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## CONTROL OF AIR ROADS POSSIBLE ENEMY WITHIN

Blériot in his first Channel flight showed, but it took the Gothas to emphasise, that England was no longer an island.

Sir Ross Smith has shown that there are also straight paths connecting Australia with other lands, and that Australia, too, is no longer an island. If a bridge were built from Timor to Darwin the Australian Government would be very interested, and demand some right of control. If a bridge were invented which could unroll itself as its travellers walked along it, connecting Australia with Timor one day, with Japan another, and with a man-o'-war in mid-Pacific another, Australia would be perturbed. That is exactly the kind of bridge that has been built and the working of which Sir Ross Smith has demonstrated.

Yet, in such a will-o'-the-wisp bridge the Commonwealth Government does not take even a languid interest. It is the clear duty of the Government to insist

on some control of any path that leads from foreign countries to Australia, whether that path be of blue metal or of blue sky. Accordingly the Commonwealth Government must control flying not only *in* Australia, but *to* Australia.

At present we have no control, and no regulations. Any person can ply for hire in any sort of aeroplane. The law insists that a cab shall be driven by a competent person, who must qualify for a license, and that the cab itself must have a certain factor of safety. It is useless for a cabman to assert that if he cannot drive, and if the cab will not hold together, he will suffer as much as the passenger. The law will not allow the risk for him to share. But for flying over cities, when the pilot and passenger are the least of those who may suffer by a crash, the law allows free play. Anybody can take any machine up in the air without any responsible body having to certify that it is airworthy, or that

the pilot can keep it aloft even if it is. That is the purely civil aspect, and much the least serious, because there are not many aeroplanes plying for hire at present, and the law may catch up.

But the war aspect of the lack of control is serious. The passenger-plane of to-day may be the bomber of to-morrow. It depends on the man who owns the machine, and the one who flies it, upon whom she will drop her bombs. If he be an Australian it is pretty certain that he will not let them fall on his own countrymen. At present there is nothing to say that the man who is learning to fly here, or the man who is going to own the machine for him to fly, shall be even a British subject. In certain parts of Australia it is reasonably probable that he will be a German, for instance. When war was declared in 1914 every German ship that could do so slipped out of Australian ports, and put to sea. Had it been possible for them to ship guns, and bombard Sydney and Melbourne a few hours

after their departure, it would have been very unpleasant. An aeroplane that slips out of its 'drome in war-time can do that.

Australia is quite big enough to offer concealment while the alien airmen replaces passenger seats by bomb-racks. Unless there is control of flying, every possible enemy of Australia can be an aircraft-owner here. In a short time his pilots can know the country far better than our Defence Department knows it. Aerial photographs give more complete and more accurate maps of a country than the station-owner's improvised charts which, unhappily, are our only guide in the Never-Never; and wars are often won on good maps.

Regulations that insist that no alien may either fly or own aircraft in Australia, and that every aircraft company must give adequate guarantees that no alien has a voice in its control, are needed. They are as essential as regulations which prevent aliens from stacking howitzers and shells in their back-yards.

## LAWRENCE HARGRAVE

Especially Written for "Sea, Land and Air" by CLAUDE E. BERESFORD.

He watched the grey gulls soar, and dip,  
and veer

Across the dimpled Harbour waters blue,  
Unmindful of the scoffer's idle jeer

About the crazy, novel kites he flew.  
Too well he knew he held within his grasp

The secret of the birds that winged the  
height;

His prying fingers working at the hasp  
That held the padlocked door to human  
flight.

His was the mind that laboured, giving  
birth

To kites, their like were never seen  
before;

Such fragile structures, tethered to the  
earth,

That showed the way that living man  
might soar.

And on his track there came the other men

Who on *his* 'planes installed a thrusting  
screw:

The brothers Wright, who gained the credit  
when,

Before a world incredulous, they flew.

Though Hargrave blazed the lone, un-  
travelled way,

He did not reap rewards of golden coin.  
We see the harvest of his toil to-day,

When land to land the speedy aircraft  
join.

From London to our corner of the earth  
Already now a 'plane has borne its crew,

And so we learn the early seeker's worth,  
And give to him the honour that was  
due.

## MY FLIGHT ACROSS AUSTRALIA FROM MELBOURNE TO DARWIN IN A "B.E.2.E."

Especially Written for "Sea, Land and Air"

By Captain HENRY NIELSON WRIGLEY, D.F.C.

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Early in the first week in November, 1919, I was informed by the Chief of General Staff, Major-General J. G. Legge, C.B., C.M.G., that I had been selected to make the first attempt to fly from south to north across Australia and, at the same time, make an aerial survey of the route for the assistance of competitors in the flight from England to Australia.

Sergeant A. W. Murphy, D.F.C., was selected to accompany me on this trip, and the machine allotted to us for the work was a *B.E.2.E.*, fitted with a 90 h.p. R.A.F. engine. Although all will admit that this type of machine is not the most suitable for so lengthy a journey, it was, however, the best available. As it had been arranged that we should start from the Central Flying School at Point Cook (Victoria) during the second week of November, we immediately set



Sergeant A. W. Murphy, D.F.C.



Captain H. N. Wrigley, D.F.C.

to work fitting out our machine for the long flight ahead.

In order to extend the range of the machine, two extra petrol tanks were fitted below the centre section of the upper plane, and thus increased our petrol capacity to 52 gallons, giving us a flying range of approximately 400 miles. An extra oil tank was also fitted to the side of the engine; spare parts most likely to be required were collected and packed into the *fuselage*, in readiness for any emergency.

Misfortune, however, dogged our first attempt, on November 12, to commence the

trans-Australian flight, our delay being due to a series of engine failures, and it was not until November 16, after two more false starts, that we eventually got away.

The first section of our journey was divided into a number of stages at the end of each of which a landing ground had been selected. Our instructions were to land at each of these selected sites and to report on their suitability for future use. As if to compensate for our previous delays, the weather was most favourable and our first stage, from Laverton to Cootamundra (a distance of over 300 miles), was covered in 3 hours, 50 minutes. This stage had previously been flown over, and its suitability reported on on several occasions.\*

Our next stages were Cootamundra to Forbes, and Forbes to Narromine. On this latter stage we experienced engine trouble and made a forced landing at Wyanga. The trouble being located and remedied we soon resumed our flight, arriving on November 18, at the Narromine depôt, of which Lieutenant E. R. Dibbs was in charge.

On the following day (November 19) we arrived at Nyngan, and here encountered further delay, for when starting up to continue our journey we again experienced engine trouble, which was traced to a broken carbon brush in our magneto. As usual, the magneto was in the most inaccessible position possible and, to get at the distributor and broken brush, it was necessary to remove the whole magneto. This involved half a day's work, and made it impossible for us to continue our flight that day.

We left Nyngan for Bourke on November 21 and, after travelling about five miles, left the open country over which we had hitherto been flying and covered a stretch of over one hundred miles of heavily timbered country with no possible landing places.

The next stage was to Barrington, over country with few communications, but with several clear, open patches on which machines of almost any type could land. This stage brought us to the border of Queensland.

Two days later, after a series of minor adjustments, we continued our flight, crossing the Queensland border at Woo-

roorka and proceeding to Cunnamulla. On the following day we reached the Charleville depôt, which is situated some ten miles west of the town, and in charge of Lieutenant A. R. McComb. The country for some distance on either side of Charleville is heavily wooded. On attempting to leave for Tambo the engine behaved unsatisfactorily, but, after much worrying and hard work beneath a blazing sun, we at last remedied the defect.

We left Charleville on November 27 and flew, by stages, to Tambo, Blackall, Longreach, Winton and Cloncurry, the last-named place being reached on November 30. These stages covered, for the most part, miles upon miles of open downs country and the only really bad stretch flown was the hilly, rocky, and timbered district between the Fullarton River and Cloncurry. At Longreach news of our approach was circulated by the town-crier, who distributed handbills enjoining all citizens to proceed to the landing ground and accord us a welcome. A facsimile of this handbill was printed in the December, 1919, issue of *Sea, Land and Air*.

At Cloncurry a depôt, in charge of Lieutenant P. J. McGinness, D.C.M., had been established, and here we remained for a few days and overhauled our engine. This proved to be most necessary, for we found that one cylinder and four exhaust valves were due for replacement, while a second cylinder needed repairing. Here was a difficult problem, for before attempting to repair the cylinder we had to make tools with which to do the work, and the entire job was undertaken in an iron shed with the temperature ranging from 110° to 115° in the shade. We carried a spare cylinder, but had no means of obtaining new exhaust valves; these were finally turned up from an old car axle. The Queensland Government Railway Workshops, by placing a lathe at our disposal, rendered great assistance.

During our stay at Cloncurry, the district experienced a severe cyclonic gale which totally destroyed numerous houses and severely damaged several others. Fortunately, our machine sustained very little damage, only one control cable being snapped by the force of the storm.

Leaving Cloncurry on December 8, we embarked upon the most difficult part of our journey, which was carried out in

\* *Sea, Land and Air*, May, 1919 (pp. 77-82).

the following stages: Cloncurry, Avon Downs Station, Alexandria Station, Anthony's Lagoon, Katherine River, and thence to Darwin. This part of the flight was undoubtedly very difficult and trying. Between Cloncurry and Camooweal the route lay over the Argylla Ranges, a series of steep, razor-back ridges, and between Camooweal and Newcastle Waters is a vast area of open downs country almost uninhabited, trackless, without communications, and, at the time of our flight, practically waterless.

The only available map of the country

for the future guidance of pilots flying over this route.

After picking up the overland telegraph in the vicinity of Newcastle Waters the route is easy to follow, for the country is heavily wooded right on to Darwin, and the cleared track along the telegraph line plainly visible. Between Newcastle Waters and Darwin the only spaces on which a landing could be made are at Warlock Ponds, the Katherine, alongside the Adelaide River, and at Batchelor Farm.

On December 10 we completed the



Aborigines at Daly Waters (Northern Territory).

Preparing for the "Sun Corroboree" in honour of the coming of "big pfeller Brolga" (Native Companion), the aboriginal conception of Captain Wrigley's aeroplane.

between Camooweal and Darwin was absolutely useless, and features had to be marked as we proceeded. As an example of the inaccuracies, a river was shown as *crossing the track at right angles* and continuing on for many miles in the same direction. From our height we were able to see that, about four or five miles after crossing the track, it turned sharply and ran *parallel* to the track for well over thirty miles. There were many faults of this kind, and we corrected them to the best of our ability. Practically the only landmarks in this area were the scrub belts, and these we marked on the map

stage from Anthony's Lagoon to the Katherine, arriving at the latter place with petrol and oil practically exhausted. Here, unfortunately, we again experienced delay. Owing to the smallness of the landing ground, which was only 300 yards by 200 yards, and closely surrounded by tall trees, we had great difficulty in landing. Only by side-slipping to within a few feet of the ground could this be successfully accomplished, whereupon it was found impossible to take off again.

In order to reach Darwin before Captain Ross Smith left for the south and so

give him the benefit of any information we had obtained, I decided to lighten our machine by sending all our spare parts and small personal kit on to Darwin by rail. I then arranged for the gang working at the landing ground to fell the trees, and so form a lane through the timber just wide enough for our machine to pass along.

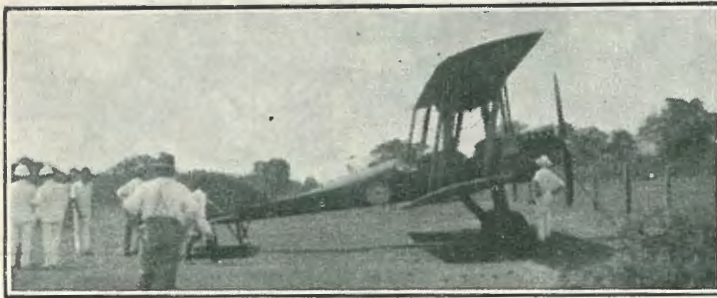
Early on December 12, I decided that it was possible to make an attempt to get away, and this proved even more difficult than landing. There was practically no wind, so we started and headed for the lane between the trees. After a clear run of about 250 yards we managed to rise over the felled trunks and, passing along the lane, gradually rose between the trees. We managed to clear the trees at the end of the lane by about ten or twelve inches and then headed for Darwin, landing at Fannie Bay about 10.30 a.m. on December 12.

Our journey completed, we had the satisfaction of knowing that we were the first to have flown across the Australian

continent from south to north. This is a distance of approximately 2,500 miles, and it was completed in 46 hours actual flying.

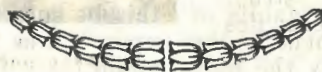
The atmospheric conditions experienced during the trip were far from pleasant. Many enthusiasts who have done no flying in Australia have spoken of Australian atmospheric conditions as being ideal for flying. This is not the case, especially in Central Australia, for in no other place have I experienced such rough and unpleasant conditions. The visibility, however, was, in most cases, good, and we had no difficulty in seeing long distances in all directions.

In conclusion, I think that, considered as a whole, the route followed by us appears the only one possible under present conditions. By following this route, one is in touch with communications to the greatest extent possible in a flight from Melbourne to Darwin, and this is of the utmost importance in the case of breakdowns, for it facilitates greatly the forwarding of spares, *et cetera*.



The End of the Flight.  
Captain Wrigley's B.E.2E. at Darwin.

[Captain Wrigley's feat is rendered all the more noteworthy by the fact that the machine used is more than four years old. It was constructed in 1915 at the works of the British and Colonial Aeroplane Co., Ltd., at Filton, the home of the famous "Bristol" aeroplane, and has been more or less in operation ever since.—Ed.]



## REPAIRING SIR ROSS SMITH'S ENGINE AT IPSWICH

It is a matter of common knowledge that shortly after leaving Charleville in Western Queensland, engine trouble developed in one of the 360 h.p. 12 cylinder Rolls-Royce engines; fortunately, although flying at a height of 2,000 ft., a safe landing was effected.

A preliminary examination showed that a thorough overhaul of the engine would be necessary, and the Queensland Railway Department, through the Minister, immediately placed the resources of the Ipswich Workshops at the aviators' disposal. A representative of the Chief Draughtsman's Office who had had experience in the Flying Corps, proceeded to Charleville, and the engine was railed to Ipswich, accompanied by Sir Ross and Sir Keith Smith and also Sergeant Mechanic J. M. Bennett. Sergeant-Mechanic W. H. Shiers remained in Charleville with the machine.

When the engine was taken down it was found necessary to supply two new connecting rods, these were forged and machined from an ingot of nickel chrome vanadium steel by the staff of the Ipswich Workshops, under the direction of Mr. Robinson, Works Manager, and Mr. Rees, Chief Draughtsman. The bearings were filled with a special mixture of white metal and the new rods fitted to the engine. The crank case, which is of an aluminium alloy, was found to be cracked, and was successfully patched by means of copper plates riveted over the fractures.

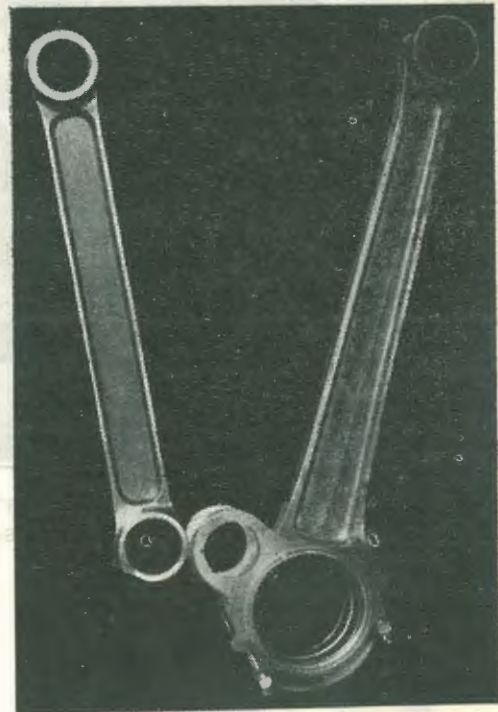
Two of the cylinders were also replaced from spare parts which had been forwarded to Australia by Messrs. Vickers, Ltd., in case of emergency. The engine was then reassembled under the direction of the aviators.

One of the propellers having been damaged owing to contact with a hawk at Calcutta, it was decided to construct a new one. On this work four mechanics from the Defence Department, Melbourne, were engaged, in addition to the Ipswich

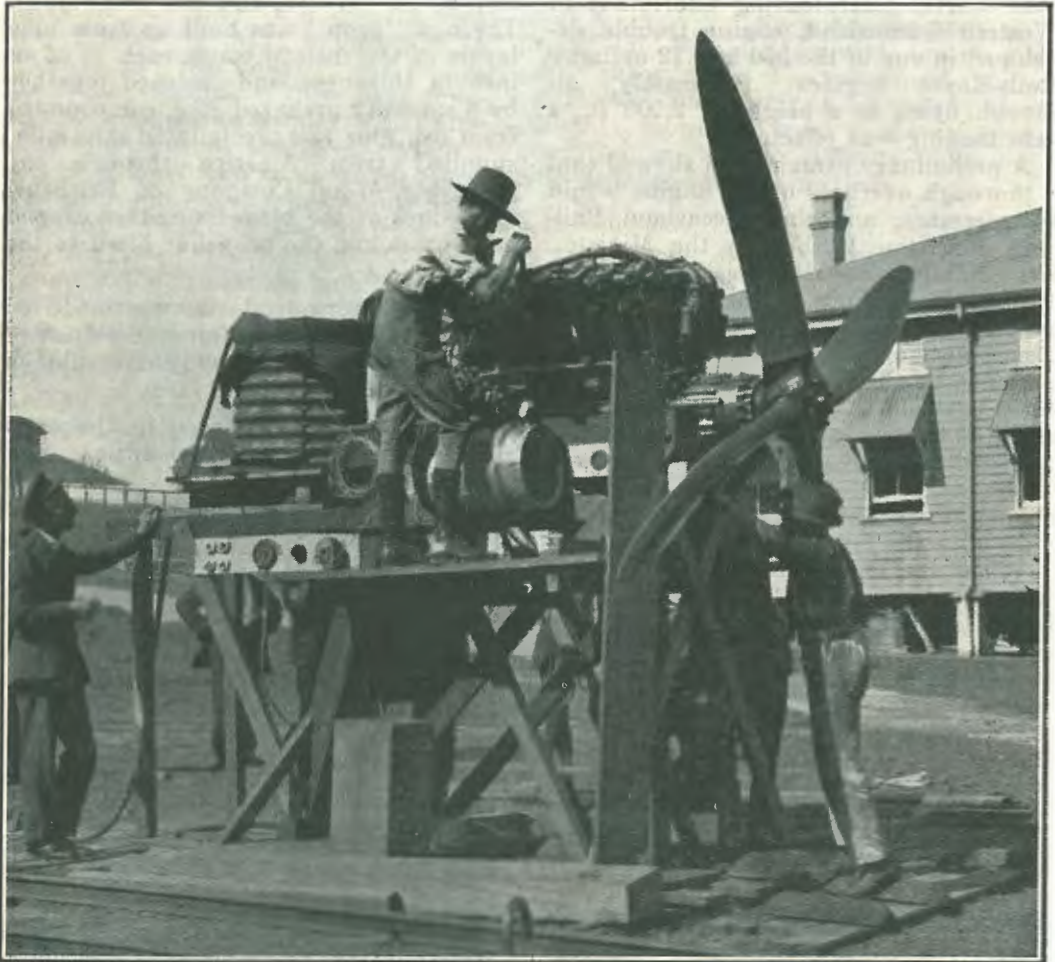
staff. These propellers measure 10 ft. 6in. across the tips, and are four-bladed. The new "prop" was built up from nine layers of Queensland maple each  $\frac{1}{8}$  of an inch in thickness, and fastened together by a specially prepared glue, compounded from fish glue and precipitated skim milk, supplied from America through the Three-ply Wood Company of Brisbane. The edges of the blades were then capped with brass and the propeller fitted to the engine.

A satisfactory trial run was made on January 28, and the engine accompanied by the aviators left for Charleville on February 3.

The engine was replaced in the aeroplane, and after trials and adjustments,



New duplex connecting-rods of nickel chrome vanadium steel.

REPAIRING SIR ROSS SMITH'S ENGINE  
AT IPSWICH

PRIOR TO STARTING FIRST TRIAL.

