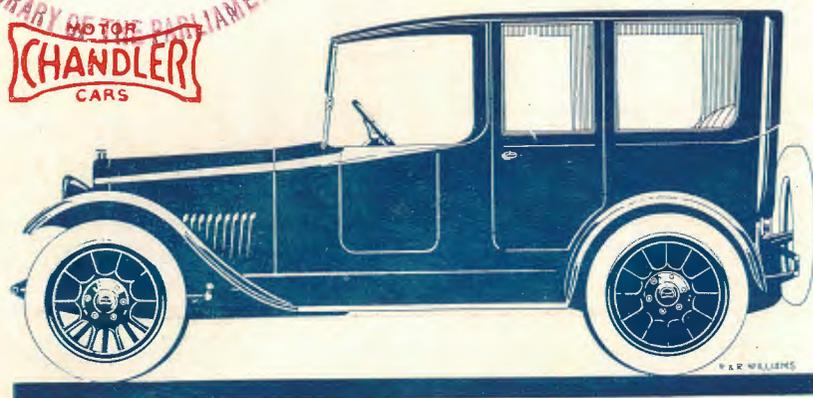




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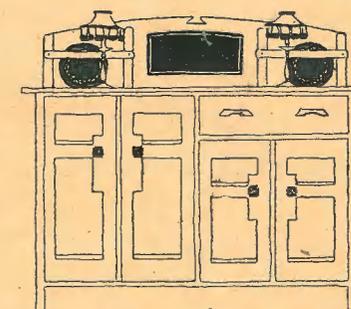
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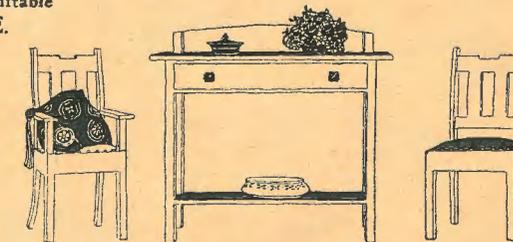
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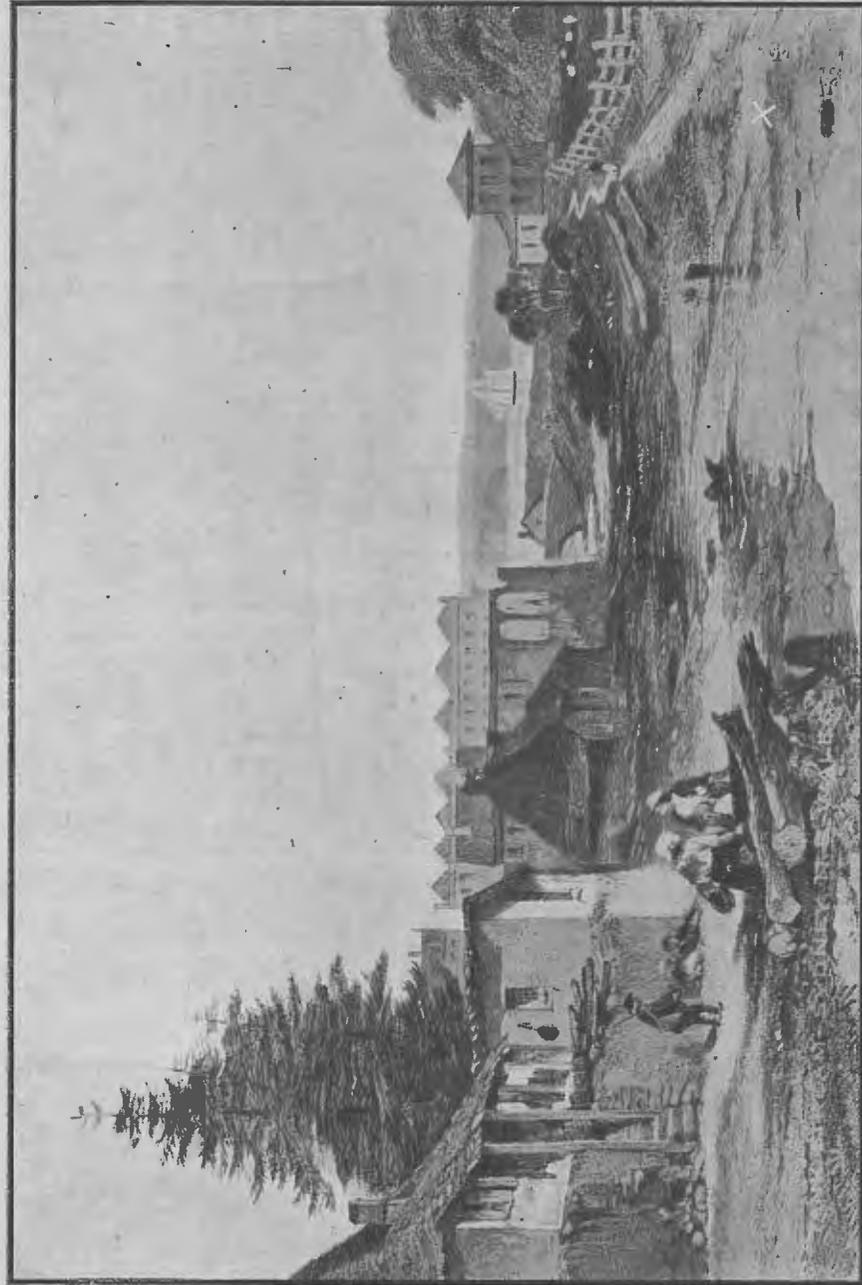
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The Tank Stream in 1848.

The Tank Stream was the main source of Sydney's water supply for nearly forty years, and ran through what is now one of the most important parts of Sydney. The bridge in the centre is where Bridge Street now runs, the X denoting the site of the A.M.P. offices, and the fence the line of our present Pitt Street.

# SEA LAND AND AIR

AUSTRALIA'S  
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APRIL 1, 1921

No. 37.

## SYDNEY'S GREAT THIRST CAN THE WATER SYSTEM QUENCH IT?

BY

R. N. CONNOLLY

The water supply system of Sydney has always been, and is still, engaged in a race with the thirst of the ever-growing city. This article tells of the efforts made from time to time to quench, and keep quenched, Sydney's great thirst.

IT seems to be the nature of things that the average City man accepts those great public utilities necessary to his comfort and health as part of his rightful heritage. Not until something goes wrong does he think about them, and when something does go wrong, as exemplified in the recent water famine in Sydney, his thinking is mainly devoted to finding adequate expression of his discomfort. The Metropolitan Board of Water Supply and Sewerage is easily the most roundly abused public body in Sydney. Yet, the service it supplies is not bad, but an exceedingly good one, having regard to the disabilities under which it labours.

To meet the needs of the people of the metropolis, nearly 50,000,000 gallons of water are required per day, this being run through a network of water mains, having a total length of 2,772 miles. These figures are an index to the magnitude of the service. It will be found exceedingly difficult to imagine what 50,000,000 gallons would be like. Certainly, no idea is provided by the gentle stream which gushes on to the unthinking head of the average city man when he takes his morning shower.

As for the main mileage, none of us would care to walk 2,772 miles, as it would mean something like a ramble across Australia from East Coast to West coast.

### Tank Stream and Village Pumps.

To-day an average of 1,060,230 persons consume the water supplied by the Board's system, and the tremendous progress of that system is seen by a glance into the comparatively short history of the metropolis. When Governor Phillip founded his small settlement in Port Jackson, he chose as the site Sydney Cove, because of all the sites inspected it had the best stream of fresh water. The source of the first water supply of Sydney was called the Tank Stream. It ran for the most part along what is now Pitt Street, and was navigable as far as Bridge Street. Close to the spot where Hunter Street and Pitt Street now intersect, three reservoirs, or the tanks, were excavated in the rock to store the Tank Stream water, and from these the needs of the population of the time were met.

In the early part of last century severe droughts had a serious effect on the supply of fresh water, and what remained was

[April 1, 1921.]



**Sherbrooke Road, N.S.W.**

From the top of Bulli Pass, Sherbrooke Road, four miles long, runs directly into the Catchment Area, ending at the water of Cataract Dam. The photograph shows the character of the scenery, which is the admiration of all visitors.

April 1, 1921.]



**Cataract Dam.**

The Cataract Reservoir overflowing, the torrent going down the spillway on right being a noticeable feature. This dam has a capacity of 21,411,000,000 gallons and cost £417,298 to build.

polluted by dirty persons, despite Governor Macquarie's severe penalties. During Governor Hunter's vice-royalty, a permanent stream of fresh water was located at Rushcutters' Bay, where the Stadium now stands, and was of great benefit to the townspeople for many years.

When the Tank Stream began to fail as the source of the settlement's water supply, wells were dug in various places in and near the town. Between 1844 and 1850 it was customary to sell these pumps by auction every year, the purchaser acquiring the right to retail water to the townspeople at the rate of 6d. a load (a large cask on wheels), or "1d. per bucket; two buckets 1½d."

#### First Water System.

The first attempt at a water supply system was commenced in 1827, when Mr. John Busby, Government Mineral Surveyor, working with convict labour, set about the construction of Busby's Bore, a tunnel 12,000 feet in length, from the Lachlan Swamp, now part of Centennial Park, to Hyde Park. The tunnel took 10 years to build, but the full scheme, including a reservoir in Hyde Park with a capacity of 15,000,000 gallons, was never completed. From 1830, however, the tunnel began to supply Sydney, and assisted in slaking the thirst of the people of the growing town during a calamitous drought. The tunnel zig-zags, rises and falls in an extraordinary manner, and these faults in construction are stated to have been the result of the fear of the convicts entertained by Mr. Busby, who would not go under-ground to personally direct the work. Those were stirring days, even in water supply. On one occasion a 6-inch main, fed from the tunnel, suddenly ceased its flow. Investigations disclosed the body of a monster eel wedged in the main! It is not generally known that the flow from Busby's bore now passes to the ponds in the Botanical Gardens.

Sydney was growing like a fine, healthy baby, and with every year of growth its thirst developed. In 1858, with a population of 50,000, the situation of Sydney was saved by the Botany Swamps scheme. A series of dams for storage purposes was built in the swamps, and a pumping plant, consisting of three engines of 100 h.p. each, were installed at the lower edge of the swamps at Botany Bay. From here

the water was conveyed through 30 inch mains to a reservoir at Crown Street, containing 3,500,000 gallons, and another at Paddington containing 1,500,000 gallons. So rapidly did Sydney grow, however, that in 1867, after recurring dry seasons, the thirst of the young city was greater than ever. In 1887 its cries were lulled a little by the construction of a feed main from the Nepean River to Botany dams.

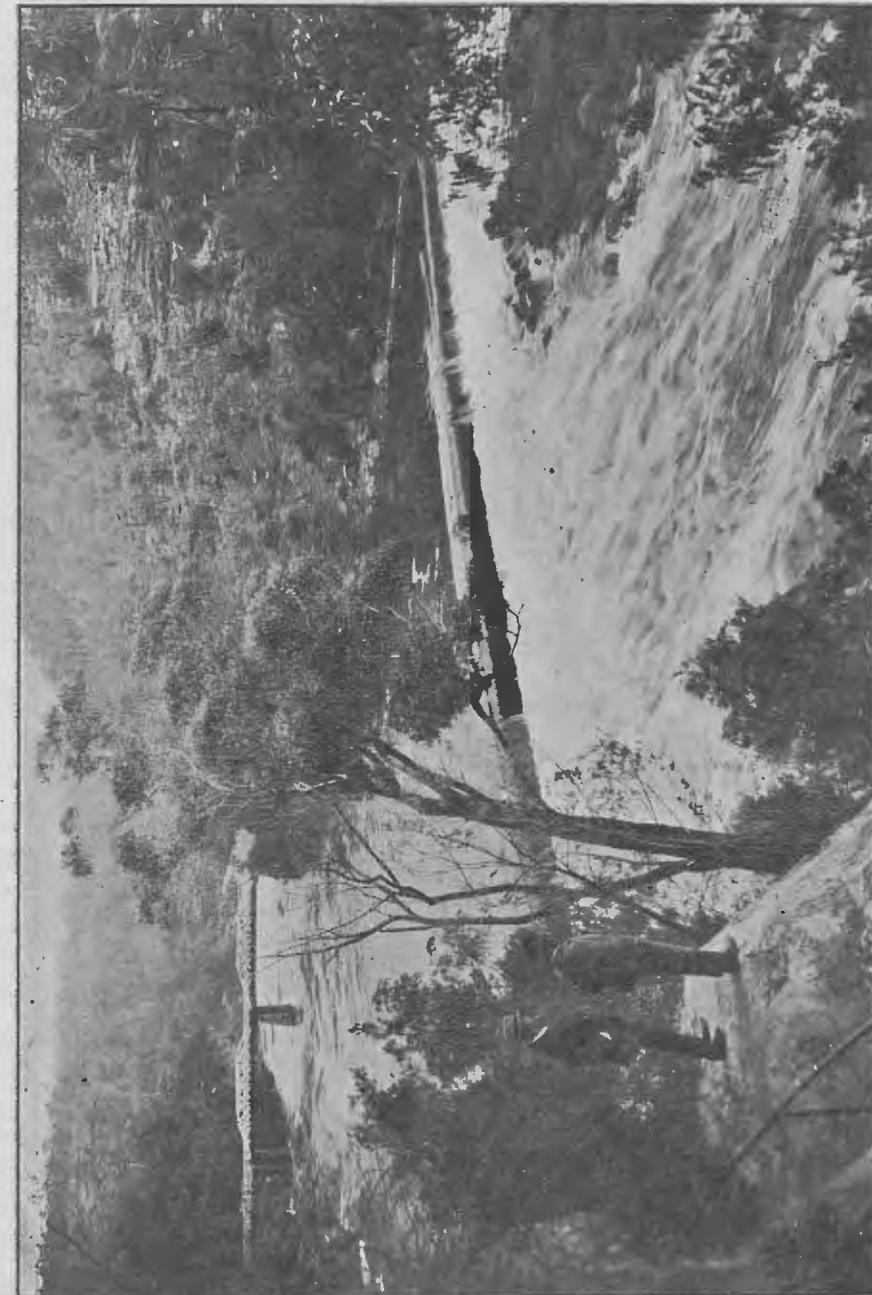
#### Ever-Growing Demand.

Then the Prospect reservoir was constructed; the people of Sydney felt that at last they were put beyond the danger of a water famine. The reservoir is formed by means of an earthen embankment built across the valley of Prospect Creek. The length of the dam is 7,300 feet, and its maximum height 85½ feet. The submerged area at overflow level is 1,266 acres, and its total capacity 11,029,180,000 gallons. When those staggering figures were considered, it is no wonder that Sydney settled down, satisfied with the future. But in 1902-3 the severe drought showed the falseness of their feeling of security. The contents of the Prospect reservoir sank below gravitation level, and the now grown-up city wailed in panic.

Once more the water system was extended, and the Cataract Dam was built in the Catchment area, just below the confluence of the Cataract River and Cataract Creek. Its capacity was nearly 21,000,000 gallons. In January, 1911, the welcome report came to Sydney that the reservoir was, for the first time, filled to the overflow. The people subsided once more, but the authorities did not. Realizing that the continued growth of the city meant a continued growth of its healthy thirst, another storage reservoir was commenced on the Cordeaux River in the catchment area.

#### Rain Averted Two Famines.

So the race between the city's thirst and the water supply which quenches it went on. In 1916 there was a serious crisis, when the water in Cataract Reservoir sank to 33.6 feet below spillway level. Timely rains saved the situation. In the height of the present summer there was a serious shortage of water in Sydney, due to the dry weather on the one hand, and the lack of up-to-date mains and pipes, owing to the shortage of the Water Board's funds,



Broughton's Pass Diversion Weir.  
This is an excellent representation of the Cataract River after a heavy rainfall.



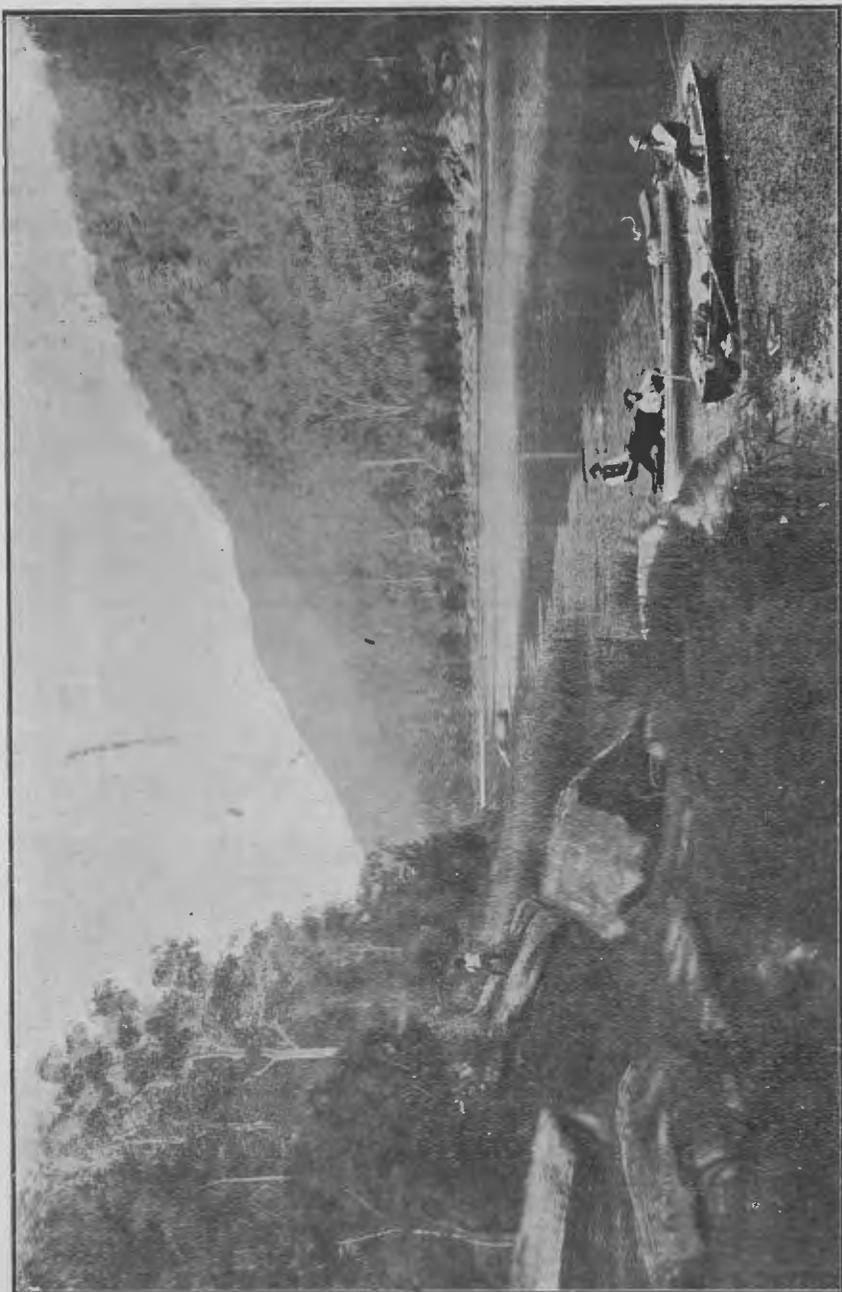
Pipe Line—Pipe Head to Potts' Hill.

Our photograph shows the two immense 72 inch mains which convey the water more than five miles from Pipe Head to Potts' Hill balance reservoir, supplying all districts south of Port Jackson. The photograph gives a good idea of the snake-like appearance of the huge mains when seen from a distance, and of the country in the vicinity, which is not unattractive,



Crown Street Pumping Station and Works.

Here the water is received from Potts' Hill and distributed by gravitation to lower levels, and pumped to reservoirs at higher levels. Here also the Board has workshops, employing a large staff of mechanics for repair work, etc. The pumping machinery is capable of raising water to the highest points on the southern side of the City at the rate of 18,000,000 gallons per day.



Scene on the Nepean River. This is the parent stream from which the Sydney water supply is drawn; its natural beauties being claimed by tourists to be some of the finest in the world. On the upper reaches are remarkably picturesque gorges, and lower down scenes similar to the above are met with.

on the other. Again, timely rains saved the situation. It is, probably, only a question of months before another water famine takes place, and from any blame in the matter the Metropolitan Board of Water Supply and Sewerage must, in common fairness, be exonerated. It has repeatedly asked this, and previous Governments, for the money necessary to remove the danger of a water famine; the reply has been that the money is not available. The general public does not care whether it is or is not. It is conscious of a growing thirst which, while it is slaked now, may not be in the future.

The water supply system under the control of the Metropolitan Board is now a very extensive one, and supremely important of all the Board's assets is the catchment area which feeds Sydney. It has an area of 347 square miles, as against the 178 acres of the Tank Stream, the 2 square miles which supplied Busby's Bore, and the 7 square miles of the Botany swamps. The major part of the catchment area is ideal, consisting, as it does, of sandstone country, unoccupied and sparsely timbered, while the remainder is alienated land composed principally of rich volcanic soil of great depth and friability, which greatly assists the filtration of the water. At the heads of many of the creeks and rivers there are swampy areas, which, besides retarding the storm waters, also act as filters. The water from the catchment area is proved to be exceedingly pure.

#### How Water Comes to Sydney.

A large part of the supply is derived from the Cordeaux, Avon and Bourke Rivers, all tributaries of the Nepean. By the aid of a weir built across the Nepean River at Pheasants Nest, more than 60 miles from Sydney, a great volume of the river's water is diverted along a four-mile tunnel into the Cataract River, across which is a weir that diverts the water through another tunnel nearly two miles in length. The water thus collected flows at the rate of 150,000,000 gallons a day along the last tunnel to Appin, whence it is carried along the dividing watershed of the Nepean and George's Rivers by a succession of canals, tunnels, and pipe aqueducts for about 40 miles to Prospect Reservoir.

Prospect Reservoir sends the water to Pipe Head through a canal nearly 5 miles

in length, with a capacity of 87,635,000 gallons per day. Pipe Head distributes the supply. Arterial mains lead to Ryde, where is established the pumping station, with a 2,000,000 gallon suction tank, which provides for the whole of the reticulated area on the North Shore as far as Manly. Two arteries branch from Pipe Head to Potts Hill balance reservoir, supplying the whole of the area on the southern side of the harbour. A fourth main branches from the great distributing centre to the Granville district.

#### Host of Service Reservoirs.

About a third of the daily consumption is delivered by gravitation to the zone south of the harbour. The reservoirs upon which this area is dependent are those of Potts Hill, Petersham, and Crown Street. The low-lying parts of Petersham, Marrickville, and the Illawarra suburbs, as far as Carlton, are supplied from Petersham, the equally low-lying parts of the city from Crown Street reservoir, which holds 3,250,000 gallons. There are 19 high level zones into which water is lifted from Crown Street. The service reservoirs for the supply of the higher portions of the metropolis are situated at Petersham, Crown Street, Paddington, Centennial Park, Woollahra, Waverley, Vaucluse, Randwick and Bellevue Hill.

North Sydney has no fewer than 11 tanks or reservoirs, located at Ryde, Ryde Hill, Chatswood, Gore Hill, Brady Street (Mosman); Bradley's Head, Pymble, Wahroonga, Beecroft, and Mobb's Hill.

In addition to the metropolitan area, the Metropolitan Board of Water Supply and Sewerage provides water for Smithfield, Liverpool, Campbelltown, Camden, Richmond, Wollongong, and Parramatta.

