water fish, crabs, periwinkles, ænemones, etc., will really live in this home-made sea-water, a recipe for which is as follows:

Common salt (chloride of sodium), 3½ ounces.
Epsom salts (sulphate of magnesia), ¼ ounce.
Chloride of magnesium, 200 grains troy.
Chloride of potassium, 40 grains troy.

It is always interesting to do your own collecting. Armed with a hand-net—which can be made from a piece of mosquito net—and a pickle bottle, treacle tin, or a small billy, restful afternoons can be spent investigating the cool rock pools of some fern-fringed stream, or wading in river shallows, where all is deeply peaceful, the only sounds to be heard being the twittering of vivacious little birds, the full, deep-throated note of some larger bush songster, the splash made by a fish leaping out of the water, or by a kingfisher diving into it. The fern-fronds, the leaves of the trees, the reflections in the water, the birds' wings—all are tremulous and shimmering with *joie de vivre*. On such days aches and pains are forgotten, and dull care, unable to face such serenity and splendour, spreads sombre wings and, bat-like, flies off to some dark and gloomy cavern.

Trans-Pacific Flight.

It was reported in the Press that the United States Government intends attempting the trans-Pacific flight in July next. A giant seaplane, with a wing spread of 167 feet, and carrying four engines of 900 h.p. each, and having a speed of 110 miles an hour, will be used. The crew will number twelve.

The tentative route mapped out is San Diego, Honolulu, Guam and Manila, a distance of 6,200 miles.

INTERSTATE FLIGHTS

Sydney to Melbourne.

Flight-Commander Nigel B. Love successfully flew from Sydney to Melbourne, *viâ* Cootamundra, last month. The flight was commenced from Mascot Aerodrome on Friday afternoon, April 15, Cootamundra being reached the same afternoon, where the night was spent. The flight was resumed the next morning, Saturday, April 16, Melbourne being reached that afternoon. The machine used was an *Avro-Dyak,* the flying time occupying about eight hours.

* * *

Sydney to Brisbane.

Pilot F. L. Roberts, of the A.A. & E., Co., left the Mascot Aerodrome on April 13, bound for Brisbane, *viâ* Singleton and Grafton. He made a successful trip, arriving at his destination on Saturday, April 16. At both Singleton and Grafton, Pilot Roberts took a number of passengers for flights, all of whom expressed themselves very delighted. He is now touring Queensland, carrying out passenger flights, and on completion of the itinerary will return to Sydney.

* * *

New "Avro-Dyak" Owners.

The A.A. & E. Company report the sales of two *Avro-Dyak* aeroplanes, one to the Chapman Aerial Service, and another to A. G. McKechnie, Esq. Mr. Day, who will pilot the machine for Mr. McKechnie, is now receiving tuition at the Mascot aerodrome, and proving himself a very capable pilot.

Mr. Hogarth, of Clio Station, Richmond, Queensland, has now taken delivery of the aeroplane he purchased a few months ago. This particular machine has been fitted with a variable incidence tail.

Passenger Flights.

The A. A. & E. Company are still conducting passenger flights at their aerodrome at Mascot, and the increasing popularity of flying is evidenced by the fact that there is always a good roll-up of passengers and sight-seers every week-end, as well as numerous flights during the week.

* * *

Aerial Survey.

The Aerial Company's *Curtiss Seagull* seaplane, in charge of Captain Andrew Lang, and which is being accompanied by an auxiliary yacht, the *Acielle,* is making an aerial survey of the East Coast of Australia, and has made splendid progress since leaving Sydney. A thorough exploration of the coast and suitable landing places has been made between Sydney and Twofold Bay, and the seaplane is now west of Gabo, on the Victorian coast. After the survey of the Victorian side has been completed they will proceed across Bass Strait to Tasmania.

Many interesting and valuable photographs of harbours have been secured, which will be made available to the naval and military authorities. The Company's objective is to select suitable bases for future operations in connection with coastal seaplane services which the Aerial Company Limited contemplate establishing on commercial lines.

* * *

CIVIL AVIATION.

Aerial Bread Delivery.

Residents and holiday-makers at Cowes, Phillip Island, were awakened on Good Friday morning by the droning of an aeroplane, and a favoured few received hot cross buns from the clouds.

Mr. H. McColl, a storekeeper and baker, of Cowes, realising his inability to supply the needs of the large parties of campers on the island, arranged with Messrs. Borer & Co., bread manufacturers, of Port Melbourne, to supply him with 100 large loaves and a bag of buns by aerial delivery.

Mr. R. Graham Carey, the well-known aviator, of Melbourne Air Service, accompanied by Mr. H. Stranaghan, left the Port Melbourne aerodrome on Thursday afternoon, with their novel cargo, travelling by way of Westernport. The airmen had a rough, bumpy flight, especially in the vicinity of Mount Eliza. Darkness setting in and being unacquainted with the landing place at Cowes they stayed at the Point Crib Naval Base for the night. Resuming their flight next morning, the aviators flew across to Cowes in 10 minutes, the actual time for the entire trip from Port Melbourne being 55 minutes.

A landing was effected about seven o'clock on the property of Mrs. H. Vaughan, and thus the first aerial bread delivery in Australia was successfully accomplished.

Mrs. Vaughan became the proud possessor of the first loaf of bread delivered by the airman.

Mr. Carey remained at Cowes for the week-end making passenger flights and giving exhibition "stunts."

Recently crayfish were delivered in Melbourne by aeroplane within 37 minutes of leaving San Remo.

* * *

Proposed Memorial for the Late Lieutenant MacIntosh.

The Returned Sailors and Soldiers' Imperial League of Australia (West Australian Division) have proposed to erect a memorial to the late Lieutenant J. C. MacIntosh. The active co-operation of all States' branches in the movement has been assured, and a fund will be established in each State at an early date.

* * *

Aeroplane Aid in Sickness.

The important part that aeroplanes are going to play in the outback part of the State was clearly demonstrated last week in the Longreach district. At Iiandia, a sheep station 32 miles from Longreach, the infant daughter of the Manager, Mr. Joliff, became seriously ill. Owing to heavy rain it was impossible to get out medicine or send the little sufferer into town. After communication was established with the Aerial Services Ltd., Lieutenant McGuiness left for Iiandia in one of the Company's 'planes. The patient and the mother were safely landed at a Longreach private hospital in an hour, none the worse for their fast trip.

* * *

AIR FORCE.

Appointment of Officers.

The following appointments of former officers of the A.F.C. to the newly-formed Air Force, are as follows:

Wing-Commander: R. Williams (Director of Intelligence and Organisation).

Wing-Commander: F. J. Goble (Director of Personnel and Training).

Squadron-Leader: W. H. Anderson.

Flight-Lieutenants (Hon. Squadron-leaders): R. S. Brown, R. M. Jones, E. Harrison, H. J. Berryman.

Flight-Lieutenants: A. F. Lawrence, L. J. Wackett, A. T. Cole, A. F. de la Rue, H. N. Rigley.

Flying-Officers: F. H. McNamara, V.C., F. W. Lukis, F. J. Kay, Fryer-Smith.

Flying Officer (Observer): W. S. J. Walne.

Quartermaster's List.

Squadron Leader: P. A. M'Bain, Director of Equipment. *Flying Officers*: H. Johnson, C. J. Harmar, and J. H. Rogers.

These appointments take effect as from March 31.

* * *

Five Thousand Applications.

That the Air Force will be a popular arm of the Defence Service is indicated by the fact that about 5,000 applications have been received altogether for 150 appointments.

* * *

PERSONNEL ANNOUNCED.

151 Aeroplanes on Strength.

The nine flying boats and twelve ships' seaplanes required to complete the units provided for will be ordered as early as possible.

The proportion of ground to flying personnel in the force will be: Officers, ground one to flying three; other ranks, ground nine to flying one.

Senator Pearce stated in the Senate that the proposed establishment provided for aeroplane squadrons being equipped with 12 machines, and the seaplane and flying boats squadrons with six machines each.

The reserve considered necessary was 50 per cent. of the total establishment of the unit.

The following machines were now in the Commonwealth's possession, and had been allotted to service units on the establishment:—D. H. 9's, 16; D.H. 9 A's, 8; S.E. A's, 24. The following would be in reserve to these units:—D.H. 9's, 6; D.H. 9 A's, 21; S.E. 5 A's, 8. There were in the department's possession and allotted to No. 1 Flying Training School:—D.H. 9's, 6; S.E. 5 A's, 3; Avros, 12; Sopwith Pups, 3; while 36 Avros and eight Sopwith Pups would be in reserve. This made the total of machines in the Commonwealth's possession 151. The reserves in D.H. 9's and S.E. 5 A's were below 50 per cent., while those of D.H. 9 A's were above 50. This was owing to the fact that the best use must be made of the machines given by the Imperial Government. It was not proposed to purchase more D.H. 9's and S.E. 5 A's. These machines were obsolete in the Royal Air Force, and should be replaced with new types when reserves so diminish as to warrant re-equipment.