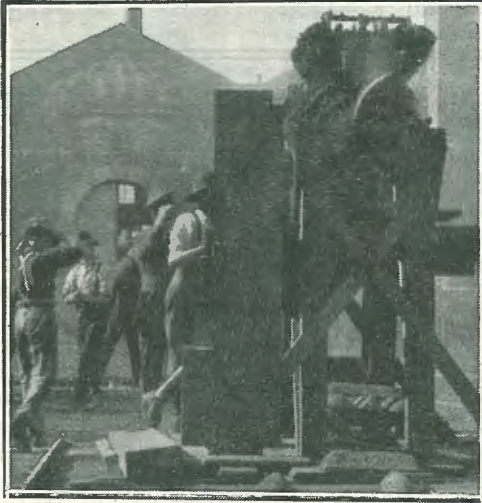
Sir Ross Smith in foreground, and Sergeant Bennett at engine "tuning-up."



a continuous flight was satisfactorily made on February 12.

All those connected with the Ipswich Workshops are entitled to very great

credit for the excellent work performed on this most difficult and unusual job. The fact that it was completed in Australia to the satisfaction of the aviators is another feather in Australia's cap.



Engine trial at full speed, 1700 revolutions per minute.



Propeller of Queensland maple, made out of stock in Ipswich Shops.

SIR ROSS SMITH'S MESSAGE TO READERS  
OF SEA, LAND AND AIR.

Written at Ipswich, Q., January 30, 1920.

Now that our Rolls Royce engine has been tested I would like to say how pleased I am with the results of the test, and also how very much I appreciate the great assistance which we have been given by the Ipswich Works.

The work carried out here has been done quickly and skilfully and reflects the greatest credit on all concerned. I am now quite confident that the engine will carry us on safely to the end of our flight. The new propeller which has been made is an excellent piece of workmanship and I am sure it will carry us along successfully.

Ross Smith.

## MARCONIGRAMS FROM MARS

Especially Written for "Sea, Land and Air"

By ERNEST T. FISK, M. Inst. R.E.

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Shall we, some day, communicate and exchange ideas with beings in other worlds? Although the possibility is one which would evoke derision in many an average man, I believe that a degree of latent faith in the suggestion would be found in the minds of ninety-nine per cent. of him were we but permitted to explore them.

Before taxing the reader's patience, or the writer's energy, by further speculation as to the feasibility, let us see how such communication could be effected; agreeing, for the moment, that life and intelligence exist in other planets—Mars, for instance.

The first essential to communication between the Martians and ourselves would be some form of connecting link, some medium through which ideas can be exchanged, and which exists—wholly or in part—in both spheres. No wire extends from Mars to Earth; we have the evidence of our own eyes to assure us of this, and, failing the presence of such copper or iron wire along which to transmit the telegraphed word, or the telephoned vibrations of the human voice, we next face the alternative problem of constructing an enormous megaphone through which to shout: "Hello, Mars!" In this, again, we should be foiled, for, even could the necessary vocal range be commanded, we are up against the disappointing fact that Sound consists exclusively of air-waves, and that between the two planets is a vast space devoid of air. In other words, between Earth and Mars is a vast vacuum across which we must transmit our messages without the use of wire. Here, by the way, is a clear illustration of the term "wireless message."

Our knowledge of the nature of Light reminds us that each evening we on Earth receive a signal from Mars when,

in the sky, we see the red glow of this interesting planet, and one immediately recognises in this a medium through which impulses may be transmitted. Light consists of waves, identical (but much shorter) with those waves which carry our wireless telegrams or wireless telephone messages from ship to shore or from one side of the world to the other.

It has been fully demonstrated that wireless waves, as well as those of Light and Heat, can cross a vacuum just as readily as they pass through the air. They travel through Ether, a medium which fills all space and permeates all matter.

Here, then, actual scientific knowledge provides us with an excellent starting point for our investigations:—

Ether forms the connecting medium between Earth and Mars.

Wireless apparatus produces waves in Ether; waves which rush across space at the speed of 186,000 miles *per second*.

Mars is approximately 50,000,000 miles distant from Earth.

Therefore, travelling 186,000 miles per second, a wireless wave would pass from planet to planet in less than five minutes.

With apparatus and connecting link now, so to speak, in our hands, the next difficulty is that of language. In order to communicate with us the Martians must, of necessity, understand one of our ancient or modern languages and, while it may be possible to suggest logical reasons for assuming a common speech, we will agree, for the purposes of this article, that none of our conversational languages is known on the other planet. Thus, one must seek elsewhere for a basis on which to exchange ideas and information.

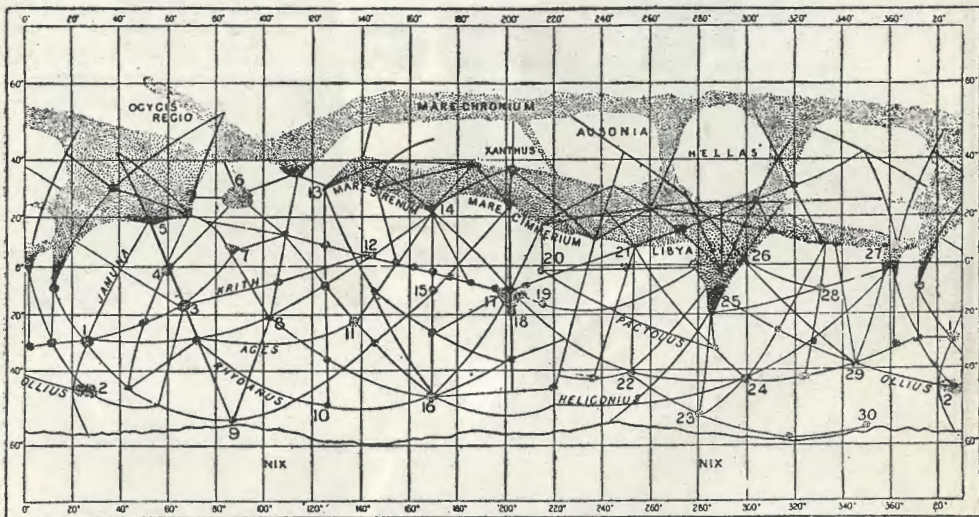
When a civilised man meets a savage on his native soil, neither understanding the language of the other, they build up a common means of communication by

reference to objects which appear alike to both—such as a tree, or an animal—and, by this means, each learns sufficient of the other's words to permit conversation.

So far as can be judged, the only idea common to all worlds is mathematics;  $2+2=4$ , throughout the cosmos. With the aid of elementary mathematics it should be possible to devise a common mode of speech by reference to objects such as the sun and other planets visible from both worlds, and to matters of mutual interest, such as Time and Distance, the common appearance of which would be recognised.

the possibility of intelligent beings in other worlds, we could assume that the degree of intelligence, in some of them at least, is equal to, if not greater than ours. Supposing there is a sphere where the beings are more advanced than we, it would not be difficult to believe that their curiosity and desire for wider scientific knowledge would prompt them to attempt to communicate with worlds other than their own.

This idea is strongly supported by statements from eminent scientific men all over the world, and recently reported in the *Sydney Sun* and other journals.



Map of the Planet Mars, on Mercator's Projection, based on a drawing by Professor Lowell.

We now have not only the physical means of communication but, also, a basis for the exchange of ideas. For the rest, we must have recourse to speculation which will either be accepted or rejected by the reader, according to its logic or relation to established facts.

Having taken Mars as the first source of ex-terranean communication because it is the nearest of all the other habitable spheres, we must consider the possible existence of intelligent beings who wish to get into touch with us.

The writer has previously stated that it would be extremely presumptuous on our part to assume that this little speck in the universe, which we call the Earth, is the only point favoured with life and intelligence, and if from this we assume

Let us also read what a great French astronomer, M. Camille Flammarion, wrote seventeen years ago:—

"As to the inhabitants of Mars, this world is in a situation as favourable as our earth for habitation . . . It appears to us to be a very living world . . . The conditions of existence there vary from ours and appear to be more delicate, more ethereal . . . Differing from ours this world may well be a more congenial habitation . . . Its astral life is more advanced, and its humanity should be superior to our own, just as our successors, a million years hence, will be less coarse and barbarous than we are at present; the law of progress governs all the worlds, and, moreover, the physical constitution of the planet Mars is less dense than our own. There is no need to despair of entering some day into communication with these unknown beings . . . The idea of communication with them in the future is no more audacious and no less scientific than



Senatoré G. Marconi, G.C.V.O., D.Sc., LL.D., Inventor of Wireless Telegraphy.

the invention of spectral analysis, X-rays or wireless telegraphy."

Adopting the consensus of opinion that highly intelligent beings exist in our neighbouring planet, we are left to speculate as to the methods and apparatus they would employ. These speculations will, necessarily, be developed from the knowledge we possess, and from the methods which we practise on earth, aided by such information concerning certain mysterious wireless signals as has been reported in the daily newspapers.

The writer of this article accepts no responsibility for the suggestion that the supposed mysterious signals emanate from any place beyond our own world. That idea appears to have originated with a London newspaper and it has been supported, to some extent, by a number of scientists. The suggestion, however, provides a convenient basis for one's theories regarding the method and apparatus for such communication.

We have read that strange sounds are being received at wireless stations in the United Kingdom and America, and that they appear to be of equal intensity on both sides of the Atlantic. From this it could be assumed that they are sent from a ship midway between opposite shores, or from a distance infinitely greater than the width of the Atlantic.

The ship idea may, for many reasons, be dismissed as impracticable. No ship would remain in one position for several months merely for the fun of playing practical jokes. The belief that the messages originated from a great distance is more acceptable. If such be the case, and particularly if the signals originate outside the earth, they should be received with equal intensity in all parts of the world. The possibility of an un-Earthly origin is by no means affected by the fact that, so far, they have been detected in England and America only. Senatore Marconi is reported to have stated that the most effective wave length is in the neighbourhood of 100,000 *mètres*, and this would satisfactorily explain the absence of reports from other countries, because that length of wave is several times greater than the longest used in present-day wireless telegraphy. No earthly station has sent messages on anything greater than 20,000 *mètres*, and, consequently, few stations are equipped with

the apparatus necessary to "tune" to 100,000. The majority of our stations seldom send messages on anything greater than 5,000 *mètres*.

There are several interesting reasons why our planetary neighbours might signal by means of waves longer than those used by ourselves.

Let us suppose that inhabitants of Mars have been endeavouring to call us up for centuries, but as yet without response. If they know, or have good reasons to believe, that we use wireless telegraphic apparatus they would assume that their waves were not arriving here or, if arriving, were not strong enough to affect our receivers. On this assumption they would continually strive to radiate waves of greater power. We know that, in order to radiate large quantities of energy, large aeriels are essential, also that these great aeriels cannot be operated efficiently on a short wave length. We have learned also that long wave lengths travel further than short waves, because the former are not affected by atmospheric absorption to the same degree as the latter. Hence we find a reasonable explanation of the possible use by the Martians of waves longer than any used on earth. They have attempted to communicate with smaller power, but are now using something enormous in comparison with our greatest wireless stations. At the present day an aerial large enough for such a purpose would be impracticable on our own planet, but it might present no insuperable difficulty to the Martian engineers. If their knowledge has reached a more advanced stage than ours their methods of construction would be equally advanced. We can assume, also, that the handling of huge constructions would be far simpler to them, because a mass weighing 70 tons on Earth would only weigh 26 tons on Mars.

Because the mysterious signals consist of groups of dots and dashes, similar to our Morse Code, and particularly the frequent repetition of three dots which form the letter S, Major Macallum, of Marconi House, London, suggested that the Martians are able to receive our wireless signals and have deciphered our Morse Code. From this interesting suggestion we might assume that they would endeavour to imitate some of our signals,

and would particularly repeat one of our simplest Morse letters, which are *e, i, s, h, t, m* and *o*.

An alternative assumption is that the signals are in a Martian code, and that ours have not been detected, or that our receivers are the more sensitive and we overhear communication between two Martian stations.

Whatever may be the ultimate explanation of the strange Marconi signals, it has been particularly interesting to read that so many eminent and practical scientists believe in the possibility of inter-planetary or inter-stellar communication. After all, most of our earthly achievements, from exploration and education to aviation and wireless, existed as vague ideas long before they became established facts.

Should we be permitted to unlock the door of infinite space in the near future,

it would come as a great relief to many thousands and lift their minds from our troubled world to things so vast and wonderful that many of the difficulties and dangers which surround us to-day would sink into insignificance.

When we consider to-day the continent of North America with its thriving millions, world-wide influence and great potentialities, arisen in comparatively few years from the voyages of Christopher Columbus and Sebastian Cabot, we can conceive some small measure of the vast future potentialities which would grow from a scientific voyage, by medium of wireless telegraphy, into the realms of universal space.

[Since this article was written, strange wireless signals have been received in Sydney by the author, Mr. E. T. Fisk, who states that their origin is, as yet, unknown.—*Ed.*]

## FISHIN' FROM A PILE

Beside the smoky harbour, with all it's  
shippin' fine,  
I sit and watch the floater upon me baited  
line,  
And in between the fishin' I often cock  
an eye,  
And feel a bit of envy to see the ships  
go by.  
The ferries hoot and scramble from cove  
to curvin' bay;  
'Mid shouts and din of whistles the tramps  
get under way.  
To take the roads they travel would be  
me dearest wish,  
As down beside the water I heave me line  
and fish.  
A trooper, steamin' homeward, around  
the headland peers,  
And soon the lads aboard her are loosen-  
in' their cheers;  
While near a laden schooner at anchor  
peaceful lies,  
And from her lofty mizzen the Yankee  
ensign flies.  
Across the blue Pacific, from out the  
Golden Gate,  
She sailed past palm and coral to bring  
her lumber freight.  
Then sounds a ship-bell clangin', where  
lofty funnels rear,  
And soon a White Star liner is backin'  
from the pier.

A Jap from Yokohama, a Frenchy from  
Marseilles;  
I watch the lazy house-flags, or see the  
dryin' sails.  
A Cunard's winches rumble beneath her  
derrick booms,  
And well I know she's loadin' our wool  
for Bradford looms.  
A trailer comes a-trailin' her wash a  
dirty white,  
And for the scraps she scatters the  
wheelin' seagulls fight.  
While yonder, for their cargo, the Inter-  
staters wait,  
To bear it past the Leeuwin, or through  
lone Torres Strait.  
A tramp that saunters slowly, bears on  
her stern the gun  
That played its part in battle against a  
pirate Hun.  
Behind a fumin' tugboat a square-rigged  
sailer swings;  
She longs for deeper water to spread her  
canvas wings.  
I board those ships in fancy, and with  
their seamen go  
To make Bombay or Durban, New York  
or Plymouth Hoe.  
And as the world is toilin', I'm watchin'  
all the while;  
I have such great adventures a'fishin'  
from a pile.

## ISLES OF ROMANCE

### SPANISH RELICS ON THE BARRIER REEF

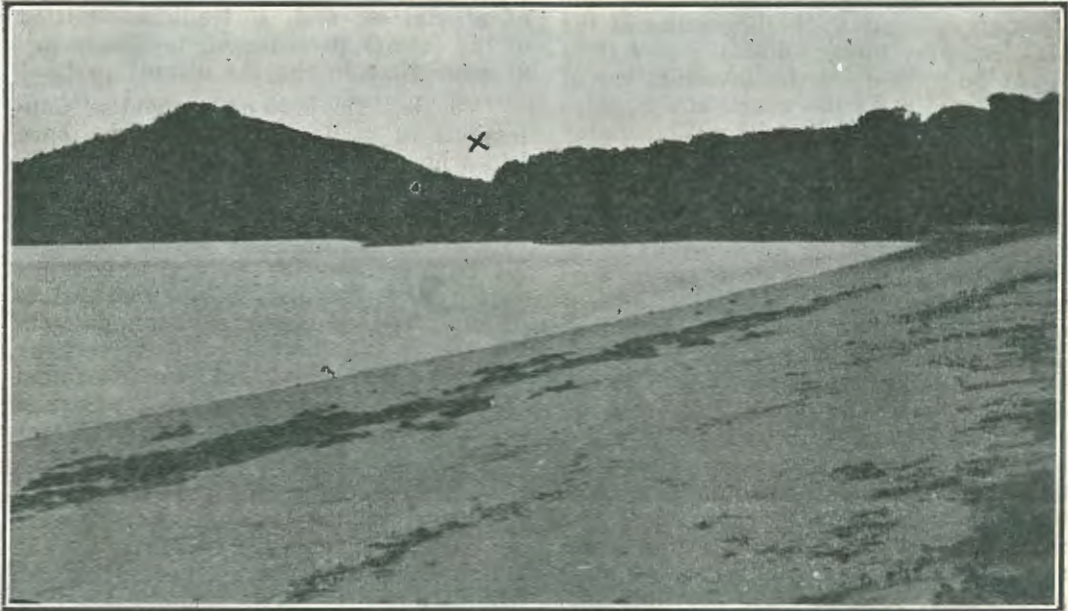
Especially Written for "Sea, Land and Air" by FRANK REID.

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Long before Captain Cook sailed his frail craft through the tempestuous and island-studded waters which lie between the Great Barrier Reef and the North Queensland coast, they were explored by many unknown adventurers. It will, of course, never be known who was the discoverer of our North-eastern coast. His name and nationality alike are lost for ever. Knowing something of the voyagers of the world, it does not require a very

article to show that, so far as Spaniards are concerned, they actually did sail down the Queensland coast more than 200 years before the *Endeavour* broke into these waters.

The coast of Northern Australia was sighted by Portuguese sailors somewhere in the first quarter of the sixteenth century. The Portuguese, however, share the honours of discovery, or re-discovery, with the Spaniards, the former being first on



Long Island. The ancient wreck lies inland from spot marked X.

great stretch of imagination to assume that the first to land on these shores was either a Phœnician, a Greek, a Spaniard, or a Malay. These were the people who at one time or another cruised in the waters which wash the northern and eastern coast of this continent, and it is quite possible that one of their rude craft, losing its bearings, may have touched these shores; in fact it is my intention in this

the northern side, while the latter had priority on the eastern coast. As early as 1528-1529 a Spanish vessel, under the command of Alvaro de Saevedra, charted 250 leagues of the coast of New Guinea, also portion of Cape York. Proof that the Spaniards again sailed down the eastern coast is shown by the traces of a Spanish settlement discovered at Port Curtis in 1847. The relics at Port Curtis

were said to be from H.M.S. *Rattlesnake*, which visited that part of our coast just before the discovery was made, but this was refuted by the unearthing of a cannon at South Tree Point by Mr. Joseph Wilmot when surveying the site of Port Curtis in 1853. The material of this relic, apparently of Spanish workmanship, was brass, and its dimensions were: length, 5ft.; diameter, 5in.; bore, 1½in. The inscription, "Santa Barbara, 1596," makes it the earliest link we have with those distant days, the others, so far as I am aware, are a coin dated 1717, found on the site of an old aboriginal camp at Hamilton, Victoria, and some tokens discovered among Dutch relics on Gun Island, Western Australia, bearing the dates 1633 and 1638.

Interesting as this ancient cannon undoubtedly is as an indication of the presence of Spanish navigators on the Queensland coast at the beginning of the 17th century, more reliable information might be gained by the investigation of what is said to be the wreck of a Spanish ship on Long Island, in the Whitsunday group, between Mackay and Townsville.

I first heard of this wreck from a French sailor about 15 years ago, and, in company with another adventurous spirit, started from Mackay in a small boat bent upon fully examining the ancient wreck. Owing to rough weather, it took us considerably longer to reach the island than we expected, and when we did so, shortage of provisions forced us, much to our regret, to hasten our examination. We found the hulk buried in the mud of a mangrove swamp about a mile from the beach. There were evidences that in the distant past a creek ran through what is now the resting place of the ship, so it is quite probable that she was wrecked on the Barrier Reef and drifted into this creek, and in the course of time the creek silted up and covered her. We attempted to dig down to the centre of the vessel, but as soon as a spadeful of mud was lifted water flowed into the hole. Eventually we were forced to abandon the task. Only the prow and stern-posts of the wreck can be seen, and these give rise to the idea that she was a Spanish galleon, as from both ends of the ship the decks slope down several feet. We drove a pole

down through the mud at a point we considered the centre of the hulk, and it came in contact with a hard substance, which we believed to be wood, at a depth of eight feet. I questioned a hoary-headed old aborigine, who lived on the island, about the wreck, but he said it was buried in the mud when he was a child, and that in his youth coins and silver spoons were scattered about the beach. These were worn as ornaments by the children. Half-way between the beach and the wreck are visible the remains of a stone-lined well. I have been informed by sheep farmers on the neighbouring islands that this was probably dug by Matthew Flinders during his journey along the Queensland coast, but after carefully inspecting the weather-worn stones I am inclined to connect the history of the well with that of the ancient wreck. Years back these islands were inhabited by a fine, intelligent race of aborigines, and a tradition existed of the former presence of "yellow men" at some time in the far distant past.