It is no mean task to supply more than a million people with water. The existence of an organisation which is accomplishing this task is an indication that something very big in the public interest has been brought about since Busby's bore was built in the days when Sydney started to climb out of its baby clothes and holler for more of everything.

[We are indebted to Mr. T. J. Roseby, Secretary of the Metropolitan Board of Water Supply and Sewerage, Sydney, for the information and photographic illustrations in this article.—Ed.]

## ITALY

BY

H. H. JOHNSON

The title of this article instantly recalls to mind the ancient Romans, whom, I think, possessed the greatest political genius, not only amongst the ancient nations, but gave evidence of political science which has seldom, if ever, been surpassed.

Although space is unavailable for any consecutive reference to them, it seems impossible to omit recalling some names of famous and infamous men of the Roman Empire and Republic, from 753 B.C. to 410 A.D., in which year the Goths sacked Rome.

History records no case more worthy of note than the patriotism of Regulus, the Roman General, who was sent by his captors, the Carthaginians, to Rome, in the hope that he would bring about peace. He urged the Roman Senate not to make any concessions, and returned to Carthage to meet his fate, in spite of the entreaties of the Senate and the people.

The greatest of all the ancient Romans was Julius Cæsar, whose name will be forever remembered as the invader of Britain. He was assassinated in Rome on March 15, 44 B.C. The memorable speech which Shakespeare puts into Anthony's mouth gives a lively notion of the art used, and the impression produced by Anthony's funeral oration over the body of Cæsar.

Marcus Tullius Cicero, Orator and Statesman; Caius Marius, who saved Rome from the barbarians; Marcus Antonius, the avenger of Cæsar and lover of Queen Cleopatra; Pompey—who married Julius Cæsar's daughter—and who successfully besieged Jerusalem, the Emperor Tiberius; Nero and his henchman, Tigellinus; the Emperor Vespasian; his son Titus, who reduced Jerusalem to "a heap of stones," and Marcus Aurelius, a philosopher.

The names of these, and many others, all recall their capital, the eternal city of the seven hills, Rome on the Tiber, the same city which to-day is the capital of united (at least constitutionally) Italy—where the gladiatorial fights occurred, chariot races were run, when the principal object of the charioteers was to overturn an opponent's chariot—the city burned by

Nero, who used to light his gardens at night by torches, using Christians for the purpose; the ancient amphitheatre, the Colosseum, said to have been capable of accommodating 50,000 persons, where converts to Christianity were worried to death by wild beasts. These things have passed away, but the remains of some of the triumphal arches erected to commemorate some great victory are still to be seen, and throw some light on the spirit of the age when "might was right," and Rome was "Mistress of the World," before the decadence of that mighty nation known to history as the Roman Empire.

Roman art has left an indelible mark. The Roman gods Jupiter, Saturn, Mercury, Diana and Venus are commemorated at the present day by the use of such names for ships of the British Royal Navy. The Roman word *toga*, the garment worn in ancient times, is recalled abruptly by the slangy description of clothes as "togs."

The designation Spartacusites, given to the section of rebellious Germans since the close of the Great War in 1918, brings to mind the origin of the word. Spartacus was a gladiator, and persuaded a number of his fellow bondsmen to join him in breaking loose. He took up a strong position on Mount Vesuvius, which overlooks the Bay of Naples, and being joined by slaves and outlaws of all descriptions, was soon at the head of a formidable army, and was not crushed until two years later. The eruption of Vesuvius in 79 A.D., which destroyed the two cities of Herculaneum and Pompeii under dense beds of cinders and ashes, is recorded in the letters of Pliny, the younger, as well as by a well-known author of the early Victorian age. History tells us that the majority of Pompeians were a leisured and pleasure-loving class. They kept a school of gladiators for their amusement. On one occasion a dispute arose in the amphitheatre in that city at a gladiatorial contest, when so many people were killed that Nero, of all men, forbade the continuance of gladiatorial shows in that city.

What could take the place of Virgil, Horace and Ovid in our Universities' curriculum, or the orations of her public men. These have still a fascination.

The sack of Rome by the Goths produced a reverberation throughout the world. Pagans accounted for it by the mutiny of the ancient gods. The peril might have been averted but for the exhaustion produced by centuries of strife among the Romans themselves. The Romans ceased as a nation in the West, but survived for some centuries more in the East, following the transference of the capital of the Roman Empire to Constantinople. When attendants of Constantine spoke to him of the extensive boundary which he was tracing for the new capital, he replied that a heavenly guide marched before him. The divine guidance which modern kings have claimed is evidently not a new idea.

Italian history, as distinguished from the history of Rome, began in the fifth century.

It would serve no useful purpose to trace the various changes in the government of Italy since that time. There seems little doubt that the outbreak of the French revolution aroused a very sympathetic enthusiasm in Italy, whose peoples yearned passionately for liberty and equality. Napoleon's affection for the Italians is well known. He bestowed upon his only son the title of "King of Rome." Perhaps Napoleon's Corsican nationality was an inspiring sentiment. France did much for her liberation.

France and Spain struggled for supremacy in Italy from 1492 to 1559. Spain was supreme from 1559 to 1700, then the Austrians and Bourbons from 1700 to 1789. France was dominant from 1789 to 1815, the year of Waterloo, and the famous Congress of Vienna, and the struggle for a united Italy lasted from 1815 to 1870.

In 1861 Victor Emmanuel was proclaimed King of Italy at Turin, but the Italians did not enter Rome (historically) until 1870, and in the following year Rome was made the capital.

Mazzini, swayed by Republican, rather than Monarchical ideals, sowed the seed of Italian unity, and was closely identified with the Garibaldian movement, led by Giuseppe Garibaldi, who took a leading part in the war of Italian Liberation.

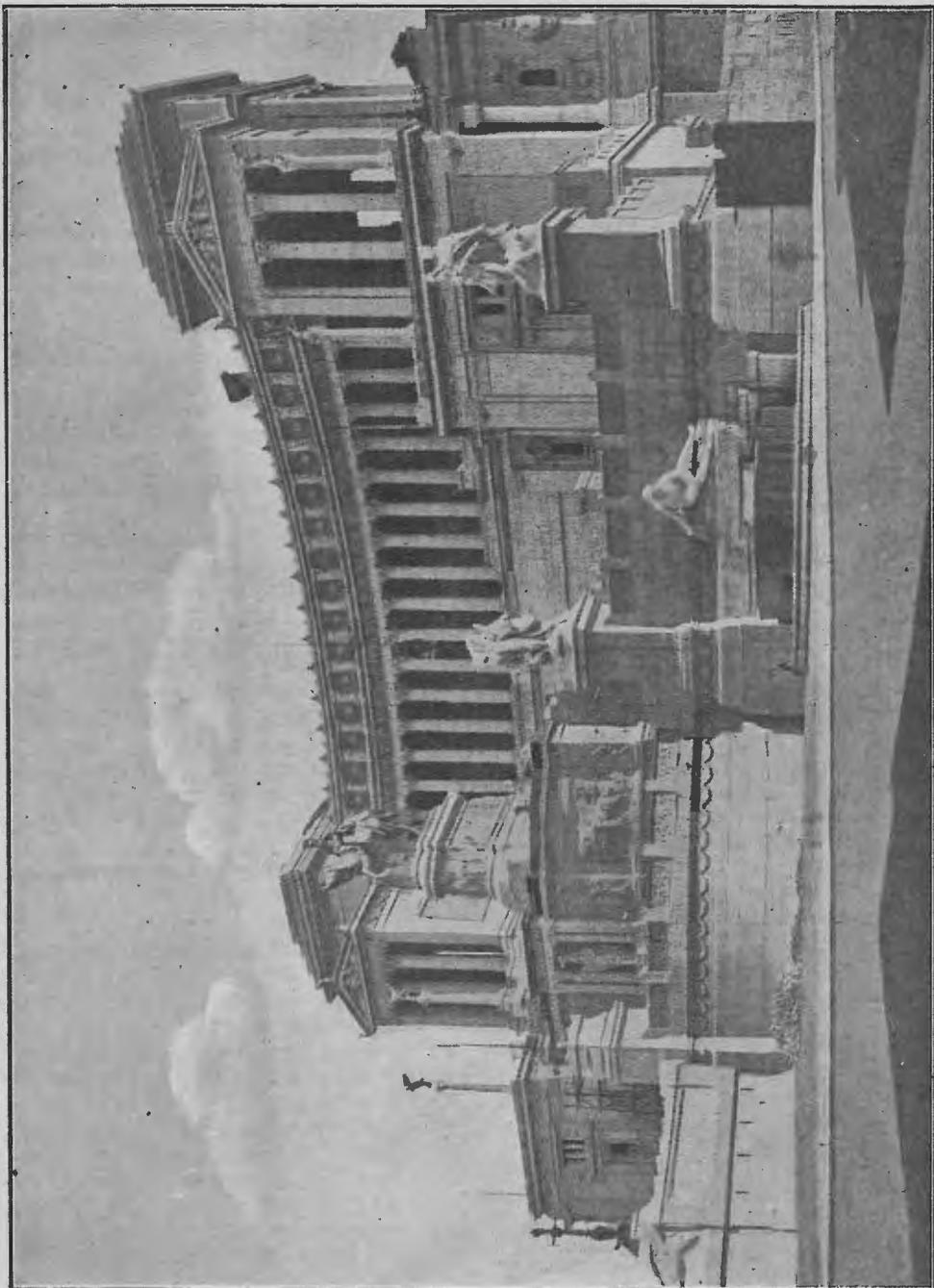
In October, 1860, a battle was fought on the Volturno, and after a victory by Garibaldi, he met Victor Emmanuel at Teano, hailed him as King of Italy, and subsequently handed over his conquests to him.

The chief architect, however, of the great fabric "a united Italy," was Camillo Cavour, a member of the Piedmontese nobility, and a statesman who ranks among the makers of modern Europe. His object was to gain foreign support for Italy to throw off the Austrian yoke. His admiration for the British Constitution stamped him an ardent Imperialist.

The Roman Catholic Church exercised great influence in Piedmont; not in Austria or Spain did it enjoy a more independent position. Its annual income, including the religious orders, was nearly £750,000. Amid a relatively small population its monks, nuns, and priests numbered 23,000. It controlled the education of the kingdom to a very large degree; its churches and shrines exercised rights of sanctuary which thwarted the civil law; it possessed a special court for the trial of its clergy, with jurisdiction in all cases of heresy, sacrilege, blasphemy, tithe, marriage, and betrothal.

Instigated by Cavour, for whom the equality of all citizens, before the law, was the basis of Constitutional Government, three measures were introduced in 1850. Cavour supported them in a powerful speech, in which he adjusted the overriding claims of the Papacy to the national ambitions of Italy. The Legislative Chambers swept away the Church's rights of sanctuary, equalised the punishment of lay and clerical offenders, and forbade the Church to acquire property under deed of gift or testament, without the civil power's consent. No other country had enacted such reforms without Rome's concurrence.

Cavour's success in bringing Sardinia into the orbit of the Great Powers was the most striking feature of his ministry. But other measures were passed which had far-reaching effects. In spite of much opposition from the clerical party in Parliament, he suppressed over 300 religious houses. He expressed himself in strong terms to Austria regarding her severities after the abortive Milanese rising in 1853, and was prepared even to go to war. He joined the Anglo-French alliance against Russia in January, 1855, and although some



The Victor Emanuel Monument Dominating Over Rome. In the architecture of this building, past formulae have, to some extent, been disregarded; it represents the latest stage of neo-Renaissance and neo-classic. It was designed by M. Sacconi. The upper colonnade is an adaptation of the early Roman Temple of Fortune at Palestrina.

deprecatd intervention in the Crimean War he by his action wooed Napoleon III., who had not then brought himself openly to champion Italian nationalism. Napoleon III. dared not break with the French clericals by forwarding a policy which threatened the temporal power of the Pope.

Cavour's cry was "Out with the Austrians and the Pope," and the essential condition which Cavour required to sway Napoleon III. was wanting until January, 1858, when Orsini's attempt to assassinate Napoleon enraged France. His last appeal from prison to Napoleon urged the Emperor to adopt the cause of Italian nationalism.

Napoleon III., desiring above all things, the humiliation of Austria, risked the opposition of the ultramontanes, *i.e.*, the extreme Catholics in France, and conspired with Cavour to expel the Austrians from the "Alps to the Adriatic." The European situation favoured the plans of the conspirators, and although Napoleon did not desire to see a strong and united Italy, he and Cavour manœuvred Austria into the position of assailant, and alienated from her the sympathies of Europe. The Allies won the battle of Maggula, and entered Milan. The Austrians also lost the battle of Solferino, and then Napoleon realised that the unification of Italy was at hand. The Empress Eugenie represented the apprehensions of the French clericals. The unification of Italy did not enter into Napoleon's plans, Germany was increasingly restless, Great Britain, under Palmerston, was no longer friendly to France, and desired the very solution of the Italian problem which Napoleon was anxious to prevent. He, therefore, acted with characteristic disregard for any interests but his own, and prepared an armistice with Austria.

The determination of the Italian peoples, the guidance of Cavour, and the assistance of Garibaldi, succeeded in the course of eleven years, and in five stages in accomplishing the national ideal of unity with two notable exceptions.

A reaction set in on behalf of the Papacy, and Napoleon III. backed the Popish claims to temporal power, but the declaration of war by France against Prussia in 1870 left Italy free of French interference, and on September 20, 1870, the Italian Imperial troops entered Rome.

The Italian Monarchy of 1870 did not include every Italian-speaking region. The Trentino in the Alps, Trieste, and the Istrian peninsula remained to Austria. They formed what the Italians call *irridenta* (unrecovered). The recent exploits of D'Annunzio at Fiume were the result of Italy's desire to recover part of the *irridenta* territory already mentioned.

The passing of time induced Italy to join the Triple Alliance with Germany and Austria, but with an anxious gaze upon the activities of Austria across the Adriatic, and the outbreak of war in 1914, gave her a not unwelcome opportunity to break away from the Alliance which, so far as Italy was concerned, had outgrown its usefulness.

Italy has produced some notable men: Senatore Guglielmo Marconi, G.C.V.O., LL.D., D.Sc., M.I.E.E., the perfecter of wireless telegraphy, was born at Bologna in 1874. He received the Nobel prize for Physics in 1909.

Dante Alighieri was Chief Magistrate of Florence, his native city.

Galileo, whose discoveries are a generous part of the foundations of modern science, was an Italian. He stood out boldly in defence of the Copernican system, *viz.*, that the earth revolves around the sun.

Another famous Italian was Leonardo Da Vinci, who has been proclaimed the most universal genius of all times. He was painter, sculptor, poet, architect, engineer and musician. In every way he seems to have been centuries in advance of his time—1452 to 1519 A.D.

Michael Angelo was an Italian, born in 1506. It would be presumptuous to comment on his incredible perseverance and energy.

Raphael was the son of a painter in the little city of Urbino. He adorned the Vatican, and was for a time chief architect of St. Peter's, at Rome.

Titian was born in a little town among the Alps in 1477, but was apprenticed when a child of nine to a maker of mosaics in Venice. He was made painter to the Doges of Venice, and later was Court painter to the rulers of Spain. He died in 1576 in his hundredth year.

Verdi (1813-1901) and Rossini (1792-1868) were both Italians.

Turning to Italian colonisation, we find that she has dependencies in Eritrea with 670 miles of coast on the Red Sea; Italian Somaliland, of 139,000 square miles; a concession at Tientsin in China; and Tripoli, which dependency has an area of 400,000 square miles.

Italy, after breaking away from the Triple Alliance between Germany, Austria and Italy, joined the cause of the Allies.

Military service is universal and compulsory. In the Great War Italy mobilised 5,500,000 men, and her casualty lists showed 2,800,000 dead, wounded and missing.

Her manufactures are handicapped by lack of coal, and her distance from the markets of raw materials. The breeding of silkworms gives employment to a large number of people in Northern Italy.

Italy manufactures paper, olive oil, wine, sugar, tobacco, salt, hemp, and takes high rank as a manufacturer of small metal articles, pottery and glass.

The co-operative system is a very pronounced feature of Italian national life.

Before the war the greatest volume of trade was with Germany, the United Kingdom next, and the United States of America third.

Italian imports from Egypt from January to March last year included large quantities of cotton, hides, and phosphates, and her sales to Egypt included cotton manu-

factures during that period to the value of 25,616,000 *lire*.

Her production of minerals per annum has been estimated at 450,000 tons iron ore, 372,000 tons iron and copper pyrites, 16,000 tons zinc ores.

The trade between Australia and Italy is at present limited to wool, although during the war Australia exported to Italy tallow, hides and sheep skins, as well as wool.

Italy has suffered from what Napoleon III. called the "monstrous complication" of her political geography. The nation is determined to live up to the motto *ITALIA FARA DA SE* (Italy will manage for herself), a fine motto for any nation joining the League of Nations, if the problems confronting the League are faced in the spirit of peace and goodwill among the nations of the earth.

Her delegates to the Peace Conference withdrew because President Wilson would not yield to Italy's claim to the city of Fiume, but they returned and offered several concessions, one of which was that Fiume was to be a free city. This instance is quoted in illustration of the Italian view of the ultimate success of the League.

The peace of the world demands nothing more than that the same spirit of conciliation should be shown by all nations, and Italy's first step in that direction was undoubtedly a historical fact that should be deeply imprinted on the human mind.

### BRITISH WAR MEDALS DISTRIBUTION TO SEAMEN

Captain Williams, Sub-Director of Navigation, stated last month that the King had approved the granting of British war medals to members of the mercantile marine in Australia.

Masters, officers, men and women who can furnish approved evidence of having served on a British ship for not less than six months outside Australian waters, will be eligible to receive the decoration.

The British mercantile marine war medal will also be granted to those quali-

fied to receive the other medal, on production of evidence that at least one voyage has been made by the applicant through a danger zone.

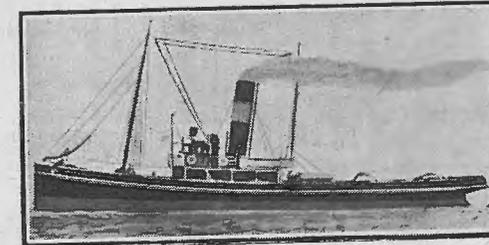
The co-operation of the States has been sought by the Commonwealth in distributing the medals, and the shipping masters' offices in all States will supply information to applicants. The medals are not yet ready, but ribbons are being distributed from the shipping masters' offices to those entitled to receive them.

## TUG BOATS

### THEIR WORK IN AND OUT OF SYDNEY HARBOUR

BY

E. J. HILL



One of Sydney's Ocean-Going Tug Boats.

WHEN two or three tug boats are seen, pushing and pulling a lordly cruiser into Cockatoo Dock, Sydney, and another tug lashed broadside on to a punt full of refuse, one must not jump to the conclusion that the same class of tugs carry out these different duties.

There are aristocrats among tugs just as there are in society, and the higher class tug boats look down in scorn and derision on those in a humbler walk in life, that only handle cargoes of refuse, or do odd jobs such as punting wool and spelter or coal hulks to oversea liners.

But as in the social scheme of things, each has his appointed place, so with the tugs. The fussy little craft, a tenth the size of the huge oblong punt, laden with merchandise lashed to its side, could no more undertake the work of the deep-sea tugs than could a pleasure launch. But each has its work, and though the little fellow may not venture out hundreds of miles to sea in search of an incoming wind-jammer or overdue cargo tank, it does work of an immensely valuable character on harbours such as Sydney.

Dealing with the deep-sea tugs, not so very long ago it was a common sight to see six or seven of them, each belonging to a rival company, racing full steam ahead down the harbour and out to sea, when a vessel needing a tow-in was reported. But to-day the various companies owning tugs

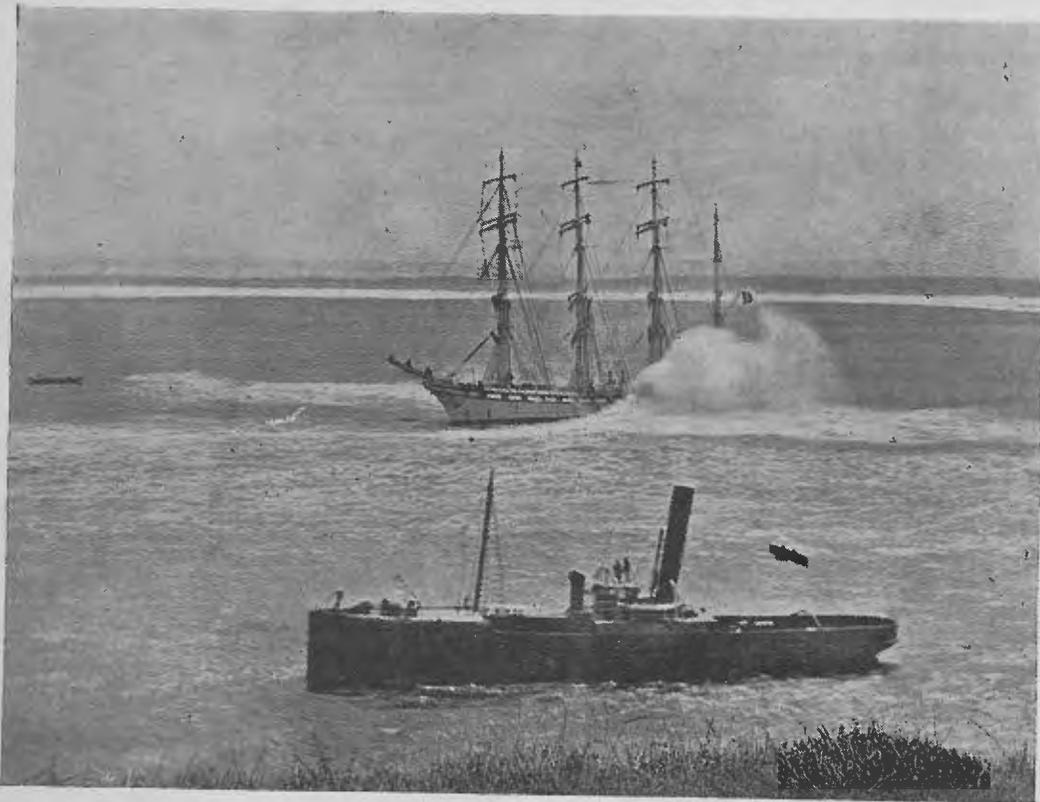
are coming to an arrangement to cut down this needless waste of coal, wear and tear, and wages, and more business-like tactics are the result. Now and then, however, the old-time rivalry crops up. For instance, when some months ago it was reported that a steamer short of coal was somewhere in the vicinity of Lord Howe Island, tugs belonging to rival firms set off in the hope of finding the steamer, and the first one to sight her and pass a rope on board naturally got the job. The other tug only had a sea trip for nothing, but it is all in the game, and in a case like that the best one wins, and there is no grumbling by the losers. These skippers of the deep-sea tugs are real sports, and are generous in their praise of a fellow skipper, even if he has snatched a rich tow from under their nose. There is a breadth in their outlook that "poor little street-bred people" would hardly understand, and would be unable to appreciate.

"It is not all beer and skittles," remarked a grizzled old skipper of one of these tugs. "You are always on duty, day and night, in case your services are required, and, of course, you've always got steam up. To give you an instance, I was told there was a schooner coming down the coast which would require a tow, and I got busy. I picked her up just off Newcastle, and thought her skipper would come to terms as it was pretty dirty weather.

But that schooner's skipper was peevish, and reckoned he'd carry on till daylight. There was nothing for me to do, but carry on close to him until he saw fit to invite me to pass my line aboard. When daylight came there was an ugly sea running and he saw sense, but he had wasted a lot of time for nothing.