In the meantime, as reserves got low in any squadron, a flight might be replaced with D.H. 9 A's. The general principle being worked on, however, was 50 per cent. reserve of the establishment in service units, and at least 200 per cent. in reserve in the preliminary training machines. At the moment there was a reserve of 300 per cent. of these machines.

Experience might show it to be necessary to maintain such reserves. There were 500 officers and 2,500 of other ranks in the war, but only 160 officers and 1,500 of other ranks under the new scheme.

The Government has under consideration a proposal for the construction of aeroplanes in this country with Australian timbers.

* * *

New Machine Tested.

In the presence of Colonel H. C. Brinsmead, Controller of Civil Aviation, and a number of interested spectators, the new Sporting Farman aeroplane, landed by the Shaw-Ross Aviation Company, went through its trials at the Port Melbourne aerodrome recently. The appearance and performances of the little machine impressed the onlookers.

The leading features of the Farman are: Span 23 ft. 4 in.; length 20 ft. 11 in.; height 8 ft. 2½ in.; range 230 miles; weight 440 lbs.; load, including passenger and pilot, 440 lbs. The tests showed the following results: Consumption of cruising speed (29 miles to the gallon), 2.5 gallons an hour; oil, 3.4 pints an hour; maximum speed at 1,000 feet, 87 miles an hour; cruising speed, 72 m.p.h.; landing speed, 25 m.p.h.; climbing 5,000 feet in 8 min. 35 sec. The engine is a 60 h.p. *Le Rhone* of simplified design.

* * *

Preparing Landing Grounds.

The Meroo Shire Council (N.S.W.) had before it at a recent meeting a communication from the Civil Aviation branch of the Defence Department, intimating that the proposed aerial route from Sydney to Charleville, Queensland, passed over the Shire, and asking the council to assist the Department in the selection and preparation of landing grounds along the route. Until a proper system of landing grounds was prepared they could not look for any great development of civil aviation, as aviation companies would not fly valuable machines across country where no facilities for landing existed. The assistance of the council was desired in the preparation of an emergency landing ground half-way between Cudgegong and Mudgee. It was asked that the shire engineer should report as to whether there was available a landing ground in the locality indicated. On receipt of the council's reply an official will be sent to inspect and report upon the suggested landing ground. A general description of the country between Mudgee and Cudgegong was asked for.

The council unanimously agreed to cooperate with the department, and to do all possible to further the interests of civil aviation.

* * *

FLYING HOME TO LUNCH.

Fifteen Miles in Ten Minutes.

Flying home to lunch is a new development in commercial aviation, which took place in Melbourne last month. Enthusiasts see in the performance wonderful possibilities for a new type of suburbanite, and relief for the jaded city business man who would like to live at Macedon, for instance, if he could leave home each morning at the usual hour for the city. Suburban houses at Flinders, War-

burton and other desirable resorts may be a development of the near future.

On a recent Sunday morning Major H. T Shaw and Mr. H. G. Ross, of the Shaw-Ross Aviation Company, found it necessary to visit their aerodrome at Port Melbourne. Having completed their work, they decided to fly to Major Shaw's place at Rickett's Point for lunch, and in ten minutes the partners were landing in a four-acre paddock at the rear of the house at Rickett's Point. The distance flown was about 15 miles.

* * *

Turkey-Shooting from 'Plane.

An aeroplane owned by the Queensland and Northern Territory Aerial Services Ltd., whose headquarters are at Longreach, Q., recently made a flight for the purpose of shooting wild duck. The pilot was Lieutenant Hudson S. Fysh, and the sportsman the Manager of the Wellshot station, and during the trip two wild turkeys were shot. This form of sport can be carried out with perfect safety, and will, no doubt, be followed by many aviation enthusiasts in the country.

BY AIR TO ANYWHERE.

Landings at Farm Houses.

Scores of landings at farms, station homesteads, and small and large towns, without the assistance of smoke fires or other signals, have been made in the past nine months by Mr. Howard Jolley, of the Life Insurance Company of Australia. Mr. Jolley, his pilot, and a medical officer have travelled over a great deal of Victoria, South Australia, and the Riverina by aeroplane, and have demonstrated to others the advantages of the aeroplane for commercial purposes.

Mr. Jolley has collected a great deal of useful information regarding landing and other facilities at different places throughout the country, and he regards the extensive use of aeroplanes by commercial travellers as only a matter of time. In his opinion more commercial men should take up flying. While getting over the country a great deal more rapidly than they could by other means of transit they would also be educating the public to the value of aviation for commercial and defence purposes.

Illustrating how the aeroplane is still

regarded in some parts of the country, Mr. Jolley said that on landing at more than one farmhouse, the aeroplane party were greeted by anxious enquiries as to their injuries, and as often as not, the inmates rushed out to the 'plane with first aid appliances!

* * *

Flying at 75 Years of Age.

Last month Lieutenant R. J. Parer, while flying at Ballarat, had as a passenger Mrs. J. H. Booth, a local resident 75 years of age.

After the flight was completed Mrs. Booth expressed herself as being very delighted with this new mode of travelling.

* * *

AVIATION IN PARLIAMENT.

House of Representatives.

April 6, 1921.

Mr. W. M. Marks: What are the names, war service and qualifications, of the officials in England who are acting for the Commonwealth in the ordering and purchasing of airplanes and seaplanes?

Senator Pearce: Orders for aircraft material, etc., to be obtained outside the Commonwealth are placed through the High Commissioner's Office, London, but the services of the Contracts Branch of the British Air Ministry are utilised in connection with the placing of orders, and the inspection of equipment.

The only Commonwealth Air Representative in London is Major W. A. Coates, M.C., who is at present attached to the Air Ministry, as Australian Liaison this officer was employed as Officer-in-Charge, Australian Aircraft Repair Section, England. He had two and a half years' war service.

Mr. W. M. Marks: Have such officials had any experience in the designing and construction of airplanes and seaplanes?

Senator Pearce: The inspection and passing of aircraft material is done by Air Ministry officials who are experienced in construction and designing. This is not the responsibility of the Australian Liaison Officer.

Mr. W. M. Marks: What is the description of, and how many airplanes and flying boats have already been purchased or are on order outside the Commonwealth for the Government, and in what year were they designed?

Senator Pearce: There are at present no aeroplanes or flying boats on order outside the Commonwealth for the Commonwealth Government, nor have any been purchased since the cessation of hostilities.

It is, however, the intention to arrange without delay for the purchase of 12 *Fairey 3D.* seaplanes, the first of which are now being manufactured for the Royal Air Force, and 9 *F.5* flying boats, designed in 1918. Both these types are now standard in the Royal Air Force for the particular work for which they were designed.

Mr. W. M. Marks: What action has been taken on the proposal of the Larkin-Sopwith Aircraft Supply Company Ltd., made in November last, to inaugurate an aerial mail service in Australia?

Mr. G. H. Wise (P.M.G.): The proposal of the Larkin-Sopwith Aviation Company is one of many suggestions that have been received with reference to aerial mail contracts. After receipt of the Larkin-Sopwith proposal a cable was sent to the Postmaster-General, United States of America, asking for full information as to the form of contracts his Government was granting to civilian companies, in order that the Commonwealth might be guided by experience gained in America over the period of 18 months that mail services had been operating there. This information has only been received by the last mail, and there has not yet been time to consult with the Air Council in reference to the valuable information now to hand. It is hoped to be able to make a definite statement of policy in regard to mail contracts very shortly.

Mr. W. M. Marks: What progress has been made in the mail carrying trials proposed last year to be carried out with Government aeroplanes?

Mr. G. H. Wise (P.M.G.): Proposals covering experimental aerial mail services over alternative routes have been submitted to the Air Council for consideration and estimates of cost involved are now in course of preparation.

* * *

COMMERCIAL AVIATION.

Charleville a Centre.

The Department of Civil Aviation has selected Charleville as the centre for the commercial aviation route which will start

from Charleville and connect with Cloncurry, *viâ* Blackall, Longreach, Winton and from Sydney to Charleville.

Already two large landing areas have been cleared and approved of by the Australian Aero Club and have been established. Both are close to the railway station.

Twelve miles out is a large aerodrome used by Sir Ross Smith on his recent voyage to Australia. From Charleville to Cloncurry the land is mostly open plain, making an emergency landing safe.

* * *

Romance in the Air.

Last month a very interesting episode in the shape of an aerial betrothal took place over Wellington, N.S.W.

Miss D. Riley and Mr. J. Davis became engaged while participating in a flight in "The Diggers'" aeroplane.