"Yorkie," the hero of Banfield's "Confessions of a Beachcomber," who once had a home on Hook Island, in the Whitsunday Island Group, found an ancient, rust-covered cannon on a small islet called Castle Rock. It lay in front of his hut for many years, and although I examined it carefully, it had corroded so deeply that if there had been any engraving it had long since been eaten by rust. Strange to say, this relic was found almost in a straight line with the Barrier Reef and Long Island. Perhaps it was a connecting link with the buried galleon. *Quien sabe?*

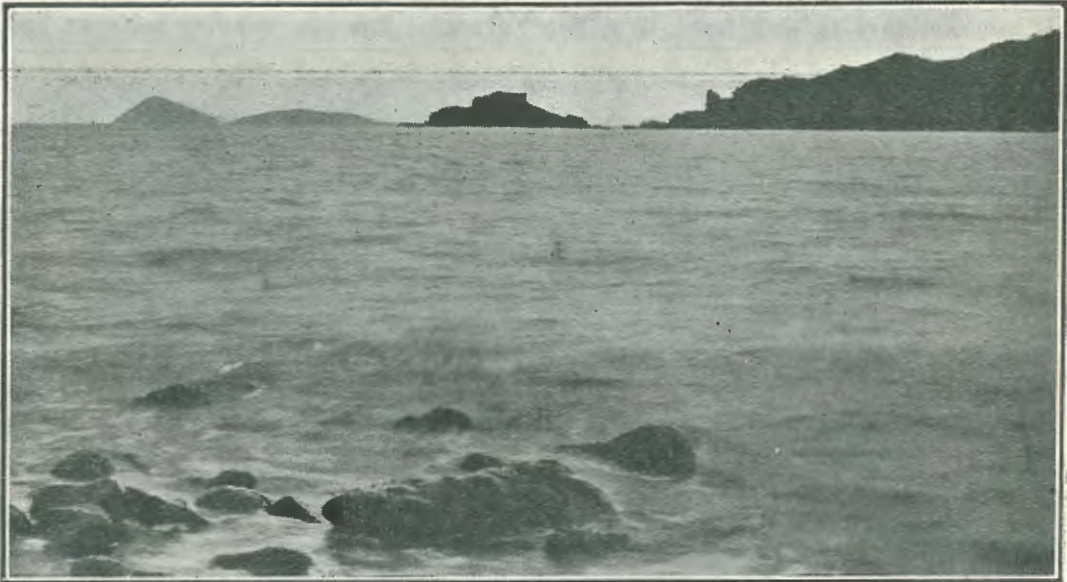
Mariners of the 17th century who were employed on vessels belonging to the Dutch East India Company, explored the islands along the Queensland coast long before the British, and although they effected no territorial acquisitions they left their traces on the map in the form of fairly numerous Dutch names scattered along the coast. Of these two or three have a special interest attached to them. Cape Keer Weer, on the eastern slopes of the Gulf of Carpentaria, is remarkable as being the first portion of the Australian continent to receive a European name. It marked the turning point of an expedition which set out from the headquarters of the Company at Batavia,



in the year 1606, to survey the south coast of New Guinea. Passing by Torres Straits, under the impression that it was the mouth of a bay or estuary, they skirted the eastern shore of the Gulf, presumably believing it to be a continuation of the New Guinea coast, as far as the point named. The name of their vessel is immortalised in Duyfhen Point, north of Cape Keer-Weer. The mistake of the *Duyfhen* was repeated seventeen years later by an expedition in the ships *Pera* and *Arnhem* which penetrated as far south as the Staaten River, which they named in honour of the States (*Staaten*) General of Holland. To commemorate this voyage were named Pera Head and

a lifetime on the Whitsunday Islands, told me the following story:—

Many years ago, before the appearance of white men on the islands, a large sailing vessel appeared around the southern point of Whitsunday Island. The natives approached the vessel with their canoes laden with fruit and fish. Barter took place. Just as the blacks were leaving the vessel one of the crew fired at an aborigine in his canoe, killing him instantly. The others returned to shore, where they discussed the murder, and decided to avenge the death of their comrade. At midnight they silently approached the vessel, and murdered all on board. After plundering the sailer, it was fired. A few days later another sail-



Castle Rock, where "Yorkie" found an ancient cannon.

Cape Arnhem, on opposite sides of the Gulf of Carpentaria. It was probably about this time that the Gulf received its name in honour of Pieter de Carpentier, Governor-General of the Dutch East India Company.

Romance keeps her vigil amongst the isles which, like a necklace of ocean pearls, stretch along the North Queensland coast. Here fierce aboriginal fights and cannibal feasts have taken place; ships have been wrecked and the crews murdered. An old aboriginal who spent

ing vessel anchored close to the island. Several of the sailors from this ship landed on the shore, and commenced to damage the native canoes, with the result that another massacre followed, and of the whole crew only one man was spared. This individual was speared through the eye, and on the gins' appeal for his life the natives released him. He lived with the tribe for many years, and eventually escaped to the mainland. He was probably one of the "yellow men" to whose presence aboriginal folk lore continually refers.

## ROMANCES OF INDUSTRY

### WOOL-TOP MAKING

Epecially Written for "Sea, Land and Air" by Miss KAE McDOWELL.  
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[Indebtedness is acknowledged to Messrs. Dalgety & Co., for the photographs which illustrated last month's article on Australian Wool for Export.—Ed.]

The manufacture of wool-tops is one of Australia's most important, but least advertised industries. A large proportion of people do not even know what wool-tops are, and much less have they any inkling of the process involved in their manufacture. For the reason of this it is not necessary to seek far. Wool-top

the machinery leaves the onlooker amazed. It is an industry of recent growth. A dozen years ago we were very backward in respect to the treatment of wool, not even washing the grease from the fleece, but exporting it almost as it left the sheep, and very imperfectly graded. The few weaving mills we had,



Wool Sorting.

making includes scouring and combing, and is usually associated with the kindred industry of fellmongering. Now, wool-scouring is an unsavoury occupation, but fellmongering—!

Wool-top making combines the whole preparation for the weaving mills except dyeing, and the process is extremely interesting. The later phases of it are beautiful, intricate and the reverse of disagreeable. The ingenuity of some of

scoured the wool they required by hand—a long process, and dried it in the open air—a longer one.

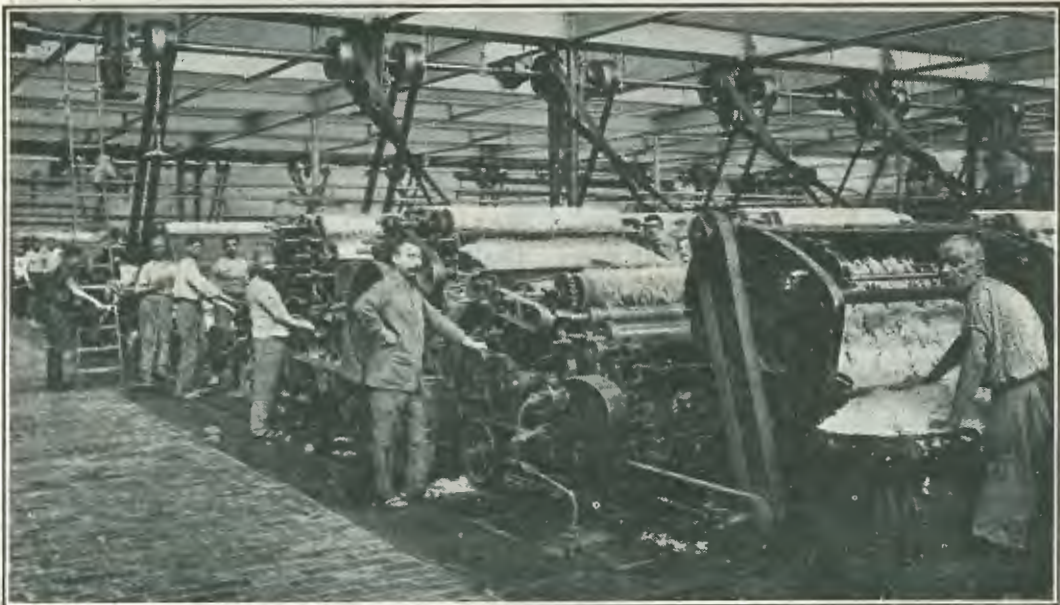
F. W. Hughes started the first top-making works in Australia, at Botany, about eleven years ago. Three years later Whiddon Bros. erected theirs in the same locality. Now, though top-makers are still scarce, there are nearly one hundred woolscouring and fellmongering works scattered throughout the Commonwealth.



Wool Scouring.

During the year 1917-18, scoured wool worth £1,510,799 was exported, and a little more than £332,500 paid in wages to 3,000 employees. The industry has flourished, and will continue to improve. Since the war the scales have fallen from Australia's eyes. We have discovered with a sense of shock how other nations

have been fattening on our prodigality, how foreign manufacturers have been swelling their coffers by utilising by-products classed by us as refuse. The manufacture of lanoline out of wool fat is one step in the right direction, and there is every indication that it will be a success.



Wool Carding.

It is significant to know that Australia only absorbs by local manufacture, 3 per cent. of her wool-clip, and that she cannot deal adequately with any of her finest wool. Every ounce of this—a product more like silk than wool, and having a sheen like spun silver, is bought by countries who employ cheap labour, such as Japan, where it is woven into those wonderful kimono fabrics so dear to the heart of luxurious leisure, and France and Italy, to be subsequently re-imported by us at exorbitant prices in manufactured form.

When the British Government closed that tremendous wool deal with Australia

lows:—As soon as the British Government appraisers have examined the wool in the warehouse showrooms, the manufacturer whose goods are to be sold in Australia is allowed to select his raw material at its appraised price, which may come out at less than the flat rate. As a matter of fact, experience proves that it usually does. The approximate average price of wool bought for local manufacture is from 22d. to 24d. per lb., inclusive of combing. It is usually second-class wool—the same is sold in London at about 80d. the pound. The top-maker, or manufacturer for export, has to buy at the flat rate.



Wool Combing.

which was described in the last issue of this journal, it bought the wool of every sheep shorn in the Commonwealth until the end of June, 1920. Not only every fleece shorn in the sheds, but the wool on the skin of every sheep killed, or that dies by the drought, or through any non-infectious cause. If one visited the biggest wool shed in the country to-day it would not be possible to buy a pound of fleece.

One naturally asks where does the local manufacturer come in. Though he only uses 3 per cent. of the "clip" it was necessary for some arrangement to be made in his interest. This was as fol-

Merino wool is the best, and is practically all exported, 55 per cent. of dirt is to be found in the average fleece. Wool that is not exported "in the grease" is sent away as scoured wool, or as "tops."

The first process in the manufacture of tops is sorting, or grading fleeces according to length and quality. Wool often varies considerably in texture in different parts of the same fleece. Some sections are coarse, others fine. One part may be strong and elastic—ideal for yarn—another tender. "Tenderness" in wool is often caused by a change of feed. When sheep have been taken from a droughty area and put onto good grass country a

break is usually discernible in the staple of the wool, and, if the fleeces were not carefully sorted, faulty tops would result.

After grading comes scouring. This is unsavoury work, because of the steam rising from the wet and dirty fleeces. The wool is dumped into an automatic machine which feeds it evenly to the washing bowls. In the first bowl is a mixture of soda, soap and water heated to 120° or 130° *Fahrenheit*. In this the wool is propelled from one end to the other by means of rotary forks which, having done their part, relinquish it to the rake and squeezing roller fixed at the end of each bowl. Here it is wrung

fifty yards through a huge metal tube into the combing mill. It wafts into the receiving room like gigantic fluttering snowflakes, beautifully soft, but still slightly damp, a feature which is necessary for working.

"Carding" is the next step in the fleece's progress. For this purpose it is fed into a complicated machine consisting of several needle-covered canvas rollers, each one finer than the last. These make the fibres parallel—the first attempt to discipline the chaotic lumps of fleece into some kind of order. By its adhesive nature the wool, of course, clings, and requires to be beaten, like a film of frost, from the last roller. The



"Gilling."

out and the still somewhat dirty wool carried on a revolving tray to the second bowl. The whole device is mechanical and the process is repeated four or five times, the mixture becoming gradually cooler. From the last rollers the wool is whisked off by a fan and conveyed to the drying machine—a great revolving wheel in a hot chamber.

The wool is now known as "100-per-cent.," and is ready for top-making. At Whiddon Bros.' factory it leaves the scouring works in a somewhat summary fashion, being blown a distance of some

width of the film is then reduced by compression to about 6 inches, and the "stiver"—as it is then called—enters the balling machine as a long, soft band.

"Gilling" comes after the wool has been wound into great balls. The machine for this purpose combs the wool to its full length, and reduces the size, though not the weight, of the balls by half. These machines are tended by girls. The work requires no special skill nor is it heavy or disagreeable, because when the actual scouring is completed the wool is as soft and white as snow,

and as sweet-smelling as the yarn in My Lady's shawl!

We are now half through the process of top-making.

The combing machine, to which the "sliver" is next subjected, is the most wonderful of all. It is composed of 1,800 separate parts and works like magic. Besides combing the fibres with fine steel needles, and picking out all remaining foreign matter such as dirt and grass seeds, it separates the short hairs from the long, dropping them into a special receptacle. The "sliver" is then sent on to the next machine to detect any dirt that the combs have missed. The short wool, "noils," which is useless for the manufacture of worsted, has a sphere of particular interest to readers of this journal. Besides being used in woven wear such as singlets, etc., it supplies the fleece linings so necessary for our aviators' outfits.

The long wool has now arrived at the dignity of "tops," and, as such, must undergo the process of "back washing" which, to the uninitiated, appears somewhat superfluous. It seems already "as driven snow." This, however, is not the woolcomber's opinion. He is convinced that carding and combing have a slightly soiling tendency, and he puts the tops into a final bath of warm, soapy water. From this they pass into heated rollers, thence to the finishing machine which combs out any blemishes in the texture. The wool is then wound into huge spools of uniform size and wrapped in brown paper. These packages are first put into presses after being covered with hessian and sprayed with naphthaline, as a protection against moths, then packed into bales to an average weight of 530 lbs., for export.

One other delicate piece of mechanism should be mentioned in connection with "top-making"; this is the condition machine, in reality a very exact computer, which indicates the precise amount of moisture left in the wool on completion of the process. Buyers are not desirous of paying for moisture, 13 per cent. of which is usually found in the finished product. A sample of wool is therefore taken from each bale just before sewing up, and this is weighed, to the last *mille*. It is then put in the conditioning oven, and subjected to a temperature of 200° *Fahrenheit*; this renders it perfectly dry and it is weighed again. The difference in the weight shows the percentage of moisture, and even the most exacting buyer is satisfied.

In this country until recently there were practically no by-products of the industry, the grease being allowed to flow through sewers into the sea. A short time ago, however, the Water and Sewerage Board put in a new kind of sewer at Botany (New South Wales), which in less than forty-eight hours was choked up with wool-fat. Notice was at once sent to the woolscourers that in future only clear water would be allowed to run through the sewer, and that they must instal grease-recovery plants at once to overcome the nuisance. The cost of such plants is considerable, and Botany manufacturers saw that they would be running at a dead loss unless some use was made of the grease. The difficulty was solved by their decision to manufacture lanoline, and experiments are now being conducted with the object of perfecting the process. It is anticipated that, before long, not only will it be possible to supply Australia with this necessary unguent, but also to export it.

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## LAWRENCE HARGRAVE

### AN APPRECIATION.

Especially Written for "Sea, Land and Air" by W. H. NICHOLAS.  
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I know of no more fitting proposal than that brought forward recently by the Australian Aero Club, which seeks to immortalise the work of Lawrence Hargrave, "The Father of the Aeroplane," and of Sir Ross M. Smith, M.C., D.F.C., A.F.C., the first pilot to fly across the world, by the erection of some form of national monument. Whatever form the proposed monument takes, it will represent for all time Australia's contribution to aerial progress.

Nation was pitted against nation in the most gigantic struggle the world has ever known when Hargrave died in Sydney. Consequently the world's Press could do little more than make passing reference to a man to whose genius it is now proposed to pay tribute. But so long as men continue to build machines in which to fly, so long will the memory of this great Australian be gratefully linked with their efforts.

I was brought into fairly frequent contact with the late inventor. I cannot recall one parting with him that did not leave me marvelling for days at his amazing personality.

I used to find myself looking forward to my periodical visits to Lawrence Hargrave in his picturesque old home on Woollahra Point. I can see him now—a tall, elderly, bearded man, poring over plans at a rough desk in the basement of his home which served him as workshop and study. It was an intellectual treat to meet this man, to watch him move about his workshop and to listen to the soothing tones of his voice as he explained in detail, without employing more technical phraseology than was actually necessary, the theories he had evolved from his beloved models.

One had to know Hargrave a long time to fully realise the amazing measure of brain power which lay behind the keen, grey eyes and thoughtful, almost dreamy face of the inventor—a most diffi-

cult man to interview for the first time; not that he objected to discussing any of his theories of inventions (though at the same time he hated publicity of the flaring headline description), but because the habitual reserve that was part and parcel of his make-up conveyed the first impression that he was disinclined to talk.

It was an entirely wrong impression, though, and one learned later to appreciate the silent periods between sentences the while the great inventor sought to translate into plain English the theoretical intricacies of the particular subject upon which he was engaged. One learned, too, from closer acquaintance with him the wisdom of refraining from breaking in upon those silent stretches until the man was satisfied that the hearer had fully grasped the purport of his remarks.

So much has been written of Hargrave and the box-kite that was both the product of his imaginative genius and the immediate forerunner of the mechanically propelled heavier-than-air machine, that I do not propose to enlarge upon this one of his many spheres of activity.

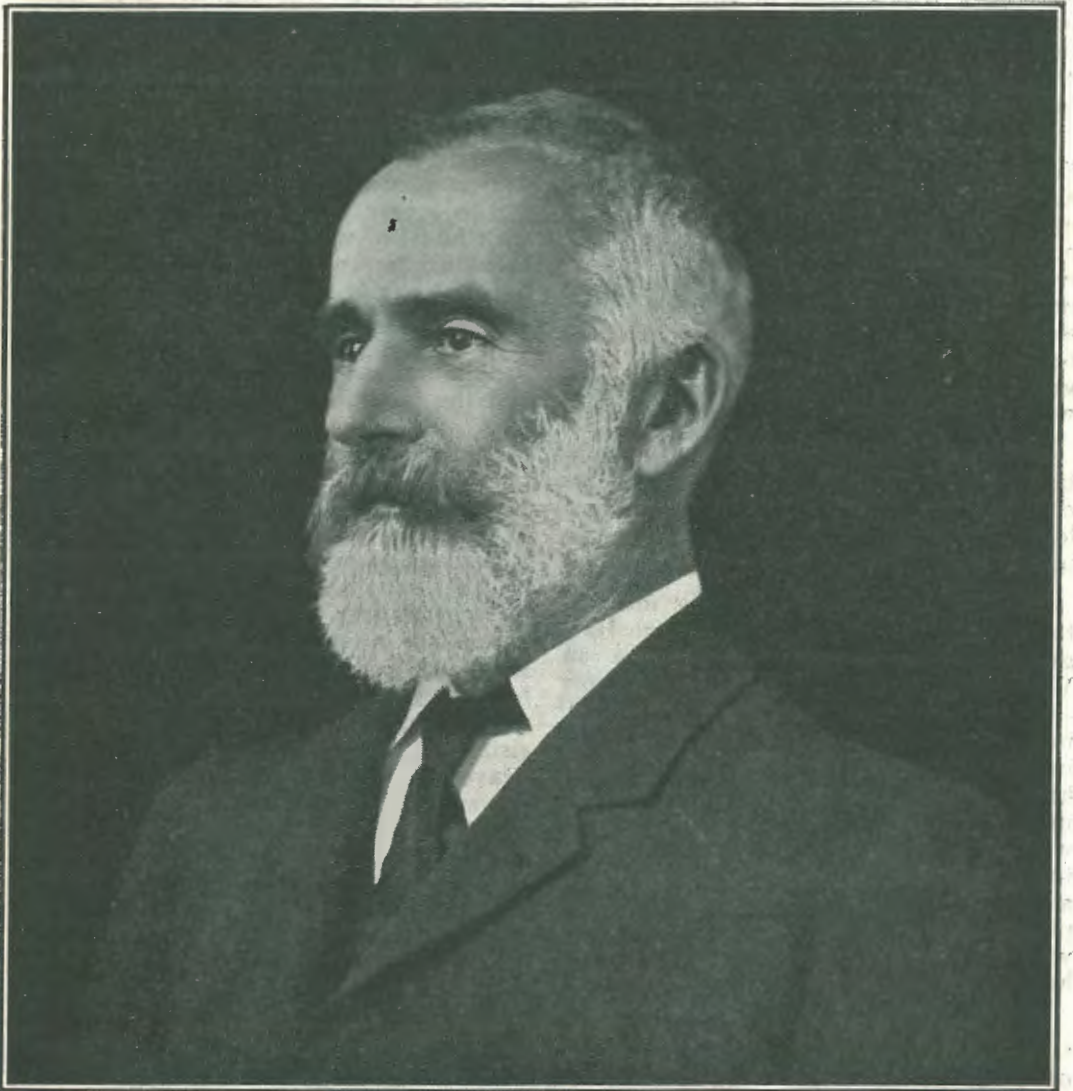
Perhaps it was Hargrave's proximity to the sea that led his great mind to the vast grey wastes that surround our continent; a study that the genius in the man prompted him to evolve an hitherto undreamt of theory in regard to the propulsion of vessels without the assistance of either wind or steam. Hargrave contended that there was sufficient power in the waves themselves to move a vessel from one point to another without any appreciable alteration to her course; a most unusual and most unnecessary line of research most people will admit. Yet it was typical of him that, having evolved a theory, there was no rest until he saw its effects in actual practice.