"When we go off on the lookout for incoming sailing ships, you can say our beat is generally from Seal Rocks to Jervis Bay, but in search of an elusive vessel we

the skipper, as he dug a horny thumb into his pipe. "You remember the big gale last December, there were several large boats lying hove to outside the Heads, waiting for the weather to lift before they would venture in, and other big boats were sheltering in Watson's Bay, not game to proceed to sea; there was one big boat hove-to about twelve miles out, with a squealing load of passengers, and the captain had been sending wireless messages to the agents for a tug. It was just after



A Tug Boat Standing by the Sailing Vessel "Adolphe," Wrecked on Breakwater at Newcastle, N.S.W., Some Years Ago.

have sometimes stretched the beat to 180 miles. Then, there is towing between Melbourne and Sydney. Say a vessel has damaged her rudder and is unfit to work her own way between ports to deliver cargo at Sydney, it pays her agents to hire a tug and have her taken round in tow rather than lift the cargo in Melbourne and have it railed overland to Sydney.

"There are times when a man has got to put his foot down, though," went on

midday that Mr. Gibson, Signal-master at South Head, reported it would be unsafe for the Manly boats to run any longer, and the service was suspended. The sea was still rising, and yet at 4 o'clock I was instructed to go out in my tug and show that liner the way in. It would have been dark before I reached her and returned to the Heads, and I pointed out firmly that it was an absurd sort of order, and I would not risk my crew's life and my own, let

alone the safety of the tug, in carrying out such instructions. Had I been told to go out at 10 o'clock in the morning, I would have gone like a shot, but to ask me to do it at dusk was just nonsense, and I told the firm so, and in the end they saw I was right."

"Many a time," chipped in the skipper of another deep-sea tug, "have I seen big liners sheltering in the harbour when I've been ordered outside to pluck in some boat or other, but the reason isn't far to seek. You see, if anything happens, the master of the liner is held responsible, and they do not take any chances of having their certificates suspended or cancelled. They aren't really masters any more than the

panies. So there you are. What with pilots outside, and tugs inside, the harbour, the job of master on a big liner is getting less that of a master every year." "Of course, the liners are getting larger, and the old breed of master is dying out. The new school has been taught to depend on pilots and tugs, and, well—there you are. There'll never be a slump in tugs," he added with a satisfied smile. "There's more and more calls for them every day."

Besides tucking the big liners into their berths, there are other duties inside the harbour that the more powerful tugs are called upon to perform. If a vessel, either steam or sail, has to be moved from



This Photograph Shows H.M.S. "Powerful" Being Shifted by Tugs, While on the Right is Seen Another Tug Towing a Barge.

owners are masters. The insurance companies are the real masters, and if anything happens, up goes the premium. Its the same berthing a vessel. Only a few years ago the masters of big inter-State boats would think no more of berthing, unaided by tugs in Darling Harbour, than the master of a ferry steamer would think of berthing at the Quay or North Shore. But its all altered now. None of the inter-State boats proceed beyond Milson's Point without having a tug in attendance, which takes them in hand and tucks them snugly in their berths, yet the master of the vessel should be able to do the whole of the work himself. But he does not; his company won't allow him, neither will the insurance com-

panies. So there you are. What with pilots outside, and tugs inside, the harbour, the job of master on a big liner is getting less that of a master every year." "Of course, the liners are getting larger, and the old breed of master is dying out. The new school has been taught to depend on pilots and tugs, and, well—there you are. There'll never be a slump in tugs," he added with a satisfied smile. "There's more and more calls for them every day."

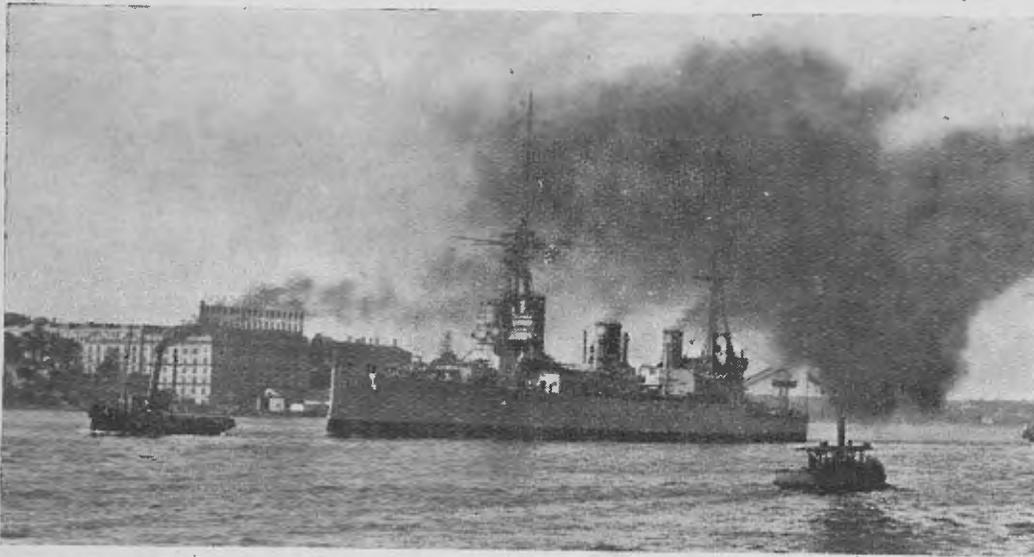
During the great war two of the most powerful tugs in Sydney Harbour were taken over by the Imperial Government, and proceeded under their own steam to the English Channel, where they were engaged on salvage and towing work. Once their duty in these far distant waters was completed they returned to the more prosaic work they are now engaged upon, none

the worse for having steamed over 25,000 miles in the cause of the Empire.

In the piping days of peace the various parts of the Empire are always preparing for war, and another job the tug boats are detailed for is to tow the big Hong Kong targets, 60 feet apart, representing the vital portions of a cruiser or battleship, up and down the coast whilst the guns from Middle Head, George's Heights, South Head, Ben Buckler and Shark Point blaze away at them (the targets) or rather the space between, for the gun layer who cuts the rope joining the two targets is a proud man. He would not be if he could listen

Off Newcastle tugs have a strenuous time when a big ship gets into difficulties, and on more than one occasion a tug has stood by a vessel being hammered to pieces by big seas, whilst the lifeboat has carried out its errand of mercy, and transferred the crew of the wreck to the safety of the tug. No tug master ever disregards the call of a vessel in distress, no matter what the weather may be like—all the more honour to the masters of these craft.

When one watches a tug gently fending a big ship into a snug berth in Sydney or Newcastle, one's glance is nearly always for the ship. She may have come from seas that are only a name on the map to



H.M.A.S. "Australia" in Charge of Tugs in Harbour. Other Tugs are Assisting on the other Side of the Vessel.

to the remarks of the R.A.G.A. men on board the tug who have to fish for the two ends of that cut tow line and knot them together again before firing can be resumed. The job often takes a couple of hours, more if there is any sea running, and picking up and joining the ends of a cut rope does not seem to be work that the R.A.G.A. is specially qualified for. However, it gives the crew of the tug a chance of a pleasant smoke-o, and an opportunity to make facetious remarks about land-lubbers, hotly resented by the men in smart-looking, but uncomfortable and unworkmanlike, uniforms, who have to fish for the rope ends, and join them up again.

the onlooker, yet full of romance for that very reason. The tug boat one is accustomed to see daily, and there is, therefore, no romance attached to her. To the man who "has gone down to the sea in ships and done business in great waters," however, the tug boat holds as much, or more, romance than the liner. He "let's the big things pass, and the little things remain," and as he watches the tug nosing or towing something in the steam kettle line a thousand or more tons its size, he remembers the work of the smaller craft—its never-ending duties ready for the call day or night, gale or calm, rain or sun, and its risks by the way.

For they take risks, these tug boats, if there is a chance of saving lives or ships, and sometimes in the execution of those risks their crews look Death as calmly in the face as have their blood brothers of the British Mercantile Marine throughout the bloodiest war the world has ever known.

In endeavouring to tow a vessel into port one of these tug boats, not so many years ago, got mixed up with the larger vessel and sank, taking down with her the whole of her crew except the only man on board who could not swim a stroke. Her engineer, one of the finest and strongest swimmers in New South Wales, though on deck at the time of the disaster, was among the drowned.

Nowadays, thanks to the invention of Wireless, with which all inter-State and oversea steamers are fitted, as well as many sailing ships, there is less need for the deep-sea tugs to patrol on the off-chance of picking up a tow. They get the opportunity of a quiet spell in harbour until

the owners receive a wireless message that such and such a boat will require a tug at a certain time, at, roughly speaking, a certain position off the coast. The tugs time their departure accordingly, but the little chaps are going practically all the time. Barges loaded with explosives may have to be towed up to the powder hulks in Middle Harbour, or the Harbour Board wants some loads of rubbish dumped outside the Heads, or coal hulks have got to be towed and laid alongside some "ram-you, damn-you liner with a brace of bucking screws." In all these jobs the utmost care has to be exercised, but the skippers of these small craft are as experienced in their way as are the brethren who handle the wheel on the deep-sea goers.

They are good men all, and our harbours would be quiet places but for the multitudinous comings and goings of their various craft, and it is gratifying to know, from the mouth of a competent authority (quoted above), that there will never be a slump in tug boats as long as Sydney Harbour is Sydney Harbour.

## WIRELESS ON THE LAND

An interesting wireless demonstration was carried out last month at "Branxholme," North Sydney, the occasion being a garden fete by the Australian Inland Mission.

A wireless receiver and electronic valve magnifier was installed by Amalgamated Wireless (Australasia) Limited, and the Company's representative received signals from stations situated in various parts of the Pacific, the United States of America, and from the Carnarvon Radio Station in Wales, Eiffel Tower and Lyons Stations in France. The signals received were magnified sufficiently to be audible 100 yards from the receiver.

Great interest was shown in the demonstration, which was visited by a constant stream of sight-seers, and considerable surprise was evidenced at the tremendous possibilities of this form of communication in the Australian out-back, especially in view of the practicability, simplicity and reliability of the instruments.

The objective of the Inland Mission is to awaken national interest in frontier problems of our own land; secure contact with our frontier pioneers by providing a patrol of capable ministers, thoroughly equipped for the tremendous journeys which are entailed, and to care especially for pioneer women and children by stationing capable nurses and providing cottage hospitals in frontier townships, and one factor which will tend to the attainment of these ideals is the utilisation of wireless.

The possibility of this means of communication cannot be over-estimated, more especially as the simplicity of operating is such that the average bushman can master it with very little preparation, while the cost is small in comparison with the very significant advantages.

The power in connection with such a set can be supplied by the ordinary motor car engine, giving a transmitting range up to 300 or 400 miles.

## FRUIT OF THE VINE

BY  
KAE McDOWELL

Grapes and wine!—there's magic, black and white, in the words. Down and through the ages they've cast a spell to conjure with, both cursing and blessing, and with the same mysterious urbanity. Mythology records how the high gods of Olympus pressed the first red vintage of the earth themselves, and revealed the secret of the grape to mortal man.

The first scriptural mention of the potency of wine was when Noah planted

rejoicing; crowned the triumph of kings and emperors, and, in the cup of the spy, has abetted treason.

History tells how, down Cleopatra's lovely throat, ran wine and melted pearls; again, how, with a steady hand, she mixed it with poison for her enemies. Wine has aided the murderer and the plotter in his darkest schemes; it has befriended innocence; inspired our most melodious poets to sing their sweetest songs. One of the



Vine on the Hunter, Ninety Years Old.

himself a vineyard, and thereafter drank more often than wisely.

Perhaps, more indissolubly bound up in the destinies of humanity than any other of the world's industries, the tendrils of vine extend to every country, through every climate, and through civilised and barbaric races. As the bubbling symbol of the "elixir of joy," it has shattered happiness for thousands, as a cannon ball shatters crystal; it has turned tragedy into

greatest poems in the world was written in praise of it:

"Oh, with the grape my fading life provide,  
And wash my body whence the life has died;  
And in a winding-sheet of vine-leaf wrapt,  
So bury me by some sweet garden-side."

So, slipping down the long vista of the ages, we find great deeds, high destinies, joys, sorrows, dark crimes, exquisite aspirations—all alike tinged with the glow of some quiet cellar's magic vintage.

But—

"The Grape that can with logic absolute,

Life's leaden metal into gold transmute,"

while it has formed a definite and important link through the gradual evolution of man, also provided controversy with some of her sharpest weapons. From the time when Bacchus first pressed the luscious purple from the grape and fashioned it into fermented liquor, the wine industry has known its violent opponents. But it is during recent years that this hostility has reached its height, and a wave of actual "prohibition" has swept over the world.

Russia went "dry" by the late Czar's decree; in a minor degree, Canada and America followed suit, and now the very uncompromising organisation of prohibitionists is turning its attention to other parts of the world—including *Australia*.

Various curious effects of American prohibition may be mentioned—for instance; how hundreds of people died from drinking wood-alcohol, and considerable numbers went blind from the same cause, and how many ingenious devices for smuggling spirit were resorted to and discovered by the authorities, such as the filling of bogus coffins and motor tyres.

During the war, the consumption of liquor in some countries was considerably restricted, but was by no means the case with all. During one year alone France supplied 250,000,000 gallons of wine to her troops.

For the years 1897-1907 the average annual wine production of the world amounted to 3,362,200,000 gallons, of which amount France supplied 36 per cent.—3 per cent. of her whole acreage being given over to the cultivation of the grape. In Australia the amount of land under grape cultivation is less than 0.004 per cent. The industry is, however, in an extremely alert and paying condition, especially in New South Wales, Victoria and South Australia. This fact will not be wondered at when it is understood that a vineyard under irrigation yields from 10 to 11 tons of fruit per annum, the

price for which ranges from £10 to £20 per ton. Non-irrigated land produces usually from two to five tons per acre.

To bring an acre of grapes into bearing, costs about £50. The vines begin to fruit in the second year, and in the third year may be considered in good bearing. One ton of grapes will produce from 150 to 160 gallons of wine.

Land most suitable for vineyards is on sunny slopes, away from the dampness of the narrow valleys, where the sun is not too fierce. The type of vine preferred varies greatly with the climate. For instance, in New South Wales, where the climate is softer than in South Australia, grapes for light, white wines, such as Chablis, Hocks, and Clarets, are favoured, the amount of grape sugar required in these, for fermentation purposes, being considerably less than is the case with Ports and such heavier varieties.

Australians can so far, by no means be classed as great consumers of wine. Experts contend that this is largely due to the fact that we do not drink it in the right way. Australians do not dilute their wine with water, as is usually done in France and Germany. The *vin ordinaire* drunk by the Frenchman with his meals is not necessarily a cheap class of wine—it is wine with water, and often contains as much as two-thirds water. It is then a grateful beverage of very light alcoholic value. Sherry and Claret are particularly adapted for dilution, and Hock may, in a similar manner be taken with aerated water.

The sweet wines of Adelaide are now world-famous, for the fierce, dry, sunshine of South Australia is considered to impart greater lusciousness to the fruit, and a higher percentage of sugar, thus aiding by natural means the production of the heavier varieties of wines.

Australia has come to be spoken of as the vineyard of the British Empire, and as such has a great future, for why should Germany, for instance, help to supply the Empire, while we can, and do, produce wines, both red and white, of such charm and with such particularly pleasing characteristics as to win the unstinted praise of connoisseurs the world over.

The grape was introduced into Australia very early in the settlement of the country. The year 1815 is said to have been the first occasion, but planters had

only meagre success with it until one James Bushby brought to Sydney in 1832 a large collection of vines from the Luxembourg collection in Paris.

The vines in this country are now usually planted in rows which run in the same direction as the hot winds—from north or thereabouts to south. The vintage takes place during March and April—in some places during the latter portion of February.

At this season the vines are a picture and a delight from an artistic, as well as a practical, standpoint. Grapes for the



Grape Picking Scene in the Hunter Valley, N.S.W., one of the Largest Vineyards in Australia.

manufacture of sparkling wine are gathered before they are fully ripe. For the rest—picture it! Acres of vineyards on sunny slopes, the smell of the warm, brown earth; hundreds of standard vines with their decorative foliage, the stems turning from green to brown; great bunches of luscious hanging berries, the purple bloom upon them. Pick some of them and test their suitability. They come off the vine easily, the exquisite juice being sweet and sticky and a little thick.

Very alcoholic wines are produced from grapes that have remained long on the

vine. "In the isles of Candia and Cyprus," says Du Breuil, the noted French authority, "the grape is allowed to shrivel before it is cut. The same is done with the alcoholic wines of Spain. Some of the most famous grapes of Franche Comté are not gathered until December, and on the hill-side of Saumer the white grapes are left until the pellicle shows certain signs of decay."

It is interesting, and perhaps not generally known, that in Australia we have more up-to-date machinery for wine-making

than they have in most parts of France and Germany. A Frenchman, on entering one of our big wineries, was astonished to find large and powerful continuous presses of the very latest patterns; hydraulic presses, some of them entirely steel-framed, with cylinders twenty-four inches in diameter and worked automatically, so that having once been put in motion they need practically no attention.

The importation of this thoroughly up-to-date machinery was made necessary by our difficult labour conditions.

The picking of the grapes, however, has still to be done by hand, after which they are taken in trucks to the winery, mechanically stemmed and crushed and then poured into fermenting tanks, a mass of skin, seeds and juice, called "marc." From the fermenting tanks the "marc" is placed into iron-bound cases mounted on portable carriages, and run on lines to the hydraulic press, where it is pressed and drained, the press being capable of a pressure of two hundred and twenty tons on the "marc." The cage is then hoisted over a dray, the dry husks being dropped out and eventually carted back to the vineyards, where they are used as manure. Meanwhile the juice or "must" is pumped through hoses into polished cement vats, where it is left until fermentation is complete.

The next process is what has been called the "remarkable phenomenon" of fermentation, the vagaries of which have to be accepted philosophically the world over. Many growers in the old world have, for instance, discovered that after fermentation, a certain number of casks of wine that were produced from grapes in the self-same vineyard, had developed different qualities.

Fermentation of wine in Australia, however, takes place under no such comparatively haphazard conditions. Step into the laboratory of a wine expert, and you will be amazed to see the elaborate and strictly scientific methods of yeast culture and general investigation. "The study is fascinating," says the investigator, and truly those rows of mysterious-looking phials and bulbs, instead of detracting from the age-old romance of the magic grape, only seem to increase it.

The high quality of Australian wine has been proved under the severest tests it

could be put to—the world's markets. It has stood purely on its merit in London and on the Continent, simply because there was no other way. And it has come to be so much appreciated in the United Kingdom, at any rate, that, as was stated at the Viticultural Congress held in Sydney last year, "during 1915 one in every 15½ bottles of all wine consumed in the old country, was Australian."

Moreover, England has recently given a preference in import duties to wines grown within the Empire. This, in spite of the insistent organisation carried on by prohibitionist movements, has given a decided fillip to the industry as it affects export. One firm alone, in New South Wales, is at present constructing a winery from which it will presently produce a million gallons of the grape's abundant essence every year.

Viticulture, though by no means a lazy man's calling, provides splendid returns for the "small man" who, if he does not wish to press his own vintage, may take his grapes to the winery in much the same way as your modern dairy-farmer takes his milk to the butter factory—and he will get a comfortable income.

Many soldiers in Australia to-day who have returned from fighting through the devastated vineyards of France, are now engaged tending with success the fruitful grape in the various irrigation areas, especially in New South Wales and Victoria, and will continue the warp and weft of the great tapestry of romance and utility that chronicles the history of the magic vine.

For—

"Still the vine her ancient ruby yields,  
And still a garden by the water blows."

## Photographers!

We will welcome exclusive popular photographs with short write-ups, suitable for publication.

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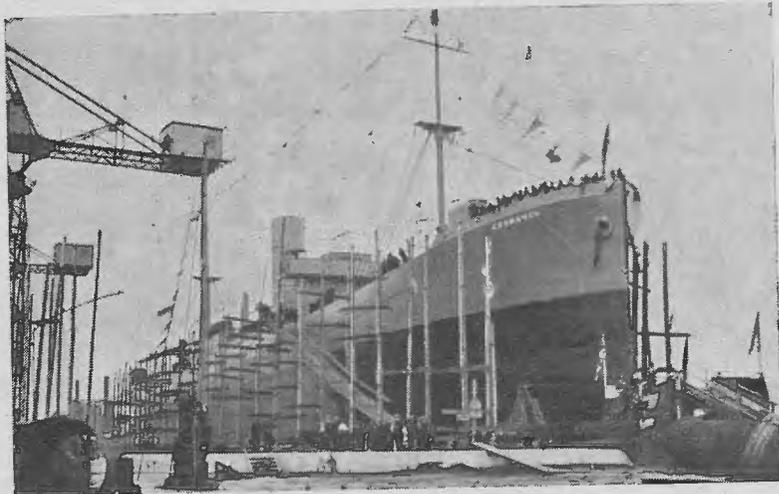
"Sea, Land and Air,"

97 Clarence Street, Sydney.

## LAUNCHING OF S.S. "EROMANGA"

Built at Walsh Island, Newcastle, the last vessel on the slips, the *Eromanga*, was successfully launched on Saturday, March 12, and was the first vessel to be fitted out before launching. Some of the fires in the stokehold were burning as the vessel took to the water, and all that remains to be done is to fit out seamen's quarters, complete a few of the unfinished portions of the interior arrangements, and instal the wireless apparatus. It is expected she will be ready for ocean trials early in April.

Among those present were Mr. Estell (Minister for Works), Mr. D. Watkins, M.H.R., and Mr. J. L. Fegan, M.L.A.



The "Eromanga" all Ready for Launching.

Representing the Steel Works were Messrs. F. W. Mitchell and Noyes.

Before the ceremony Mr. Estell stated that everybody regretted the *Eromanga* was the last ship to be built under the Commonwealth contract, but hoped before long that Commonwealth ship-building would be continued, and that Walsh Island would get a good share of the work.

Mr. Estell then read a letter from Mr. Poynton, Minister in charge of Commonwealth Shipbuilding, which stated: "With reference to the launching of the *Eromanga*, I regret that pressure of business

will not permit of my being present, but I will express the hope that the function will be in every way successful. As the *Eromanga* will be the last ship to be built under the contract with the Commonwealth Government, I take this opportunity of complimenting your establishment on the successful carrying out of an extensive programme which exceeded anything previously undertaken in the ship-building industry of Australia, and of tendering you my appreciation of the manner in which the work has been fulfilled."

Mrs. Watkins, who performed the launching ceremony, was presented with a pair of silver shears.

After the launching there was an informal gathering, at which Mr. Watkins proposed the toast of Mr. Cutler, General Manager of the Works on the Island. He asked those present not to lose hope of getting further orders for ships from the Commonwealth Government, and stated there was every hope of their getting another ship of the present class.

Mr. Cutler, responding, said that the ships were well and faithfully built, and he was glad to hear from Mr. Watkins that there was a possibility of further orders for similar vessels, but the disap-



The "Eromanga" Immediately after Taking to the Water.

pointment to him, and the staff generally, had been very great, because it was almost impossible to hope for an order for a 12,000 vessel. They would have been glad to go a little further, and show what they could do, for they believed they could turn out a 12,000 ton vessel that would be a credit to any establishment in the world.

Mr. Cutler pointed out that he and his staff realised and appreciated all that Mr. Watkins had done in trying to bring the

work to them, and that if he (Mr. Watkins) had not succeeded in bringing an order for one of the larger ships, it was not his fault.