* * *

The Vacuum Oil Co., Pty., Ltd., Sydney, received the following telegram from Lieutenant Bert Hinkler after he had made his record non-stop flight from Sydney to Bundaberg in a *Baby Avro* fitted with a 35 h.p. Green engine:

> "Seven hundred miles of perfect lubrication effected by one gallon of Gargoyle mobiloil "BB."

The Vacuum Oil Co.'s engineers are watching, working and growing with the aircraft industry; they are continually solving new and difficult lubricating problems as they have solved other problems in the past. The Gargoyle is the emblem of "correct lubrication."

OVERSEAS AVIATION NEWS

Aircraft for the Dutch Indies.

The Dutch Colonial Department has ordered a number of *D.VII.* machines from the Fokker factory for use in the Dutch Indies. These machines are fitted with British engines and have been specially constructed for use in the damp, warm climate of the Dutch Indies.

Parachuting.

Parachuting is becoming quite the vogue in France. Angoulême is the centre for these little adventures, and the other day when M. Blanquier, a demonstrator, failed to be on time, his 65-year-old father, promptly and sportily offering himself as a substitute for the drop, was taken up by M. Desmoulins in his Sopwith and made a perfect landing from a 300-metre jump. He deserved the ovation which awaited him from the assembled "audience."

International Balloon Race.

September has been fixed for the 1921 International Gordon-Bennett Balloon Race, and Brussels is the centre for starting. The British competitors will be selected by the Royal Aero Club, and anyone wishing to compete should communicate at once with the Secretary of the Club, 3 Clifford Street, London.

President Millerand's Aeroplane.

President Millerand is reported to have ordered an aeroplane limousine for the purpose of making official visits to foreign capitals and cities in the provinces.

Air Traffic Agreement with Sweden.

A provisional agreement in regard to air traffic between Sweden and Great Britain was signed at Stockholm last week by the Swedish Foreign Minister and the British Minister.

International Seaplane Race.

The Royal Aero Club has decided to contribute £1,000 towards the expenses of the British competitors in the International Seaplane Competition for the Jacques Schneider Trophy to be held at Venice in September.

An Aerodrome for Algiers.

A promising undertaking is in course of materialising in connection with the creation of a commercial aircraft base at Maison Blanche, about 11 miles from Algiers. A company has acquired there 130 hectares of land for the purpose, and it is stated that a sum of 43 million francs has been provided for laying out the landing-ground, hangars, buildings, etc. By way of a start, two of the Zeppelins surrendered by Germany are said to have been ceded to this company, and are to proceed to the aerodrome under their own power.

Well-Known Pilots Retire.

Their many friends will be sorry to hear that Mr. L. R. Tait-Cox and his colleague, Mr. J. H. James, both Nieuport pilots, have retired from aviation. Both are very fine pilots, and their loss to aviation is greatly to be regretted. We wish them both the best of luck in other spheres.

RECORD FLIGHT

PERFORMANCE OF "BABY AVRO"

Lieutenant Hinkler and his "Baby" Avro.

Lieut. Bert. Hinkler placed another flying record to his own and the credit of the *Baby Avro* aeroplane, in flying direct from Sydney to Bundaberg (Queensland), on Monday, April 11.

Just at dawn Lieutenant Hinkler placed the aeroplane in position, started the engine, and taxied away at 6 a.m. from the Australian Aircraft & Engineering Co.'s aerodrome at Mascot. At an average altitude of 5,000 feet he flew in a direct line to Bundaberg, his native town, arriving at 2.40 the same afternoon, landed within 200 yards of his home, and then taxied along the street to the front door, where he was met by his parents.

700 Miles in 8 Hours 40 Minutes.

The distance covered was 700 miles; the flying time occupying 8 hours 40 minutes, which at the present time is the world's record non-stop flight for that type of machine, and an Australian record for any type of machine.

The Machine.

How British aircraft has progressed is evidenced by the *Baby Avro* machine, which, in all details, is of complete British design and production. Mr. Roy Chadwick, chief designer to Messrs. A. V. Roe & Co., designed the "Baby" as a private touring plane.

The Engine.

The machine is fitted with a 35-h.p. *Green* water-cooled engine, which was designed and built in Great Britain about 12 years ago, and still holds its position in the forefront for reliability and economy among modern Aero engines. It is an orthodox four-cylinder vertical motor car type engine, having valves in head operated by an overhead cam shaft. The ignition is effected by a *Watford* magneto, also of British production. This magneto has not been touched since it left the works 12 months ago, and ensures very easy starting. A *Zenith* carburettor of the Automobile type, No. 36 A.B.C. is fitted, and its efficiency can be gauged when the consumption works out so low as 33 miles to the gallon.

Activities at Bundaberg.

Lieutenant Hinkler reported having a glorious flight, and during his short stay at Bundaberg was entertained at a civic reception and several other functions.

Whilst at Bundaberg one of the local enterprising newspaper proprietors arranged with him to carry out a delivery of the paper to various centres round Bundaberg. Lieutenant Hinkler demonstrated the immense advantage of aircraft in this district, which was fully appreciated by the settlers. Owing to the inconvenient train service, in the ordinary course of events newspapers are delivered to the parts visited by the aeroplane on the afternoon of the day following publication, whereas the *Baby Avro* delivered them within an hour

Lieutenant Hinkler thinks the atmosphere in that district is ideal for aviation, but unfortunately the country, with its ruggedness, the unoccupied territory, and the vast expanse of forest, would make a forced landing a more or less hazardous matter.

He thinks it should be possible for an arrangement to be made with farmers to extend a little clearing, which would facilitate landings for aircraft, and thus induce airmen to visit them. The farmer would then enjoy the benefits derived by aircraft communication.

The Return Journey.

After spending about 10 days at Bundaberg, Lieutenant Hinkler flew to Brisbane, and spent a little time there.

On Wednesday, April 17, he left the Albion Aerodrome at 6.15 a.m., but soon after leaving ran into heavy rain, which was experienced throughout the flight.

Just as he was nearing Newcastle very heavy rain was experienced, limiting the visibility to a few yards only, and, rather than run the risk of hitting any obstacles at Newcastle, he considered it advisable to land, which he did on an open beach below.

After landing he had to walk about ten miles over sandhills and scrub in the pouring rain until he struck civilisation, where he succeeded in communicating with Sydney, where he was to be entertained at dinner by the Australian Aero Club that evening. Unfortunately he was unable to be present, although the dinner was held, the information regarding his forced landing being received too late to defer it.

The next morning four horses dragged the machine 15 miles over the sandhills to Stockton, where the machine was dismantled and taken to Sydney by steamer.

Returning to England.

Lieutenant Hinkler is returning to England, via America, leaving Sydney by the *Makura* on May 5, after an extremely brief, but thoroughly enjoyable, visit.

As the *Baby Avro* aeroplane has been purchased by the Australian Aircraft & Engineering Co. of Sydney, we shall probably hear of further Australian records being accomplished in the near future.

LOCOMOTIVES OF TO-DAY AND TO-MORROW

THE PASSING OF THE STEAM ENGINE

The Assembly Room—Testing, Fitting, and Painting—Building an Engine in Twenty-four Hours —The Steam Engine Doomed—The Advantages of Electricity.

BY

S. T. JAMES (in "The World's Work")

In order to meet the requirements of the modern-day railway working, which insists upon long and heavy trains being drawn at a high speed, something approaching mechanical perfection is demanded of British locomotives. Very striking indeed is the contrast between those which were once upon a time regarded as marvels of engineering skill, and the magnificent monsters turned out from the building sheds to-day.

No one can spend a day more profitably or more agreeably than in making a tour round these works, witnessing the building of a steam engine through all the many intermediate processes. Everything, down to the smallest and least important part, is made on the premises from raw materials.

The visitor should first see the converting house, where the steel-making plant is at work. Here it is that common pig-iron is manufactured into the high quality steel of which modern locomotives are built. The plant consists of four vessels, known technically as "retorts," each holding about five tons, with cupolas behind them, in which the pig-iron is melted down. From the cupolas the molten mass is transferred to the retorts by means of a huge ladle moving on an overhead line of rails. The retorts are lined with ganister, and in the bottom of each a number of small holes is pierced. Through these holes, air is injected into the molten iron, and the oxygen in the air causes the elimination of all carbon. In a very short time the metal is thoroughly decarbonised, and then another kind of iron, highly charged with manganese, and which has been simultaneously melted down, is poured into the retort. The two kinds, when thoroughly combined, form a high quality steel.

The next step is to pour the metal back into the overhead ladle, as in the bottom of this ladle there is a small orifice through which, when opened, the liquid can be poured into the scores of moulds waiting to receive it. The moulds are, of course, set to the shapes of the various parts of the engine, and thus, when the liquid steel sets hard, we find the innumerable castings, large and small, which are used in the making of a modern locomotive.

The Assembly Room.