In this direction he worked along most original lines. Over the stern of his first model—about the size of a small rowing boat—he fitted an apparatus, difficult to

describe on paper, that sought to utilise the enormous latent power of the waves in such a way that when the vessel rose and fell with the motion of the sea, a plank-like arrangement from the poop to the water would gain sufficient leverage from the waves to push the vessel along. A weird theory, probably, and yet it worked. On one occasion he showed me, floating placidly down Rose Bay, his little model, which moved along slowly when a light southerly breeze ruffled the surface of the harbour. Of course Hargrave never intended that this method of propulsion would

supplant steam. His sole object was to satisfy himself that the waves could be harnessed if necessary.

A succession of maritime disasters several years ago were probably responsible for his efforts in the direction of a non-capsizable lifeboat, though I do not consider for one moment that it was his intention to offer it as a universal pattern. Using thin sheet steel instead of wood, he built a boat about the same size as a ship's lifeboat, roofing it over so that at first glance it reminded one slightly of a submarine. Water-tight compartments fore and aft rendered it ex-



The Late Mr. Lawrence Hargrave.



tremely buoyant, yet left the model so light in weight as to be practically useless in a heavy sea. For the orthodox keel the inventor substituted an entirely new idea to secure stability in the water. I cannot better describe it than by asking the reader to imagine an ordinary carpenter's trestle of solid iron, inverted, and securely fastened to the bottom of the craft. The additional weight was more than sufficient to "hold" the vessel in the roughest sea. At our last meeting Hargrave mentioned his intention of installing a small, high-powered engine in the vessel, which he looked upon as quite as seaworthy as anything afloat on Port Jackson.

Few keener students of ancient geography than Hargrave ever lived. I think he had in his possession copies of the charts made by every navigator of note from the time that the mariners of Spain first voyaged across unknown seas in search of new continents to conquer. I spent many an interesting hour listening to Hargrave explain the tangled mass of lines and loops and evolutions with which those old adventurers recorded their movements up and down the Seven Seas. He had the peculiar faculty of being able to recreate each navigator in person, and while he recounted his version of the trials and tribulations of each of those old-time sea-dogs, he would roll back the centuries and make each subject tell his own particular narrative. I have never met another man who could do this. He seemed to be able to live with the ancient *voyageurs*, to accurately interpret their aspirations and intentions, and to appreciate their ambitions, fulfilled or unfulfilled; and yet all the time one sat listening to him one could not help thinking of what was running through his mind; that he dreamed the same dream as Columbus, or La Perouse, or Cook—of the day when the world would be linked up by regular communication—with this difference; whereas those old-time pioneers aimed at drawing countries closer together by means of deep-sea navigation, Hargrave always had in mind the age when a feat like Sir Ross Smith's would come about.

Small wonder, then, that we find this silent genius following the long, dreary voyages of the early navigators across uncharted seas. Hargrave had a fixed

idea that neither Captain Cook nor La Perouse was the first white man to sight the succession of forbidding cliffs and sand-fringed inlets that are a feature of the coastline around Sydney. Knowing that it was the custom of Spanish navigators to leave some record of their landing on foreign shores, he turned his attention to those of Port Jackson, and after much investigation was able to prove conclusively, from certain markings on low-lying rocks, that at least one high-pooped vessel of Spain dropped anchor in Sydney Harbour many, many years before Captain Cook saw the light of day—a theory which, although unrecorded in documentary form in the history of the world, is, nevertheless, now regarded as accurate.

These are but a few of the activities in which Hargrave interested himself. They serve to show the many amazing sides of the man's character; and call him what you will—thinker, dreamer, idealist, inventor, geographer, historian—his claim to fame is undisputed.

Certainly no man more deserves recognition at the hands of so scientific a body of men as The Australian Aero Club than Lawrence Hargrave.

### LAWRENCE HARGRAVE MEMORIAL FUND.

The following donations to the above fund have been received and are acknowledged with very many thanks by the Trustees:—

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## COMMERCIAL AVIATION IN AUSTRALIA

Lecture by Major-General J. G. LEGGE, C.B., C.M.G.

Important Statement by Hon. W. A. HOLMAN.

So long ago as September, 1918, in the course of a railway journey from Sydney to Brisbane, General Legge called the present writer's attention to the necessity for the formation of an Australian Aero Club, with branches throughout the Commonwealth and, to the editor of this journal, the General summed up the situation in the following words:—

"I shall be delighted to hear of the formation of Australian aero clubs, because I consider that they can do for us in the Air Service what the National Rifle Associations do for our land forces. Aero clubs are to be encouraged because they, in turn, would stimulate the construction of 'planes for private or commercial purposes, and any 'plane that can carry passengers can carry bombs. In the event of their formation I would be very happy to advise and assist by every practicable means at my disposal, and I would gladly become an active patron of any such club."

During the eighteen months which have elapsed since this conversation, General Legge's promise has been fulfilled in the most conclusive manner possible.

His first lecture—"What an Air Service Can Do for Australia"—was delivered on October 22, 1919, before the United Service Institute of Victoria at the Town Hall, Melbourne, and was fully reported in the November issue of this journal.

His second lecture—"The Air Defence of Australia"—was delivered in Adelaide on December 18, before the South Australian Section of the Australian Aero Club and was duly reported in our last issue. General Legge's third lecture—"Commercial Aviation in Australia"—was delivered at St. James' Hall, Sydney, on January 7 of the present year, under the auspices of the New South Wales Section of the Australian Aero Club, and arrangements are now in hand for a fourth lecture in Brisbane before the Queensland Section of the Club.

The lecture in Sydney was attended by several hundred prominent citizens, among whom may be mentioned the State Commandant, Brigadier-General G. L. Lee, C.M.G., D.S.O.; Major-General Sir Charles Rosenthal, K.C.B., C.M.G., D.S.O.; Senator Brigadier-General Charles F. Cox, C.B., C.M.G., D.S.O.; Brigadier-General S. C. E. Herring, D.S.O.; Colonel R. E. Williams, D.S.O. (Commanding A.F.C. in Egypt and Palestine); Major D. V. J. Blake, Sir Thomas Hughes, M.L.C., and a full muster of some two hundred members of the Australian Aero Club.

A letter was read from the Private Secretary of His Excellency Sir Walter Davidson, K.C.M.B., Governor of New South Wales, of which the following is an extract:—

"I am directed by His Excellency the Governor to state that it will afford him great pleasure to grant his patronage to the address on "Commercial Aviation in Australia," by Major-General Legge.

"His Excellency much regrets that he cannot be present at the lecture, as he will be out of town on that date. *The subject is one which has His Excellency's deepest interest, and he hopes that you will have a good attendance.*"

The chair was taken at 8 p.m. by the State Premier, Hon. W. A. Holman, who said:—

"We are to have the very great privilege of hearing an address from the Chief of General Staff on the prospects of Commercial Aviation in Australia. We have here, upon the platform and in the body of this hall, an assemblage of officers and men who have gained considerable aeronautical experience during the military operations in the recent war. In addition, there is, I think, gathered here a great number of those who realise the important part which aviation is to play in the commercial and industrial future of our country.

"This is a flying age. Aviation has arrived. It is no longer a subject of experiment or speculation. It is a thoroughly established and successful fact, and the task which lies before the Government

of Australia and such influential organisations as the Australian Aero Club is to arouse the public mind to the recognition of that fact.

"Such an address as we shall now hear from General Legge will do a very great deal indeed to educate and stimulate public imagination to some understanding of the enormous change in the habits of mankind, and in the situation of the world, which aviation has carried with it. I am unfeignedly flattered and honoured at having the opportunity of helping, in a humble way, in the delivery of this important address which will, I hope, mark a new era in the subject of aviation."

#### General Legge's Lecture.

Major-General J. Gordon Legge, C.B., C.M.G., prefaced his lecture by expressing sincere thanks to the Premier for having demonstrated the interest which "this great State of New South Wales" was taking in aviation. "It is very gratifying (he continued) when a subject is, so to speak, on its *début*, that the Premier of the State adopts it and assists in its development."

Air supremacy is vital to the existence of Australia. I therefore make no apology for having pressed my views on our people already three times during the last three months; the urgency of the case should rather be the theme of a hundred speakers. A few of the more patriotic newspapers have commenced to give us serious attention, but, if you will take our side, we shall soon have more generous recognition by the Press. When I use the term "we," I mean the lads of that most gallant body, the Australian Flying Corps, of which I have the honour to be the advocate, though not a member, or even a flier, myself.

In previous addresses it was urged that Australia needs at once—

16 Air squadrons of 25 'planes each.

2 Flying boat squadrons.

200 large passenger 'planes in commercial use.

A Central Flying School and 10 to 12 aerodromes.

An establishment to manufacture engines and metal parts of 'planes. The personnel would be partly per-

manent, partly militia, the capital cost £1,500,000, the annual cost £1,000,000.

To-night I am here to speak on Commercial Aviation, and more especially on the subject of the 200 large passenger-carrying 'planes, which I have said are necessary as part of our air defence. The defence of a country in these times, and more especially of a large country such as Australia with a small population, is the task of the whole people and the whole resources of the country. Australia cannot pay for all the men, horses, 'planes, motor transport, and other material of war, unless a great portion is engaged normally in peaceful occupations, and it is the business side of their employment that you are now asked to consider.

The Air Service, which Australia should have, will be anything but a wasteful or unproductive form of expenditure.

The pick of the Permanent Air Service will be occupied in the elementary and higher instruction, not only of fighting officers and recruits for the air pilot service, but also of highly skilled mechanics. The air squadrons will police the air, carry out reconnaissances of the coast and the interior of the continent, assist the charting of our country by air photography, carry mails for the Post Office to the far distant homes of the centre and north-west, and assist in Government administration and exploration where ordinary means of transit fail. It is this permanent force, strengthened by a citizen force, and reserve personnel, that should man the 18 fighting squadrons. Their machines will all be of the specialised fighting type, quite different to commercial machines, but it is to these that we must look to *own our own air*—in other words to fight, destroy, and drive down the hostile airmen.

Further, we need a large force of commercial machines, equal to at least 200 of the *Handley-Page V/1500* type, more if we can have them. These are the machines that will do the heavy transport in war. They will move troops, if necessary, over the stretches where railways are wanting, they will even move them by air faster than railways, they will carry petrol and supplies to the advanced bases for the fighters, and—most important of all—they will be capable of carrying and dropping bombs of high explosive

totalling 1,000 tons; in other words they will be armed with the destructive power of 22 first-class battleships and have far greater speed. No battleship has, or is likely to have, the power of dropping five tons of high explosive in a single parcel, and one such would be sufficient for any battleship. It is on the commercial aspect that we rely to provide these machines upon which I am here to speak to-night, and I would ask you to allow me to read the results of the experience gained in the late war by the United States of America. This report, delivered in July last, did not come into my hands until Christmas, but it completely bears out all that we have been asking for:—

**Extracts from the Report of the Aviation Mission sent by the United States Government—(dated July 19, 1919).**

One of the striking features of our investigations in Europe was the unanimous belief that the use of aircraft in warfare and for national defence would continue to increase, and that in the next war, whenever it might come, aircraft would be far more vital even than it has been in this war. One of the greatest military authorities in Europe stated that in his opinion the first battle of the next great war would be in the air, and would very nearly decide which side would win, in that the side winning in the air would immediately have access to all of its enemy's sources of supply and production, and would quickly cripple them by air raids upon an enormous scale. The opinion was everywhere expressed that the development of aircraft for purposes of national defence must continue, and that sufficient flying and production facilities and personnel must be maintained at all times to ensure an adequate supply in case of need. Due to the complicated and delicate nature of such equipment, to its rapid depreciation in use, and to its constant obsolescence, the expense involved in such a programme would be very great, in fact, almost prohibitive in peace times.

The existence of an aerial transportation industry with a great commercial air fleet and of a strong production industry would greatly decrease the need for strictly military equipment and resources, in that practically all of the aircraft and landing field facilities and personnel, and the manufacturing and maintenance facilities and personnel employed by such commercial activities, would be available as a reserve in time of war. It is evident, therefore, that the most economical way to develop a strong air service for national defence is to encourage, by every means possible, the use of aircraft for commercial purposes, and thereby build up a commercial fleet at relatively small expense to the Government, which would effectively supplement its strictly military equipment in time of need. America's experience during the war has proven conclusively that

aircraft facilities and personnel, and particularly production facilities and technical personnel, cannot be obtained upon short notice, but only by long and continued experience and at great expense.

**Recommendations.**

Upon the basis of these conclusions, we offer the following plan for stimulating the development of commercial aviation as an aid to national defence, and as a response to the demand that is already developing for improved commercial transportation through the use of aircraft.

(a) The Civil Aviation Division of the National Air Service should establish, with the advice of the Army and Navy and the Divisions of Military and Naval Aeronautics, a series of flying routes throughout the United States and its possessions, and to contiguous foreign countries, which will be of military and commercial value. It should also prepare and publish maps and descriptions of each of these routes suitable for the use of fliers.

(b) There should be provided, at national expense, certain flying fields in strategic locations and suitable for military purposes, and encouragement should be given to the various States and Municipalities to provide flying fields upon all flying routes at points found desirable, thus eliminating the necessity for private ownership of flying fields except for strictly private use. Hangars should be provided at each flying field by the Government authority owning the field (that is, Federal, State or Municipal), or, where such fields are used constantly by private interests, they should be permitted to provide their own hangars immediately adjacent to and opening upon such flying fields.

The operation and use of such flying fields should be controlled by Federal Law, so as to obtain uniformity throughout the nation and conformity with international regulations.

(c) All flying routes and flying fields should be equipped, at national expense, with signalling and communication systems, including wireless telegraphy, wireless telephony and searchlights, to thoroughly safeguard and guide aircraft in flight at night. The Government's attitude in this matter should be the same as that maintained towards shipping in its lighthouse and coast patrol service. The operation of signalling and communication equipment should be controlled by Federal Law for the reasons indicated under item (b).

(d) A meteorological service should be developed to provide fliers and other aviation interests with accurate weather reports and other atmospheric data necessary to govern their activities intelligently. The value of this service to commercial aviation cannot be over-estimated, as it will go far towards establishing reliability and safety of service, just as weather reports are of immeasurable value to ocean and lake transportation.

(e) There should be established at least one school for the teaching of aerodynamics and other branches of the science of aeronautics, as recommended under the heading "Organisa-

tion." Encouragement should be offered to universities throughout the country to establish departments of aeronautical science.

(f) The Government should encourage the development of new design and aeronautical technique for commercial purposes, along the lines recommended under the heading "Technical Department."

(g) The Department of Aeronautics should maintain the closest possible relations with all civilised nations in determining and applying the rules and regulations which will govern the international use of aircraft, and there should be developed, as rapidly as is consistent with proper consideration, a body of Federal Law governing the use and airworthiness of aircraft for commercial purposes which will safeguard life and property and promote the commercial usage of aerial transportation.

In order that commercial aviation may be helped and not hindered by such legal restrictions, it is of vital importance that aerial transportation be recognised at once as an element of inter-State commerce, and be made subject to one body of FEDERAL Law applying uniformly throughout all of the United States. It will thereby avoid the complications of individual State control, which have proven to be such a handicap to railroad and automobile operation.

**Technical Recommendation.**

That all technical functions of the Government in respect to aeronautics be centralised in a single technical division, which shall perform the work for the Army, Navy and Civil aviation; and which shall be headed by, preferably, a civilian of wide executive experience. Such a division should include, as assistants to the director, experienced representatives of Army, Navy and other Government departments interested in aviation, who shall be nominated by the departments, and shall act as advisers upon the special needs of the Service they represent.

The report is signed by Messrs. Benedict Crowell, the Assistant Secretary of War; Howard C. Coffin, Member of Council of National Defence; Captain Henry C. Mustin, U.S. Navy; Colonel Halsey Dunwoody, Air Service, U.S.A., Assistant Chief, Air Service, A.E.F.; Lieut.-Colonel James A. Blair, Jr., General Staff, U.S.A.; George H. Houston, President, Wright-Martin Aeroplane Corporation; Charles M. Keys, President, Curtiss Aeroplane and Motor Corporation; and S. S. Bradley, Manager, Manufacturers' Aircraft Association.

\* \* \* \* \*

*In Australia to-day we haven't got a single fighting 'plane that is fit for service.*

\* \* \* \* \*

Turning now to the purely commercial aspects of aviation, I propose to prove to you that *Commercial Aviation will pay*—and will pay handsomely.

I hope also to show that it reliable, safe, able to compete with much of our existing transport system, and far more speedy:—

**Estimate of Costs (I).**

Using 'planes of the Vickers Commercial type with twin Rolls-Royce *Eagle VIII*. engines, a 'plane travelling two stages daily (each about 5 hours at 90 miles per hour, equalling 450 miles). Load, 2 pilots and 12 passengers (at 160 lbs. each) or their equivalent.

**TIME-TABLE.**

		Weekly Mileage
Cloncurry Station. (3 machines)	To Darwin, 1 trip weekly and return .. ..	2,000
	„ Townsville, 3 trips weekly and return .. ..	2,880
	„ Charleville, 3 trips weekly and return .. ..	3,180
	Charleville—Bourke, 1 trip weekly and return ..	500
Brisbane Station. (2 machines)	{ To Rockhampton, 3 trips weekly and return ..	2,400
	{ „ Charleville, 3 trips weekly and return .. ..	3,000
Sydney Station. (14 machines)	{ To Brisbane, 12 trips weekly and return .. ..	17,000
	{ „ Bourke, 2 trips weekly and return .. ..	2,000
	{ „ Port Augusta (via Broken Hill), 12 trips weekly and return .. ..	21,600
	{ „ Melbourne, 18 trips weekly and return .. ..	21,600
Melbourne Station. (6 Machines)	{ To Adelaide, 12 trips weekly and return .. ..	12,000
Port Augusta Station (8 machines)	{ To Adelaide, 6 trips weekly and return .. ..	3,000
	{ „ Perth, 12 trips weekly and return .. ..	34,000
Weekly Total .. ..		125,160
Annual Mileage .. ..		6,508,320

Sheds for—

2	'planes at Darwin.	
3	" " Cloncurry.	
1	" " Bourke.	
4	" " Brisbane.	
10	" " Sydney.	
6	" " Melbourne	
4	" " Adelaide	
6	" " Port Augusta.	
4	" " Perth.	
<hr/>		
40		
'Planes in use	.. ..	26
'Planes spare	.. ..	7
		<hr/>
		33 (66 engines)
Engines spare	.. ..	77

Total hours of flying at 90 miles per hour .. .. . 72,314  
 Each pilot will fly 25 hours per week, and 1,200 hours per annum.  
 Number of pilots required at £500 (average) flying in pairs .. .. 120  
 Fuel consumption per hour (1 engine) 200 pints  
 Oil consumption per hour (1 engine) 8 pints  
 Life of 'plane 3 years (life of Rolls-Royce Engine) .. .. . 4,000 hours

Capital Charges—

33 'planes with 2 engines each at £8,000	.. .. .	£264,000
77 spare Engines at £1,300	.. .. .	100,100
Spare parts	.. .. .	26,000
Land for 15 stations (200 acres)	.. .. .	75,000
Sheds for 'planes	.. .. .	80,000
Workshops and equipment	.. .. .	60,000
<hr/>		
Total	.. .. .	£605,100

Annual Charges—

Annual Interest at 8 per cent.	.. ..	£48,400
Depreciation of 'planes (life 3 years)	£5,500 ÷ 3 × 33	.. .. . 60,500

Depreciation of engines, 72,000 hours ÷ 4,000 × 2 × £1,300	.. ..	46,800
Depreciation of workshops and plant	.. ..	7,000
Insurance	.. .. .	53,000
Maintenance and repairs to machines and plant	.. .. .	20,000
Salaries, etc. Management and staff	.. .. . £10,000	
Pilots, 120 at average £500	60,000	
Ground and workshop personnel 150 (say)	.. ..	37,500
<hr/>		
		107,500
Petrol, 145,000 hours at 200 pints	..	634,750
Oil, 145,000 hours at 200 pints	..	36,250
<hr/>		
Total	.. .. .	£1,014,200

**Fares and Freights.**

The annual charges of £1,014,200 cover an annual mileage of 6,508,320, or 3s. 1½d. per 'plane mile.