Later Mr. Cutler stated that very shortly things would be busy again at the Island, as he hoped that work would proceed on the Sydney Ferries Contract, and the Government Bar Dredge. These, with other minor contracts, would keep them busy for about 12 months, but they were looking for fresh contracts all the time.



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**THE WIRELESS PRESS**

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## AMERICA AND THE AMATEUR RADIO MAN

BY

RALPH W. WIGHT (Radio Officer s.s. "Cathlamet")

AMERICA'S policy regarding the handling of amateur radio enthusiasts in pre-war days was, without a doubt, her greatest boon when it became necessary to place all radio apparatus and communication under Government control. The amateurs had been so aided and encouraged that many had become very efficient in this line and were able to fill responsible positions with very little additional training. Many of these men joined the Army Signal Corps or the Navy, and were able, almost at once, to take up the routine of work. They had reached a stage of efficiency which would have required many months of training.

During the war all amateur stations were closed; coastal and trans-oceanic stations being taken over by the Navy. Since the armistice these stations have been gradually returned to the former owners, and amateur communication once more authorised. The two hundred meter wave length reserved for amateurs is once more a continual buzz of chatter and amateur traffic. One may "listen-in" any evening to radiophones, continuous wave transmitters, and all classes of rotary and quenched spark signals. To assist the amateurs the Navy has established a station at the Bureau of Standards at Anacosta, Maryland (call signal NSF). This station is complete in every detail, consisting of a modern five-hundred cycle quenched spark transmitter as well as a radiophone and valve CW transmitter, operates exclusively on two hundred metres and carries on tests and communications with different amateur stations.

The amateurs have established a Radio Relay League (in actual operation before the war), whereby messages may be relayed to any part of the United States through a chain of its stations. Almost any evening Anacosta may be heard helping the Relay League clear traffic. His radiophone signals are very clear at night in New York Harbour, a distance of about two hundred and fifty miles. There are several radio-phones under amateur control in and near New York City. On nearly

all of these stations the valve system of modulation is used. It is used to such an advantage that with a fairly sensitive receiver, every detail of a violin solo or an orchestra selection is clearly reproduced. Most of the privately-owned radiophones carry on communication with a marked degree of success over distances up to thirty-five or forty miles. The majority of the equipments are so constructed that CW signalling may be started by merely throwing over a switch. The valve circuit is then excited by means of a high-frequency buzzer and hand-key for forming the letters. These low-powered CW sets are particularly useful for communication over a short distance through heavy interference on account of the extremely sharp wave emitted.

Amateur stations within five miles of a Naval station are limited to 500 watts power, while the others may use up to 1,000 watts primary input. The Government Inspectors are very particular that the amateurs' wavelengths do not exceed two hundred metres. Frequent inspections of stations are made, wavelength, decrement and power input being measured. Licenses are often temporarily revoked or suspended for the violation of any radio laws in order to make the amateur more careful. Since the war things have leaped ahead at an almost unbelievable pace. Everyone is wondering what the future will bring forth in the radio field.

Most of us can afford a piece of antenna wire, a valve or two, and a few other necessary pieces of apparatus, to receive local or long-distance signals, and it is remarkable the progress that the Australian amateurs are making. The transmission will have to come later.

With an aerial 300 feet long, two valves, and the proper loading inductances, nearly any high-powered station in the world should be readable right here in Australia. From Sydney Harbour the writer has copied Nauen, Germany (POZ); Chatham, Mass., U.S.A. (WSO); Lafayette, France (LY), and many others.

(Continued on next page.)

## NEW ZEALAND AFFAIRS THE NUCLEUS OF A NAVY

BY

HENRY BATESON (Our Special N.Z. Correspondent).

With the arrival of the H.M.S. *Chatham*, the flagship of New Zealand's future navy, it was expected that some definite policy would be announced by the Prime Minister (Right Hon. W. F. Massey), but this has not been done. The *Chatham* was sent to New Zealand under the scheme suggested by Admiral Viscount Jellicoe, now Governor-General of the Dominion, when he made a report recently on the subject of naval matters here.

The *Chatham* is a light cruiser of the "City" class, specially designed to meet certain requirements of the oversea stations where cruisers of fair speed, quick-firing armament and economical coal consumption could be advantageously employed; or alternatively kept in British waters to act as screens to the bigger ship squadrons, do scouting and patrol work. During the war the *Chatham* carried out all these duties, being employed on the African coast, around India, at the Dardanelles and in the North Sea. In the early days of the war she captured the *Konigsberg* in an African river, and just prior to the battle of Jutland she had the

misfortune to be mined, thus missing the fight.

The *Chatham* is commanded by Commodore Alan Hotham, C.M.G., as previously reported in these columns. She was built at a cost of £349,538, a proportion of her boilers being oil fed.

The future movements of the vessel are not yet known, but she will probably be employed around the islands.

### Air Mail Services Inaugurated.

Air mail services have been inaugurated in the South Island between Christchurch and Timaru, calling at Ashburton, by the Canterbury Aviation Company. The service has been run well up to schedule, but since the first few days there has been a marked falling-off in the number of letters carried, and it is hardly likely that from the postal point of view the service will be a success. This, of course, was half expected, as there is an excellent train service between these places. Captains Dickson and Gray have been piloting the *Avros* running in the service, which is a daily one.

## AMERICA AND THE AMATEUR RADIO MAN—(Continued)

For those who have valves and long-wave receivers the following data may prove interesting.

Pearl Harbour, Hawaii (NPM), sends traffic daily to Guam, Marianna Islands (NPN), from 2200 Greenwich Mean Time to about 0130 G.M.T. That corresponds with 8.00 a.m. to 11.30 a.m. Sydney time. Pearl Harbour works on 11,200 metres and Guam on 7,000 metres, both being audible in daytime and very strong at night. Pearl Harbour also sends time signals daily from 9.55 to 10.00 a.m. N.S.W. time. San Diego, California, U.S.A. (NPL), will be heard at 8.00 p.m. Sydney time, broadcasting press on 9,800 metres each day. These stations are all arc transmitters.

The A.M.S. *Sonoma* and *Ventura* are equipped with five K.W. Federal arc transmitters. They will be heard working with

Sydney Radio Station (VIS) when approaching or leaving, and transmit on 2,400 metres, receiving Sydney's signals on 600 metres.

Other American and European stations will be heard almost continually on wavelengths ranging from 9,000 to 17,000 metres. Chatham (Mass.) and Nauen (Germany), and one or two others do not use arc transmitters. Nauen uses a Telefunken alternator, Chatham employing an Alexanderson alternator. A difference will be noticed in the signalling of the two systems, there being no compensating wave when using the alternator system.

Here's to better days for the Australian Amateur Radio Man! May co-operation from the public and Government meet him on every hand!

## MAKING THE NATION'S WINGS

### WORK OF THE AUSTRALIAN AIRCRAFT & ENGINEERING COMPANY, LIMITED

In its work of constructing aircraft, the Australian Aircraft & Engineering Company Ltd., may truly be said to be providing wings for the fledgling Australia. It has established an industry of vital importance and interest to the people.

AUSTRALIA is not yet 150 years old, and it is certainly a great tribute to our progressive spirit that we, among the youngest of nations, should be engaged in the most modern of all manufactures—the construction of aircraft.

It is to the enterprise of the Australian Aircraft & Engineering Co., Ltd., of Sydney, that we owe this praiseworthy development. Joy-riders of whom there are many thousands in N.S.W., know this company, which has a record for safety in the air, which certainly cannot be outdone by any street traffic figures. It is not, however, in the pleasure retained by the company's machines that the greatest interest lies, but in the activities of their works and aerodrome at Mascot, which a special representative of *Sea, Land and Air* visited last week.

No industry depending on untested local raw material for its supplies was ever built up in a day, and the A. A. & E. Co.'s works are no exception. At present it is found necessary to depend very largely on imported materials, but already they have manufactured a number of propellers from rosewood and Queensland maple, which are equal to those imported. At the present time they are experimenting and testing a large number of selected timbers, grown in the Commonwealth, in order to determine the best available for their use.

#### The Mascot Works.

Touring the works, a skilled staff of about twenty-five—many of whom have had experience with A. V. Roe & Co., England—were seen engaged on the production of aircraft and aircraft accessories.

In one section of the works wings were under construction, the framework being covered with fabric and dope. In another section woodworkers were engaged on "all Australian" propellers, made from laminae of wood. Propeller making calls

for great care and accuracy, exact weight, measurement, etc., the finished article being made up of seven separate pieces of wood. Further along engineers and mechanics were cautiously assembling, repairing and testing various types of engines, while others were busily engaged in fitting an engine into an aeroplane almost complete.

Although the works have only been operating for about nine months, in addition to a great amount of repair work, they have turned out eight aeroplanes of the following types:—

- 2 Avro Standard 504 K type, fitted with 110 h.p. *Le Rhone* engine.
- 2 Avro Standard 504 K type, fitted with 130 h.p. *Clerget* engine.
- 4 Redesigned Avro 504 type, fitted with 100 h.p. Sunbeam *Dyak* (water-cooled) engine.

Three more Avro-*Dyaks* are now in course of construction, one of which will be fitted with all steel wings, covered with thin duralumin sheets.

That is a very creditable output for a form of manufacture new to Australia as it is to the rest of the world.

Irrespective of the contingencies that arise, the works swing to meet them. For instance, up to quite recently the majority of engines used in aeroplanes were of the rotary type, which was not considered as economical as it might be, and science dictated the installation of a stationary engine similar to that employed in motor cars. The Mascot works were adapted to the new need, the necessary redesigning on the aeroplane was carried out, and the Avros now produced are fitted with the powerful and thoroughly dependable Sunbeam-*Dyak* engine.

As it is practically impossible to manufacture in Australia every part needed in the construction of an aeroplane, the Company is to be congratulated on the great

strides it has made in that direction. The engines are, of course, imported, but wherever possible Australian materials are being used. In addition to the propellers, certain parts of the 'planes are being made of Australian timbers. The tanks, metal fittings, welded components, aluminium cowling, and other parts, have been entirely made at Mascot. The struts are an exceedingly important consideration in building an aeroplane; it is necessary not only that the timber employed be strong and clean in the grain, but that

from that famous English Company. There are quite a number of *Avro* machines flying over the aerial traffic-ways of the Commonwealth, in addition to those manufactured at Mascot; therefore, it is necessary to meet a growing demand for spare parts. Large stocks are kept, and any *Avro* spares can be supplied from the works at short notice. A large quantity of *Clerget* and *Le Rhone* engine parts are held in stock, many of which are made in Australia, and which are available for sale to owners of private 'planes.



General View of the Assembling Shop at the Mascot Works.

it be light also. A special Canadian timber is at present practically universally employed for the purpose, but it is believed that Australia can produce a wood suitable for the purpose. The Company hope in the near future to produce a machine the timbers of which will be Australian throughout.

#### Spares.

As agents for A. V. Roe & Co., the Mascot works are naturally turning out the type of machine which derived its name

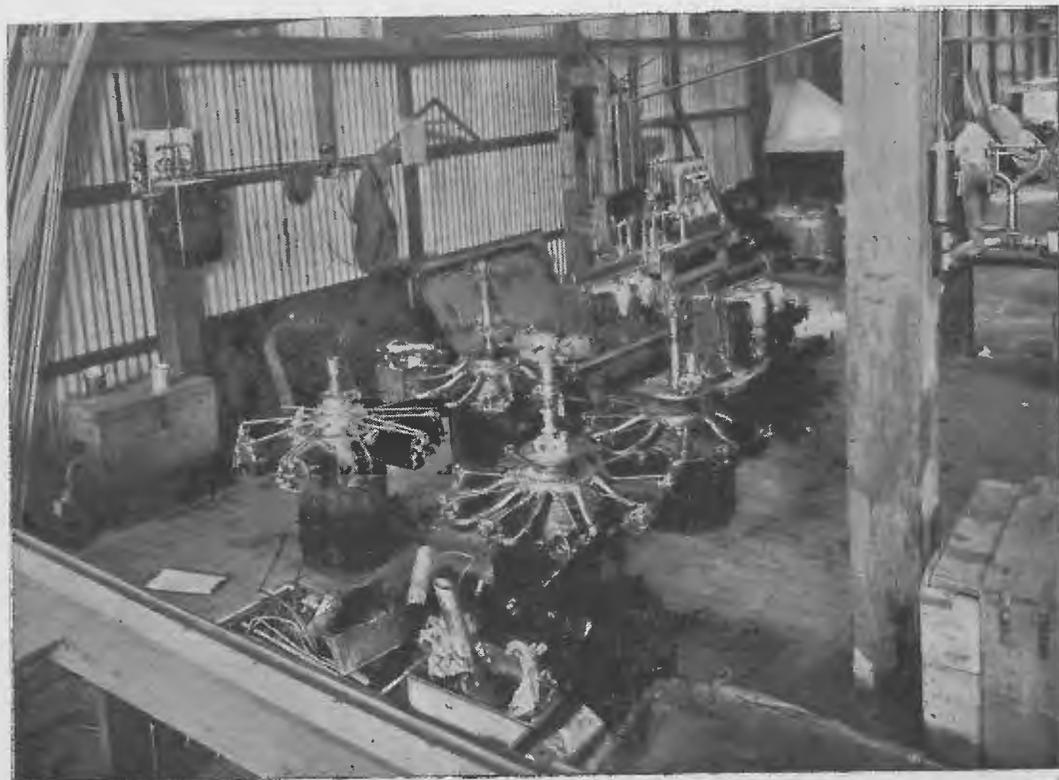
A new undercarriage known as the *Vee* type has been specially designed by the firm, and is suitable for any *Avro* machine, the *Vee* struts being made of Australian timber. They are also making front and rear *Vee* struts. These struts, which may become damaged in a rough landing, are very expensive, and would, of course, have to be replaced. In order to enable this to be done at a minimum cost, the Company has designed a timber system of *Vee* struts instead of steel tubes, and both in point

of economy and easy repair, the struts of timber are stated to be superior.

As no particular make of motor car has a monopoly of Australian custom, neither will any particular type of air machine monopolise the Australian market. Recognising this fact, the A. A. & E. Company are organising and equipping their Mascot

is a hangar, which will comfortably accommodate four large 'planes, while sheds contain sleeping quarters, spares, oils and office.

In every direction there is a clear run for a good take off, as well as for machines to make a perfect landing. At this 'drome Sir Ross Smith and his companions landed after their flight from



View of Aeroplane Engines being Assembled, Overhauled, etc. In the Front is Seen the Rotary Type, and at the Back the Stationary Type.

factory, so that in future spare parts for any type of machine will be obtainable at short notice, and repairs and renewals for any type of aircraft carried out.

#### The Aerodrome.

Leaving the works, we visited the aerodrome—a large expanse of flat, ground covered with grass, one end extending to the bank of a river—which is used by seaplanes. On the 'drome

England; Lieuts. Parer and MacIntosh also from England *by air*; and the first Aerial Derby in Australia was run from this point.

Private owners and pilots of machines owned by other companies use this 'drome when in Sydney.

#### The Defence Aspect.

The importance of aircraft in the defence of the Commonwealth is indisput-

able, and it is considered by experts that machines made wholly in Australia, manned by pilots trained in Australia, will be an important part of our military and naval system within the next few years.

This will give considerable impetus to the manufacture of aeroplanes, seaplanes, flying boats, etc., and will eventually mean the expansion of the aircraft industry, not

purchased aeroplanes. As the manufacture of machines grows the demand will become greater, and the Mascot works of the A. A. & E. Company will take on a significance in Australian life beyond dispute.

#### For the Man Outback.

Strangely enough, it is not only for the City man, but for "the man outback," the business man in the small country town,



Manufacturing Propellers.

only to those engaged in it; but to the community generally.

Australia is a country naturally suited to aviation, in weather conditions, landing grounds, and in the need for rapid transport between outlying centres.

Already an aerial service has been established between Queensland and the Northern Territory, a passenger service is running between two outlying Queensland towns, and a number of squatters have

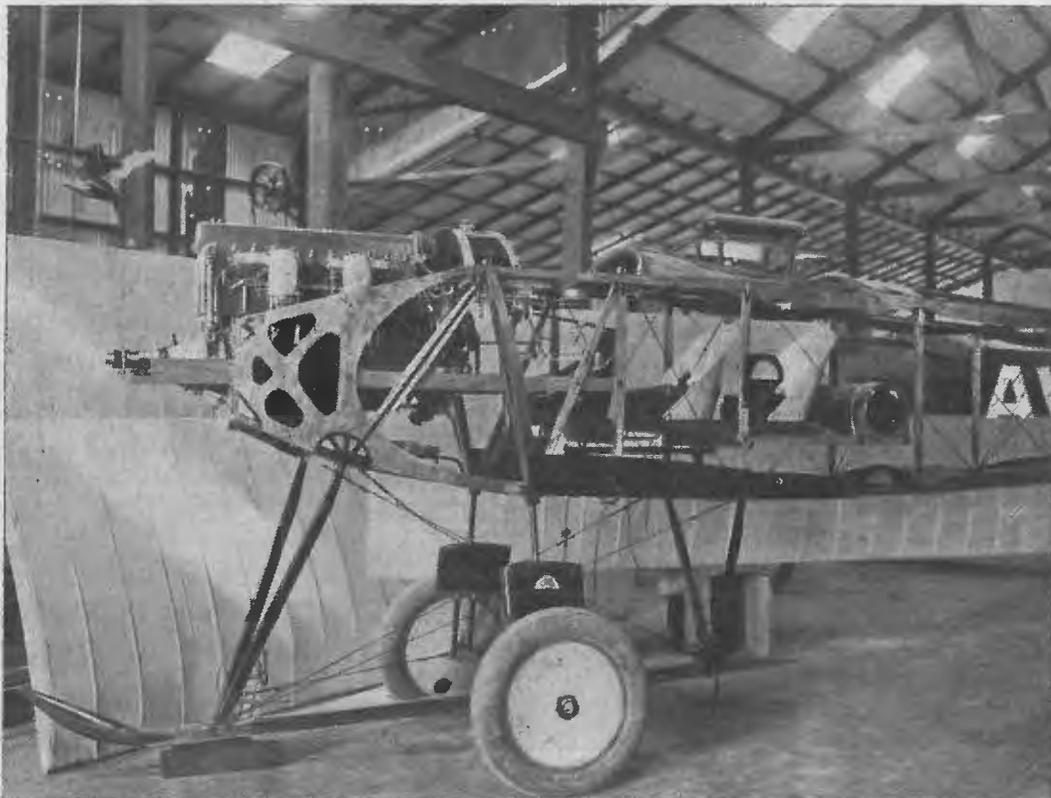
the squatter with an urgent need or a hobby strong upon him, and for the enterprising pioneer of long distance commercial aviation that the wheels of industry at Mascot are mainly turning. The Avro-Dyak machine will suit them all, especially the man outback. This machine, simple in construction and principle, is a three-seater 'bus, carrying a pilot and two passengers, and is fitted with dual control. It is also quite modern, being fitted with a

self-starter, which obviates the necessity for any preliminary urging of the propeller. A cranking handle is fitted in the cockpit in front of the pilot's seat, and is manipulated on precisely the same principle as the cranking handle of a motor car. Several of these machines are now flying in the more isolated districts of New South Wales and Queensland.

quent inspections of machines, provision of proper landing places, and generally for conditions which make flying as safe as walking the streets of any city.

#### Tide of Opportunity.

It is just such a turn in events which gives the aviation industry of this country a full opportunity to develop. The *Avro*, being a standard British machine, is one



An "Avro" Plane Under Construction. This Photograph Shows the Sunbeam-"Dyak" Engine Installed; at the Rear Three Seats to Accommodate the Pilot and two Passengers.

Australia has undoubtedly reached the turning point in its flying history. Aviation is no longer the field of the irresponsible pilot and the dilapidated "bus"; henceforth it will be placed on as safe and secure a basis as the navigation of steamers or the driving of motor cars. The Commonwealth Air Regulations provide for the licensing of pilots, the fre-

of the specific types approved by the British Air Ministry. Not only is it widely used for the transport of passengers and goods in various parts of the world, but is the machine upon which many pilots receive their tuition. There is, therefore, a considerable demand for *Avros*, and with the hall-mark of approval of the Controller of Aviation stamped upon them, and with

a reasonable amount of assistance from the Commonwealth Government, the pioneers of aerial construction should go far.

The Australian Aircraft & Engineering Company should be encouraged. Of all business enterprises it probably took a risk greater than most. It launched an industry in Australia which was, after all, only in its infancy as an industry anywhere. It

of the community, but will bring the far-flung outposts of Australia nearer together, and will, moreover, contribute, by means of the manufacture of military aircraft, to the continued safety of the Commonwealth.

#### Notable "Avro" Flight.

Capt. Cornish piloted an *Avro* aeroplane from Mudgee to Sydney on Sunday, March



The Finished Article—Built in Australia. The "Avro" Sunbeam-"Dyak" Aeroplane.

did this without assistance, without even a promise of support other than that given to it by its shareholders. The Company is engaged in an industry which will not only materially assist the commercial life

13. The flying distance was 170 miles, and passing over the mountains at a height of 10,000 feet, the trip was completed in a little under two hours. The machine was fitted with a Sunbeam-*Dyak* engine.



# CRICKET MATCH

## RADIO SERVICE v. WIRELESS COMPANY



The Two Teams and Umpires.

The Melbourne staff of Amalgamated Wireless (Australasia) Limited, recently challenged the officers of the Commonwealth Radio Service to a game of cricket, which was played on the cricket ground of the Brighton Grammar School. Mr. J. Malone, Deputy Director of the Radio Service, captained that team, and Mr. L. A. Hooke, Melbourne Manager of the Wireless Company captained his team. Lieut. H. Johnson and Mr. W. Rorke were the Umpires.

The impression formed by an onlooker, rather than a radio expert, was that in the interests of the science of radio telegraphy, all concerned should know infinitely more about wireless than they apparently did about cricket! Nevertheless, a strenuous game was fought and thoroughly enjoyed by all the players. It resulted in a victory for the Wireless Company's team by four runs, and a great tribute of sportsmanship must be paid to both teams. The scoring was as follows:

|                             |    |
|-----------------------------|----|
| <b>Radio Service.</b>       |    |
| Page, c McMahon, b Warner   | 0  |
| Jenkin, c Alford, b Hooke   | 24 |
| O'Kelly, c Falls, b Hore    | 22 |
| Williams, c McMahon, b Hore | 0  |

|                                       |            |
|---------------------------------------|------------|
| Malone, stumped McMahon, b Webb-Watts | 27         |
| Tregea, b Hooke                       | 2          |
| Weston, c Dymond, b Hore              | 15         |
| Newman, c Warner, b Warner            | 5          |
| Marks, c Hooke, b Hooke               | 2          |
| Everod, not out                       | 3          |
| Fletcher, run out                     | 0          |
| Byes                                  | 6          |
| <b>Total</b>                          | <b>106</b> |

|                 |                    |
|-----------------|--------------------|
| <b>BOWLING.</b> |                    |
| Warner          | 2 wickets 20 runs. |
| Falls           | 0 wickets 22 runs. |
| Hore            | 3 wickets 22 runs. |
| Webb-Watts      | 1 wicket 20 runs.  |
| Hooke           | 3 wickets 16 runs. |

|  |            |
|--|------------|
| <b>Amalgamated Wireless (Australasia) Ltd.</b> |            |
| Warner, b Williams                             | 8          |
| McDonald, b Page                               | 0          |
| Dymond, b Page                                 | 3          |
| Flanagan, b Page                               | 0          |
| Hore, c O'Kelly, b Fletcher                    | 30         |
| McMahon, c Page b Page                         | 33         |
| Webb-Watts, c Williams, b Page                 | 2          |
| Hooke, not out                                 | 2          |
| Williams, b Page                               | 2          |
| Falls, c Marks, b Marks                        | 27         |
| Alford, run out, b Jenkin                      | 0          |
| Byes   | 3          |
| <b>Total</b>                                   | <b>110</b> |

(Continued on next page.)