Next door to the converting-house is the fitting shop, which presents to the eyes of the stranger a most bewildering appearance, with its endless conglomeration of pulleys, shafting, revolving wheels and mysterious machinery of many types. All kinds of operations in the making of the various parts of an engine are to be seen here. In one corner, cylinders are being made, pistons, valves, connecting rods, injectors, and axle-boxes. Innumerable lathes, and other machines with all sorts of names, are turning, planing, slotting, drilling, shaping, and boring. In another corner, young boy apprentices are making pins, bolts, and nuts.

Passing on, we reach the wheel-shop, where engine wheels and axles are made. This is the home of large and extraordinarily powerful machinery. There is a roughing lathe in which at least seven cutting tools are simultaneously at work, shaping the crank axle. Close to it is a nibbling machine, designed for cutting out the cranks, and this particular instrument consists of any number from 150 to 200 cutting tools arranged round what appears to the uninitiated to be simply the circumference of a large disc.

However, it is usually the assembly room that attracts the chief attention of visitors. Here are stacks of various sized wrought iron plates from the plate-mill, cranks, axles, tyres, springs and spring steel, connecting rods, etc., from the

forge; cylinders, wheels, horn-blocks, and axle boxes from the foundry, together with piles of the various nuts, bolts and pins, besides scores of other parts. All these are conveyed when required, and in the quantities required, to the erecting shop, which is very close at hand. It is in the erecting shop that the locomotive is built up, and there is no more complicated or more technical operation in all the world's work.

The various parts are fitted together one after the other, with methodical precision, until the frame or skeleton is complete. Then comes a pause, whilst the boiler is brought and added. The next step is the testing of the boiler, and in readiness for this test the engine is grasped by two or more overhead travelling cranes, and lifted bodily out of the shop into the open. The actual testing is not a difficult job, but it is of necessity a very precise and particular one, always carried out with what would seem almost irksome thoroughness.

Testing, Fitting, and Painting.

It is a tribute to the efficiency of the boiler-makers that so very few fail to pass the test. But when the boilers are built, remarkable precautions are taken to select for use only absolutely reliable plates, and after the selection a piece is cut from each and subjected to the most severe tests known. Until this test is successfully passed, the selected plates are not used, and even then, a register is compiled, detailing the results of the test, and recording the exact position of every plate used in making the boiler. This is in order that failure may be checked, and its causes analysed. So that, with all this testing, there is really very little probability of a locomotive boiler proving a failure.

The next step, after the testing, is to bring the engine back to the shops, where it will be under cover, and the remaining portions of the internal machinery such as driving wheels, gauges, etc., are added, Then comes the fitting of externals, *i.e.*, the chimney, domes, whistle, etc. The fitting of the compounding apparatus, and of the superheating apparatus, is done before further progress can be made. These are operations most interesting to the observer, as they represent the latest additions and improvements to the locomotive.

Compounding is the introduction of one or two additional low-pressure cylinders, so that when the steam has passed through those of high pressure, it exhausts into the new ones, where it expands further. This not only reduces fuel consumption, but results in additional work being obtained from the same pressure of steam.

Superheating is the introduction of two steam chests instead of one, as formerly. The first is for saturated steam as it comes from the boiler dome, and the other is for this same saturated steam after it has passed through the torpedo-shaped tubes in the fire-box, where it is dried and heated to such an extent that it becomes gaseous. The apparatus results in a saving of sixteen per cent. in coal, and a reduction of twenty per cent. in the maintenance expenses, whilst locomotives are given enhanced power without additional size.

After all these fittings are properly accomplished, the locomotive leaves the erection shop, possibly for ever, and goes to the paint shop.

Then there remains but the attaching of the tender, which has been built simultaneously in another part of the works, and the latest addition is ready for its preliminary run.

Building an Engine in Twenty-four Hours.

The whole process of building occupies on the average about four weeks, but under stress some of the leading companies have completed the work in twenty-four hours —a triumph of efficiency and organisation. Of course, every part was ready-made; it was the building or assembling which, together with the testing, occupied the time. Although it was not always so, standardisation of the parts is to-day a fine art.

Each railway company builds its engines, not in single units, but in classes. For instance, there is the "Atlantic" type of locomotive, the "Fay" type, and scores of others. Each engine of a particular class is absolutely alike in every detail, and the parts are exactly the same, so that they may be interchanged without difficulty. This ensures more speedy repairs and renewals, in addition to greatly simplifying both building and fitting.

The Steam Engine Doomed.

Yet to-day the steam-engine is doomed. Magnificent monster though it has grown to be, it has no place on the railways of the future. With regret we shall see it go,

for its services to commerce and to civilisation have been indeed great. By its aid the dark continent of Africa has been opened out, the vast resources of China are being steadily developed, and even the frost-bound plains of Siberia are being conquered.

But commerce has grown, and must continue to grow; so it was inevitable that the question should arise as to whether the locomotive of to-day is sufficiently economical and efficient. Whatever the verdict of other countries may be, our own is unfavourable. For the steam-engine has many defects, and prominent amongst them is its inability to grow larger and more powerful. Already its dimensions have reached the limits of the gauge, and it would seem that nothing more is possible in the direction of increasing the power without increasing the dimensions, or without prohibitively increasing the cost of haulage.

It was chiefly to allow of the economical haulage of heavier loads that furnace draughts, brick arches, patent smoke burners, and patent furnaces were introduced on the locomotive. Compounding and superheating had the same object.

But although these were steps in the right direction, they have but postponed the inevitable hour, and since no further similar improvements seem forthcoming, the steam-engine is pronounced inadequate to cope efficiently and economically with present-day loads.

Even such efficiency as the steam-engine has can never be utilised to the fullest extent. For a locomotive must always be sufficiently powerful to haul its load over the most difficult part of the journey, so that if there is a stiff gradient in a hundred-mile journey, the locomotive used must be sufficiently powerful to take the load up this gradient, which means that for the rest of the journey there is an excess, and consequently a waste of haulage power.

The Advantages of Electricity.

The advantages to be derived from the introduction of electricity are substantial. The power of a locomotive will be varied in accordance with necessity, avoiding excess and waste of power. Higher speed and more frequent services will be attainable.

The ideal of railway operation is uniformity of speed. With every train running at the same rate of speed, ten times as many of them could be on the lines, without any danger of one overtaking another, or a heavy goods train delaying five or six others, as happens at present if too many trains are running in a district. Electric traction will bring the attainment of this ideal much nearer, for the increased power and speed it gives will naturally be applied more to the slower and heavier trains than to the express passengers.

Another important consideration is the cost. The power generated follows the law of increasing return: *i.e.*, successive units decrease the cost of production. Coupling this with the fact that electricity can be applied to aid every department of a railway, we begin to see how much cheaper and more economical than steam it will be. For all the railway workshops can be worked by electricity; cranes, capstans, and traversers at goods depots, lighting of yards, offices, stations, electric point detection, track circuiting; telegraphs, telephones, cooking in the dining-cars, etc., all can be done by its power. They will be done much more economically than at present, too.

But had the railways been electrified under private ownership, commerce would have been made very sick. For the peculiar laws which govern the rating of railways, and which treat the companies as hypothetical tenants, consider the steam locomotives as part of the tenants' property, which results in the rates the companies are allowed to charge for carriage being less than they would otherwise be. In the case of an electric railway, the fixed engines, boilers, dynamos, and batteries which supply the power would be rated separately, and the expenditure in connection with them would be taken into consideration by the Rates Commissioners, which would mean a substantial increase.

There is one point in connection with electrification that must be carefully watched. The necessity for a uniform system would appear sufficiently obvious to need no emphasis, yet we find that the Metropolian and L. and Y. Companies, in electrifying portions of their line, have adopted the live rail system, whilst the L. B. and S. C. have shown a tendency for the overhead wires, and the North-Eastern have an electric locomotive carrying storage batteries capable of drawing

1,800 tons of mineral traffic. All three systems are excellent, in view of the local conditions governing each case, but bearing in mind the ever-increasing through services, the differences suggest that unless care is taken the battle of the gauges will be refought as the battle of the systems.

New Voltmeter.

A voltmeter improvement is evident in the recent offering of a British electrical instrument manufacturer. This improvement takes the form of a six-range switch which gives values for the calibrations of the single scale of from .001 to 1,040 volts. The switch handle is made in the form of a flat rod, which may be pulled more or less out of its slot in the side of the instrument case. A series of graduations on the side of this slide indicates how the scale reading should be multiplied in order to obtain the correct value for any setting.

Poulet's Adventurous Feat.

It is reported from London that M. Poulet, the French aviator, arrived at the Celebes Islands, completing an adventurous flight from Java, of more than 1,000 miles.

AEROPLANES FOR JAPAN.

Description of "Goliath."

According to cable messages received in Melbourne recently, Japan has ordered in France six machines of the *Goliath* type.