The cost for 12 passengers averaging 160 lbs. each, without baggage, will therefore be 3¼d. per mile.

For 10 passengers at 160 lbs., and 30 lbs. of baggage, 3¼d. per mile.

If full loads were carried 4d. per passenger mile would result in an additional profit of over £60,000, equal to a further 10 per cent. on capital.

Parcels are carried by the Post Office within a State at 6d. for 1 lb., and within Australia at 8d.

These could be carried by 'plane at 1s. for 600 miles, in less than half the time.

**Comparison of First-Class Fares.**

	By Air.		By Existing Routes.		Cost including Meals, Berths and Tips.
	Time.	Cost.	Time.	Cost.	
Sydney to Perth	.. .. 2 days.	.. .. £38	5 days .. 8 days ..	{ Rail. £12 4 6 Steamer. £12 2 0	.. .. £18 0 0 .. .. £13 0 0
Melbourne to Brisbane	.. 1½ days .. (later, 1 day.)	.. .. £22	2¼ days ..	.. .. £6 13 0	.. .. £9 10 0
Brisbane to Darwin	.. .. 2 days	.. .. £33	7 days ..	.. .. £18 0 0	.. .. £19 0 0
Sydney to Longreach	.. 1 day	.. .. £17	3 days ..	.. .. £8 4 6	.. .. £12 0 0
Sydney to Broken Hill	.. ¾ day	.. .. £11	3 days ..	.. .. £7 6 6	.. .. £11 5 0
Sydney to Melbourne	.. 7 hours	.. .. £10	17 hrs. .. 36 hrs. ..	.. .. £3 3 0 .. .. £3 3 0	.. .. £4 0 0 .. .. £3 10 0

**VICKERS**  
LIMITED

**“VICKERS-Vimy-COMMERCIAL”**

1 Pilot and 16 Passengers or 1½ Tons  
of Mails or Freight. Endurance 5 hours



Aeroplanes for Commercial and Military Use  
Flying Boats for Commercial and Naval Use  
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**VICKERS-AUSTRALIA, LIMITED**  
(Messrs. William Adams & Co., Limited)  
Corner King and Clarence Sts., SYDNEY

As soon as the routes are organised for night flying no distance in Australia will exceed 26 hours on a direct route.

Letters can be carried on the basis of a surcharge for the Air Mail at the rate of  $\frac{1}{2}$ d. for each  $\frac{1}{2}$  oz. for each 600 miles of air route, the maximum surcharge thus being 2d. Collection and delivery should be made by the Post Office, which receives its usual postage, and saves all or part of the railway or steamer charges.

### Estimates of Costs (II.).

Using larger 'planes of the type known as Handley-Page V/1500, having four engines, and carrying a load of over 10,000 lbs. in passengers or freight.

Assuming the same time-table as in Estimate (I.) with the same number of machines and hours of flying, both capital and annual costs naturally increase, as follows:—

	Capital Cost.	Annual Cost.
With smaller machines ..	£605,100	£1,014,200
With larger machines ..	969,200	1,921,620
	Smaller Type.	Larger Type.
Cost per 'plane mile ..	37½d.	71d.
Paying weight carried ..	2,300 lbs.	10,000 lbs.
Number of passengers, } ..	10	40
with baggage .. .. . }	30 lbs.	50 lbs.
Cost per passenger mile ..	3.75d.	1.8d.
Charge per passenger mile	4d.	2d.

Passenger fares by railway, first-class, in Australia average 1.8d. per mile. The use of the larger 'planes will give quicker service at practically cheaper rates, due to saving in berths, meals, etc.

The possibilities opened up by the use of these larger machines are unlimited. For 6s. per mile they each carry nearly five tons of paying load at 90 miles per hour for six hours, or 1s. 2½d. per ton mile.

At a reduced speed of 60 miles per hour, and a radius not exceeding 250 miles, the rate will be less than 1s. per ton mile, and your freight can be landed, not at a distant railway station, but at your own door.

### Annual Charges.

Showing percentages under separate headings.

	Estimate I.	Estimate II.
Totals .. .. .	£1,014,200	£1,921,620
Interest at 8% on Capital	£48,400	£77,520
	5%	4%
Depreciation .. .. .	£114,300	£221,600
	11%	11%

Maintenance and Insurance	£73,000	£133,000
	7%	7%
Salaries .. .. .	£107,500	£147,500
	11%	8%
Petrol and oil .. ..	£671,000	£1,342,000
	66%	70%

### Confirmatory Estimate.

(From an advertisement in "Flight" of November 2, 1919.)

The British Aerial Transport Co., Ltd., of London, a well-known firm, states:—

Commercial Model B.A.T., F.K.26.

Engine—Rolls-Royce Eagle VIII.

Speed—45-120 miles per hour.

Cabin—Clear space measures 8ft. by 3ft. 3in. by 6ft. Direct entry by ordinary door.

Load—With 600 mile range of fuel, 2,000lbs.

Fuel cost at full load—7.2 pence per mile.

NOTE:—A machine such as the above, carrying 1 pilot and 5 passengers, with some freight, naturally costs more per mile than a more powerful machine. The fuel cost is no doubt based on a price of about 2/- per gallon, and requires to be increased by 50% in Australia. If the fuel cost be taken then at 10.8d. per mile, and an overhead charge of about 50% added, we arrive at 16.2d. per mile, about 3d. per passenger mile.

These figures are only estimates it is true, and there have been many such published in England, showing much larger costs. Most of them have been based on very insufficient data. I have followed in my calculations the methods of Mr. Handley Page and the Vickers Company, and the different results are due, not to a different system, but to the *exceptional circumstances in which aviation in Australia is bound to succeed.*

The capital costs may be increased slightly by unforeseen items, but these cannot be large. On the other hand the costs of engines and 'planes are certain to become lower.

Petrol has been taken at the present retail price of 3s. 6d. per gallon, in order to provide for a possible increase in price. It is more probable, however, that a very large saving would be made on this item. The interests of Commercial Aviation and Defence are closely linked, and I shall therefore be ready at all times to assist inquirers with further details. It is necessary, however, to emphasise the point that, to reduce mileage costs in this service, we must have undertakings capitalised at no less than £500,000.



# NIEUPORT and General Aircraft Co. Ltd.

CONTRACTORS TO H.M. GOVERNMENT

Office :  
Langton Road  
Cricklewood  
London, N.W. 2

Cable Address :  
" Nieu Scout  
Crickle, London "

Prior to the War and throughout the entire War period the Management, Designers and Staff of this Company have been engaged on the Design and Production of aircraft which have been in continual use day and night, on active service, from August, 1914, to the cessation of hostilities.



Evidence of our high state of efficiency is again demonstrated in the fact that the LATEST TYPE OF FIGHTING MACHINE chosen by the Royal Air Force prior to the Armistice was the BRITISH NIEUPORT NIGHT-HAWK, which we are still producing in large quantities for the Royal Air Force Peace Programme.

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THE FIRST DELIVERY BY AIR OF NEWSPAPERS WAS UNDERTAKEN BY

## BRITISH NIEUPORT

¶ Our Organisation which has in the past been responsible for our success in design and production of NAVAL and MILITARY aircraft, is now concentrating its energies in the development of Commercial machines—ranging from a small single-seater, of moderate power and price, to a large, twin-engine machine capable of carrying a disposable load of 1 ton.

¶ Inquiries are therefore solicited from Governments, companies or individuals interested.

**Reliability.**

Certainty in working time-tables is a prime consideration in business, and in aviation there cannot be greater certainty than with other machines, locomotives, and motor cars. Peace conditions, however, are far different to war, and the weather in Australia affords not one-tenth of the difficulties experienced in Europe and North America.

Their experience has been as follows:—

**London-Paris Air Express.**

250 miles.

Summary of first eleven weeks' flying—

August 25 to November 8, 1919.

Flights scheduled .. ..	166
Flights accomplished .. ..	149
Prevented by weather .. ..	8
Interrupted by weather .. ..	6
Interrupted by mechanical defects .. .. .	3
Number of miles flown .. ..	39,000
Average speed (M.P.H.) .. ..	105

The official reports of the weather for the period were:—

Days favourable for flying	17
Days unfavourable for flying	30
Days noted officially as unfit for flying .. .. .	19

*In Australia there are probably not more than three days in a year when the weather is "unfit" for flying.*

In the United States of America a regular mail service has been operating for 15 months from Washington, through New York and Cleveland, to Chicago. It has through winter and summer traversed the Atlantic coast and crossed the mountains, carried 12,000,000 letters, saved 26 hours on railway transit, and reached a total of 272,628 flying miles. *This was done with old training machines.* They are now flying 1,900 miles per day, and expect soon, with improved machines, to extend the mail service as far as San Francisco.

Americans did not teach us very much at the beginning of the war; they are teaching us now, though, in the practical adoption of flying and adapting it to their commercial needs.

The conditions of war no longer apply. Even in war there were many instructors who took thousands of flights without any accident.

With properly organised air routes and landing grounds, machines carefully overhauled, and picked pilots, there will be no more accidents than with automobiles—probably less.

**Safety.**

What I have said in regard to reliability also affects safety. If flying were unsafe we should not have the men who still fly and have been flying now for five to eight years. (*Hear, hear.*)

The *Avro* Company last summer took up 30,000 joy-riders in the North of England without a single accident. A later report by General Sir F. H. Sykes, states that in the last six months there had been 52,000 passengers, and the total accidents to passengers, ten—none of whom was killed; one passenger hurt for 5,200 carried, and the proportion is going to be very much lower.

The British Insurance Companies charge only 2s. 6d. for a £500 policy on a short trip. Allowing for expenses and profit it would appear the odds are calculated at not less than *10,000 to 1 against accident.*

Need I say more?

**Competition With Other Transport.**

Let me first take the question of carriage of mails, because it is important to remember that all the mails carried in Australia would not maintain a large organisation of the sort outlined.

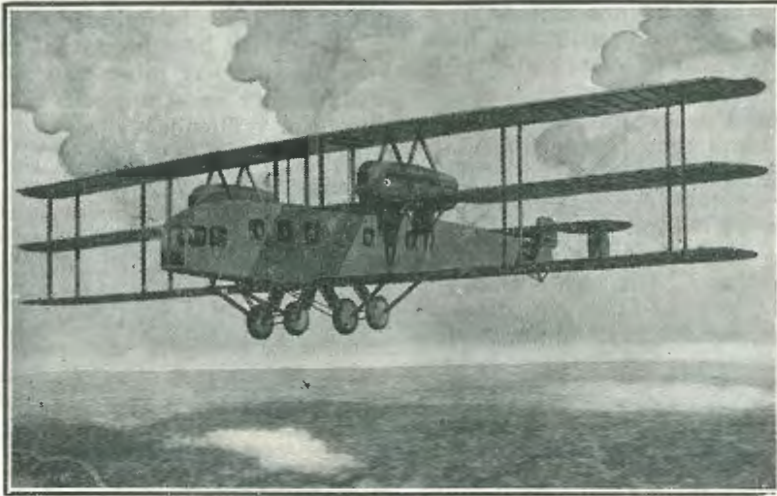
They would be, however, a very helpful addition to the carriage of passengers, especially in the early stages of the business before flying became a habit with the people. Mails can also be stowed in a 'plane more economically, with regard to space, than passengers.

*Assistance is due to the organisations which provide this new method of transit,* so necessary for defence, and a mail subsidy is not a loss to the Post Office when it can be passed on to the public. Thus a half-penny surcharge paid to the Air Company for each 600 miles would not be grudged by writers who had their letters carried at three times railway speed, and the Post Office would lose nothing, in fact it would save railway freight. The United States Post Office in 15 months saved 170,000 dollars, and expects this year to save 1,500,000 dollars. Mails can, however, only be carried profitably by air on main routes, and be-

## The "Bristol" Aeroplanes.

Cables:  
"AVIATION, BRISTOL"

Codes  
A 1, A.B.C. and Moreing



"BRISTOL" TRIPLANE IN FLIGHT

THE finest aeroplane constructed for passenger and cargo-carrying work. Fitted with four 400 h.p. engines, it is absolutely safe and reliable. In addition to the pilot and engineer it has accommodation for 14 passengers in a luxurious Pullman. This is 7 feet in height, is electrically lighted and heated, has comfortable arm-chairs, and for each passenger a triplex glass window is provided.

EACH, or all the seats may be removed, making room for cargo up to 320 cubic feet. The wing span is 81 feet, overall length 52 feet, and height 20 feet. The speed at ground level is 125 m.p.h., and at 10,000 feet 113 m.p.h. The climb is 5 minutes to 5,000 feet, and 12 minutes to 10,000 feet. In addition to the two pilots the machine carries a load of 2,700 lbs. with fuel for 5 hours' flight, or 4,000 lbs. with fuel for 2½ hours' flight.

THE BRITISH & COLONIAL  
AEROPLANE COMPANY LIMITED

FILTON, BRISTOL, ENGLAND

tween large cities. The chief business of the 'planes will be the carriage of passengers.

My balance-sheet has, I hope, convinced you that air routes will not have higher rates than first-class railway fares, and certainly less than fares by coach or motor car. There need be no fear, however, that they will ruin the railways. The rate at which 'planes can be produced and put in commission will limit the amount of traffic to simply absorbing a share of the annual increase.

Any loss on this account to the railways can be more than balanced by saving the necessity for non-paying lines through the operation of 'planes as feeders to the railways.

In the first 15 years since Federation, State railways have been constructed annually to the extent of 500 miles, passengers have increased by 10 million trips per annum, goods by 800,000 tons, and receipts by £750,000. The average cost of the railways, with their equipment, has been £10,000 per mile, and on the lighter and cheaper lines, £3,000.

Thousands of miles of our railways do not pay the whole of their working expenses, and none of the interest on their cost. Probably in time they will, but Victoria has had to write off about two-thirds of a million on lines no longer used.

Taking an instance in this State, which I have quoted before, a certain spur line, 80 miles long, earns £13,000 annually, resulting in a loss of £14,000. The passengers numbered 6,700, the ordinary goods 8,000 tons, and the wool 26,000 bales. If the air charges had been 2d. per mile for passengers, and 1s. per ton-mile for freight, the total cost would have been less than £27,000. *It would therefore pay the Government to subsidise air lines rather than build new railways up to a certain condition of traffic, after which the lines should be constructed.* Further, these air routes would not be limited to the narrow track of a railway, but could deliver anywhere at a corresponding distance, even at the farmer's door, thus saving haulage to and from the railway.

The aeroplane would therefore only compete for freight with the railway where railway costs exceed 1s. per ton-mile, on the other hand, the 'plane will

bring in large quantities of freight at this rate and tranship it to the railways at points from which the onward journey is at the lower rate.

#### Speed.

The average speed of an express train in Australia is under 30 miles per hour, a motor car about the same. Passenger 'planes will have a time-table that does not require the full effort of the engines, so that it will be seldom that time cannot be kept. Expert pilots can also, by taking a higher or a lower level, greatly reduce the influence of contrary winds.

*Under existing conditions we can safely promise not less than three times the speed of the Australian express train.* At first air routes will provide only for daylight flying, but when the tracks are marked by vertical lights, in fact, aerial lighthouses, we shall then achieve the success of bringing any point of Australia within less than 26 hours' travel of any other point.

#### Generally.

The prospects of aviation in Australia are of the most encouraging character, if we can only break down the prejudice of ancient habits of thought.

Air traffic is already proving its practical value in Europe and America. It carries mails at a profit, and paying passengers also, though not yet at railway costs. Here we have conditions so favourable that the problem is easy if handled with ordinary business ability.

#### IN ENGLAND.

Distances are short.  
Railways everywhere  
within a few miles.

Land for aerodromes  
expensive.

Climate as often bad  
as good for flying.

#### IN AUSTRALIA.

Distances are great.  
Railways far apart.  
many places 600 miles  
from any railway.

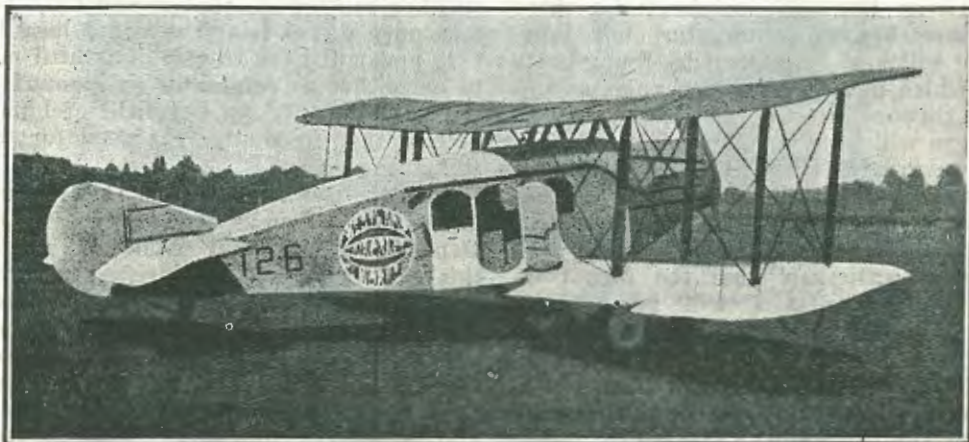
Land cheap.

Days unfit for flying,  
rare.

No mention has been made of aircraft, lighter-than-air, *i.e.*, of the balloon type.

For land travel it is a more expensive means than 'planes, except in special cases. For sea travel, over long non-stop stages, a point is reached where the 'planes can only carry crew and fuel without passengers, and it ceases to be a useful means of transit. That distance is somewhere in the neighbourhood of 1,000 miles, and we may safely assume that, although 'planes will be able to fly from Australia to New Zealand, and even

# WESTLAND AIRCRAFT



THE WESTLAND "LIMOUSINE" with the ROLLS-ROYCE BODY.

This is not a converted war machine but one which has been designed and built for high-class public passenger service or for the convenience of the private owner.

During the recent Railway Strike in England a Westland "Limousine" was taken over by the British Air Ministry for carrying H.M. Mails. In that week it flew nearly 1,000 miles without the slightest defect. A great part of the distance was covered in very bad weather, testing the airworthiness of the machine to the utmost.

It combines the speed of an aeroplane with the comfort of a Limousine.

Illustrated Booklet and full particulars from—

## THE WESTLAND AIRCRAFT WORKS

(Branch of Petters, Ltd., Yeovil, England).

Australian Agents :

19 CASTLEREAGH STREET, SYDNEY



carry some passengers, as a paying proposition the airships will take first place.

Vickers Limited published a calculation showing cost of passengers by airship from London to New York at £48 each, but by aeroplane £115. Both estimates are, I consider, too high, but the ratio is about correct.

Between England and Australia there are stretches of water, but not long. These will best be crossed by flying-boats into which passengers will change, and in fact throughout the journey frequent changes will be necessary. The cost will also be greater than on journeys within Australia, due to necessity for more liberal spacing of passengers, and greater cost of maintaining stations. I would therefore anticipate that the fare from England to Australia will be, after a very few years, £200 by airship, £150 by aeroplane, and the time about 14 days by the former, 10 days by the latter, with a reduction to 5 days, if found necessary, and at slightly higher expenditure.

The problem before Australia is full of difficulties, but want of gallant fighters is not one of them. Nor is want of money one of them, and I hope after what I have put before you that unwillingness to put up the money is not one of them.

Sydney is the capital of the most populous State in the Commonwealth. I have an idea that it also has the deepest pocket, and I therefore trust that this great focus of business will realise that here is a proposition to be tackled at once, that there is money in it too, but above all that it is the only sure means by which Australia can be made safe. I appeal therefore to all the men of Sydney to consider this and put up their bit in any big commercial undertaking that may be started in this country; to remember those flying boys of ours, who laughed at death, and will do it for you again—*if you will give them the wings.*

\* \* \* \*

On the conclusion of the lecture, which was received with considerable enthusiasm, the Premier called upon Colonel W. Oswald Watt, O.B.E. (President of the New South Wales Section of The Australian Aero Club), "to express the gratitude which we all feel towards General Legge."

Colonel Watt, before proposing a formal vote of thanks, furnished a brief

synopsis of the efforts made by his (N.S.W.) Section towards ensuring the safety of aerial passengers in New South Wales. There was, he said, one thing which must be definitely settled—the question of Control of the Air. (*Hear, hear.*)

"It is, I think, a recognised fact (the speaker continued) that if you have two men on a desert island it is not long before you will have to call in a third man to act either as referee or policeman! As soon as you open up any field of human activity you encounter the need for control.