## CRICKET MATCH—(Continued).

## PERILS OF THE SEA

### SECOND OFFICER'S EXPERIENCE.



The Genial G. J. Weston Keeps Wickets.

|                 |                    |
|-----------------|--------------------|
| <b>BOWLING.</b> |                    |
| Page            | 6 wickets 20 runs. |
| Williams        | 1 wicket 23 runs.  |
| Everod          | 0 wickets 9 runs.  |
| Marks           | 0 wickets 6 runs.  |
| Malone          | 0 wickets 17 runs. |
| Jenkin          | 1 wicket 18 runs.  |
| Tregea          | 0 wickets 7 runs.  |
| Fletcher        | 1 wicket 7 runs.   |

|                                     |     |
|-------------------------------------|-----|
| <b>Final Scores.</b>                |     |
| Amalgamated Wireless (A'sia.), Ltd. | 110 |
| Radio Service                       | 106 |

### A NEW AIRPLANE.

"The Sporting Farman" is a post-war airplane introduced to Australian aviators by the Shaw-Ross Engineering Company of Melbourne, who tested the first machine last month, when satisfactory results were secured. The airplane was designed by Farman Bros. with a view of landing in a small space. It is fitted with a newly designed engine, which is a combination of the Societe Gnome and Le Rhone. The useful load is two passengers, or 440lb.

Thrilling adventures have marked the career of Mr. B. Earl, second officer of the Scottish barque *Kilmallie*, which recently visited Australia.

In 1917, while Mr. Earl was serving his apprenticeship on the four-masted barque *Hougomont*, the vessel was reported lost while on a voyage from Sydney to New York with a cargo of wheat. The ship ran into a fierce cyclone. Her cargo shifted, the stanchion was carried down the hold, and the ship went over on her beam ends. In an attempt to save the vessel the sails were released and blown away. Heavy seas were shipped, and the lifeboats were washed overboard. One of the boats was picked up in Monte Video, and the vessel was thought to be lost. Subsequently the ship was blown ashore and wrecked on Fire Island, about 40 miles from New York. Six of the plates in the vessel's hull were broken, her rudder shattered, and the two top-gallant masts disabled. With the aid of the rocket and life-saving apparatus, the crew was towed to land for more than a mile and a quarter through an angry sea. Fourteen days were occupied in towing the vessel off the rocks to Monte Video. The voyage from Sydney to New York occupied 191 days, the longest period on record for such a journey. Shortly after Mr. Earl left the *Hougomont*, the second officer and the whole of the men on his watch were washed overboard. Since then four or five seamen have been lost in similar circumstances.

Mr. Earl's last experience was on the *Kilmallie*, which became dismasted on the voyage to Australia. While attempting to set the vessel's stays, which were buried in water, he narrowly escaped being washed overboard.

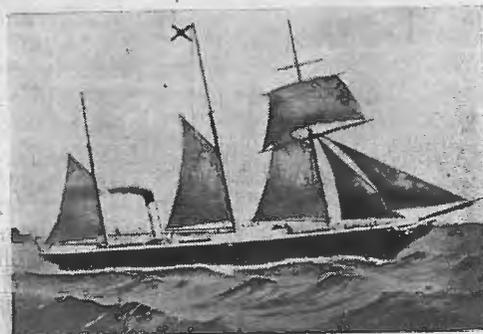


## A NOTABLE FERRY STEAMER

BY  
W. G. KENDALL

As the Bay steamer *Edina* left the pier at Geelong, Victoria, on her daily trip to Melbourne with passengers and cargo, an observer remarked: "There goes one of the oldest passenger steamers afloat. That vessel has braved the seas for over 67 years and is still going strong."

The *Edina* was built in 1853 for the Leith-Hull-Hamburg trade by Messrs. Barclay, Curle & Co., of Glasgow, and is a vessel of 380 gross tons and 289 tons net. When launched she was a three-masted steamer, barquentine rigged, and was placed in the North Sea trade. She travelled between Leith, Rotterdam, and neighbouring ports, carrying passengers and cargo, the latter consisting mainly of herrings.



The s.s. "Edina" in 1853, as Originally Rigged.

Like most historic vessels, she proved useful in time of war as in times of peace. When the Crimean War broke out the vessel was engaged in blockade running. During the American Civil War in 1863, she again took up the role of blockade runner and carried bales of cotton to England from Galveston, in Texas.

The *Edina* first made her appearance in Australian waters after the discovery of gold in New Zealand, bringing out from England a number of men keen on making their fortune in the newly-found gold-fields. She made a number of trips between Australia and New Zealand, carrying as many as 350 gold diggers one trip.

In 1864 she was purchased by Mr. S. G. Henty for £13,500, and was placed in the

trade between the mainland of Australia and the west coast of Tasmania. On the occasion of the visit of the Duke of Edinburgh to Australia in 1867, the *Edina* was one of 25 vessels chosen to welcome the Royal yacht *Galatea* on her arrival at Port Phillip Heads. Six months later she was sold to the Warrnambool Steam Packet Co. for £9,500. At that time she was still rigged as she had left her builder's yards, but whilst lying at Warrnambool a gale swept over the harbour and the steamer *Dandenong* drifted across the *Edina's* bows and smashed her beautiful figurehead, "The Maid of Judah." The vessel in a crippled condition was taken to Melbourne for repairs, and after completion she was but a relie-



The "Edina" Prior to the Overhaul in 1917.

of her former beauty. Dwarfed in size, with one mast less, she lacked the appearance of a "crack" vessel that had distinguished her from the ordinary trader around the coast.

Later on she was purchased by Messrs. Howard Smith Ltd., her present owners, and placed in the North Queensland trade, and at that time was one of the finest vessels engaged on that run.

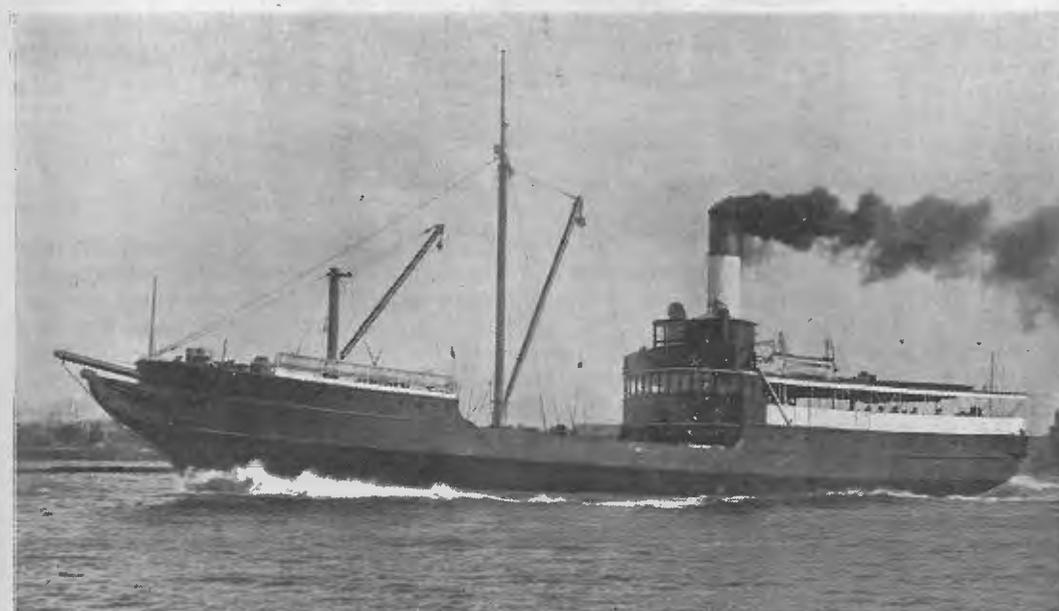
On May 1, 1880, she made her first trip in the Bay service between Melbourne and Geelong, a service she has maintained right up till the present time. During her career as a Bay steamer the *Edina* has figured in some important and exciting events, and has earned for herself the *nom-de-plume* of "Dreadnought," for in spite of numerous severe knocks she has

always come out of any accident with the best of the deal. Perhaps two of her most notable mishaps will prove of interest.

How many of those 60 or 70 passengers who travelled on her to Melbourne on the evening of Wednesday, April 27, 1894, will forget their experience, when at 8 o'clock the *Edina* came into collision with the steamer *Manawatu* near the Gellibrand light, Port Phillip Bay. The latter steamer was bound to Tasmania with passengers and mails when the mishap occurred. This vessel was badly damaged, and although the captain made an attempt to get his vessel ashore, she filled too rapidly and sank about 100 yards off the Williamstown,

filling rapidly, sank in deep water. All the passengers were saved, but of the cargo and luggage, only two bags were recovered. As the *Edina* was making water she returned to Melbourne for repairs. The wreck of the *Excelsior* was subsequently sold, raised and later re-commissioned. She continued in the Bay service for some time, but has since been broken up.

In May, 1917, the *Edina* was docked at Melbourne for a complete overhaul and renovation. The decks and superstructure were removed and replaced by new works. The long, narrow funnel was replaced by a shorter one, whilst a large bridge took the place of the former box-like structure.



The "Edina" After Being Overhauled and Remodelled in 1917, and as she now is.

pier. The *Edina*, badly maimed, made her way to the shore and was beached to prevent her from sinking. Temporary repairs were effected and the vessel was towed to Melbourne, where the repairs were completed and she was soon in service again. The *Manawatu* was subsequently raised, re-commissioned, and is still trading on the coast.

Another important mishap was the one with the *Excelsior* off Point Cook, Port Phillip Bay, during a fog on July 11, 1898. The impact between the vessels was severe and the damage great. The *Edina* tried to keep close to the *Excelsior*, but the latter gradually drifted away and,

The boilers were moved and the result was an increase in speed, whilst the accommodation on board was greatly improved.

The *Edina* has been running as a ferry steamer between Geelong and Melbourne for 41 years, and is still on the run, making an average of 312 trips per year, 90 miles per trip, and carrying an average of about 100 passengers per day.

This account would be incomplete without some mention of her late master, Captain W. Forbes, who brought the vessel from Melbourne to Geelong on her first trip in 1880, and who navigated her between those ports until he retired from the service towards the end of 1918.

## ST. JOHN AMBULANCE ITS WORK THROUGHOUT THE AGES

BY  
"MANNA MEAD"



First Ambulance Station in the Eastern Suburbs of Sydney in 1908.

We of the British race set great store by tradition in the navy, the army, and our civil life, and in these traditions there is something each man clings to when the test comes to him. Our traditions run to clean living and clean fighting, and when the fight is over, the succouring of the wounded, whether friend or foe.

Very few of the thousands in the city and suburbs have any idea when they see a motor ambulance flash by, with its white eight-pointed cross on a black ground, that the men and women in uniform on the ambulance have traditions behind them that come echoing down the corridors of time from the very birth of Britain as a nation. And yet this is so. The ancient order of St. John of Jerusalem found its beginning in those far-off days when the Caliphs of Egypt held Jerusalem in bondage, and, owing to this, certain Italian merchants in the city determined to alleviate the sufferings of the ill-treated pilgrims who annually visited Jerusalem, and they obtained permission from the Caliph Billah to erect a hospital in the Holy City for that purpose. This hospital was named "St. John the Abnomer," but the name was afterwards changed to "St. John the Baptist," which the Order continues to bear to this day. This Order was founded about the time when Norman William was

setting his heel on Saxon England, but the treatment by the Turks of the unfortunate pilgrims visiting Jerusalem became such a crying scandal that an expedition was arranged by Peter the Hermit to oust the infidel from the Holy City. Thus began the first Crusade War which culminated in the rescue of Jerusalem from the hands of the Turks. At this period Peter Gerard was rector of the Hospital of St. John, and when the Crusaders entered Jerusalem he commanded the doors of the hospital to be opened for the sick and wounded to enter in.

Peter Gerard died in 1118, and was succeeded by Raymond du Puy, who changed the Order to a warlike one for the better protection of Jerusalem, and ere long the White Cross banner waved over many a battlefield, spreading dismay among the infidels.

The Order was divided into three classes, the first rank being "Knights of Justice," and of necessity able to prove nobility of descent. The second was strictly ecclesiastical, and divided into grades. The third class was termed "Serving Brothers," and this was also subdivided. The fame of the Order soon filled Christendom, and young men from the noblest families in every land enlisted under its banner.

One need not trace the varying ups and downs of the Order in this article, but briefly state that it was established in England in 1100, when a wealthy Norman baron, Jourdain de Brisset, erected a Priory for the Order in Clerkenwell, London, and in 1166 a Sisterhood was formed at a Priory at Buckland, Somerset.

As the centuries rolled on the Order became one of the most influential in Europe, having its headquarters first at the Island of Rhodes and then at Malta. Henry VIII. and his daughter Elizabeth in turn drove the Knights of the Order out of England, and these Knights, together with their Esquires and Serving Brothers and others of the Order sought sanctuary at Malta. There is a wonderful series of documents still extant on the Island, dealing with the Order, including

Sovereign Head and Patron, with H.R.H. the Duke of Connaught Grand Prior, and half the nobility of Great Britain as its Knights and Ladies of Justice or Grace, and influential men and women as Serving Brothers or Sisters.

In the true spirit of the Italian merchants of old, the members of the Order today seek Samaritan work, and one of its most useful institutions has been the St. John Ambulance Association and Brigade, for instruction in rendering first aid to the injured in peace and the wounded in time of war.

The Transport Branches of the St. John Ambulance Brigade, which includes the Civil Ambulance Corps, and which practically handle the whole of the accident and illness transport cases in and around Sydney, have, under the title of the "N.S.W.



Eastern Suburbs, N.S.W., Ambulance Transport Station at Coogee, 1921.

one which announces Henry VIII. as "supreme head of the Anglican Church, and the Protector of the Order of St. John of Jerusalem." Henry, however, would only protect the Order as long as it would knuckle under to him. When he found it refused to hand over its revenues to him he turned from protector to persecutor.

The Order carried on its good work in Malta until in 1798 Napoleon captured the island, and the Knights, presided over by the first German raised to the rank of Grand Master—Ferdinand Joseph Antoine Herman Louis de Hompesch—surrendered without a struggle.

The Order was re-established in England in 1826, and to-day the King is its

Ambulance Transport Service," been recently taken over by the Government under an Act of Parliament dated November 10, 1919, in the same manner as the various fire brigades were reconstituted some years ago.

The reason for this is that the St. John Ambulance Brigade was never intended to be a transport body, but rather for maintaining a trained body of men and women fully qualified to render first aid under any circumstances. Gradually, however, the various branches of the Brigade had acquired transport vehicles (whether hand, horse, or motor-driven), and by amalgamating the brigades under one head and subsidising them, the Govern-

ment and the various municipalities have a well-organised service ready to their hand at a minimum of cost. The Government is already subsidising the Service, and under the Local Government (Amending) Act, 1919, Municipal Cities and Shire Councils may, and in many cases already have, also contributed towards the maintenance of the Service. The work of the Ambulance Service in saving life has only tardily been recognised as equal to, if not far more important than, that of the Fire Brigade in saving property. The subsidy, so long side-stepped by various Governments, together with the voluntary subsidies from the Municipalities and Shires concerned, and subscriptions from sporting and other bodies and private indi-



A Group of St. John Ambulance Men, with Superintendent T. H. Henderson (in centre), Secretary of the St. John Ambulance in N.S.W.

viduals, will enable the Service to be carried on with renewed vigour.

The Civil Ambulance, which attends to accidents and illness cases in the heart of the city, is actually a branch of the St. John organisation, all its staff having been trained under the auspices of this great Association, whose ramifications to-day extend throughout the whole of the civilized world.

Of the many fine branches of the St. John Ambulance Brigade—to give it its best known title—outside the city proper, one may cite that of the Eastern Suburbs. Its area of operation extends from La Perouse in the south to South Head on the north, running inland as far back as Centennial Park. This division of the Bri-

gade was first established in 1908, with only a hand ambulance and a little galvanised iron shed on the front at Coogee, and during that year 16 cases were attended to, and the ambulance "pushed" 54 miles. Two years later a horse-drawn ambulance was installed and the building enlarged. The gentle old horse "Jenny," who occupied the shafts, had one extraordinary peculiarity. She would not drink out of a bucket or any other vessel, and when at morn and evening she required a thirst-quencher, the officer at the station had to place the water hose in her mouth!

As the district increased in size with the advent of mixed surf bathing, it became evident that a more adequate service would be necessary, especially when it is

remembered that the number of the settled population was increasing by leaps and bounds. Accordingly, a new building was erected at the corner of Beach Street, on the Bandstand Reserve, by permission of the Randwick Council, at a nominal rental, with properly equipped casualty room, superintendent's office, stabling and coach-house, and a recreation and lecture room for the staff.

On the outbreak of war in 1914, the staff comprised 72 workers, and from the Superintendent to the latest joined recruit, one and all, men and women volunteered for active service, and five nurses and 63 officers, non-commissioned officers and men were actually accepted for service overseas. In this same year the num-



The Casualty Room, Coogee Station.

ber of cases handled had increased to 516, and the mileage covered by the horse wagon ran into 421.

With the certainty of a steady flow of wounded and sick shortly returning, the old horse-wagon was dispensed with, and motor ambulances installed, and immediately placed at the disposal of the Defence Department for the transport of wounded and sick from the trains or hospital ships to the Military Hospital at Randwick, and from the Sunday morning at Central Railway Station, when Sydney saw the first wounded from Gallipoli, until the last steamer entered the Heads with sick cases on board, the men and women of the St. John Ambulance Brigade attended them as had the Knights, Chaplains and Serving Brothers centuries ago attended to the sick pilgrims in Jerusalem or the wounded on the islands of Rhodes and Malta, and on many a stricken field in Europe.

The following year, 1915, saw the work of this Branch of the Brigade increased

to over a thousand cases, and its motor ambulances travelled 3,900 miles with their bandaged burdens.

When the influenza epidemic visited Sydney in 1919 the work of every branch of the Brigade was added to enormously, and the number of cases handled by the Eastern Suburbs Corps alone in that year, including influenza patients, shot up to 4,088, while the mileage covered by its cars was 18,264.

Since the Eastern Suburbs' branch was established 13 years ago, its members have attended to over 15,000 accident and illness cases, while the grand total of miles its vehicles have travelled is more than 51,000.

So heavy has the work become in this district with its many surf beaches, that the present building on the front at Coogee has been found inadequate if proper and efficient service is to be rendered, and consequently a commodious new building is being erected not far from the old site at a total cost of over £11,000, where everything of the latest for the alleviation and prompt treatment of human suffering is being installed.

The Association, which is the teaching section, holds classes continually throughout the city and suburbs, and these classes are attended by men and women anxious to become proficient in first aid. The instruction at these classes is voluntarily given by medical men and members of the Brigade, and the successful candidates are then invited to join the ambulance or nursing division of the Brigade, and from these successful candidates a steady flow of recruits is always available to carry on the good work, day or night, wet or fine.

Mr. T. H. Henderson, Secretary and Superintendent of the Eastern Suburbs branch of the Brigade, has recently been raised to the rank of Serving Brother, and had conferred upon him by the King the medal of the Order—the oldest and most exclusive decoration in Christendom.

## The Central Press

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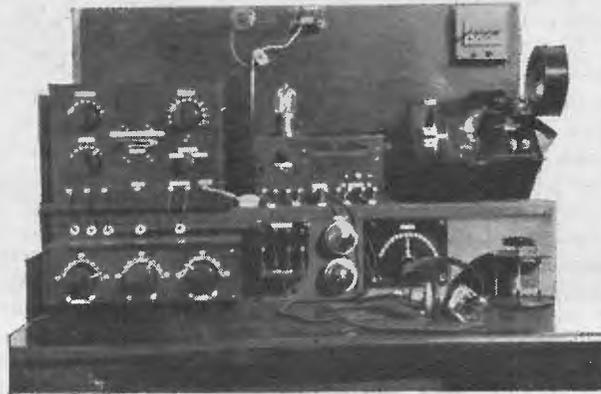
# WIRELESS EXPERIMENTAL STATIONS IN AUSTRALASIA

[Under this heading we propose to publish month by month, photographs and descriptions of Experimental Wireless Stations in Australasia. All experimenters are invited to submit particulars and photographs of their stations, which will be published if suitable.—Ed.]

## MR. H. STOWE'S STATION AT CHATSWOOD, N.S.W.

**T**HE aim in the construction of this set has been convenience of handling and operating; at the same time to allow various connections being used without having to alter the apparatus.

The circuit is regenerative, the design and layout offering some new departures in experimental apparatus. The two main coils in the long wave set are bank wound in layers, the tickler coil being wound in with the secondary and conductively coupled to it as shown. The Primary coil has 27 layers with 32 turns per layer with taps taken out at end of third, fifth, seventh, ninth, eleventh, thirteenth, fifteenth, seventeenth, nineteenth, twenty-first, twenty-fourth, and twenty-seventh layers; these taps going to the Primary Switch, which is provided with an end turn switch cutting the Primary winding into 4 sections. The breaks occur at the seventh, thirteenth and nineteenth taps. Each layer in the coils is separated with Roneo paper, which is porous, thus tending to keep down the distributed capacity of the coils. The secondary coil has 33 layers, with 32 turns per layer, with the taps taken out at end of fourth, seventh, tenth, fourteenth, eighteenth, twenty-third, twenty-eighth, and thirty-third layers; the end turn switch breaking the winding at the seventh, fourteenth and twenty-third taps. For the tickler connections tapings are taken out as follows:—The fifteenth turn of the first, second, third,



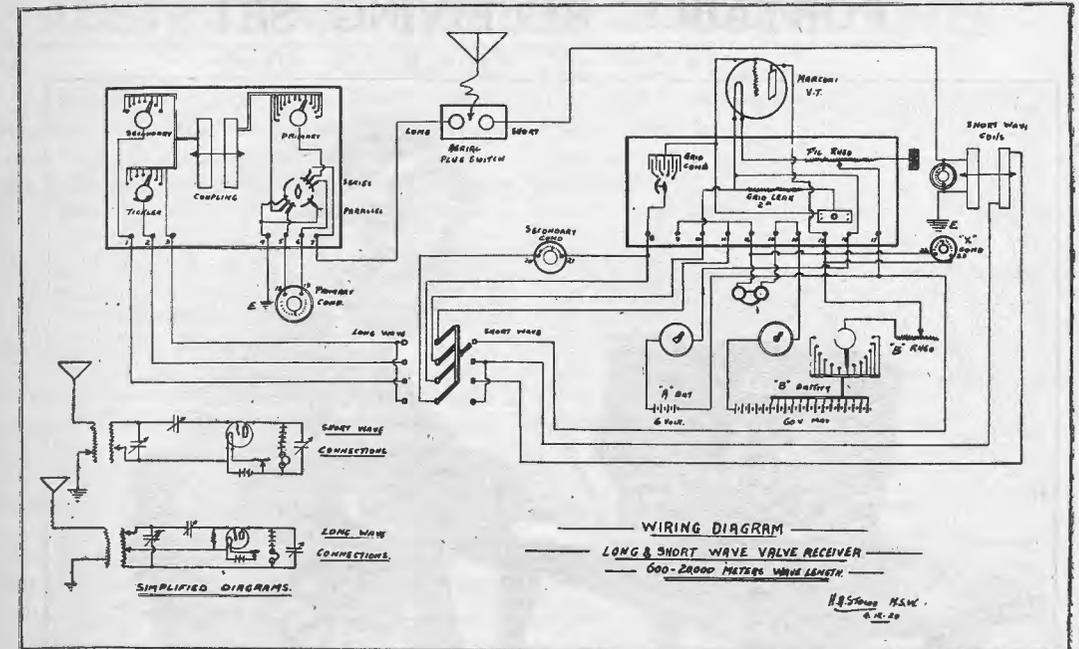
Mr. H. Stowe's Receiving Instruments, all home-made.

fourth, fifth, sixth and seventh layer, each of these taps being led to the Tickler Switch.