This refers, apparently, to the Farman *Goliath*, the details of which are as follows: Span, 92 ft.; length, 46 ft.; height, 16 ft. 5 in.; area of wings, 200 square yards (nearly); load (useful), 4,400 lbs. (nearly two tons); speed, 100 miles an hour; climbing capacity, 4,500 ft. in less than eight minutes. The machines are fitted with two 260 Salmson water-cooled engines or two 300 h.p. Renault engines.

In June, 1920, the *Goliath* created a world's record by remaining in the air for 24 hours 19 min. 7 sec. This machine was originally designed as a long distance bomber, but is now built as a passenger machine, seating 28 passengers. It is used in the Paris-London daily service by one or two of the French companies.

AUSTRALIA AND THE AMATEUR RADIO MAN

BY

PHIL. RENSHAW (Hon. Secretary, New South Wales Division, Wireless Institute of Australia)

IN Australia we are, unfortunately, handicapped by the very size of our island continent. Of necessity there is not that easy access between the greater centres of population which alone should so much contribute to the success of such enterprises as wireless telegraphy and wireless telephony, but, on account of Australia's very size, necessitating as it does such enormous decentralisation of Government, and taking into consideration the comparative smallness of the whole community, it is very easy to comprehend that officialdom, accustomed to arbitrary methods, is not to be easily induced to consider the desires of a comparative handful of citizens.

The amateur radio enthusiast does, deep down in his heart, fully believe that the regularly constituted authorities sense a deep obligation to him. It must be realised that to suppress the experimenter in any scientific field is detrimental to society, and it cannot be conceived, with our present-day outlook, that it would be tolerated for a moment by any ambitious Government. The fact remains the Commonwealth Wireless Telegraph Act provided that licenses for transmitting and receiving *may* be granted by the controlling authority. This word *may* is, and has been, the stumbling block in the way of the radio experimenter in this great country, and as long as it leaves the matter to the discretion of the Minister whose duty it is to administrate the Act, it is avowedly unfair to the long-suffering individual who is thereby trammelled in his investigations of the hidden mysteries of Nature and Science.

To look at the matter in the light of how it affects the whole community, at best our population must be regarded as very scattered, and yet—with this very science sufficiently and most economically developed—we still see the perpetration of acts such as "overland telegraphs," requiring continual attention and repair under most difficult circumstances, enforcing quite unnecessary privations on those whose duty it is to attend to breakages, faults, etc., as well as those who suffer as a result of same. The expense of upkeep of these "overland telegraphs" in white ant country, for example, forces the adoption of ant-resisting poles, such as cast iron, and the initial expense of such construction is sufficiently obvious, even to the man in the street, to make us pause aghast at the sad lack of enterprise thus clearly demonstrated.

An extract from an Australian contemporary quotes: "Some experiments are now being carried out by the Postmaster-General's Department with regard to establishing wireless communications between widespread pastoral districts. . . . The area selected for the experiment is without telephonic communication. Owing to the prevalence of white ants, it would be necessary to provide iron poles, and the cost of installing a telephone service has been estimated at £50,000. An expenditure of £4,000 has been approved for the erection of wireless stations."

From the above one would be pardoned for inferring that the Commonwealth Government encouraged experimental wireless.

In turning our attention to the recent advances made in the parellel science of Aviation, to the student it is apparent that, since history has given us records, progress in communication and progress in transportation has ever gone hand in hand. Thus we note the evolution of aviation, accompanied by a corresponding advance in communication—wireless, and here a real problem no doubt confronts the authorities, *viz.*, that progress in wireless communication promises to be so rapid as to very soon render the mass of land lines valueless and obsolete. However, it must be remembered that progress in aviation is equally remarkable. We read of Hinkler's Australian record—Sydney to Bundaberg in 8 hours, and wonder what next!

The daily Press recently announced that the huge appropriation of £500,000 is to be devoted to the establishment of aviation in Australia for military and naval purposes. The effect of such a stimulus can readily be imagined, will be equally reflected and, no doubt, encouraged in civil circles wherein no expense will be spared in the perfection of the science.

Likewise, given the necessary stimulus, wireless would come into its own. All the talk of interference is merely so much eyewash for the uninitiated, and its repetition at this stage by experts is utterly incomprehensible. By proper supervision tuning can be so sharp and accurate that no two experimental stations need ever "jam" each other, no matter how many there are, or how close together they are situated, and as to "jamming" the high powered commercial stations—that is impossible.

Take America for example. There we note thousands of radio experimenters intermingled with a perfect network of both high and low-powered commercial stations. Further we find the authorities there so much alive to their responsibilities that they have established a special station at the Bureau of Standards at Anacosta, Maryland (previously reported in the last issue of *Sea, Land and Air*) to assist the experimenters. Apart from this there is a strict system of Government Inspection and control which any community would appreciate.

I am not putting this case for the "ether tapper," but am endeavouring to show that wireless can be handled and kept within desirable bounds, without in any way obstructing legitimate co-operative experiment, and it is impossible to conceive that the authorities can justly longer withhold the issue of licenses for both transmitting and receiving, both for wireless telephony and telegraphy on lines at least similar to those in the United States of America at the present time.

GROUND WIRELESS

LETTER TO THE EDITOR

Dear Sir,—

The article in the February issue of *Sea, Land and Air,* by Mr. J. G. Reed, opens up a subject that seems to have been sidestepped by practically all writers on wireless telegraphy, and ignored by most textbooks.

I can add my experience to that of Mr. Reed's with regard to earth currents radiating from the transmitter.

Whilst in Belgium and on different fronts in France, when wishing to listen in for Eiffel Tower I would disconnect the aerial and arrange a circuit similar to that shown by Mr. Reed in Figure 1.

The local low power stations, both British and German, would be entirely cut out, and Eiffel Tower would come in good and strong without any jambing at all.

While not able to advance any definite theory in explanation of this, it certainly seems feasible that earth currents radiate from the transmitter to great distances. The transmitting aerial becoming charged, and discharging into the earth at high-power stations, would undoubtedly alter the potential of the earth in the immediate neighbourhood of the earth plates. This change of potential would be very considerable, and would, of course, vary directly as the power oscillating in the aerial.

These impulses of potential difference travel out radially from the earth plates, but decrease rapidly in amplitude in a given proportion to the distance travelled, taken for granted of course that the nature of surface traversed is electrically uniform, which of course is never the case in practice; the closest case being over sea water.

Mr. Reed suggests that the space wave is the result, and not the cause of the earth currents from the transmitter.

It has commonly been thought that the feet of the space wave produce these earth currents.

Whichever is the correct theory, I am of the opinion that the shape of the wave (theoretically) would be the same, as if the wave were the result of the earth currents it would travel faster through the higher ionised atmosphere than through the low unionised portions, and lastly the feet of the wave would lag, *i.e.,* the earth currents would lag behind the rest of the wave, and the present theory of the bent wave would still hold good.

I believe that when we earth one side of a transmitting and receiving aerial we not only make use of the "image effect" but also we avail ourselves of the earth currents that radiate from the transmitter, so that whether the earth current is the result of the space wave or vice versa, we make use of both the energy from the wave and from the earth currents accompanying it.

The earth currents causing or belonging to a particular space wave would affect the detector at a later instant than the energy, or the period of maximum energy from the wave.

The possibility of taking advantage of the earth currents at the instant of maximum wave energy seems to be very desirable, as it would then be possible to deliver energy from two sources simultaneously to the detector.

I do not think we could brand the idea of earth currents as heresy as far as Hertz is concerned, as it was not discrediting his theory, but adding a little more on. I doubt if Hertz himself ever gave the feet of the waves named after him any serious thought.

WALTER T. FAULKNER,
Orange, N.S.W.

[NOTE.—We wish to point out that the opinions of Mr. Faulkner are not necessarily those of *Sea, Land and Air.*—ED.]

WRECK OF S.S. "HONG MO" ON CHINA COAST

WIRELESS SAVES MANY LIVES

The following particulars regarding the wreck of the steamer *Hong Mo* on the China coast were furnished by Mr. T. Bannister, Wireless Officer of the E. & A. Mail Steamer *St. Albans.*

The *St. Albans* left Moji (Japan) on March 4, bound for Hong Kong. The following night, the 5th, at 9.30 p.m., the *S.O.S.* distress signal was transmitted by the *Hong Mo* and picked up by the *St. Albans, Euryalus, Delaware* and H.M. Ships *Carlisle* and *Foxglove.* The *Hong Mo* sent the distress call out three times with intervals between and subsequently no further wireless signals were received from her.

H.M. Ship *Carlisle* being nearest to the *Hong Mo,* immediately went to her assistance and the *Euryalus* stood by in case of emergency. Owing to the high seas, darkness and thick rain nothing could be done that night.