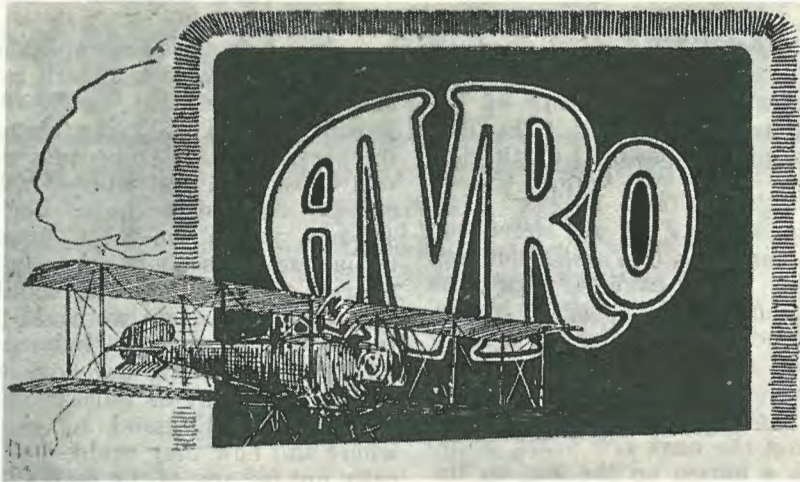
"Great Britain has an Aerial Navigation Act which is administered by the Department of Civil Aviation. Under this Act civil flying commenced last year on May 1, but it was very soon realised that aviation was too big a proposition to be dealt with by the laws of any one country. Accordingly, in October last, an International Committee met in Paris and issued recommendations which were immediately embodied in the British Act.

"Here in Australia we have no Act of any description. We have no regulations. Any man may fly any machine anywhere he chooses, when he chooses and how he chooses. The Australian Aero Club is endeavouring to obtain legislation on the lines of the International Convention and, in the meanwhile, is doing everything possible to make flying safe. (*Hear, hear.*) The Club comprises practically every flying officer and technical officer resident in New South Wales who served in the war, and from these members we have appointed a sub-committee which will inspect and report on the safety of commercial aeroplanes. On a satisfactory report the Club will issue a Certificate of Airworthiness, and if a machine plying for hire does not carry a certificate, the public will draw its own conclusions.

"The Australian Aero Club has neither intention nor desire to control the air. The public, to whom it belongs, has the right to control it as soon as the necessary machinery is set in motion.

"General Legge's interest in this subject, both in the military and commercial sense, has been a source of deep gratification to all concerned. His propaganda work has been absolutely priceless."

The Premier, in supporting the vote of thanks, emphasised that this had not been



**Aerial Photography** The striking photographs of Sydney appearing in this Journal were taken from an Avro biplane and illustrate the remarkable value of aerial photography for commercial and advertising purposes. Business men interested in obtaining really first-class aerial photographs of their factories, workshops, estates, etc., should write to us for full particulars.

#### ADMINISTRATION

**CONSULT-ING:** H. E. Broadsmith, F.R.Ae.S., A.M.I.A.E., late Chief Engineer to A. V. Roe & Co., Ltd, on all technical matters concerning design and construction.

**PILOT:** N. B. Love, late Flight-Commander Australian Flying Corps, Gosport Instructor's Certificate.

**GENERAL:** W. J. Warneford, late Australian Flying Corps.

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Patent Steam, Gas and Water Jointing.  
Leather and Rope Dressing and Wood Preservative.  
"Col-Wa-Glu" Co. Cold Water Glues.  
Tangent Tool Co. (Cosmos), Ltd.

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proposed in any formal spirit. The close attention with which all had followed the General's lecture was a real indication of the interest which his handling of the subject had aroused, and he (The Premier) would add his personal gratitude.

*General Legge*, in reply, said:—

"Australia has got to be defended; perhaps to-morrow. One need not say against whom; we all have our own ideas on that subject. In what position is Australia to defend herself? Has she a Navy which can do it? Has she an Army, or an Air Force which can do it? Brave as our men undoubtedly are, has she a chance during the next few years of defeating such a nation on the sea, on the land or in the air?"

"Australia, as I have pointed out on a previous occasion, must fly or die! *Commercial aviation will form the chief part of our defence scheme*; the other part is purely for the Government. The public must see that commercial aviation is necessary, and I consider it the duty of our leading business men to get together and decide how best it can be established. Let these commercial leaders examine it for themselves and see whether or not it is a business proposition. I think it is." (*Hear, hear.*)

At this juncture *General Legge* launched the *Lawrence Hargrave Memorial appeal*, as reported in a leading article in the last issue of this journal.

*General Cox*, in moving a vote of thanks to the Premier for presiding, paid a tribute to the work of the Australian Flying Corps. He had, he said, been closely associated with many of our flying men who, as troopers and machine-gunners under his command in Egypt and Palestine, had transferred into the Flying Corps. Among these he was particularly proud of Captain Sir Ross Smith and Lieutenant H. Fysh, whom he recommended for commissions in the A.F.C. (*Applause.*)

"Until we got supremacy in the air (the speaker insisted) we were helpless. If we don't adopt aviation in Australia, other nations will beat us. We must adopt it for commercial purposes. If not, there will be nothing to save us when war comes."

*Sir Thomas Hughes*, in supporting the vote of thanks to the Premier, announced

that he had a crow to pluck with his gallant friend the previous speaker who, in course of his maiden speech as Senator, had just stated that many of his men joined the Royal Flying Corps in preference to the A.F.C. because the former was considered the more "fashionable" corps. Australian boys, declared *Sir Thomas*, joined the R.F.C. because Australia had no schools properly equipped to train them in their own country. (*Prolonged cheers.*) Here we could train only twelve men at a time. Imbued with the spirit of patriotism, our boys wanted to get to the Front as quickly as possible; they went to England to get training where and how they could, most emphatically not for any of the reasons suggested by "certain foolish and grievously misinformed persons who do not give the matter a moment's careful thought."

"I see no harm," concluded *Sir Thomas*, "in an occasional word of praise for our boys who fought, and fought well, in the Royal Air Force, and unless we do better than the Military Forces did at the commencement of this last war, we shall be compelled to draw our trained men from elsewhere." (*Applause.*)

#### State Enterprise.

*The Premier*, in replying to the vote of thanks, made his first, and long-awaited public announcement concerning the New South Wales Government's attitude in regard to civil aviation. "From what has been said to-night, by *General Legge* and *Colonel Watt*, it is clear," he confessed, "that one important duty rests upon the Government. This is a matter which has not entirely escaped notice; certain steps have already been taken towards framing a code of regulations, and I have no doubt that in a very little while we shall receive what information we require.

"It is equally clear that there is another duty resting upon the Government, and that is to satisfy the general public that, with ordinary care and caution, travel by air is safe, reliable and comfortable.

"*The Government must provide some legislation for the general control.*

"*General Legge* has put, in the clearest way, what the cost of aerial transport will probably be, but he, of course, will be the first to realise that demand must, to some extent, precede supply.



# THE CENTAUR 4 AEROPLANE

THE MOST WONDERFUL TRAINING AND PASSENGER MACHINE YET DESIGNED.

**SPECIFICATION**

Motor 100 H. P. Anzani  
 Tankage 3 Hours  
 Feed Gravity  
 Control Dual  
 Seats Two or Three  
 Oil Consumption 1½ galls. per hour  
 Petrol 8 galls. per hour  
 Speed 32-70 miles per hr.  
 Load 500 lbs.  
 Weight 1,400 lbs.  
 Wt. per H.P. 18.85 lbs.

The Last 4 Royal Aero Club Certificates taken at the Central Aircraft Co.'s School of Aviation were obtained in the following Flying Times:—

J. E. Russell, New York, 1 hr. 40 mns.  
 E. P. C. Godsil, New York, 2 hrs. 5 mns.  
 W. Pool, London, 3 hrs. 15 mns.  
 M. E. Tanner, London, 3 hrs. 30 mns.

Price: **£900**  
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Length, 24 ft. 8 in.  
 Span, 34 ft.  
 Speedometer  
 Oil Gauges  
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 Compass  
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 Best Workmanship and Finish.

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This Machine can be converted into a 3-seater in a few minutes.

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Passenger or Commercial Aeroplane. Th most Economical Machine yet produced.  
 Carries 9 People for 320 H.P.

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Motors 2-160 Beardmore  
 Tankage 3½ hours  
 Span 63 feet  
 Length 39 feet  
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ENCLOSED CABIN, HANDSOMELY DECORATED.  
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Wt. per H.P. 18.9 lbs.  
 Load 2,000 lbs.  
 Speed Range 40-90 M.P.H.  
 Petrol consumption .83 pints.  
 Oil 4 pts per hour.

Certified Air Worthy by Air Ministry

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# THE CENTRAL AIRCRAFT CO.,

KILBURN, LONDON, ENGLAND

CABLES: AVIDUCTION, LONDON.

CODE: A.B.C., 5th ED.

"It appears that the first thing for the Government to do is to clear away what indifference there is, and the Government, of which I am the head, proposes to commence certain experimental undertakings, at its own cost, in order to familiarise the public with traffic in the air and to satisfy them as to the safety and trustworthiness of the new method of transport which aviation comprises. So far as the Government of New South

Wales is concerned, I assure you that we do recognise it.

"It has been to me a very great satisfaction and a very great privilege to hear the clearly reasoned statement which General Legge has so lucidly put before us. We are not experts upon the subject, but we shall all leave this meeting tonight more enlightened than when we came."

## AIRCRAFT CONSTRUCTION IN GREAT BRITAIN

### TWO NEW LIMOUSINE BIPLANES

#### A Beardmore Engine for Australia

One of the most pleasing results of the flight from England to Australia is the interest in this country which has been aroused among prominent British aircraft manufacturers who are rapidly recognising that they have, in Australia, a favourable market for aeroplanes and aero engines.

Two welcome additions to the growing list are the Westland Aircraft Co., of Yeovil, Somersetshire, and The Beardmore Aero Engine Ltd., of London and Glasgow.

The last-named company, in a recent letter to *Sea, Land and Air*, state that they are particularly desirous of giving the utmost assistance to the aircraft industry in Australia, and are fully prepared, in furtherance of this policy, to send out an engine to Sydney, Melbourne, and other populous centres, in order that it may be inspected by such members of the public as may find interest therein. This sporting offer has been gladly accepted on behalf of the Australian Aircraft and Engineering Co. of Sydney, and The Larkin-Sopwith Aviation Co. (Australia) Ltd., of Melbourne, both of whom are willing to exhibit the engine.

In concluding their letter, the Beardmore Company emphasise that they are anxious to do business with Australia in the most serious and comprehensive manner possible.

#### Westlands.

The Westland Works are a branch of Petters' Ltd., long established in England as oil-engine manufacturers, and require little or no introduction to the majority of our readers. During the early part of the war they built many hundreds of *B.E.2E.*, *D.H.4's* and *D.H.9's*, working on contracts and sub-contracts.

In 1917 they secured the services, as designer, of Mr. M. A. Bruce, and to meet the Air Ministry's specifications for the 170 h.p. *Wasp* A.B.C. engine, they produced the *Wagtail*, which proved a distinct success and acquitted itself very creditably at the Air Board's testing station at Martlesham Heath. Here all new machines were sent for their official trials, after a preliminary flight by the firm's own pilots, being finally passed—or otherwise—by pilots of the Design Section.

An idea of the activities at Martlesham may be formed from the fact that on some days they would have up for trials as many as eight machines of the one class, built to the same specification, in addition to numerous other machines; a detailed report on each performance was required, the Air Ministry then deciding which type, if any, should be ordered for fighting service. In the Westland *Wagtail* class were four or five other machines of the same type, all very efficient and having an excellent view, their chief recommendations being speed,



## THE FUTURE OF FLYING DEPENDS ON RELIABILITY

*The following is an extract from a leading Article in the DAILY MAIL (LONDON), October 9, 1919:—*

### "A LANDMARK IN FLIGHT."

Flights scheduled .. . . .	86	Interrupted by weather .. . . .	1
Flights accomplished .. . . .	83	Interrupted by mechanical defect	1
Prevented by weather .. . . .	1	Number of miles flown .. . . .	20,750

"The above figures, reflecting the opening six weeks' activity of the London-Paris Air Express Service, need little elaboration. Reliability in the air has been achieved.

"At 12.30 p.m. each day from Paris and from London, the London-Paris Air pilots have started off more punctually than many a train. They have averaged 106 miles an hour and covered the 250 miles systematically in 2½ hours. The machines are a peace offshoot of the famous de Havilland bombers, and the pilots—an all-important factor—are the cream of the R.A.F. Business men have booked up the service for a month ahead. The Company is aiming at an hourly schedule, but we believe its main immediate success will be in carrying mails at a speed by which it will be possible to get a reply, by tea-time, to a letter air-mailed to Paris after breakfast.

"Reliability must be guaranteed the public. That it is so guaranteed emerges forcibly if we consider that the London-Paris stretch is the worst in the whole world for rapid weather changes, and that in the six weeks above tabulated only eight days were officially reported as 'favourable for flying.'"

**ROLLS-ROYCE ENGINES, WITH FEW EXCEPTIONS, ARE USED ON ALL THE MACHINES OF THE LONDON-PARIS AIR EXPRESS SERVICE.**

**THE FIRST DIRECT ATLANTIC FLIGHT WAS ACCOMPLISHED WITH ROLLS-ROYCE ENGINES IN A VICKERS-VIMY AEROPLANE.**

**THE FIRST FLIGHT FROM ENGLAND TO AUSTRALIA WAS ACCOMPLISHED WITH ROLLS-ROYCE ENGINES IN A VICKERS-VIMY AEROPLANE.**



Australian Service Depot : 2 Smail Street (off Bay Street), Sydney

climb, and quickness of "manœuvrability." These recommendations notwithstanding, none of this class of machine was accepted, the Air Ministry making an eleventh-hour decision to abandon the small 170 h.p. *Wasp* engine in favour of one of 320 h.p.—the A.B.C. *Dragonfly*.

This sudden change of programme raised a storm of criticism, as may well have been expected, but as the Production Department appears to have been unable to arrange for the manufacture of both types of engine, the decision stood.

The Design Branch of the Air Ministry then issued specifications for single-seater fighting 'planes, two-seaters, and twin-engined machines. Building for the

with a 285 h.p. Rolls-Royce *Falcon* engine, it is said to be very easy to handle and can be landed on a small aerodrome without the slightest difficulty. At a cruising speed of 100 m.p.h. it carries a pilot and three passengers, accommodation being provided in an enclosed cabin. Here one may converse without the aid of telephones, letters may be written in perfect comfort, and ladies may travel in ordinary walking dress without fear of inconvenience.

In Australia the Westland interests are represented by Mr. A. Denis Allen, who has recently relinquished his commission as captain in the Royal Air Force. A native of Sydney, Mr. Allen joined the Royal Naval Air Service in February, 1915, and after two years' war service in



The Handley-Page "W.8."  
A Post-Armistice limousine.

two-seater class, Westlands then produced the *Weasel*, a machine which showed great thought in design; the view from it was excellent, and its performance with a big load remarkable to a degree. With the outlook becoming brighter, yet another disappointment was sprung on the manufacturers; the Technical Department of the Air Ministry insisted on various modifications to the *Dragonfly* engine (in favour of which the *Wasp* had been discarded) and finally, before a single order had been placed, the signing of the Armistice ended Westland's war career.

The closing of one sphere of activity, however, opened up that of civil aviation and resulted in the production of the Westland *Limousine*. This is a biplane which one may shortly hope to see in Australia, and one for which a particularly big demand is predicted. Fitted

France, returned to England to test machines for the Design Department of the Air Ministry. He has flown more than 100 different types of machine, and his knowledge on the manufacturing side is almost unsurpassed. It is greatly to be the only "colonial" who had his own credit of Australia that Captain Allen was room in the British Air Ministry, and on the cessation of hostilities he succeeded another brilliant Australian airman, Mr. H. G. Hawker, as test pilot to The Sopwith Aviation and Engineering Company, during the latter's absence in America prior to his attempt to fly the Atlantic.

Practically the first to apply for a civilian flying ticket, Mr. Allen emerged from a stringent general examination the proud possessor of Certificate No. 2.

A handsome illustrated booklet containing photographs and specifications of the Westland products will be forwarded



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as the

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Post-War  
Power Unit**

by many of the  
Leading Aircraft  
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**There's a Reason!**

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on application. Only a small number of these are available in Australia, and requests should be addressed, in writing, to the Aircraft Editor, *Sea, Land and Air*, 99 Clarence Street, Sydney.

#### The Handley-Page "W.8."

From its manufacturers in London we have received the accompanying photograph and specifications of the Handley-Page W.8 biplane which recently flew from London to Paris in 2 hours, 10 minutes.

The machine is the result of lengthy post-Armistice experiment, assisted by the experience gained in the production of giant bombers. A magnificent "flying saloon," the W.8 is capable of carrying from 15 to 20 passengers, or heavy loads of cargo up to 2 tons.

It has been designed to provide a single large saloon, 22 feet long, 4 ft. 6 in. wide and 6 ft. high—dimensions unique in the history of aircraft construction. The space is entirely unobstructed by wires or cross-struts and, when utilised for cargo only, 470 cubic feet of space is available. The pilot and engineer are accommodated in a well sheltered cockpit immediately forward of the saloon.

Adjustable port windows line either side of the cabin, one to each passenger. Lenses fitted into the floor permit a direct downward view, while the interior is lavishly equipped with carpets, curtains, electric candelabra, lamps, clocks, writing tables, mirrors and flower vases. Telephones and wireless apparatus are installed, also every modern toilet convenience. Velvet cushioned saddle-bag chairs, fitted with receptacles for books, newspapers and maps, make the machine the last word in comfort.

When heavy consignments of cargo are carried, light racks, shelves and cupboards may be fitted along either side of the cabin, leaving a central gangway. Wide doors are let into the side of the machine, while a trapdoor in the floor facilitates the entry and removal of freight. Another door communicates between the passenger saloon and the pilot's cockpit.

Due to the provision of effective engine-silencers, conversation between passengers may be carried on as in the case of the Westland *Limousine*, described above.

The W.8 may be flown, if necessary, entirely on one engine and, being fitted with folding wings, requires very little space in the matter of hangar accommodation.

#### Specifications and Performance of the "W.8."

Type of machine—Twin Engine Biplane.

Engines—Two Napier *Lion*.

Maximum available horse power—450 h.p. each engine.

Cruising horse power—350 h.p. each engine.

Performance with normal maximum horse power:—

Speed (maximum) .. ..	112 m.p.h.
Normal cruising speed .. ..	90 "
Landing speed .. ..	45 "
Duration of flight .. ..	6½ hours


Fifteen to twenty passengers or 2 tons of freight can be carried. For shorter distances than 500 miles the weight can be correspondingly increased.

#### DIMENSIONS.

Main 'plane span .. ..	75 ft.
Overall length .. ..	60 ft.
Overall height .. ..	17 ft.
Maximum width with wings folded .. ..	29 ft.