The variation in coupling between the coils is arranged by a lever which projects through the front of the panel; so connected to the coils at the back that, as the lever is moved, they either swing apart or together. A very convenient and efficient means of varying the coupling is thus obtained, both coils being wound with 24 gauge D.C.C. wire.

The panel is provided with a rotary series parallel switch, which places the Primary Condenser in series or in parallel with the Primary Coil. The taps from the coils are taken to the switches by means of short lengths of Rosette cord, similar to that used on telephonette work.

The valve cabinet containing the grid leak has a switch connected, so that it can be cut in or out, as it is found that better results are obtained in some cases with the grid leak cut out. On the left of this cabinet is a little drum type switch which cuts in step by step four little grid condensers of about .0001 m.f. each. The Condensers are made in the form of little rolls, and are all placed in holes drilled for them in a solid block of Bakelite. The Filament rheostat of 10 ohms resistance is also included in this cabinet, being varied by a spindle having a fine thread on it, turned at will by a knob on the end of the cabinet.



The Short Wave set not shown in photograph is of the Variometer type, with eight taps taken off both primary and secondary. The Primary, wound with 24 G. enamelled wire, has 124 turns, on a cylinder of 4in. diameter, the taps being taken out at every tenth turn. The Secondary is wound with 31 gauge G.S.C. wire on a former made in the shape of a sphere, and has about 150 turns with taps taken out every tenth turn, up to the eightieth turn. All the variable condensers are about .0005 m.f. capacity. The diagram shows the layout connections of the cabinet and the interconnections of the same, with the four pole change over

switch for changing from short to long wave. At present the long wave is regenerative, and the short wave set is the standard Marconi connection for V.T.'s. An aerial plug switch is also provided. The whole of the apparatus, including variable condensers, has been home made.

Fairly good results have been obtained with the set, and various circuits will be tried before the connections are finalised, although the present arrangement gives good results. With 0.0005 m.f. condensers, or larger, in the Primary and Secondary circuits, the set functions on maximum wave length of 20,000 metres.

## Expanse B Valve with 2 Filaments

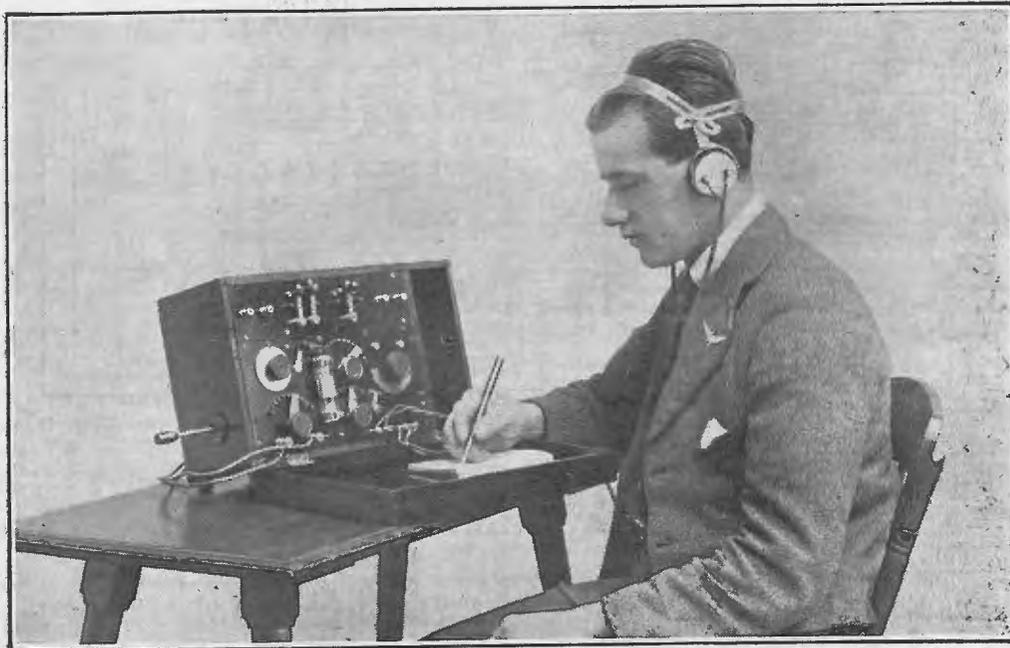
Manufactured for Wireless Experimenters. Filament, 6 volts; plate, 24 volts. The most efficient "soft" valve yet produced.

### THE AUSTRAL ELECTRIC COMPANY

97 Clarence Street Sydney

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## PORTABLE RECEIVING SET



Mr. L. Hughes Receiving Messages on his Portable Set Described Below.

Mr. L. Hughes, of Mosman, New South Wales, has forwarded the following description and photograph of a portable wireless receiving set he recently constructed. The primary and secondary formers of the loose coupler were made from cardboard, the primary being wound with 230 turns of No. 26 D.C.C. wire, and the secondary with 390 turns of No. 32 S.S.C. wire. The primary is divided into eight sections, and the secondary into seven, tappings being taken to selective switches mounted on the panel. By this means one or more sections can be used independently of the others, and so dead-end losses are eliminated.

The lower panel of ebonite measures 11½ in. by 5½ in. by ¼ in., and accommodates the primary and secondary switches, the filament rheostat, the grid condenser, the battery switch, and the valve. The smaller and upper panel measures 11½ in. by 2½ in. by ¼ in., and carries another battery switch, controlling the "B" battery, which consists of seven flashlight batteries contained in the cabinet at the back of the upper panel. The filament battery is carried independently of the cabinet.

The valve used is of the "Expanse A"

type, and never more than three volts has been used on the filament.

The telephones fold up and pack away in the recess at the right of the cabinet, and the coupling handle seen in the left of the photograph unscrews, and fits into the same recess.

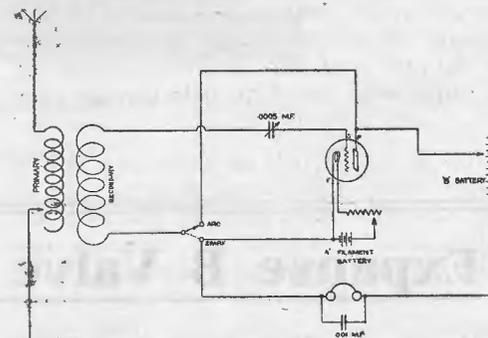


Fig. 1.—Showing Internal Connections.

The internal connections are shown in Figure 1, and using a single-wire aerial 70 feet high, Mr. Hughes reports intercepting messages from all Australian and New Zealand coast stations, as well as ships on the high seas.

## AUSTRALIAN BATTLE PHOTOGRAPHS NOW AVAILABLE TO THE PUBLIC

In her collection of official battle photographs, Australia possesses a pictorial record of the war which equals, if it does not surpass, that acquired by any of the other nations who participated in the conflict. Some idea of the comprehensive nature of the collection, and of its interest, will be gained when it is stated that the number of negatives held by the Australian War Museum totals 20,000, in which are represented battle scenes taken actually during the fighting in every campaign in which the A.I.F. participated, excellent views of devastated towns and villages in France and Belgium which faithfully portray the terrible havoc wrought by years of fighting, photographs of training camps in England and elsewhere, posed group photographs of nearly every A.I.F. unit, and wonderful pictures of the Holy Land campaign. These photographs were taken on behalf of the Commonwealth Government during the war by official photographers, who included such men as Captain G. H. Wilkins, Captain Frank Hurley, and Lieutenant G. H. Baldwin.

Realising their interest, not only to returned soldiers, but also to the general public, and particularly to relatives of fallen men, the Australian War Museum Committee has now completed arrangements for their sale throughout Australia.

In making this announcement Mr. A. Poynton, M.P., Minister for Home and Territories, who is chairman of the Australian War Museum Committee, stated that orders will be accepted for whole-plate prints, mounted or un-mounted;

sepia-toned and artist-coloured enlargements. The workmanship is of the highest class, and prices have been kept as low as possible.

Any profit resulting from the sale will be devoted to memorial funds. The Returned Sailors and Soldiers' Imperial League of Australia is co-operating with the Australian War Museum, and all branches of the League throughout Australia and Tasmania have a catalogue on view which contains descriptions of 6,000 official photographs which have been specially selected; many of them were not released by the censor until after the Armistice.

Orders for photographs or enlargements may be placed with any branch of the R. S. and S. I. League, or direct with the Australian War Museum. Mr. Poynton also commented on the fact that certain persons have been making copies of official war photographs for private enjoyment or personal gain; the copyright of all official war photographs belongs to the Australian War Museum, and it has been decided to take drastic action in cases where provisions of the Copyright Act, 1912, have been violated.

The offices of the Australian War Museum are located on the ground floor of Wool Exchange Buildings, corner King and Little Collins Streets, Melbourne, the director of which will, Mr. Poynton stated, be pleased to give any information desired in connection with official war photographs. A copy of the catalogue can be obtained from the War Museum, but owing to the excessive printing cost it has been necessary to make the small charge of 6d. for this.

## M.S.S. Wanted

Authors and writers are cordially invited to submit popular articles, stories and news paragraphs, which will receive our careful consideration, and if accepted will be paid for on publication.

Name and address must be endorsed on all MSS., which should be accompanied by stamps to cover postage, thus ensuring return.

Address all communications to

THE EDITOR, "Sea, Land and Air,"

97 Clarence Street, Sydney.

## DEEP SEA TOILERS

BY

FRANK REID.

ONCE the sea air becomes fixed in a man's nostrils, it may be said, it is fixed there for the rest of his days.

There is a longing for the sharp, salty twang that comes across the bows of a vessel when he first raises his head above the deck at dawn. He hankers for the heavy swell and the soft glide as the ship drops into the troughs; the creak of the boom is music; the weblike cracks on the deck lightly pull at the bottoms of his bare feet as he feels the water slip beneath the beam; the dancing skies, and the picture clouds, in an unending canopy float lazily and soothingly across his upturned face as he sprawls on the deck at the end of the day.

No wonder then that Big Tim Malloy, who had forsaken the sea no less than five times, once more responded to the call when he saw the dim-coloured bows of the *Barrier Queen* swing into her berth at Sydney.

Walking down the wharf, he crossed over to the vessel's bowline. Although rough and ragged, it mattered not, for bowlines and open seams do not always rate a ship.

Leaning lazily across the top of the snubbing-post he waited for the captain to come ashore. When he did, Malloy braced him after the fashion of his kind.

"Want any extra hands?" he asked.

The captain looked at him for a moment. From the top of his right ear, and down half-way across his cheek was a livid scar, with small, white knots at intervals; his neck was thick and short, his arms were long, the first knuckles of his hand were higher than the others, and the thumbs curled in—rope hands—and the captain answered:

"What's your line?"

"Able seaman, sir."

"Got your papers?"

Malloy shook his head and kept his eyes on the wharf floor.

"Hum—I thought so," said the captain. "Go aboard and keep your mouth shut," he added, walking away.

Malloy shuffled up the gangway and

stopped beside a man who hung over the ship's rail.

"Who's mate here?" he asked.

"Schall," answered the man without looking up.

"Schall, eh?" muttered Malloy, glancing sharply about the deck.

The man now looked up.

"You know him?" he asked wisely.

Malloy nodded.

He knew him—every man in the South Sea trade knew and hated him.

Two years before, Malloy had deliberately gone ashore at Apia, Samoa, and flatly refused to return to the ship on which Schall was mate, knowing if he went back, there would be good and sufficient reasons for the owners' mailing Schall's or his own pay to the nearest kin.

It appeared to Malloy that killing was to be Schall's portion, and for some reason he felt that he was to serve it to him, but as he was not ready he remained ashore.

This passing recollection caused him to run lightly over the possibilities that might arise when Schall found him among the crew.

But Malloy had served too long. He either obeyed mechanically or acted intuitively, as the occasion demanded. He never anticipated, and fear was unspeakably foreign.

That afternoon he drew his pay for coal-lumping, and by 5 o'clock had acquired a heavy deck-load of fiery rum. Near the wharf where the *Barrier Queen* was berthed stood a shaky-looking structure known as the "Seamen's Rest," and, within the parlour, Malloy sat at a small table close to the wall. Various other members of the *Barrier Queen's* cosmopolitan crew were with him, and rum was being consumed in large quantities.

Later, hearing heavy footsteps at the door and an extra movement among the shuffling crew, Malloy looked up languidly at the storeroom.

A tall, big-framed, squarely-built, red-faced man stood there. Malloy, recognising him, pushed back from the table, and rose. The man was Schall.

"Get aboard!" he said to the suddenly stilled lot, "and be mighty quick about it." He then moved further into the room and edged along one side, as a man circles a bunch of cattle to drive them through a hole in the fence.

Malloy watched him until he caught his eye, and saw Schall start as the flash of recognition came.

Even the rum-dulled brain of Malloy partially sensed Schall's hostility. The mate moved nearer to him. Malloy waited, his finger-ends slipping back and forth across his wet palms, his body taut, and his mind staggering for light under the heavy cloud of rum.

"So, it's you again, is it?" Schall growled, "and you've signed on, eh? Are you going to stick it this time, or squeal?" he leered.

"It depends," muttered the blonde giant, mentally fumbling for words.

"Oh, it does, does it? I suppose you'll want milk warmed, and honey on your bread," he sneered, close to Malloy's face.

"We'll see," answered Malloy, slowly realising that the mate was trying to show him up before the crew.

"Yes, we will see," shouted Schall, his tongue oddly slipping between his puffy lips, then back through the space of missing teeth, "and you'll find you haven't got old Haimes to deal with this trip; you're taking your orders from me, and I won't stand any of your sulking or splitting the crew against the company. I suppose you've been telling the crew already what you're going to do with me, eh! Well, why don't you start the row—you're off the ship?" he added, pulling back the chair that stood between them.

Malloy stepped clear of him, and walked slowly into the centre of the room. He ran his thumb along the inside of his trousers-top, and was silent. Knowing he was being bullied by the mate, there were two courses left for him to take—the door or open resentment.

The former classified him with the spineless lot who huddled together, waiting for him to row or back water. The latter course meant the precipitation of a fight that he wanted to postpone.

He realised, too, that the mate must win here and now, or no longer be worth his papers.

Schall had crossed over and was standing close beside him, but Malloy remained

motionless. He stood looking through the door at the water beyond—expectant, wondering, undecided.

"Well, are you going?" said Schall, "or are you scared to ship with me? Perhaps you're afraid I'll show you up—you murder!"

"Don't say that word!" yelled Malloy, turning sharply, "or we will settle here and now: I'm not afraid of you, or any other man alive. I'll go to the ship because I'm hired to go, but you can't drive me!"

The scar on his cheek was purple, and his body was hot with the lust to kill. Once before had this thing pounded within him, and he had killed. In the flash of hate that swept over him he again felt the sickening crush of bones in his great hands, when he had broken the giant kanaka who had slashed his cheek.

It was this that kept his hands at his sides, and his feet fast to the boards in the floor, for he wanted no more of it—the name he loathed.

"I won't take any chance to have a rope raised over me—for you—you're not worth it, and as for being afraid to ship with you—bah! Why there's no more harm in you than there is in a sand crab. Come on, you mullet fishermen," he said, turning to the silent group ranged along the wall, "we'll make ship," and strode out of the door with the muttering pack at his heels.

Astern of the *Barrier Queen* the little sunlit bubbles, flecked with froth, trailed in two lines. The sails fattened to the breeze, and she creaked and strained against the water banking against her bows.

Malloy stood at the stern. He had slept the night through on the cool, breeze-swept deck, where he could hear the purr of the water and feel the heave of the ship's hull. The fever of the rum had disappeared, and the open sea was ahead.

He held a rope in his hand, and was attempting to throw the coils into a pile some feet away.

Occasionally a loop would fall on the deck, for eight months handling coal dulls the hand for finer things, but Malloy was slowly recovering the twist.

"Stand closer to the pile, you lubber!" said Schall's gruff voice behind.

Malloy ignored the order, and continued

to flirt with the rope—without turning his head.

Schall stepped quickly between him and the pile of rope. He stooped to take the hemp in his hand. The ship tacked and swung into the wind.

Malloy pulled at the rope; it caught snugly around the legs of Schall, who pitched towards the stern rail, his great bulk crashing into the rotten barrier which gave way, and with a yell he slipped over the side into the swirl of water.

There was a sound of rushing feet, shouts, and an attempt to launch the stern boat, but one of the ropes caught in the wooden block, and the wheel jammed, hanging the boat with bow down.

The *Barrier Queen* keeping straight on, was slowly drawing away from the swimmer, though Malloy knew the ship would be hauled about as soon as possible.

He watched the mate throw off his coat, turn on his side, and commence swimming easily and strongly.

The vessel was now slowed down, and the stern boat had been cut free. Malloy's eye caught the shimmer of a black fin and the pointed ripple of a shark, still many

yards behind the mop of wet hair, yet decreasing the distance every second. He knew, long before the boat could be cut from the davits and reach the mate, the shark would have blotched the green sea with red, and the widening ripple would have been lost in the swell.

"Shark!" he yelled; snatched his knife from the sheath at his side, poised himself for an instant, and then dived from the stern.

Coming to the surface he quickly covered the intervening space between himself and the mate.

"Shark!" he repeated as he passed him. "Keep on!"

Again Malloy dived. The dull shadow of the shark was now above him. Extending his arm, he drove the knife into the shark just behind the bubbling mouth, and pulled.

The rough hide grated across his hand and the flat tail whipped his face as the fish turned to the depths, and Malloy shot up to the surface into the sunshine.

There was a feeling of exultation as he drew the air into his lungs, for he had not forgotten the trick—that trick of island seas and coral shoals.

He saw Schall hauled into the boat, which then pulled for him.

When they came abreast it was the mate's hand that was nearest him, but ignoring it he took the hand of a kanaka, who pulled him in.

Schall climbed across the thwarts towards him.

"You saved me, Malloy, here's my hand," he said. "You're made of the

right stuff. I haven't treated you white—you name the price and—"

The look of indescribable scorn that flashed across Malloy's face halted the words Schall would have spoken.

"Oh, get out of the way," he said; "don't think I did it for your sake, I only wanted to see if I had forgotten the trick those kanaka shark-fighters showed me at Papeete!"

## BOGUS AIR CAPTAIN

A few weeks ago a well-dressed and imposing-looking individual—about 6 ft. 4 in. in height, made his appearance at Dromana, Victoria, and, taking up his quarters at a leading house, gave it out to the inhabitants that he was an owner of aircraft, and that on the arrival of his machine and mechanics a few days hence, he would be prepared to afford them an opportunity of obtaining a bird's-eye view of their hamlet at half a guinea a trip. He posed as a captain, formerly of the British Air Force, and much interest was, naturally, aroused in the promised entertainment. Indeed for the nonce, aviation seemed destined to oust all other forms of recreation in the town, but just when the prospective fliers were contemplating the joys in store, the exhilarating sensation of being whirled through space at fabulous speed—and at bargain prices—a development occurred. The aeronaut had vanished from the town, incidentally, it is alleged, omitting to settle up a certain small account having relation to his board and lodging during the period of his publicity campaign.

The same prank, it is stated, was played at one or two other pleasure centres round the Bay, and finally the enterprising gentleman turned up at Sorrento, where,

apparently, he intended to make a big hit. To the guest at his new headquarters he introduced himself as Captain —, M.C., and they, too, were regaled with promises of aerial tours at startlingly low charges—when the 'plane and mechanics arrived in a few days' time. Stories of thrilling adventures and hair-breadth escapes, coupled with enquiries as to the existence of a suitable landing ground, helped to create the necessary "atmosphere" for the scheme, and the whole household began to look forward to the arrival of the "bus" with feelings of delight. It so happened, however, that a well-known Melbourne detective was holiday-making at the same establishment. This officer spent several years on detective work with the Australian Forces oversea, and his acquaintance with airmen, amongst others, on the other side, caused him seriously to suspect the *bona fides* of the newcomer. Judicious investigations followed, with the result that his career was cut short by his apprehension on a charge of having no lawful visible means of support—not even an aeroplane!

It is understood that the flighty one came out from Great Britain about 15 months ago as an assisted immigrant. He is described as a farmer.

## THE NAVIGATION ACT

The Minister for Trade and Customs recently announced that a proclamation would be issued, bringing 79 sections and 4 schedules of the consolidated Navigation Act 1912-20 into operation, as on and from July 1, 1921.

### Wireless Installations.

The provision relating to wireless installation in the Act, Section 231, will be

proclaimed to commence on and from October 1, 1921. The reason why it will not be proclaimed to commence on the same date as the Coasting Trade provisions is that a promise was made some time ago to certain foreign Governments that at least six months' notice would be given before enforcing the wireless requirements of the Act.

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1921

Sir DENISON MILLER, K.C.M.G., Governor

Established 1912



Head Office, Sydney.

# Aviation in Australia

## Centenarian Flies.

During a recent tour by Captain Roy King in a Sopwith *Gnu* aeroplane he landed right alongside the home of Mr. B. G. Hill, at Beasley's Bridge, near St. Arnaud, Victoria, with whom was living Mr. William Dick, aged 103 years. The latter gentleman had never previously seen an aeroplane, and he went for a flight with Captain King, after which he expressed great delight. It is believed that he is the oldest man in the world who has travelled by air.

## Fast Flights.

Lieutenant F. S. Briggs, accompanied by Mr. C. J. De Garis, flew from the Port Melbourne Aerodrome to Leeton, N.S.W., in the fast time of two and a half hours. The machine used was a *D.H.A.*

In his 100 h.p. *Boulton Paul* aeroplane, Mr. R. S. Faulkner made an exceptionally fast flight from his Riverina station, "Groongal," to Melbourne recently. The approximate distance covered was 275 miles, and the flying time occupied two and a half hours.

## Late Captain Stutt.

A movement is on foot to establish a memorial to Captain Stutt and his mechanic, Sergeant Dalzell, who lost their lives off the coast of Tasmania while searching for the schooner *Amelia J.* The Lord Mayor of Sydney agreed to further the proposal by every means in his power, and to become President of a Sydney committee for the purpose. This committee, before convening a public meeting, will communicate with the Federal Government with a view to securing united action in all States.

## Newspaper Delivery by Air.

The proprietary of the *Midnight Sun*, Melbourne, recently ran a special air delivery of their paper, and covered a route which embraced the country towns of Winchelsea, Colac, Camperdown, Terang, and Warrnambool, Victoria. The Shaw-

Ross Aviation Company supplied the machine, which was an *Avro*, fitted with 110 h.p. *Le Rhone* engine. The total time for this enterprising trip of 150 miles was exactly two hours, and the whole run was carried out successfully, the performance reflecting great credit on the aviation company, the pilot and the "bus."

## Aerial Express. 1s. 6d. per Mile.

The Queensland and Northern Territory Aerial Services Ltd., whose aerodromes are at Longreach and Winton (Q.), has decided that the first aerial route to be opened for a regular passenger service will be between Longreach and Winton, with special trips as far north as Cloncurry, and Charleville as the southern terminus.