The following morning, March 6, the *Carlisle* was able to approach the wrecked vessel much closer, and with very great difficulty rescued about 270 of the passengers and crew who had jumped into the sea. Unfortunately a great number of other people jumped into the sea, in the hope of being picked up, but were dashed upon the Lammock Rocks and then disappeared.

Next day, the 7th, the *Hong Mo* broke into three pieces, firstly the fore part of the vessel disappearing, next the after part, and finally the 'midships. After the vessel disappeared the *Carlisle* thoroughly searched the rocks, but found no signs of life. The estimated loss was 1,153 souls, including Captain Holmes, master of the vessel.

Throughout the whole time the *Hong Mo* and vessels rendering assistance were in wireless communication with the Admiral of the British Fleet, the messages being relayed by the *St. Albans* from the *Carlisle* and *Euryalus* to the radio station at Hong Kong and from Hong Kong to the *St. Albans,* that vessel relaying the messages to the gunboat and other ships.

The Admiral and Chinese Consul at Hong Kong sent wireless messages of thanks and appreciation to the steamers *St. Albans* and *Euryalus* for the able way in which they carried out their allotted tasks in assisting to save human life.

About eighteen hours after the *Hong Mo* disappeared an unknown Japanese steamer piled up on the Wankan Shoal, subsequently becoming a total wreck.

SOUND AND VOICE MAGNIFIERS

BY

RAYMOND EVANS

The question of magnifying weak signals of a wireless receiver has already appeared in these columns. However, as most of the articles have made use of the "valve" as a magnifying medium, the present one should prove of interest to experimenters as it utilises methods other than that of the valve in order to effect the necessary magnification.

The terms: sound, voice, note or tone-magnifier, merely apply to the instrument or combination used to magnify or amplify, not the high-frequency currents or oscillations which are above audibility, but the received audible note or tone as heard in the telephones; in simple terms a sound magnifier or loud speaker. In order that the "valve" may be made to function as a tone magnifier, it must be connected inductively to the "plate" circuit of the valve receiver, or in place of the phones in a crystal receiver per medium of an audio-frequency or iron-core transformer as shown in Figure 1. It can readily be seen that this circuit will not magnify the high-frequency currents on account of the high impedance of the iron-core transformer windings, through which these currents would require to pass, but the low-frequency or note currents will pass through readily to the valve, where magnification will take place as already explained in preceding articles.

The first type of note magnifier which will be dealt with in this article is that known as the microphonic relay. In its elementary form, which by the way is quite practicable, it consists of an electro-magnet introduced into the receiver in the position usually occupied by the telephone receivers.

The electro-magnet is arranged so that one or both of its poles are in close proximity to a diaphragm of thin sheet-iron to which is secured on its reverse side, a small button of hard carbon. From this it is obvious that any variation of the field of the electro-magnet due to received currents will have the effect of causing the diaphragm to vibrate. An adjustable screw with a contact-point of steel or hard carbon makes very light contact upon the carbon button on the diaphragm. An auxiliary circuit, including a four to ten volt battery and telephones, is connected in series across the terminals of the microphonic contacts as shown in Figure 2. These microphonic relays certainly do magnify the signals, but, unfortunately, weak signals are not magnified in nearly the same ratio as strong ones, while very weak signals will not magnify at all. The arrangement is so susceptible to ordinary mechanical vibrations that permanent sensitive adjustment is out of the question.

An improved type of microphonic relay developed by S. G. Brown has been used both singly and in cascade with good results. These relays have been so successfully used in the past by many of the Marconi high-power stations using balanced crystal and Fleming valve receivers, that three or four relays in cascade produced such magnification that signals emanating from distances of from 3,000 to 4,000 miles could frequently be heard at a considerable distance from the telephone receivers.

In construction, the "Brown" relay consists fundamentally of a soft iron core whereon is wound two windings, a fine and a heavy winding, the finer one being wound upon the ends of the magnet as shown and connected to the receiving circuit in place of the usual telephone receivers. This forms the input circuit of the relay. The heavier winding is connected at one end to a steel reed or vibrating tongue, on which is mounted a contact button of hard carbon. An adjustment screw is provided and fitted with a contact-point of an alloy of iridium and osmium and is poised in such a position by means of the micrometer adjustment, that very delicate contact can be made with the carbon button on the reed. The opposite end of the heavy winding is connected to the telephones, a battery of dry cells and thence to the contact-screw, as shown in Figure 4.

This is the output circuit, and, in the case where several relays are used in cas-

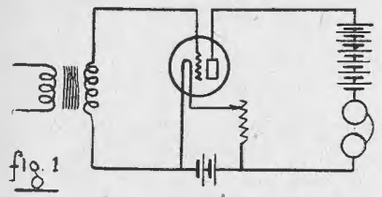


fig. 1

the "valve" as a note magnifier

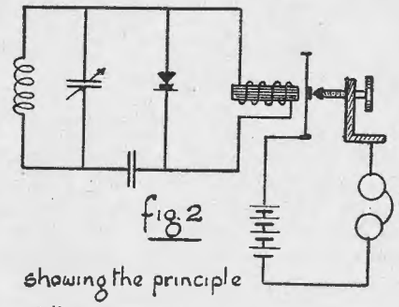


fig 2

showing the principle of the microphonic relay

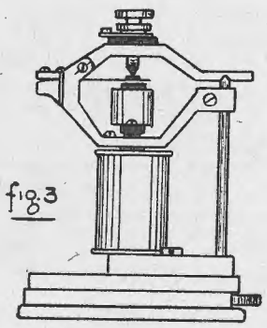


fig 3

"Brown" relay

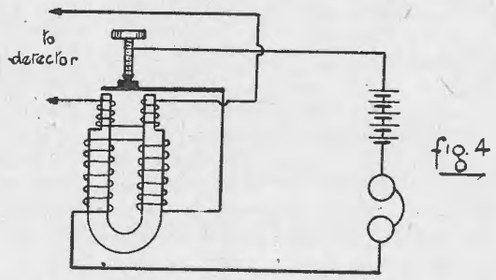


fig 4

method of connecting up "Brown" relay

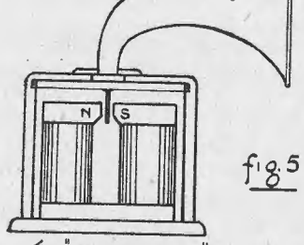


fig 5

The "Magnavox"

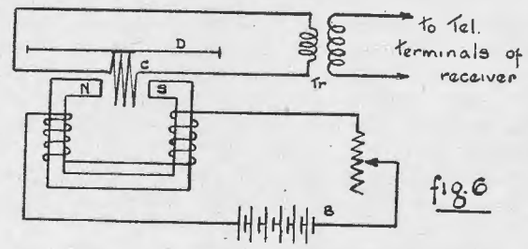


fig 6

"magnavox" connections

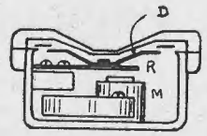


fig 7

Section of The "Brown" telephone receiver

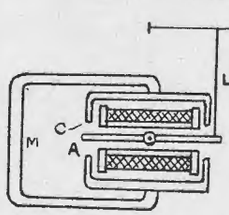


fig 8

Section of the "Baldwin" phone

R. Evans

cade, the telephones are omitted and in their place the input terminals of the second relay are substituted and so on. The aforementioned micrometer adjustment is obtained by a movement of the knurled nut shown let into the base in Figure 3. The "Brown" relay will also magnify voice currents without any appreciable harshness or distortion and considerable use has been made of it in this direction.

Another and perhaps more universally known instrument developed by the same engineer, is the "Brown" telephone receiver, a diagram of which is shown in Figure 7. This cannot be truthfully classed as a magnifier, but a telephone of considerably higher efficiency than the average, merely on account of its producing a greater volume of sound for a given value of current input. It consists essentially of an ebonite case in which is mounted a horse-shoe magnet (*M*) of hard steel, with pole-pieces of soft iron, upon which are the bobbins and windings. The resistance of the magnet windings varies, an average value being 750 ohms per receiver, but on account of the more universal use of telephone transformers, low resistances of about 75 ohms are now being used. A small steel reed (*R*) is placed with one end, as shown, immediately over the ends of the pole-pieces so as to obtain the maximum magnetic influence. This end of the reed is also secured to the centre of a diaphragm (*D*) of very thin aluminium, which, instead of being flat, is of a conical shape and unlike most receivers does not rest upon the receiver case but a short distance from it, a ring of tissue being cemented around the gap.