Total petrol capacity .. .. 250 gallons

Total oil capacity .. .. 37.5 gallons



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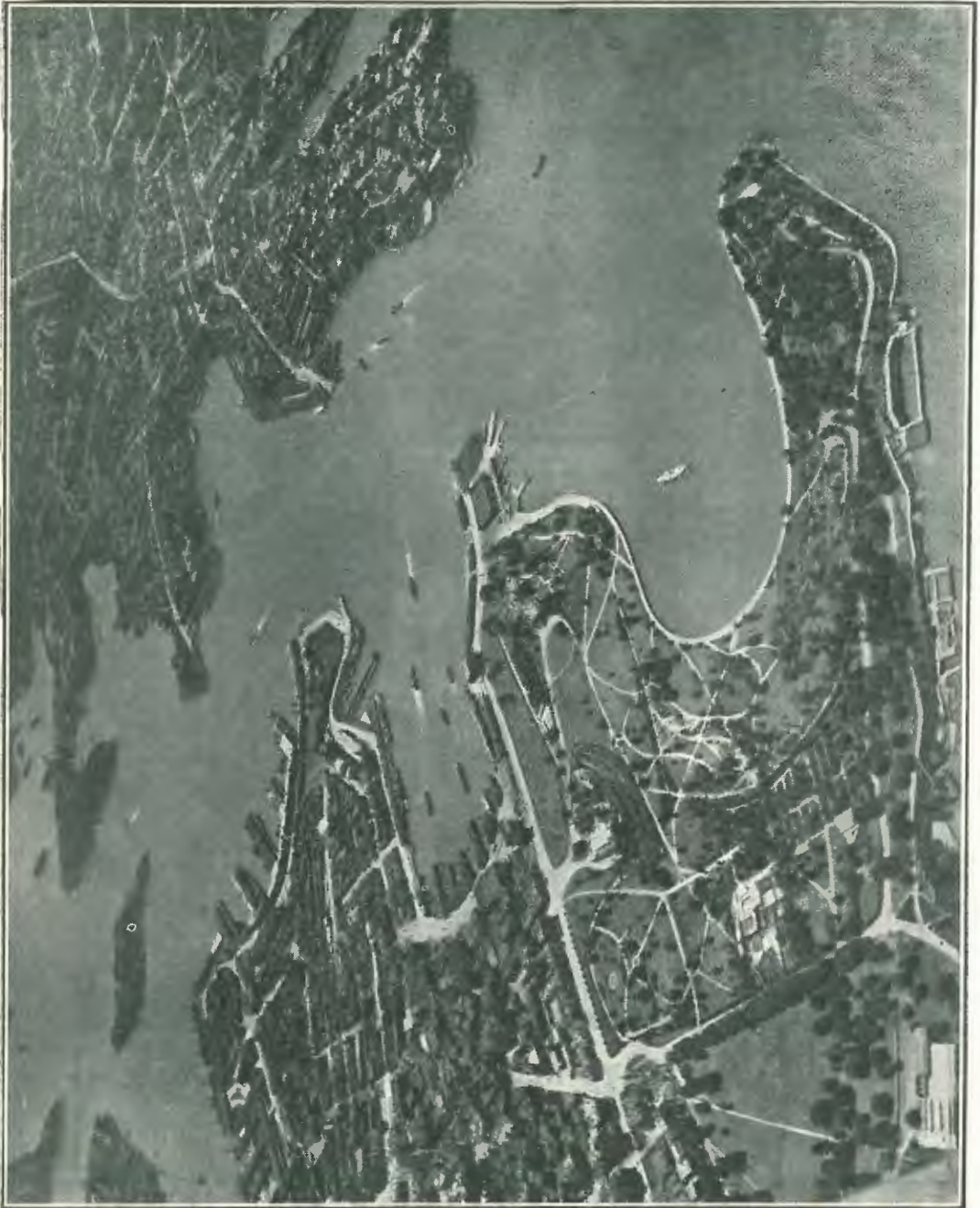


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Aerial Sydney. A view of the Circular Quay.

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## **Dalgety & Company Ltd.**

are now negotiating for the Australian representation of British Companies prepared to insure against the following risks to Aircraft in commission in Australia

### **POLICIES WILL COVER :**

**Damage to Aircraft by Accident, or Fire;**

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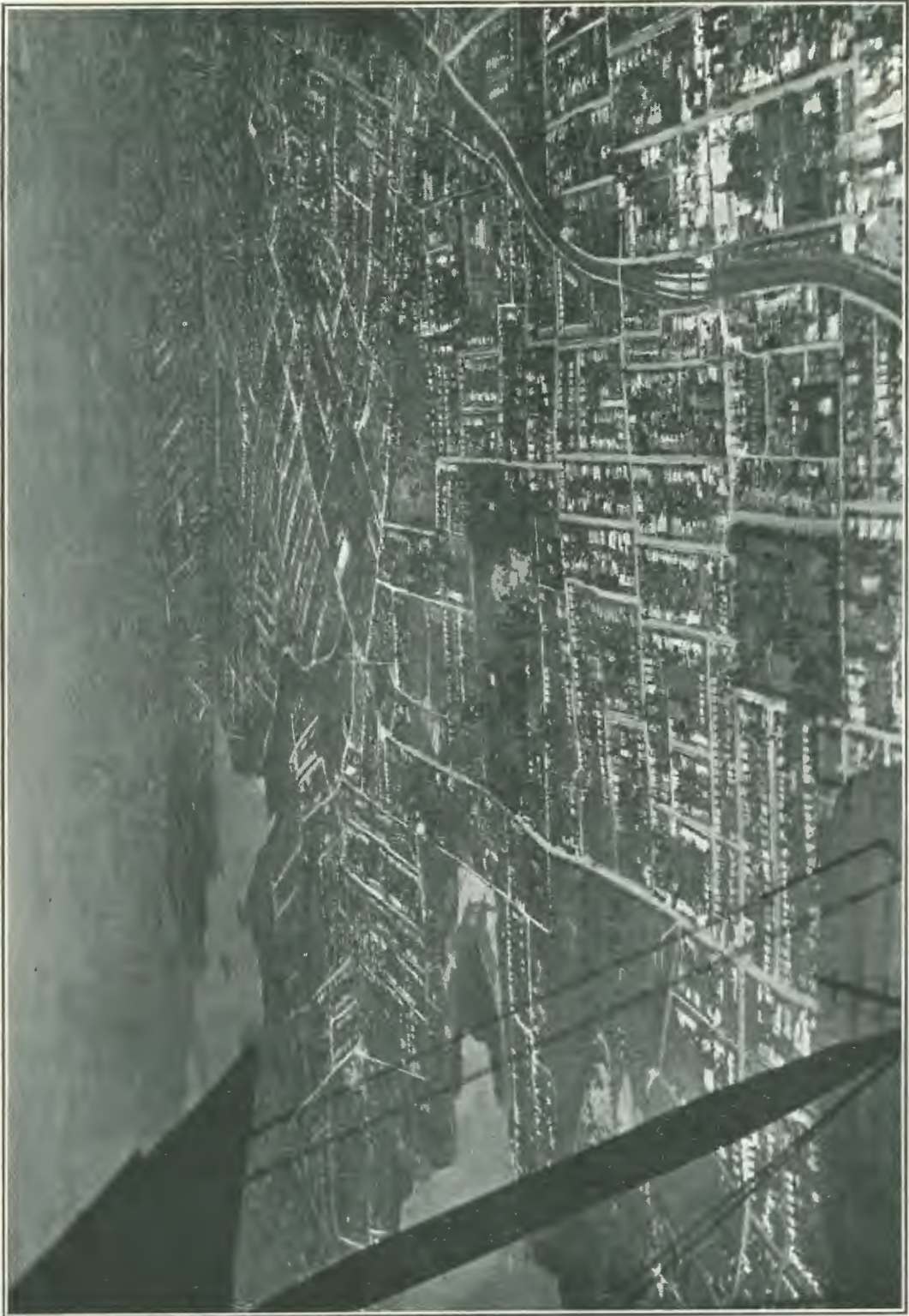
**Injury or death to passengers or pilots or other employees, for any period, or in respect of the number of miles flown**

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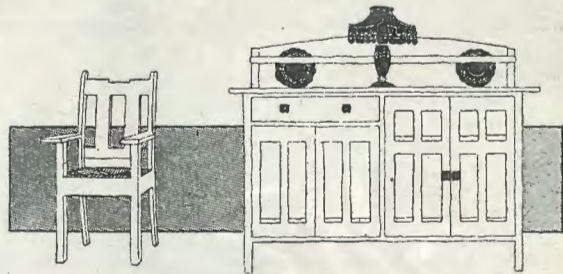


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Suburban Sydney from the air—Burwood and Strathfield.

# Solid Work - Solid Worth.

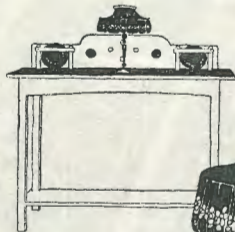
The "STAFFORD" SUITE is a splendid example of these two virtues: substantial construction and moderate cost. Both make a direct appeal. Yet the whole scheme is one of refinement and pleasing ideas.



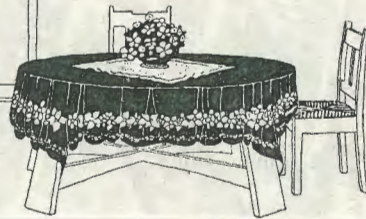
The Suite is composed of  
 5 ft SIDEBOARD, divided drawer  
 for Cutlery and Silver.  
 3 ft. WAGGON  
 4 ft. CIRCULAR TABLE  
 6 DINNER CHAIRS, and  
 2 CARVING CHAIRS, all Rush  
 Seated

IN MAPLE OR OAK OUR  
 OWN FACTORY MAKE.

£36/10/-



## The "STAFFORD" Suite



A SOLUTION OF THE  
 PROBLEM of the SIMPLE  
 EFFICIENT, INEXPEN-  
 SIVE FURNISHING of a  
 SMALL LIVING ROOM  
 in COTTAGE or FLAT.

OUR STANDARD OF QUALITY IS MAINTAINED IN ALL WE MAKE.

# BEARD WATSON LTD.

361-363 George Street



Another View of Circular Quay, Sydney.

## SYDNEY MOTOR SHOW

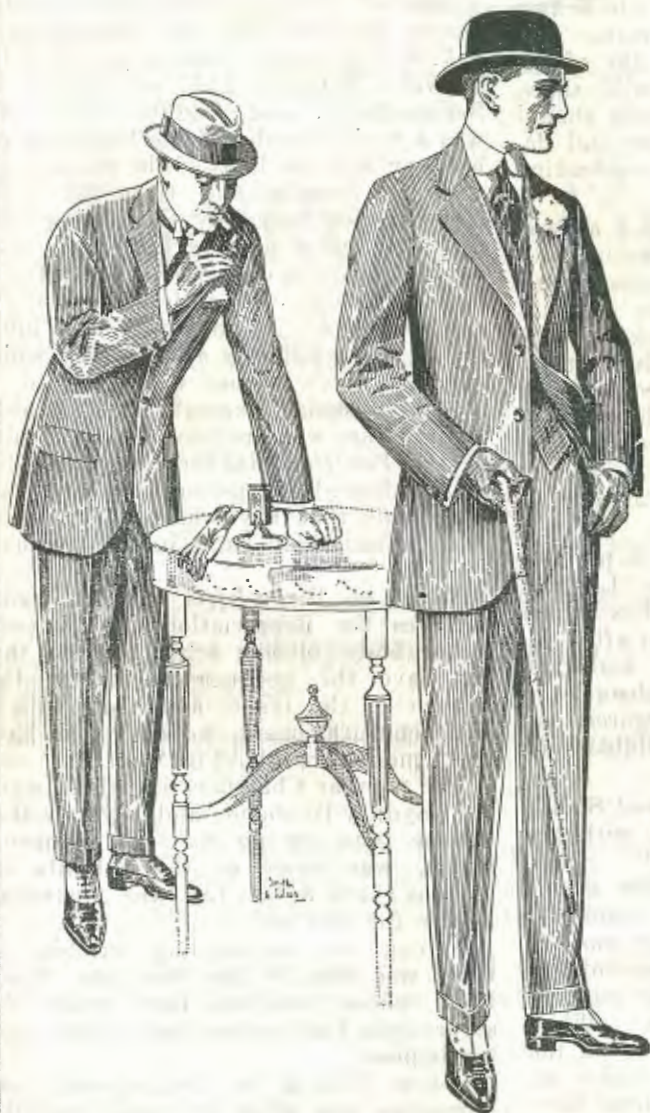
Eighteen months ago, *Sea, Land and Air* published a cover design which pictorially traced the progress of maritime transport. Across the map of the world was printed—"England to Australia: Aeroplane—150 hours."

Sceptical friends pointed to the aeroprophecy and smiled, but on December

10 last it was proved by Captain Sir Ross Smith that we had over-estimated the time by 15 hours.

It is but a few years since the first motor car created a panic among the horses in our cities and caused the curious to collect, much as a new design in bathing-costumes does to-day; yet when the

# "Orient" Ready-to-Wear Suits at 100/-



**"As Good as  
Made-to-Measure"**

aptly describes "Orient" Ready-to-Wear Suits. Sizes are made to suit every type of figure. Special attention is given to cut. Workmanship is accurate in every detail. Material is all wool Australian Tweed in new designs for present wear. Grey mixtures predominate. A typical example of the splendid standard of value embodied in all "Orient" Clothing.

**Price, 100/-**

**We  
Pay  
Carriage**

*David Jones*  
for Service  
Opp. G. P. O. SYDNEY Tel City 6336.

Sydney Motor Show was opened last month it was stated that in New South Wales alone 25,000 motor-driven vehicles are in use, and that 97 per cent. of all the cars in Australia work for their living. The trade directly employs 15,000 people in New South Wales, despite the fact that the manufacture of cars in this country is yet in its infant stage.

There is a significant moral to be drawn from this. The progress of motor cars in these few years is but a tithe of the advance that the aeroplane will show, and it is essential that Australia should concentrate on the manufacture and development of the internal combustion engine.

It requires such an exhibition as was arranged in Sydney to impress us with the strides that have been made in the motor industry. Although the war has naturally hampered this work, it was gratifying to those who have pinned their faith to mechanical-transport to see such a remarkable display of models both for work and pleasure. Every branch of the industry was covered, and the exhibits of the principal firms showed a pleasing enterprise.

Leyland Motors, Ltd., made a prominent display with the famous Leyland lorries, as befits a vehicle that has helped to win wars. One reflected that after the Somme roads, even the worst highways of Australia would offer no obstacle to a Leyland, and the lorries inspired one to speculate on the vast possibilities of road transport by motor.

An old friend of flying days—"Shell"—had a suitable niche loaded with the familiar canisters of "Shell" motor spirit, lubricating oils and things generally that make the wheels go round.

Something new in felt-roofing was the talk of the Texas Company's exhibit. It is prepared "ready to lay," fit for garages and aeroplane hangars. When station-owners keep an aeroplane on the premises the Texas Felt will make an ideal shelter, and even the Federal Government will be unable to explain future delays in accepting gift machines by declaring that there are no hangars in the country to house them.

Duval & Company specialised on the Goodrich tyres of "safety-tread" fame, and on the "Prest-o-lite" Storage Battery for which they are agents.

Castrol Motor Oil, which helped to make the Hispana-Suiza aero-engine, and thereby the popular *S.E.5* aeroplane, was chief among the Wakefield Company's displays. Unaffected by extremes of temperature—from 60° of frost at 20,000 feet, to 120° in the shade at Bourke—Castrol was able to claim some unique records.

One of the most attractive models among the cars was the Scripps-Booth *S.X.39*, a five-seater touring car exhibited by John McGrath, Ltd., sole agents for Scripps-Booth and Cadillac cars. She was a typical model of the luxurious upholstery and fine lines of the modern car.

Plume benzine and Gargoyle motor oils were exhibited by the Vacuum Oil Company, who made a feature of their various gradings of Gargoyle for different types of motor. As at least half of the engine troubles are due to faulty lubrication, the grading is a precaution which motorists have learned to appreciate.

An impressive example of Australian manufacture was provided by the display of the Perdriau Rubber Company Ltd., which showed the motor tyres and rubber goods that have made this firm's name a household word in the Commonwealth.

While on the subject of home-manufactures the Repatriation Department's motor body-building school proved that we have the necessary skill for this branch of the trade, also that, with a little encouragement, we shall soon have the "made-throughout-in-Australia" car.

The popular Chandler-Six, which made the Sydney-Brisbane and Sydney-Melbourne trips during the last seamen's strike, was chief of the exhibits by Marcus Clark & Co., Ltd., the Australian agents for this car.

Among the outstanding exhibits of tyres was that by the Goodyear Tyres Ltd., whose products have stood the severe tests that general use in this country imposes.

George Wills & Co., Ltd., showed their Monogram oils which are made from the best grade of Pennsylvania crude oil, and also exhibited the Whitmore Composition for gears and grease cups.

A novel display was made by Bennett & Wood, Ltd., who cater for all the needs of the motor-man, from driving gloves to oil cans. This firm are also agents for the Willard Storage Battery.

# Leyland



By Appointment

## The Royal Air Force

from March, 1915, to the end of the Great War, took the whole output of Leyland Motors Ltd., and the early appreciation by this branch of the Services of their sterling qualities materially assisted in the development, organisation and efficiency of the most modern fighting force in the world.

Leyland Motors, Ltd. manufacture petrol-driven lorries from 2 to 6-tons capacity, and steam-driven lorries of 5, 6 and 8-tons capacity.

Both types may be fitted with all classes of body-work suitable for general, municipal, timber or contractors' haulage.

## Leyland Motors Limited

London Bank Chambers, Moore Street, Sydney

TELEPHONE: City 10286

TELEGRAMS: "Leymotors, Sydney"

# THE HISTORY OF THE P. & O. LINE

## UNDER SAIL AND STEAM

Especially Written for "Sea, Land and Air"  
By CAPTAIN J. H. WATSON, J.P., F.R.A.H.S.  
(All Rights Reserved)

### II.

At the conclusion of the war with Russia, early in 1856, the P. and O. Company, not the huge concern it is now, found itself much in the same position as it did when Peace was signed last year. Many of its best vessels were in the hands of the Government, their largest having been purchased and placed in the Navy List as "H.M.S. *Himalaya*, 6 guns, troopship."

This was followed by the curtailment of many of its services, which brought other steamship companies into the field. The General Screw Steam Shipping Company, the Royal Mail Company and the European and Australian Royal Mail Company all attempted to establish services that would be satisfactory to the travelling public, the postal officials and their own shareholders. It seemed a favourable opportunity to develop the Pacific route, and for this purpose the Australasian Pacific Mail Steam Packet Company came into a brief existence.

None of the above companies, however, gave a satisfactory service; the one that nearest approached the mark was the European and Australian Royal Mail Company which, in 1856, secured the contract to carry mails to Australia, *via* Suez. The P. & O. Company's tender for the service was £135,000, but the E. & A. Company's £180,000 tender secured it. It appeared that the former would not accept some of the conditions and desired to substitute others, thereby losing the contract.

The new company had no vessels of their own, and depended on being able to charter steamers that would fulfil the conditions as to tonnage and speed. No steamer was to be less than 2,300 tons and 500 H.P., and the time for the run from Suez to Melbourne was to be 45 days outward and 43 days homeward. The P. & O. Company showed a friendly disposition to the new company by chartering to it their largest steamer, the *Simla*, a vessel built in 1854, of 2,441 tons.

The E. & A. Royal Mail Company, al-

though at various stages of its career having the assistance of the Cunard Company and the Royal Mail Steam Packet Company, was not able to overcome the many difficulties into which inexperience led it. Complaints were constant, and in spite of most flattering Press notices attention was called, in the House of Commons, to the inefficiency of the service; also the Board of Trade directed that notice should be taken of the manner in which the contract was being constantly broken. The Government, therefore, early in 1858 cancelled the contract and called for tenders for a service. This was secured by the P. & O. Company, which for the four years its vessels were absent from Australian waters, had been engaged in other parts of the Empire, and had been developing its fleet by adding to it larger vessels ready to take on the Australian trade, which its management was sanguine enough to see must come again into its hands.

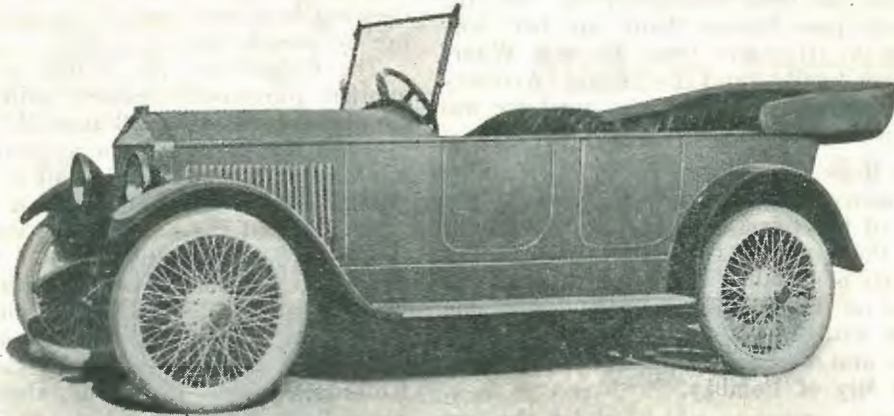
In June, 1858, the Company had a fleet of 47 steamers, 27 of which were screw-propelled, and the remainder by paddle-wheel. In European waters 14 steamers, in the Calcutta to Suez run 8 steamers; in that connecting Bombay, Ceylon, Hong Kong and Suez 11; in China and other Eastern seas, 9; and on transport service, 5; and several new vessels were on the stocks at various builders' yards. Under the new contract the steamers to carry the mails between Sydney and Suez would leave England monthly, carrying a mail *via* the Cape of Good Hope, until six steamers were on that line.

The first steamer to carry the mail from Sydney was timed to leave on February 12, 1859, and to undertake that duty the *Salsette* was selected; this vessel was built at Glasgow and was launched on March 30, 1858. She left Southampton on November 11, under command of Captain Brown, and arrived at Melbourne on January 8, the following year, her time being 65 days. She brought neither passengers nor cargo, but a number of officers for the



# Scripps-Booth Motor Cars

New Model, 6-Cylinder Type



Inspection is invited of these cars at our Show-rooms.