The charges for a journey in the *Avro Dyak*, two-passenger machine, will be approximately 1s. 6d. per mile for each passenger, and the run between Longreach and Winton will cost £9 9s., while in the *Avro* triplane, four-passenger machine, which is almost ready, the charge per head for the 125-mile run to Winton will be approximately £6 6s. As the motto of the company is strictly "Safety First," the bulk of the work will be undertaken over the good flying country of the western districts.

## Lady Pilot.

Miss Laura Guerite, a revue artist at present in Melbourne, piloted an aeroplane over that city early last month, and therefore gained the distinction of being the first lady to pilot an aeroplane in Australia.

Accompanied by Major Ross, she left from Port Melbourne Aerodrome and spent about half an hour in the air, manipulating the machine with perfect confidence.

Miss Guerite, who gained her pilot's certificate in 1917, also holds the Royal Aero Club certificate, and acted as instructor to many pilots in the U.S. Army.

## Special Offer to Readers !

This being the first issue of Volume Number 4, we will enter your name on our subscribers' list for 12 months for 10s. (usual price, 12s.) Present subscribers may renew or extend their subscriptions at the same rate.

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### Special Offer Coupon

The Circulation Manager,  
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Date.....

Sir,  
Enclosed find 10s. note being <sup>New</sup> <sub>Renewal</sub> subscription for one year.

Signature.....

Full Address.....

### A FAMOUS AEROPLANE

Lieutenant Bert Hinckler, who flew an *Avro Baby* machine, fitted with a 35 h.p. Green engine, from London to Turin, a distance of 650 miles, in 9½ hours, arrived, with the actual machine itself, in Sydney by the s.s. *Ascanius* on March 18.

During the Royal Easter Show the machine was exhibited at the Australian Aircraft & Engineering Co.'s stand, where a tremendous amount of interest was taken in it by the public.

Lieutenant Hinckler stated that the *Avro Baby* is capable of cruising at a speed of 70 miles an hour, with the engine well throttled down, covering 30 miles to the gallon, carrying full load and passenger.

Asked what the advantages of the *Baby* were over the ordinary type, Lieutenant Hinckler stated: "The main point of superiority is economy, and the machine being so small one man can do absolutely everything." He continued: "It would be possible, if competition became keen enough, to run the *Baby* at 1s. per mile as an aerial taxi, at a speed of 70 miles an hour; in fact, the whole thing is speed and economy."

Lieutenant Hinckler, who is an Australian, is out here visiting his home, and at the time of going to press had no definite plans for the future, but stated that he hoped to disturb a part of the Australian atmosphere during his short sojourn.



[Block by courtesy of "Sunday News."] Lieutenant Hinckler, who flew from London to Turin in 9½ hours. The machine, a "Baby Avro," measures 25 feet by 18 feet.

### AIR FORCE TITLES.

#### British Forms Used.

In order to bring the titles of officers of the Australian Air Force into line with the Royal Air Force, they will be altered as follow on and from March 31:

Lieutenant-Colonel altered to Wing-Commander.

Major altered to Squadron Leader.

Captain altered to Flight-Lieutenant.

Lieutenant altered to Flying Officer.

Second-Lieutenant altered to Pilot Officer.

The relative seniority as compared with the Navy and Army will be as follows:

| Navy.         | Army.       | Air Force.      |
|---------------|-------------|-----------------|
| Commander.    | Lieut.-Col. | Wing-Comdr.     |
| Lieut.-Comdr. | Major.      | Sqdn. Leader    |
| Lieutenant.   | Captain.    | Flight-Lieut.   |
| Sub-Lieut.    | Lieutenant. | Flying Officer. |
| Wt.-Officer.  | 2nd-Lieut.  | Pilot Officer.  |

### Sheep Dealing by Aeroplane.

The value of the aeroplane in effecting a saving of time was demonstrated in a sheep deal which was carried out recently.

Mr. Peter Nalty left Longreach in an aeroplane for Moscow station, more than 100 miles distant, inspected 28,000 wethers, completed the purchase, and returned to Longreach the same day. Mr. Nalty bought the wethers on behalf of Mr. William Naughton, of Victoria.

### Melbourne to Perth in 20 Hours.

Lieutenant Briggs, accompanied by Mr. C. J. De Garis, left Melbourne by aeroplane last month and flew to Perth, W.A. The distance covered by air was 2,114 miles, the flying time being 20 hours 5 minutes.

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## NEW FLYING BOAT FOR NEW ZEALAND

We recently had a visit from Captain J. Hoare, D.S.C. (late R.A.F. and R.N.A.S.), now attached to the Supermarine Aviation Works Limited, Southampton, England, who was *en route* to Auckland, New Zealand, where he is to deliver a flying boat to Messrs. Walsh Bros. & Dexter. The machine is of the standard supermarine four-seater Channel type, with 160 h.p. Beardmore engine, similar machines having been supplied to aviation companies in Bermuda, Norway, Sweden, and other parts of the world.

Captain Hoare has been considerably impressed with the possibilities of aviation in Australia, especially from the marine aspect, that is to say, the use of the flying boat around the coast, but thinks that much demonstrating will have to be done, so as to accustom the public to the sight and use of aircraft, and the more demonstrations there are, the sooner will aviation become general. Captain Hoare says: "There is not the slightest doubt in my mind that when people get used to aircraft, they will find them very useful in this country, but up to the present they are more or less regarded as something very mystical by the average individual. In England, of course, the need for aircraft is not so pressing, on account of the fact that a railway system is in operation which was built up over a good many years, and this system more or less does away with the necessity of aircraft. Here, in Australia, the most important towns are on the coast, and for the purpose of communication, mails, etc., the flying boat and seaplane would, of course, be most useful, the distances being covered in minutes instead of hours, as in the case of the steamer. Therefore, Australia offers greater possibilities as far as flying is concerned than does Great Britain, and aircraft should fulfil an acutely felt want.

"For instance, Newcastle, a manufacturing centre 100 miles by rail from Sydney is reached in four hours, and by steamer in six hours, but by flying boat or seaplane it would take just one-quarter the time, *viz.*, one hour. A case in point would be a man desiring to adjust a small matter of business. He could complete same in about three hours, instead of one or two days by train or steamer."

Captain Hoare, continuing, stated: "In conversation recently with a gentleman in

the shipping business in England, who frequently had occasion to travel from one end of the country to the other, had two modes of conveyance, one a high-powered touring car, the other a single-seater aeroplane, and he learnt that the aeroplane came cheaper than the car. The same thing is equally true of flying boats which, if anything, are going to be cheaper than aeroplanes, as you save the cost of aerodromes; a fairly sheltered space of water only, about two or three feet deep at low tide, being all that is necessary. People have an idea that repairs to floats and hulls will come heavy, but they won't, and I think you may safely say that a damaged hull, provided the hull is properly built in the first instance, is of less frequent occurrence than a damaged under-carriage or burst tyre in an aeroplane.

"I was piloting a Supermarine amphibian in the Air Ministry Competition, held at Martlesham Heath (that is the Royal Air Force testing establishment) in September last year, which took second prize, the value of which was doubled to that originally intended. The prize money in the first instance was: first, £10,000, and second, £4,000, the Air Ministry reserving the right to reduce or increase the amount at the discretion of the judges, who, however, increased the amount to £8,000, to bring us nearer the first prize winner, there being little difference between us, and that due to difference in the horse-power of engines in the two machines. The competition consisted of making the machines do everything they would be called upon to do in commercial service and, further, the competition was designed to bring out the machine which was most suitable for general work. The trial included such things as high speed, low speed, reliability, economy, quickness of getting off, manoeuvring ability on sea, land, and in the air; airworthiness and seaworthiness, and landing in a restricted area to demonstrate that, in case of a forced landing, the machine would be safe to land in a very small field. Our machine was fitted with 360 h.p. Rolls Royce engine, the hull conforming in general principles to the Supermarine Company's standard type, which consists of a circular structure, which is free to give and take on meeting with any shocks when landing in rough water."

# AIRCRAFT INSURANCE

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are now negotiating for the Australian representation of British Companies prepared to insure against all risks to Aircraft in commission in Australia. Rates of Premium will be available shortly.

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**Western Australia.**

An immense amount of interest is growing in aviation in this State which is undoubtedly on the edge of the company promoting era. The consistent success of Major N. Brearly, the State's pioneer ex-service aviator; the transcontinental flights of Lieutenant Briggs and Mr. C. J. De Garis, is proof positive of a very definite start here.

Major Brearly, after nearly six years of constant air work, is now taking up agencies to import planes for private owners, and his vast amount of technical knowledge and data will be available to those desiring his advice. His experience and success in aviation generally will be invaluable to the industry.

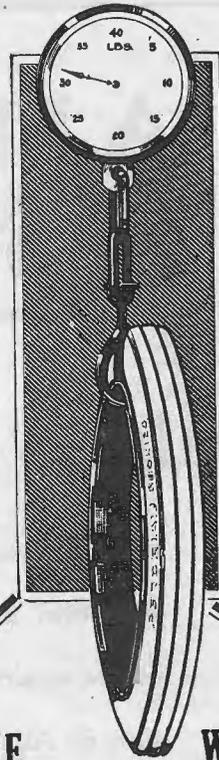
There are a number of private undertakings to get things moving, and one firm in Perth has been enterprising enough to design and build a small type machine cheaply enough to be within the reach of almost any person.

The machine is almost completed, and many experienced aviators who have seen it have expressed their praise and encouragement.

Two ex-service men, one a certificated pilot, have been ambitious enough to tackle the building of two small machines, and are making rapid progress. They deserve success, for they are making a whole-hearted and genuine attempt to further the greatest of modern, sporting, and commercial industries.

The development of the North-west, comprising a vast expanse of country, is being mooted, and aeroplanes will undoubtedly be one of the principal means to that desirable end.

At present no actual aerial service is in operation; two aeroplanes representing the complement of flying machines in the State. These splendid machines have made marvellous flights in the capable hands of Major Brearly, but different machines will be necessary to establish mail and passenger services to the distant parts of the State, which will actually benefit by air transport. What seems to be required, are weight-carrying machines, and small single and double-seaters of moderate speed and power, for use on stations.



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**OBITUARY:****THE LATE  
LIEUTENANT J. C. MacINTOSH**

Just as we are going to press comes the sad news that Lieutenant John Cowe MacIntosh met with a fatal accident in Western Australia on Monday, March 28. His death removes one of the most notable figures in the aviation world, for he, together with Lieutenant Parer, made a most brilliant and adventurous flight from England to Australia last year.

Born in Scotland, the late airman came to Australia about 1907 and at the outbreak of war in 1914 enlisted. He sailed with the infantry, became a stretcher-bearer at Gallipoli, gaining a reputation as a fearless soldier and very soon received a commission. In the early part of 1919 he was transferred to the Australian Flying Corps, and received his training at the Australian Training Wing at Tetbury and Leighterton.

Early in January, 1920, Lieutenants Parer and MacIntosh expressed their intention of flying from England to Aus-

tralia, and on January 8 they set out from Hounslow in a D.H.9 machine on one of the most remarkable air voyages yet made in the history of aviation.

After many adventures and exciting incidents, these two airmen arrived in Sydney on August 22 last year, and later completed the flight to Melbourne.

Some time after the conclusion of the flight Lieutenant MacIntosh travelled from Melbourne to Perth by motor cycle, where, after investigating the possibilities of aviation, he decided to acquire Major Brearly's aeroplanes and commence a commercial aviation service. Unfortunately, before having actually taken over Major Brearly's planes and establishing himself, he met his death.

On behalf of our readers and ourselves we express our sincere regret at the loss of Lieutenant MacIntosh, for without a doubt, the flying world, particularly in Australia, has sustained a great loss.

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## HOW FAST CAN A YACHT SAIL?

### SOME INTERESTING SPEED TESTS

A leading article in the "Scientific American" supplies some details that will interest all yachtsmen, and many landmen, concerning the knotty problem of how fast a yacht can sail. The writer begins by asserting that, generally speaking, the speed of yachts is always over-estimated to the extent of about thirty per cent.

"The maximum speed of a yacht, supposing that her model and the cut of her sails are correct, is dependent upon certain adventitious conditions, such as the right kind of wind, the sea, and (above all) the skipper. The ideal conditions for speed are when a yacht is reaching in a smooth sea with the wind over the quarter, that is well abaft the beam, and with everything set that she can carry without an excessive angle of heel.

"At full speed a racing schooner about 105 feet on the waterline can do about 15.8 knots. This would be in a strong breeze with the wind on the quarter. Assuming that this speed is about right, then with exactly the same breeze, a ninety-footer can go 14.2 knots; a seventy-five-footer 13.4 knots; a sixty-footer, 12 knots; a fifty-footer, 10.9 knots; a thirty-six-footer, 9 knots; and a twenty-foot boat, 7 knots.

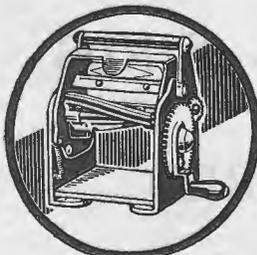
"In verification of these surprisingly high rates of speed," the writer says, "beginning with the big fellows, let us take the three-masted American schooner, 'Atlantic,' which won the Kaiser's Cup in the trans-Atlantic races. The log of the

yacht shows that during this race the famous schooner averaged 14.2 knots for twenty-four hours in mid-Atlantic and one occasion on Long Island Sound she made an even 16 knots in smooth water and a strong reaching breeze. The two-masted schooner, 'Rainbow,' 115 feet long, is quoted as having actually logged 16½ knots.

"Coming to the 90-footers, Major Heckstall-Smith, the author, tells us that he was in an historic race, sailed in a gale of wind from Rothesay around Hilsa Craig and back, a distance of seventy-five miles—a close reach on the way out and broad coming back. The average speed of the winning ninety-footer yawl 'Sybarita' was 12.3 knots.

"A much higher speed, unquestionably the fastest speed on record for a ninety-foot yacht, is that given to us by William Butler Duncan. He tells us that in September, 1899, he sailed the ninety-foot 'Defender' with full mainsail, with a jib header above it, fore staysail, jib, and small jib topsail from New London to City Island, at an average speed for the whole eighty-six miles (knots) of 13.8 knots. By patent log, the actual speed through the water for two hours was shown to be 14.5 knots, which agrees very well with Heckstall-Smith's estimated highest possible speed of 14.2 knots."

It would be interesting to know if any of the estimated maximum speeds have been tested by Australian yachtsmen.



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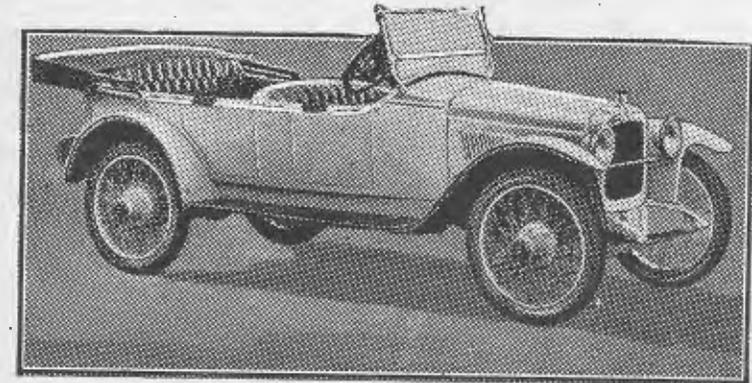
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COMMERCE HOUSE, MELBOURNE

## MOTORING NOTES. THE LATEST HUPMOBILE



The car illustrated is the latest model *Hupmobile*, for which I. Phizackerley is agent. The photograph gives a good idea of the sturdy, yet graceful, build of the car, while *Hupmobile* reputation for engine efficiency is sufficient recommendation without further comment here.

Mr. Phizackerley's is one of the oldest established firms in Sydney, having first opened business in 1883. He has commodious premises facing Hyde Park, Syd-

ney, in Elizabeth Street, the building extending right through to Castlereagh Street. Here the cars are completed (body work built, etc.); only the chassis of various makes being imported.

Over 100 men are employed in the works, and it would surprise the uninitiated to see the amount of care and labour expended in turning out the *Hupmobile*, *Talbot*, *Minerva* and *Standard* cars, for which Phizackerley's are justly famed.

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**ROAD "HOGS."**

This little story about a real road hog was told by Captain Carpenter, sales manager of Colonial Motors, Johannesburg. The other evening a Hupp car was travelling in front of an Austin, and both were proceeding out along the Main Reef Road. When a little way down Commissioner Street, the Austin wanted to get ahead, and endeavoured to do so in the correct manner, but was prevented by the Hupp, which suddenly swerved in front. A little farther on another attempt was made to pass, which was again stopped—this time in an obvious manner. Then the Austin slowed down, but so did the Hupp, and the consequence was choking dust for the occupants, as they were now on the bad road leading out of Commissioner Street. This kept on for some little time, until the Austin man, watching his opportunity, made a dash for it and got past. This is a typical example of the type of real road hog one occasionally comes across, and it is pleasing to know that he swallowed quite a lot of dust, as the Austin man kept just ahead for a little distance to give a much-needed lesson. It ended up by the road hog getting the wind up

and pulling to the side of the road and waiting for the punishing car to get well ahead.

**A "FORD DODGE."**

The latest Ford story, which in this case is affirmed to be true, concerns a labourer who, for a time, at any rate, solved the problem of receiving high wages for little work. He is stated to have made a practice of passing from one department to another, punching clocks at each, getting himself put on the pay roll of each and drawing his week's salary several times. Before he was found out his profits had reached nearly £2000.

**AERIAL DERBY AROUND THE WORLD.**

The draft regulations drawn up by the Aviation Commission of the Aero Club de France were presented at a meeting of the Committee of the Royal Aero Club, London, on Wednesday, January 12, but it was decided to defer their consideration until they had been submitted to the Aero Club of America.

THE  
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ment and all important Coal Mines.

## MOTORISING THE BACK COUNTRY

The Drive-Away Method of Delivery.

An event of particular interest to motorists will take place, the day this paper is published, Friday, April 1, when twenty cars of the new *Overland-Four* type, each piloted by its purchaser, will leave Sydney on a "drive-away" to Gilgandra (New South Wales).

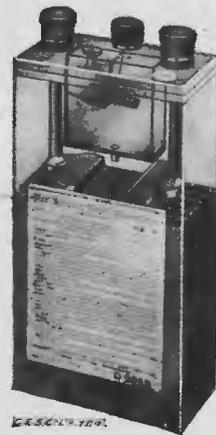
The "drive-away" is a form of car delivery which became popular in America a year or two ago when war congestion would not permit delivery by rail, and there seems to be no reason why it should not find equal favour here in Australia.

The sixteen cars participating were purchased by residents of Gilgandra and district through the local agent, Mr. F. Munro. The fleet will leave the premises of Messrs. Garratt's Limited, in Castlereagh Street, Sydney, about 10 a.m.; the start and different events which will arouse considerable interest along the route will

be filmed, and receptions held at the various towns visited. Altogether the new owners' first experience of their *Overlands* will be a joy-ride in the best sense of the term.

Mr. A. McNeil, General Manager of Garratt's Ltd. (who, by the way, is the organising mind) has decided that figures are to be compiled on the journey to demonstrate again the remarkably low petrol consumption of the new *Overland-Four*; while the journey will be a guarantee of the absolute faith that Garratt's Ltd. have in the reliability of their machines.

Incidentally, these 16 Gilgandra motorists are doing something to put their town "on the map," because many thousands of Australians will take notice when they realise that Gilgandra has enough moneyed men to buy sixteen cars of one make in one batch.



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Arranged in Sets as Required

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#### MARCONI'S PROPHECY—SPEAKING ACROSS THE OCEAN WITHIN A YEAR

Nearly twenty years ago, Signor Marconi, an Italian electrical engineer, developed wireless telegraphy, by which the first trans-oceanic message was telegraphed.

Years later, when receiving the hon. degree of D.Sc. at Oxford, he was described as "the magician who found a way of transmitting signals from shore to shore and from ship to ship."

Just now he is on a brief visit to London, and in the course of a conversation with a representative of the "Pall Mall Gazette," he discussed his many-sided activities.

#### Many Experiments.

"My yacht," he said, "is exceptionally well equipped for enabling me to test instruments for wireless telephony.

"I am engaged in many experiments. The public do not understand the technical difficulties. But improvements in instruments are constantly taking place, and we have to consider these.

"My yacht also enables me to move

about under the actual conditions of ships at sea, so that I am better able to note results obtained during fogs or other special circumstances.

"While in the Bay of Naples recently I succeeded by wireless telephony in talking to London through the station at Chelmsford. The conversation was quite distinct.

"As yet the distance between England and Italy is about the limit for a satisfactory wireless telephonic conversation. We hope to increase the distance very considerably, and efforts are already being made to link up London and New York by wireless telephony.

#### Talking With U.S.

"When do I expect this to be placed on a commercial footing? Well, the year is yet young, and a great deal can be done in twelve months. I fully expect that before the end of the year we shall be able to talk with the United States.

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#### SEALED UP IN LINER'S TANK.

Two shipyard apprentices recently passed through a terrifying experience on board the new *Cunarder Samaria*. They were sealed up in a tank at the bottom of the vessel for five hours just before she was launched from the shipyard. The two apprentices, Casson and Irwin, were engaged in blanking up the rivet holes in one of the forward tanks at the bottom of the new vessel, when they were shut in accidentally by the caulker, whose duty it was to see that all manholes were fastened down before the ship was launched. The youths had been in the tank for some time before they made the discovery that they had been shut in. When they realised their peril they had to blow out their candles to prevent an explosion of vapour from the oil used in pipes running through the tank. They were only able to kneel down, the roof of the tank being so low. During the quietness of the dinner hour officials examining the launching ways heard the noise of the boys' tapping on the walls of the tank. Casson afterwards said:—"We had been knocking for half an hour after the men ceased work, when

there was an answering knock, and a voice asked, 'Where are you?' We gave them our position, and they reached our 'tomb' as we were beginning to feel groggy."

#### 100 WORDS A MINUTE RADIO TRANSMISSION.

It is stated that experiments in wireless telegraphy by officers employed at the signals experimental establishment at Woolwich, England, have succeeded in transmitting messages over considerable distances at the speed of 100 words a minute, and that very much greater speeds have been proved to be attainable.—*Wireless Age*.

#### LAWRENCE HARGRAVE MEMORIAL FUND.

The following donation is acknowledged with many thanks by the Trustees.

#### Ninth List.

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# LOOP AERIALS AND AMPLIFICATION

## LECTURE AND DEMONSTRATION

BY

J. G. REED

[Before the New South Wales Division of The Wireless Institute of Australia.]

In this lecture arrangements were made to demonstrate the use of a valve amplifier in conjunction with a small loop aerial for the reception of radio signals.

Commencing with the loop and working back through the various parts of the receiver, detailed information of inductances, capacities and other particulars were given.

The loop consisted of two pieces of wood, 5 ft. by 4 in. by  $\frac{5}{8}$  in., placed at right angles to provide the diagonals for the square wire loops to be placed on. To the ends of the diagonal pieces, a row of nine round-head brass screws were placed  $\frac{1}{2}$  in. apart, allowing the heads to project above the wood work about  $\frac{1}{8}$  in., and wind on a spiral of wire consisting of nine complete turns of No. 18 gauge Bell wire. This gauge of wire is not essential as any other size up to about No. 22 can be used without appreciable effect upon the signal strength.

If desired this loop can be mounted on a pedestal bearing or attached by means of hinges to the wall of the radio room to enable it to be turned into a position which brings in the maximum strength of signals. Connection is made to the rest of the receiving instrument as shown in Figure 2.