Another magnifier of considerable merit, the product of an American engineer, for use both as a magnifier of wireless signals and voice currents, is known commercially as the "Magnavox." This magnifier, which operates upon an electro-dynamic principle, gives out sound in exact proportion to the current put into it; of course, allowing for the efficiency of the electrical design of its windings. Figure 5 will give the reader an idea of the general arrangement of the parts, while Figure 6 illustrates the electrical connections necessary for the magnification of weak wireless signals. A magnetic circuit (*NS*) which is almost closed, is energised by means of current from a local battery (*B*) passing through its windings. A coil of fine wire is placed centrally in the gap as shown in the magnetic circuit, and is connected to the terminals of the secondary of a small step-down transformer. The coil is secured by means of wax, cement, or shellac, to a diaphragm of mica about 0.002 inch in thickness. A large horn or megaphone is usually placed over the diaphragm and takes the place of the usual uncomfortable ear-pieces.

The "Magnavox" works on the principle that the magnetic field across the gap being constant, whenever a received current from the transformer passes through the windings of the small coil it is either attracted or repelled, depending upon the direction of the pulsating current. The movements of this coil are therefore transferred to the mica diaphragm and in turn converted to sound waves in the horn.

During the development of this apparatus an experimental instrument was placed on the chimney of the laboratory and connected with microphones and a phonograph. On clear evenings songs and phonograph music, sung and played before the microphones within the building could be heard by the whole population of the town, approximately 6,000, and on one of these occasions it is claimed the voice and

music was heard eight miles away. The slender tones of a single violin could be distinctly heard a mile away, while a piano solo resembled the chimes of Westminster Abbey played by the Colossus of Rhodes, truly a wonderful achievement. It is claimed, also, in connection with its use as a radio-signal magnifier used in conjunction with a valve amplifier, signals which are just audible can be eventually heard over a mile away, while wireless telephone conversations can be heard by assemblages of thousands of people and wireless music made loud enough to provide dance music for a hall full of dancers.

Added interest will also be given to this piece of apparatus when it is recalled how, last year, H.R.H. the Prince of Wales delivered an address at San Diego, Cal., U.S.A., to an audience of over 10,000 people during which his voice was distinctly heard in every corner of the vast auditorium, the "Magnavox" supplying the necessary voice magnification.

This article would be incomplete without reference to the "Baldwin" amplifying telephones. These receivers have come into considerable use since their inception, particularly for wireless purposes, as it is claimed that the incoming signal is magnified eight or nine times. A glance at the diagram, Figure 8, will give an idea of the principle of its working, though for the sake of clearness the shape shown in the drawing has deviated somewhat from the actual instrument, mainly due to constructional details necessary in order to adapt such an arrangement into the size of an ordinary telephone receiver case.

As shown, it comprised a steel permanent magnet (M) with soft iron pole-pieces (C) of the shape illustrated, between which is placed the receiver winding, generally of high resistance, and a light soft-iron armature (A) pivoted at its centre. One end of this armature is left free, while to the other is secured a piece of stiff wire (L), the opposite end of which is secured to the centre of a diaphragm of selected mica.

The extreme sensitiveness of the receiver is mainly due to the fact that until signals are being received the armature (A) is under no magnetic strain, thus producing a greater diaphragm movement, and again, the armature is acted upon at both ends on account of the divided flux due to the design of the pole-pieces.

Thus, the deflection for a given current is correspondingly increased.

WIRELESS INSTITUTE OF AUSTRALIA

NEW SOUTH WALES DIVISION

The Annual General Meeting of this Division was held at Wireless House, Sydney, on Tuesday, April 12, at 8 p.m.

In the unavoidable absence of Mr. E. T. Fisk, who was away in Melbourne, Mr. C. MacLurclan occupied the chair.

The following gentlemen were elected as country members:

Mr. P. Shaw, Goondiwindi, N.S.W.

Mr. L. V. G. Todd, West Tamworth.

The Honorary Treasurer's report was read and the Balance Sheet adopted. The Division completed the financial year with a credit balance of £26 18s. 11d., which is a very gratifying state of affairs and reflects much credit on those responsible for the management of the Division's interests.

Regret was expressed owing to Mr. J. G. Reed resigning from membership in this Division on account of him being transferred to headquarters of the Postmaster-General's Department in Melbourne. However, as Mr. Reed intends joining the Victorian Division, the Institute will not lose his membership.

The principal business of the evening was the election of the officers for the ensuing year, which resulted as follows:

President: Mr. E. T. Fisk, M.I.R.E., unanimously re-elected.

Vice-Presidents: Messrs. Bartholomew, Wilson, Stowe, Cooke, and MacLurcan.

Honorary Secretary: Mr. Phil. Renshaw.

Honorary Treasurer: Mr. Malcolm Perry.

Council: Messrs. Pike, Zech, Mawson, Hamilton, Steele and Blanchard.

The syllabus of this Division for the period May-August, 1921, is as follows:

May 10: Lecture by Mr. F. Basil Cooke.

May 24: Visit to the Sydney Observatory.

June 14: Demonstration of Instructional Gear.

June 25: Visit to City North Automatic Telephone Exchange.

July 12: Wireless Telephone Demonstration by Mr. E. T. Fisk, M.I.R.E.

July 26: Visit to Sydney Observatory.

August 9: Debate on "Panel and Cabinet Sets versus Isolated Apparatus."

August 27: Visit to Overseas Liner.

All members are urged to attend as many as possible if not all of the above meetings.

SOUTH AUSTRALIAN DIVISION

The regular monthly meeting of the South Australian Division of the Wireless Institute of Australia was held on Wednesday, April 6. Mr. Clark occupying the chair.

The Minutes of the previous Meeting were read and confirmed. One new member was elected and two new applications for membership received.

An illustrated lantern lecture on the Panama Canal was given by Mr. P. C. Mitchell, who explained the Canal from the Pacific to the Atlantic side by means of the pictures, the various stages of construction, and also the completion of the

Canal. Mr. Mitchell described the different scenes with a vividness which impressed those present with the magnitude of the work undertaken in the construction of the canal.

A vote of thanks to the lecturer moved by Mr. Ames, and seconded by Mr. Martin, was carried with acclamation.

The lantern was kindly lent by Messrs. Harringtons Ltd., and the lighting by Messrs. Newton & McLaren.

WESTERN AUSTRALIAN DIVISION.

This Division held the regular Monthly Meeting in the Science Rooms, James Street, on Thursday, March 31.

The President, Mr. W. C. Coxon, presided over a large attendance.

It was thought that as restrictions are being lifted by the Department, and, as amateurs are recommencing activities, a reorganisation of the work of this Division should be considered, and a number of changes were agreed to.

Meetings will be held fortnightly instead of monthly, the meetings in future to be held in "Warwick House" on the second and fourth Wednesday of each month.

The mid-monthly meeting will take the form of lectures, demonstrations, etc., while the official business of the Institute will be conducted on the fourth Wednesday.

It was also agreed to prepare a syllabus three meetings ahead, so that members may be in a position to know what lectures are to be delivered.

A regulation was gazetted that members erecting wireless aerials must fly a pennant designed and issued by the Institute. This regulation was passed with a view to helping the Department to control unauthorised stations.

It was further decided to communicate with the central body with a view to making representations to the Department concerning the issue of transmitting licenses. Several members stated that amateurs in England and America were granted licenses and encouraged in every way to carry on investigations, while in Australia only receiving licenses were issued.

The Council is now re-organising the secretarial and executive work, and the local branch of the organisation promises to become one of the most energetic in the Australian group.

LIST OF WIRELESS OFFICERS ATTACHED TO VESSELS OF THE AUSTRALASIAN MERCANTILE MARINE

Revised to April 15, 1921.