This circuit is a regenerative one and greatly amplifies the received energy. By adjusting the tuned circuit in the lead to the plate, the valve can be caused to oscillate and so receive undamped signals by the Hetrodyne principle.

The details of the circuit are as follows:

Primary Condenser, C<sup>1</sup> = 0.007 m.f.  
 Primary Inductance, P = 100 turns No. 22 D.C.C. wire on cylinder of 4 in. diameter.  
 Secondary Inductance, S = 185 turns of No. 30 S.C.C. wire on cylinder of 3 in. diameter.

The dimensions of the secondary winding should be closely adhered to, as it is designed to have a natural wave length of 600 metres, thereby doing away with any condensers across the winding, thus securing maximum voltage of its terminals. The

grid condenser is a small variable, of 0.0003 M.F. capacity. A fixed condenser of about 0.0001 M.F. can be used here, the only advantage of using a variable is to secure a close control of the oscillating properties of the bulb and bring it to that critical adjustment, just before self oscillation, where spark signals are greatly amplified without distortion of the true note.

The detecting bulb used was an "Expansion A" valve. This particular bulb, although critical in its adjustment is best suited for the role of detector on account of the small amount of residual gas it contains, which gives rise to a particular "kink" in its characteristic curve, at which point it functions with marvellous sensitivity.

The plate battery consisted of a bank of flashlight cells which had been treated with wax. These cells purchased in March, 1920, still read over 4 volts when tested with a 500 ohm voltmeter.

The telephone receivers—Baldwin mica diaphragm pattern—connected to the circuit by means of a Telefunken type telephone transformer. Between this point and the plate is a radio frequency tuned circuit capable of being adjusted to the same wave length as the secondary.

The inductance consisted of 100 turns of No. 24 D.C.C. wire wound on a former 5 in. diameter and provided with a slider for close adjustment. This is shunted with a condenser of 0.0005 M.F. capacity. In place of this coil, a variometer without condenser can be used.

Across the telephone transformer winding and the plate battery another condenser of 0.0005 M.F. is shunted to provide a path of low impedance for the radio frequency component of the plate current. If this condenser is not included in the circuit, extreme difficulty will be experienced in making the valve oscillate, particularly so if there is very little distributed capacity in the leads to the tele-



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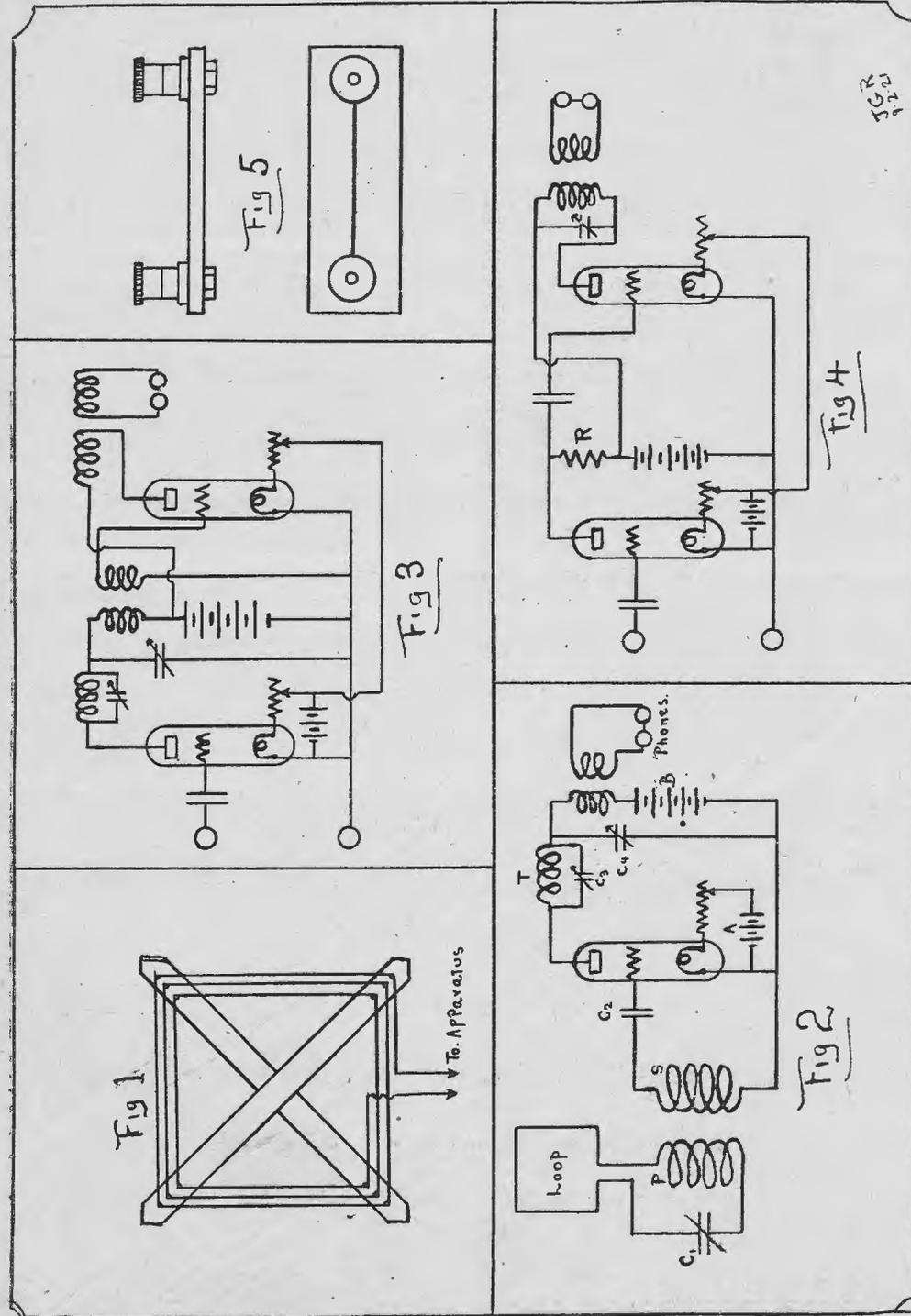
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phone transformer. It is the impedance of the windings in this instrument which effectively chokes back currents of high frequency. A more suitable arrangement

is to shunt the transformer windings only with the variable condenser, and across the terminals of the plate battery provide a waxed paper, or mica dielectric condenser



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of high capacity and insulation. This protects the battery from an accidental short-circuit if such happens to take place in the variable condenser.

Having described the circuit employed for reception with one valve, consideration will now be given to the connections employed to secure audio frequency amplification using a second valve.

In place of the telephone transformer a special one, of three to one step-up ratio, is employed. The secondary winding is connected to the grid circuit of the second valve as per Figure 3, and the telephone transformer transferred to the plate circuit. It will be noticed that only one "A" and "B" battery is employed for both valves, thereby effecting a considerable saving over the circuits recommended a few years ago. The bulb employed in the amplifier circuit should be of the "hard," or high vacuum pattern, as a soft bulb used for detecting may be troublesome to adjust to best working conditions. The "V.24" bulb is admirably suited for this work, especially in the resistance type amplifier to be described later.

To enable a quick change over from one to two step amplification or straight out detecting, the amplifier employed in this demonstration uses a special jack and plug combination which makes the desired circuit changes.

If any member wishes to carry out experiments in amplification, I would recommend him to construct a resistance-coupled amplifier which, apart from the output required for additional valves and filament rheostats, costs practically nothing for additional apparatus.

The voltage fluctuations in the plate circuit must be transferred to the grid of the second bulb to secure amplification, and in this amplifier, as its name implies, this is accomplished by means of a series resistance of high value. The circuit is given in Figure 4, and a diagram of the resistance unit in Figure 5.

A condenser is included in lead to the grid of the second valve, to prevent the high potential of the plate battery from causing trouble by placing the grid at an abnormal voltage positive to the filament. This condenser has a value ranging from 0.0001 to 0.01 M.F., depending whether the circuit is to be used for amplification of radio or audio frequency currents respectively.

When building the resistance unit cover the ebonite under the terminals thickly with graphite from a soft lead-pencil. Use a few tinfoil washers under the terminals to ensure good contact, and in a small groove between them draw several pencil lines until best signal strength is secured. If too much is rubbed on at first, it can be removed by a pointed piece of rubber pencil eraser. Owing to the ease with which this resistance can be adjusted to the best value, it will be found superior to the fixed resistances available in the experimenters' market.

This type of amplifier functions best on long waves and will not be found to work very good on waves below 1,000 metres, owing to low impedance path in parallel to the resistance, provided by the grid to filament capacity of the second bulb. The value of this capacity varies between 15 to 40 micro-microfarads, and at the high frequencies corresponding to wave lengths below 1,000 metres, those mathematically inclined can calculate that the impedance of this shunt path drops down to a few thousand ohms. It is just here that the extremely low capacity of the V.24 valve comes in useful in extending the range lower down in the wave length scale.

During the lecture the amplifier using one step amplification was tuned to 600 metres and the loop adjusted to pick up signals from the radio station at Pennant Hills. The signals were audible throughout the lecture room, and by revolving the loop its directional effects were found to be quite pronounced. Several members picked up stations working with Pennant Hills Radio Station (VIS), and although not as loud, their general direction was easily noted.

Mr. Fisk, the President, offered a valuable suggestion to the members concerning additional amplification secured by causing a tuned column of air to vibrate in resonance with the telephone diaphragms. A telephone receiver is supported directly above a deep, narrow-necked jar, and water slowly poured into the latter until resonance occurs. A very suitable water container is a graduated 250 c.c. chemical measure. This phenomenon depends upon sound physical principles and is worthy of the attention of all experimenters who are after "real sigs."

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## WIRELESS INSTITUTE OF AUSTRALIA

### NEW SOUTH WALES DIVISION

The Forty-Eighth General Meeting was held at "Wireless House," Clarence Street, Sydney, on Tuesday, March 8, and was the last General Meeting of the old year 1920-21. The business included the election of two honorary auditors, Messrs. Callan and Steele being elected.

The topic of the evening was a "Discussion of Apparatus," Mr. C. Maclurean opening the proceedings by giving an interesting description of an audio-frequency transformer which he had constructed. One particular suggestion he made was the best way to keep down the Eddy Currents in the core. He stated he was able to entice them all out of the core by calling them "Edward Currents." This suggestion might be worth while trying by ambitious experimenters.

Mr. H. Stowe gave a few points on the construction and arrangement of receiving sets. He pointed out that for the experimenter to obtain maximum results it is essential that ideas and experiences be interchanged, which to a great extent is the secret of the success of the American experimenter.

The Institute is therefore arranging a series of discussions similar to those outlined by Mr. Stowe.

The day of the 7s. 6d. wireless set has passed, so that there is a need for thoughtful consideration in the layout of the funds available. The question then before the experimenter is, how to best make

and layout his set to get the best results, and yet be flexible and convenient.

To this end the receiving sets were divided into three classes:

- (1) Cabinet, or panel, sets.
- (2) Isolated, or separate, apparatus.
- (3) Combined cabinet and isolated apparatus.

Mr. Stowe also gave a brief description of his set which he had brought in for the benefit of the meeting.\*

A discussion then took place among the members, bringing out points for and against the various classes, and it was generally accepted that the arrangement which offered the best facilities was the latter class (combined cabinet and isolated apparatus), which enabled an experimenter to conveniently interchange his apparatus and so try out the various circuits.

Other members related their experience with their own particular sets, and several had pieces of apparatus constructed by themselves, and an examination of the workmanship showed it was excellent.

Altogether a very enjoyable evening was spent, and a hearty vote of thanks tendered to the speakers.

The date of the Annual General Meeting has been fixed for April 12, at 8 p.m., and will be held at "Wireless House."

\* Particulars of Mr. Stowe's receiving set appear on another page.—Ed.

### SOUTH AUSTRALIAN DIVISION

The Monthly Meeting of this Division was held on the evening of Wednesday, March 2, at Alfred Chambers, Currie Street, Adelaide. Mr. Hambly Clark presiding.

A motion to register this Division under the Company's Act was carried unanimously.

A paper on "Direction Finding with Frame Aerials," was read by Mr. C. E. Ames, who gave diagrams showing how the frame aerial gives strongest signals when in the plane of the direction of the transmitting station. Diagrams of circuits

giving absolute directional effects were also shown.

A feature of the evening was the exhibition of a two-stage amplifier set, and several hand-wound honeycomb coils by Mr. F. Williamson, who explained the working of the amplifier and also the manner of winding the honeycomb coils. Mr. Williamson has shown remarkable skill and patience in the winding of these coils, the spacing being perfect.

The largest coil on exhibit was one with a 0.001 M.F. capacity condenser, which will tune to any wavelength between 6,000 and 20,000 metres.

The meeting concluded with a hearty vote of thanks to the speakers.

Members are reminded that this Division is now at the beginning of a new half-year, and those in arrears with their fees are requested to remit same to the Secretary as early as possible. The membership fee is now 15s. per annum.

General Meetings are held on the first Wednesdays of each month, to which all interested are welcome.

### WESTERN AUSTRALIAN DIVISION

The first 1921 meeting of this division was held in the Science Rooms, James Street, Perth, on Thursday, March 3, Mr. W. E. Coxon presiding over a large attendance.

He informed members that the P.M.G. Department intended disposing of a quantity of apparatus by tender early in March. A motion was moved to the effect that the Government Stores Department be written to requesting them to sell this material by auction.

The Secretary reported that Membership Badges were now available from Headquarters, but the local supply is exhausted at present.

Mr. Turnbull (Assistant Secretary) presented a list of registered amateur stations in the State, and promised to make the necessary additions each month. It was decided to write to all amateurs who were not members of the Institute, urging upon them the necessity of joining without delay. The Institute has set itself the task of collecting complete data concerning the apparatus possessed by every amateur in the State, and with this object in view, responsible Radio experimenters are being communicated with.

At the conclusion of the business portion of the meeting a general discussion, tending towards the greater efficiency of the Institute, ensued, with the result that this question is to be finalised at the next meeting. One of the notices of motion handed in suggests that meetings be held fortnightly instead of monthly.

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| Kaimanawa .. .. .    | R. R. Robinson   | Talune .. .. .       | D. Hairs             |
| Kaitangata .. .. .   | A. W. Watt       | Tarawera .. .. .     | R. W. Barnes         |
| Kaitoke .. .. .      | G. M. Gormlie    |                      | T. H. McWilliams     |
| Kaituna .. .. .      | L. H. Jones      |                      |                      |

(Continued on next page.)

(Continued from last page.)

|                   |                  |
|-------------------|------------------|
| Tofua .. .. .     | L. R. Dickson    |
| Toromeo .. .. .   | M. Sedgers       |
| Ulmaroa .. .. .   | H. Tuson         |
| Victoria .. .. .  | H. M. Lamb       |
| 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       |
| Wandilla .. .. .  | D. N. Quinn      |
| Westralia .. .. . | M. A. Ryan       |
| Whangape .. .. .  | A. O. Sutherland |
| Wodonga .. .. .   | A. W. Hooper     |
| Wyandra .. .. .   | J. Doggett       |
| Wyreema .. .. .   | T. Chalmers      |
| Zealandia .. .. . | A. G. Ross       |

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Radio Holland Station.

Rotti .. .. . R. H. Alexander

New Guinea Expedition.

Wattle .. .. . L. N. Callaghan

**WIRELESS TYPEWRITER.**

A scheme for typing by wireless has been evolved by a young London man, who hopes in the near future (says the "Daily Chronicle") to carry through practical experiments. At the transmitting station there is a keyboard similar to that on the ordinary typewriter, and on the pressure of one of the keys an electric circuit is controlled. The waves produced would each represent a given note to indicate various letters, figures, and marks. The signals operate receiving diaphragms.

It is claimed that anyone versed in the operation of a typewriter could operate this machine. The simplest way of receiving the "copy" would be by the tape as used in electrical machines at present in clubs and newspaper offices.

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# 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.

W.H.P. (Newcastle).—Question: "What is a Brush Discharge?"

Answer: A Brush Discharge is a discharge having a feathery form, and consisting of an intermittent partial discharge which takes place from a conductor when the potential difference exceeds a certain limit, but is not high enough to cause the formation of a true spark or arc. It is always accompanied by a hissing or crackling sound. When such a discharge is being given off by a conductor the latter is said to be "Brushing."

"Avro" (Dunedin, N.Z.).—Question: "What is the effect caused on an aeroplane by Engine Torque?"

Answer: The action caused by the revolutions of the propeller which tends to make the machine twist about its longitudinal axis in the

opposite direction to that of the path of the propeller.

"Interested" (Goulburn, N.S.W.).—Question: "Can you recommend a good elementary text book that will give me an all-round knowledge of Wireless Telegraphy?"

Answer: The most suitable books for you are "The Elementary Principles of Wireless Telegraphy," by R. D. Bangay, in two parts. These are obtainable from any bookseller or The Wireless Press, 97 Clarence Street, Sydney.

"Experimenter" (Sydney).—Question: "What is the formula for converting a Centigrade reading to Farenheit?"

Answer: Multiply Centigrade reading by 9, divide quotient by 5 and add 32. Example: Suppose Centigrade reading 200°; proceed as follows,  $200 \times 9 = 1,800$ , divided by 5 = 360, plus 32 = 392°. Reading in Farenheit.

## WIRELESS SERVICE.

One of the vessels carrying a wireless installation, installed and operated by Amalgamated Wireless (Australasia) Ltd., recently ran aground near Long Island, while approaching New York, in very thick weather.

The captain of the ship being dubious as to the ship's position, instructed the wire-

less officer to communicate with the radio stations ashore. This he did, and the New York Wireless Direction Finding Station immediately advised the exact position of the ship, and also arranged for the prompt despatch of a salvage steamer. The ship was subsequently towed off and the voyage continued.

## U.S. NAVAL AIR STATION AT HONOLULU.

It is proposed to build a naval air station, costing £267,000, at Pearl Harbour, Honolulu.—*Aeronautics.*

## SHANGHAI-PEKING AIR MAIL SERVICE.

It is hoped that a tri-weekly air mail service from Shanghai to Peking will be started on May 1.

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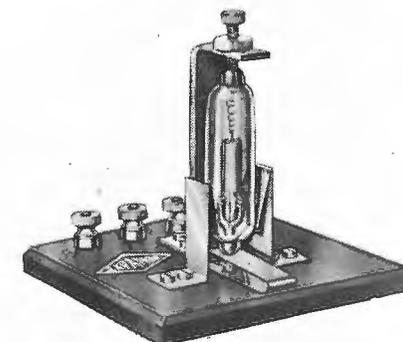
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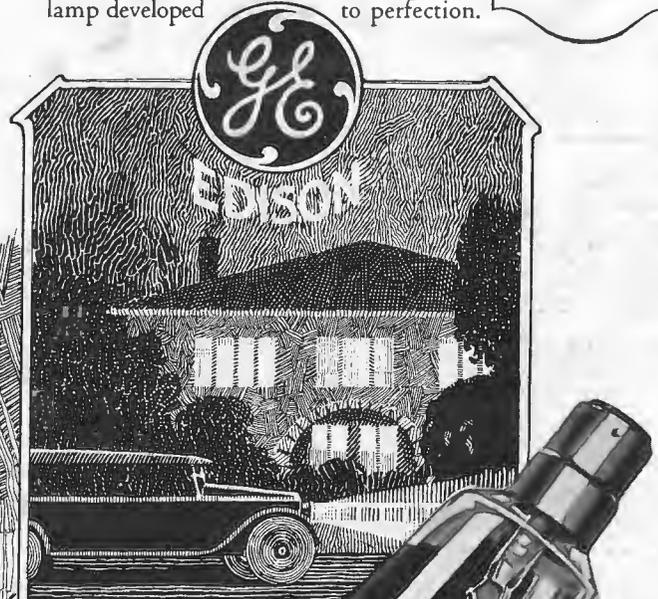
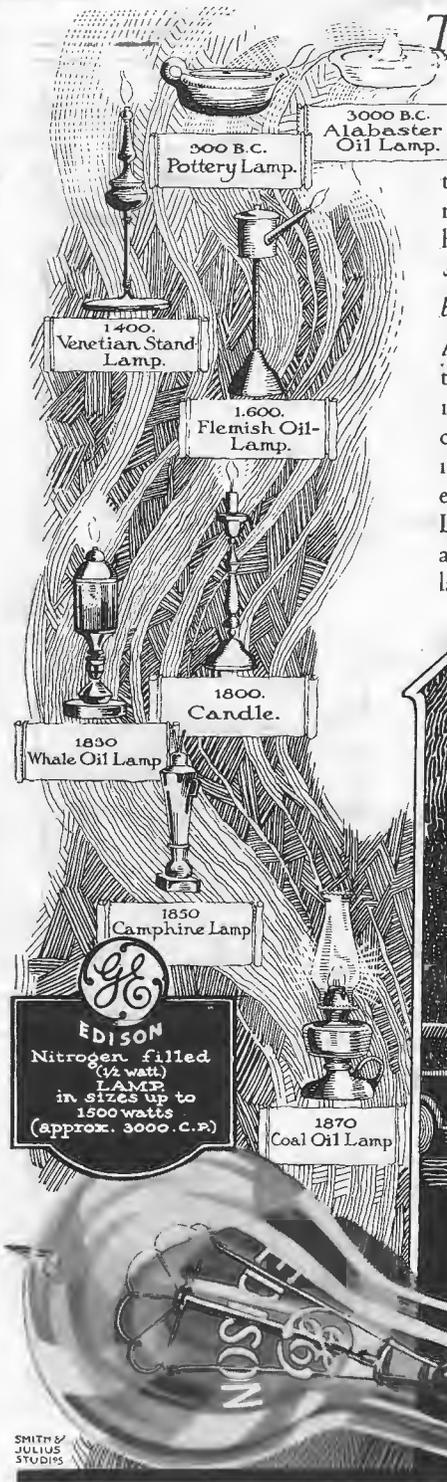
# The Evolution of LIGHTING

When the world was young and civilisation was in the learning-to-walk stage of its development, primitive man realised a need for something which would enable him to finish the task arrested by darkness; and of that need artificial illumination was born. Every step forward in the progress of culture has been marked by an advance in illumination.

*The way to our civilisation of to-day lies parallel to the way to better light.*

A stick from the fire was no doubt the first lighting unit, but there is plenty of evidence that crude forms of oil lamps came into use long before history was begun. These have been discarded one by one until to-day the final step in the evolution of light is the incandescent electric lamp. The G-E EDISON Electric Lamp with its drawn tungsten wire filament and brilliant responsive light is the electric lamp developed to perfection.

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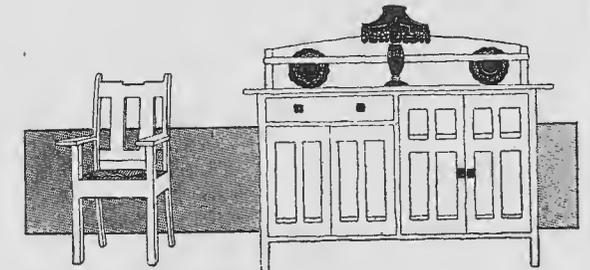
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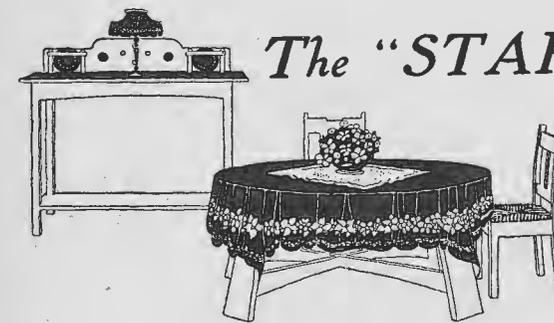
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