SHIP.	OPERATOR.
Aldinga	———
Apolda	J. W. McKay
Arahura	W. C. Brown
Araluen	H. H. Black
Aramac	G. Pow
Arawatta	F. L. Scott
Atua	N. Leeder
Australbrook	J. F. McGinley
Australcrag	V. E. Stanley
Australford	H. G. Reilly
Australglen	W. H. Richardson
Australmead	S. V. Blight
Australmount	A. R. Catford
Australpeak	J. B. Ponsonby
Australplain	A. Stuart
Australpool	E. J. Glaisher
Australport	J. H. Pullan
Australrange	V. P. Nevins
Bakara	C. W. Donne
Baldina	———
Bambra	R. C. Williams
Barambah	M. L. Robertson
Bellata	G. Soilleux
Berringa	K. J. Dines
Bethanga	F. G. Forrest
Bingera	J. H. Hawkins
Birriwa	F. G. Lewis
Bombala	A. H. Jeremy
Boonah	F. A. Cook
Booral	T. V. Tressler
Boorara	T. Alexander
Bulla	R. T. Stephen
Bundarra	N. W. G. Scott
Calulu	F. Exon
Canberra	H. W. Barnfield
Carina	W. Hill
Changsha	B. Boni
Charon	J. E. Cleary
Cooee	P. D. Hodges
Cooma	V. M. Brooker
Delungra	I. B. Gibson
Dilga	R. Jordon
Dimboola	R. T. Murray
Dinoga	T. W. Bearup
Dongarra	H. J. Byrne
Dromana	F. Stevens
Dumosa	H. Beckett
Dundula	P. C. Gillon
Eastern	J. F. Hutton
Emita	———
Enoggera	———
Eudunda	———
Eurelia	J. A. Guy
Gilgai	A. S. Dening
Gorgon	J. G. C. Higgins
Hwah Ping	H. F. Hartley
Kaiapoi	E. A. Miller
Kaikorai	J. Elmore
Kaimanawa	L. E. Ternes
Kaitangata	R. R. Robinson
Kaitoke	A. W. Watt
Kaituna	G. M. Gormlie
Kaiwarra	L. H. Jones
Kanna	K. H. McSwan
Kanowna	W. J. Washbourne
Karoola	R. R. Pilmore
Karori	W. C. Lucas
Katoa	A. E. Lawrence
Katoomba	T. A. Jones
Kauri	H. S. Chown
Kawatiri	E. H. Heather
Kekerangu	R. P. Ginders
Koromiko	J. G. Henderson
Kowarra	H. Fullerton
Kurow	A. D. R. Davis
Levuka	R. Alexander
Loongana	H. A. de Dassel
Macedon	H. E. Young
Mackarra	S. L. Filer
Macumba	S. G. Jones
Maheno	G. H. Hugman
Makambo	C. F. Griffiths
Makura	F. A. Hunter (s) / W. Reithmuller (j)
Malayan	H. F. Giles
Manuka	J. A. Heavey
Maori	R. S. Taylor
Mapourika	C. F. G. Taylor
Marama	J. H. Bennett (s) / J. M. Camps (j)
Mararoa	W. A. Hawkins
Marella	W. H. Harris
Marsina	A. Cuthill
Mataram	C. H. A. Kidman
Maunganui	———
Melusia	S. F. Stafford
Minderoo	M. A. Prudence
Mindini	E. F. Hayes
Moana	G. Illingworth
Moeraki	L. G. Devenport
Mokoia	———
Monowai	———
Montoro	A. L. Dixon
Morinda	F. C. Davies
Nairana	H. A. De Dassel
Navua	L. V. B. Sutton
Ngakuta	S. G. Bargrove
Niagara	W. J. Martin (s) / ——— (j)
Ooma	A. E. Sheppherd
Oonah	R. M. Firminger
Paloona	G. M. Whiteside
Parattah	K. L. Simpson
Rakanoa	———
Riverina	A. H. Beard
Rotomahana	R. J. Webb
Shandon	G. Vincent
South Africa	S. R. Dixon
St. Albans	T. Bannister
St. George	A. J. Sawyer
Suva	L. S. Lane
Tahiti	E. M. Bain (s) / W. S. Ringrose (j)
Taiyuan	F. A. Woodall
Talawa	D. Hairs
Talune	R. W. Barnes
Tarawera	T. H. McWilliams

(*Continued on next page.*)

(*Continued from last page.*)

Tofua	L. R. Dickson
Toromeo	M. Sedgers
Ulimaroa	H. Tuson
Victoria	J. H. Gilligan
Waihemo	C. Williamson
Wahine	K. N. Williams
Waihora	E. A. Hunter
Waikawa	N. W. Marshall
Waimarino	F. L. Dawes
Waipori	G. Donnelly
Wairuna	F. N. Davidson
Waitemata	D. W. Higgins
Waitomo	S. J. McVeigh
Wanaka	F. Marsden
Westralia	M. A. Ryan
Whangape	A. O. Sutherland
Wodonga	A. W. Hooper
Wyandra	J. Doggett
Wyreema	T. Chalmers
Zealandia	A. G. Ross

Amalgamated Wireless (A'sia.) Operators Temporarily Attached to M.I.M.C. Co.'s Ships.

Rupara	G. Cook

New Guinea Expedition.

Wattle	L. N. Callaghan

New Ship Wireless Stations.

The following vessels have been equipped with wireless telegraph installations by Amalgamated Wireless (A'sia.), Ltd.:

Name.	Type set.	Call Letters.
Emita, C.G. Line	1½ K.W. and Emergency and Valve Receiver.	VHG
Eromanga, C.G. Line	1½ K.W. and Emergency and Valve Receiver.	VHH
Alice A. Leigh, 4-m bq.	½ K.W. Set and Valve Receiver.	BHQ

S.S. ST. GEORGE.

We have been further advised regarding the efficiency of the wireless installation on the steamer *St. George*. This vessel is at present trading among the Gilbert Islands.

Communication between the *St. George* and Ocean Island has been successfully maintained during the day at a distance of 600 miles, using the ship's power, and 440 miles using the emergency installation. In both instances the Radio Station at Ocean Island reported that the *St. George's* signals were strong and easily readable. This vessel is fitted with a Marconi standard ship installation, type C4, with emergency set, and the "Expanse" type 103 Magnifying Valve Receiver.

The communication that this ship is maintaining is another instance of the utility of wireless telegraphy. She is trading in and around a group of islands in the Pacific that have no means of telegraphic communication with the mainland of Australia, all news and correspondence being carried only by ships that visit these islands more or less infrequently.

By medium of wireless the *St. George* is able to keep in constant touch with the agents in Australia and other points, who are able to advise the Captain of any amended itinerary that may be decided on. In addition, passengers are able to make use of this means of communicating rapidly with their friends ashore, or on other ships.

As the *St. George* is only a small vessel, and considering the dimensions of the aerial, and the electric power available, the communication that the *St. George* is at present maintaining is very highly commendable.

QUESTIONS AND ANSWERS

Under this heading the Editor will be pleased to reply to any questions within the scope of the magazine, provided the following conditions are observed:—

1. Questions to be numbered and written on one side of paper only, and not to exceed four in number.

2. All questions must be accompanied by the full name and address of sender, which is for reference and not for publication. Answers will be published under any initials or nom-de-plume selected by the questioner.

"Wireless" (Balmain).—*Question* 1: *Is an ordinary receiving valve powerful enough to transmit over a distance of 1,000 yards; and will a battery of dry cells be sufficient to supply the plate current?*
Answer.—Yes.

Question 2: Will the circuit illustrated receive if I short the microphone Y and insert telephone at Z; if not would a separate crystal receiving set do to receive speech?

Answer: Yes; and crystal receiver is also serviceable to receive speech.

Question 3: What plate voltage will be required for both transmitting and receiving?

Answer: This depends on type of valve used. "V 24" receiving 24-30 volts, transmitting 100-300 volts; "Q" receiving 160 volts, transmitting 200-300 volts.

Question 4: Can you supply suitable dimensions for the coils L and R?

Answer: Dimensions depend on wave length it is desired to use. Coil "R" should have 50% to 75% inductance of "L."

H. Banks (Mosman).—*Question: How far should an aerial of two or more wires be separated, and what difference is made by having more or less wires in an aerial?*

Answer: In a multi wire aerial wires should be spaced as widely as conveniently possible, generally two to four feet. An increase in the number of wires increases the capacity but reduces the inductance.

"Incidence" (Victoria).—*Question: I am very interested in aviation and would like to obtain a position in connection with that work, preferably on the engineering side. Will you advise me what opportunities there are of obtaining such a position in Australia?*

Answer: We suggest that you communicate with the Air Board, Melbourne, or with some of the civil aviation companies in Australia.

PERSONALITIES

Captain P. W. Engelback, who is keenly interested in amateur wireless, recently arrived in Sydney from London. Before leaving London Captain Engelback was given authority by the Wireless Society of London to discuss the matter of affiliation with the Wireless Institute of Australia. He will therefore discuss this matter with the Council of the New South Wales Division at an early date.

* * *

Mr. George Apperley, of the experimental and research department of Amalgamated Wireless (A'sia.), Ltd., was on April 16 presented by the staff with several handsome presents on the occasion of his retirement from the Company. Mr. Apperley has joined the Radio Service of the P.M.G.'s Department.

* * *

Mr. D. N. Quinn, wireless officer of Amalgamated Wireless (A'sia.), Ltd., left Sydney in the steamer *Wandilla* bound to New York. During the voyage across the Pacific he took ill and on arrival at Colon, Republic of Panama, entered hospital ashore and was operated on for appendicitis. He returned to Sydney last month in good health again, ready for another voyage.

"SEA, LAND and AIR"

THE AUSTRALIAN NATIONAL MONTHLY

— OF —

TOPICAL INTEREST

EDITED BY S. E. TATHAM.

CONTENTS

The Editor will be pleased to receive, for consideration, contributions on Aviation, Wireless, the Navy, Mercantile Marine or other subjects within the scope of *Sea, Land and Air*. All MSS., photographs, drawings, etc., submitted must bear the sender's name on back and be accompanied by postage stamps for return if unsuitable. Although every care will be taken of all contributions received, no responsibility is accepted.

All business communications should be addressed to

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