The Scripps-Booth is a light car, 20½ cwt., and 19 H.P., R.A.C., equipped with Liberty Bosch magneto, Remy system lighting and starting, Marvel carburettor, with petrol mileage consumption of over 25 miles to the gallon — Stewart Vacuum Feed.

The Chassis is specially constructed with semi-elliptic springs, 51 inches in length, and ensures the greatest riding comfort over the roughest roads.

Immediate delivery can be given.

## JOHN McGRATH LTD.

200 PITT STREET, SYDNEY

Sole Agents for CADILLAC and SCRIPPS-BOOTH Cars.

*Emeu*, which the P. & O. Company had bought from the Royal Mail Company; she was to be kept on this run, under the four triangles.

The departure of the *Salsette* on February 12, 1859, initiating the new service, was reminiscent of the day seven years before, when Sydney, unused to ocean steam liners gave a "send-off" to the little *Chusan*, as those assembled to see the *Salsette* pass Dawes Point on her way down the Harbour from Moore's Wharf cheered lustily, and the Royal Artillery Band played enlivening airs until she was far on her way to the Heads.

To those who like to know the meaning of names, it may be mentioned that most of the vessels of the P. & O. fleet derive their names from the Orient. The *Salsette* is so called from what was a large island on the west coast of Hindostan, but which with others was, by the aid of seawalls and reclamation, formed into the great city of Bombay.

The six steamers which, under the new contract, formed the Australian Squadron of the P. & O. fleet were the *Salsette*, *Emeu*, *Malta*, *Columbian*, *Benares* and *Northam*. The *Emeu* sailed to the timetable on March 14, with Captain Thomas Small in command, he brought her out in 1857 for her former owners, and on arrival at Suez would relinquish charge.

The third vessel was the *Malta*, of about 1,200 tons and 450 H.P., built in 1848 as a paddle-wheel steamer, under which condition she saw service in the China Sea, her speed being from 8 to 9 knots. As her hull was said to be "everything that could be desired," it was decided to convert her to screw propulsion, and put her on the new Australian line. She was placed in the hands of Caird & Co., of Greenock, who performed one of the first of those operations which have since become every-day occurrences. Her paddles were removed, and a screw propeller installed, also 70 feet were added to her bow, thus turning her into one of the company's finest vessels, of about 2,000 tons. On her four trial runs she averaged 14 knots, this being the result of new engines having been fitted. She had a party of representative Australians on board on her trials, Sir Charles Nicholson, Bart., Dr. Dobie, of Clarence River fame, Mr. George A. Lloyd, of Sydney, and Mr. Ed-

ward Wilson, of the *Argus*. The command was given to Captain Down, the same man who took the *Chusan* to Sydney, and had the *Norna* when the ships were withdrawn in 1854. The *Malta* sailed from Southampton on January 20 and arrived at Sydney on April 8, allowing for calls at coaling stations, this works out at 78 days; in the '60's this was considered good time for a sailing ship, but does not look good work for steamers judging by present day standards.

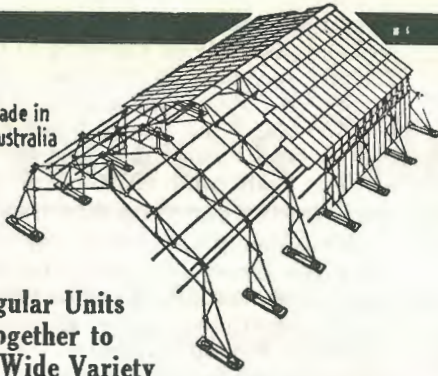
The *Columbian*, the fourth vessel was another purchased steamer, built on the Clyde in 1853, of 2,283 tons, 2,116 H.P., and 313 feet in length, she arrived in Sydney originally under command of Captain Pender, but at the time the P. & O. Company resumed the mail service she was in charge of Captain Stewart.

The fifth steamer was the *Benares*, 1491 tons, built in 1858, and when she arrived in Sydney on May 14, 1859, was a new ship. She was commanded by Captain S. Kottowe, whom many of the present generation will remember; as he continued to serve the travelling public on several of the company's steamers, to and from the Old Country, up to the end of the last century. The next steamer to take her place on the Red Sea run was the *Northam*, of 1,330 tons and 300 feet in length, called after the spot where she was built; at this part of Southampton, Messrs. Summers and Day had their shipbuilding yard. She was launched in April, 1858, and made her trial trip on June 14. She arrived at Sydney on June 10, 1859, under the command of Captain Stead, and left with her first mail for Suez on July 14.

These six steamers were to form the establishment in Australia, the terminal ports under the contract being Sydney and Suez. The ports of call were Melbourne, King George's Sound and Mauritius, Adelaide being catered for by a branch boat from King George's Sound, and by these vessels was the uninterrupted success of the P. and O. Company firmly established.

The company was also fortunate in having Mr. Henry Moore for its agent. Moore's Wharf was one of Sydney's most noted spots for forty years, and the P. & O. steamers anchored off this wharf were a familiar sight. Mr. Moore occupied as a residence at various times, both Spencer Lodge and Moorecliffe (now the Ophthalmic Hospital) at Miller's Point, before he bought Barneleuth and

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# GAWCO

Each triangular unit is standardised; no riveting necessary. Easily handled, easily erected, easily transported—and

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## HANGARS

as well as Mining Buildings, Machine Shops (especially in isolated districts), Roof Trusses, Suburban Machine Shops, and all Engineering construction.

FOR THE CONSTRUCTION OF HANGARS "GAWCO" is specially suitable, being easily and quickly erected, and due to the standardisation of the "Gawco" units a building may be quickly taken down and removed without deterioration, or could be added to as required to increase accommodation.

Write for fullest particulars and prices, which will be promptly supplied by the manufacturers—

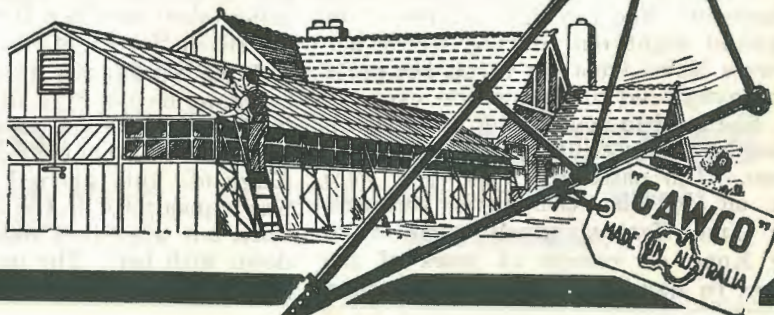
## GARDNER, WÆRN & CO.

225 Clarence Street, SYDNEY  
367 Queen Street, BRISBANE

Showrooms :

369 Flinders Street  
484 City Road

MELBOURNE



finally Carrara, Rose Bay. He was born in London, but came to the colony in 1820, when five years of age, with his father, Captain Joseph Moore, a noted whaler of his day, and the rest of his family in the brig *Woodlark*. Mr. Moore was appointed to the Legislative Council in 1868. He was the agent for the P. & O. Company until 1880, when the company opened their own offices in Sydney. He died in 1888.

Up to this time (1859) the company was not exempt from those losses which in spite of all precautions and care fall to the lot of shipping firms, none, however, occurred in Australian waters, but in the Eastern section several of its vessels came to grief. The Company's *Erin*, 797 tons, a paddle-wheel vessel built in 1846, was in the Straits of Malacca bound from Calcutta to Singapore under the command of Captain Ironson, when on the night of July 21, 1851, she came into violent collision with the same company's *Pacha*, also a paddle-wheel steamer. The *Erin* struck her a little forward of the starboard paddle-box and the *Pacha* sank in seven minutes, two European and two Chinese passengers lost their lives; a large number of boxes of gold, and dollars went down with her, and were regarded as a total loss. In 1854 vain efforts were made to locate the wreck, and it was not until May 3, 1855, that it was found. It was in April a year later before operations for the recovery of the treasure could be begun. By the end of May bullion and coin to the value of £65,000 were raised from a depth of 124 feet, this being four-fifths of the total quantity. The *Erin*, the contributing cause of the disaster, was herself wrecked on the coast of Ceylon, 60 miles north of Galle on June 7, 1857, the vessel was a total loss, but all on board were saved.

The *Douro*, a screw steamer of 810 tons, built in 1853, was placed on the Ceylon and Hong Kong service, which latter port she left in May, 1855, with passengers and mails for England. She ran into a typhoon on the second night out, during which her sails were blown from the yards, her boats washed away, and the funnel lost over the side. She tried to make Hong Kong again, but ran on to a reef about 120 miles from Hainan. The passengers and crew were taken off by the company's steamers, *Malta* and *Tartar*, which came from Hong Kong on receipt of news of the disaster. In March, 1858, the screw steamer

*Ava*, 1,373 tons, a vessel built in 1855, was on her passage from Calcutta to Galle, and keeping too close to the shore, went on a sunken reef about half a mile off Trincomalee, Ceylon. She had a large number of passengers who fortunately were all saved, but her mails and £250,000 in gold were lost irretrievably when she broke up.

The company also lost on the Peninsular coast the *Great Liverpool* and the *Tiber*, which were running between Southampton and Mediterranean ports; great loss of life attending the dual disaster. The captain of the former committed suicide. The closing loss of the decade was the *Malabar*, one of the smaller vessels of the company's fleet. She was a new screw-steamer of 917 tons, and when she struck her trouble was commanded by Captain Grainger. She was conveying to China, Lord Elgin and Baron Gros, the British and French plenipotentiaries, on their mission to enforce a treaty. She met a similar fate to others of the fleet which made Galle a port of call, and did not give the coast a wide enough berth.

But if in the decade the company suffered losses, they also added many vessels to their list. Since 1854, 23 steamers were built and put in commission, of these only three were paddle-wheel, which showed that the new mode of propulsion had now come to stay, and large vessels were taking the place of numerous small ones. In twenty years the largest boat had grown from 800 tons to 2,283 tons, and five were over 2,000 tons each, and seven others averaged 1,600 tons. One of these seven the *Alma*, 2,164 tons, had an interesting incident in connection with her christening. She was built by Mr. John Laird of Liverpool, and launched in July, 1854. She was named *Pera*, by Miss Harriet Laird with the usual ceremony; before she was quite ready for sea the battle of The Alma (September 24, 1854) had been fought in the Crimea, and in honour of that event her name was changed to *Alma*, and being taken over as a troopship, she was in the Black Sea in 1855.

After the war the *Alma* went out to take her place on the Suez to Calcutta run, and in December, 1857, broke her shaft and had to lie at Aden till a new one came from England; this arrived at Calcutta and was transhipped to the *Ava* to be taken to Suez, but when that vessel was lost it went down with her. The name *Pera* was soon restored to the list of the company's ves-

# There's Money in it

Once you have looked at this heading we know you will not put this book down until you have read this page right through; because we have some questions to ask you—questions that affect YOU!

## THEY ARE—

**Have you thought what your future will be?**

**What has your present position to offer you?**

**What do you hope to rise to?**

Think well over these questions. If you cannot answer them satisfactorily there is something wrong with your present job. That being so, look around and see where the good positions are.

You must decide on WIRELESS for the following reasons: You travel the world, and travel is education. The prospects are unlimited because this profession is only in its infancy. The pay is good, because good men are worth good money.

Students of the MARCONI SCHOOL have priority of appointment to all vacancies in the Australasian Mercantile Marine, and to fit you for these positions we have—

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AND THE ELECTRONIC VALVE.

Do the right thing NOW and call or write to us to-day. We will put you on the road where the good positions are.

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**MELBOURNE**

sels, and a 2,014 ton steamer of that name was launched in August, 1855. The company distributed its favours to the various builders in Southampton, Liverpool, Glasgow and London, all sharing in the work of creating the greatest fleet in the mercantile marine. The twenty-ninth half-yearly meeting of the company was held in the offices at Leadenhall Street on May 31, 1855, Sir James Matheson, Bart., M.P., in the chair; C. W. Howell, Esq., being the Secretary. The report gives some interesting information respecting "The War Service," "The Australian Postal Service," "Hotel Accommodation at Cairo," "The Egyptian Railway," and financial matters. The report concluded with a clause which said: "your fleet has been free from casualties up to the date of the last advices. The annual statement of accounts at the close of the financial year, there is every reason to believe, will be satisfactory and warrant the payment of a dividend of 3½ per cent. for the half-year ending 31st March last, which your directors accordingly recommend should be now declared, and payable, clear of income tax, on and after June 23." It can be well understood that "the report was received with loud applause." A shareholder, in moving that the report be adopted, said that it was with pleasure he heard the declaration of the proposed dividend, but he thought there were matters of higher consideration in it. He thought that the report showed not only that the company was in a highly prosperous state, but that it had obtained stability which established its high character.

Now those who have followed the *modus operandi* of the P. & O.S.N. Company in the many ramifications of its great business will cordially agree with this shareholder (Mr. Lewin), and will also hold the opinion that the high character has been maintained ever since, from the time of Sir Thomas Sutherland to that of Lord Inchcape.

### LIST OF THE PENINSULAR AND ORIENTAL COMPANY, 1856.

#### SOUTHAMPTON AND ALEXANDRIA SERVICE.

Name.	Ton-nage.	Horse Power.	Propelled by
<i>Ava</i> .. .. .	1,373	1,056	Screw
<i>Pera</i> .. .. .	2,014	1,373	"
<i>Indus</i> .. .. .	1,950	1,367	Paddle
<i>Euxine</i> .. .. .	1,165	1,069	"

#### MALTA AND MARSEILLES SERVICE.

Name.	Ton-nage.	Horse Power.	Propelled by
<i>Vectis</i> .. .. .	841	1,058	Paddle
<i>Valetta</i> .. .. .	832	1,027	"

#### PENINSULAR SERVICE.

<i>Tagus</i> .. .. .	782	280	Paddle
<i>Alhambra</i> .. .. .	642	454	Screw
<i>Madrid</i> .. .. .	479	160	Paddle
<i>Sultan</i> .. .. .	1,125	806	Screw

#### SUEZ AND CALCUTTA SERVICE.

<i>Bentinck</i> .. .. .	1,974	520	Paddle
<i>Hindustan</i> .. .. .	2,017	520	"
<i>Oriental</i> .. .. .	1,787	420	"
<i>Bengal</i> .. .. .	2,185	1,084	Screw
<i>Nubia</i> .. .. .	2,096	1,422	"
<i>Bombay</i> .. .. .	1,186	750	"

#### BOMBAY, ADEN AND CHINA SERVICE.

<i>Singapore</i> .. .. .	1,190	1,122	Paddle
<i>Ganges</i> .. .. .	1,190	1,162	"
<i>Erin</i> .. .. .	797	280	"
<i>Norna</i> .. .. .	969	624	Screw
<i>Madras</i> .. .. .	1,185	754	"
<i>Cadiz</i> .. .. .	816	450	"
<i>Pottinger</i> .. .. .	1,350	450	Paddle
<i>Malta</i> .. .. .	1,217	450	"

#### CALCUTTA AND CHINA SERVICE.

<i>Formosa</i> .. .. .	675	80	Screw
<i>Chusan</i> .. .. .	699	80	"
<i>Shanghai</i> .. .. .	546	100	"
<i>Precursor</i> .. .. .	1,817	500	Paddle
<i>Pekin</i> .. .. .	1,182	400	"

#### CHINA LOCAL SERVICE.

<i>Lady M. Wood</i> .. .. .	553	250	Paddle
<i>Canton</i> .. .. .	348	150	"

#### PROCEEDING TO INDIA.

<i>Alma</i> .. .. .	2,164	1,445	Screw
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#### TRANSPORT SERVICE. IN THE MEDITERRANEAN AND BLACK SEA.

<i>Simla</i> .. .. .	2,441	1,766	Screw
<i>Candia</i> .. .. .	1,961	450	"
<i>Colombo</i> .. .. .	1,864	450	"
<i>Ripon</i> .. .. .	1,508	900	Paddle
<i>Rajah</i> .. .. .	537	120	Screw

#### NEW SHIPS.

<i>Fitting out at Southampton.</i>			
<i>Delta</i> .. .. .	985	210	Screw
<i>Building at Glasgow.</i>			
<i>Delhi</i> .. .. .	2,400	450	Screw

#### TRANSPORT, COAL AND STORESHIPS.

<i>Transports.</i>			
<i>Manila</i> .. .. .	646	60	Screw
<i>Haddington</i> .. .. .	1,647	450	Paddle

#### Coal Hulks.

	Ton-nage.	Port.
<i>Zenobia</i> .. .. .	900	At Suez.
<i>Fort William</i> .. .. .	1,800	" Hong Kong.
<i>Santa Anna</i> .. .. .	1,500	" Gibraltar.
<i>Ariadne</i> .. .. .	900	" Alexandria.
<i>Larkins</i> .. .. .	1,000	" King George's Sd.
<i>Orestes</i> .. .. .	900	" Port Phillip.

# The Shock-Troops of Commerce.

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Name.	Ton- age.	Horse Power.	When Built.	Propelled by	Name.	Ton- age.	Horse Power.	When Built.	Propelled by
<i>Sir Jamsetjee</i>					<i>Orissa</i> .. ..	1,647	950	1856	"
<i>Jeejeebhoy</i>	125	36	1855	Paddle	<i>Granada</i> .. ..	561	721	1857	"
<i>Alma</i> .. ..	2,164	1,445	1855	Screw	<i>Nemesis</i> .. ..	2,018	1,894	1857	"
<i>Alhambra</i> .. ..	642	454	1855	"	<i>Malabar</i> .. ..	917	724	1858	"
<i>Pera</i> .. ..	2,014	1,373	1855	"	<i>Benares</i> .. ..	1,491	1,373	1858	"
<i>Ava</i> .. ..	1,373	1,056	1855	"	<i>Salsette</i> .. ..	1,491	1,550	1858	"
<i>Azof</i> .. ..	700	348	1855	"	<i>Northam</i> .. ..	1,330	1,514	1858	"
<i>China</i> .. ..	2,010	1,488	1855	"	<i>Ceylon</i> .. ..	2,020	2,054	1858	"
<i>Behar</i> .. ..	1,603	900	1855	"	<i>Nepaul</i> .. ..	796	960	1859	"
<i>Columbian</i> .. ..	2,283	2,116	1855	"	<i>Jeddo</i> .. ..	1,632	2,059	1859	"
<i>Ellora</i> .. ..	1,607	1,055	1855	"	<i>Delta</i> .. ..	1,618	1,612	1859	Paddle
<i>Aden</i> .. ..	812	954	1856	"	<i>Massilia</i> .. ..	1,640	1,730	1860	"

[Our contributor, Captain Watson, sailed for New Zealand on January 14, and will be unable to continue the above series of shipping articles until his return to his reference library in Sydney. Captain Watson writes: "I shall not be back until the end of April, and am very sorry to leave my old friends, the ships. On my return I shall take up the story where I left off."—Ed.]

## THE AUSTRALIAN AERO CLUB

### QUEENSLAND.

At the Bellevue Hotel, Brisbane, on January 12, Sir Ross Smith and Sir Keith Smith attended a dinner given in their honour by members of the Queensland Section of the Club. The function was well attended and the visiting airmen renewed many old acquaintances from No. 1 Squadron.

General disappointment was occasioned by the absence of the two (now world-famous) mechanics, one of whom, Sergeant Bennett, was supervising the repairs at Ipswich, while his companion, Sergeant Shiers, remained at Charleville with the *Vimy*.

Considerable artistic ingenuity was apparent in the arrangement of floral effects and table decorations, the central feature of which was a shield bearing the Air Force motto—*Per Ardua ad Astra*—beribboned in the colours of the Australian Flying Corps (light and dark blue and cerise), while, extending across the room, a line of large triangular shields marked the various landing stages from London to Charleville. Miniature aeroplanes in flight completed the picture.

The loyal toast, proposed by the Chairman, Mr. J. J. Knight, and that of "Our Guests," proposed by Major J. Macleod, O.B.E., and supported by Mr. H. Bowden Fletcher, D.F.C., having been duly honoured, Sir Ross Smith, in reply, detailed his flight from England and spoke

very enthusiastically regarding the future of aviation in Queensland. "It is most certainly the duty of all members of this Club," he added, "to use every effort to ensure that Queensland obtains her share of the aeroplanes which have been presented to Australia by the British Government. (*Applause.*) The public must be educated as to the value of aviation, and every machine that can be obtained will help along this vital need."

Sir Ross Smith, whose remarks were warmly supported by his brother, paid a glowing tribute to his mechanics, without whom the flight could not have been achieved. Considerable satisfaction was expressed also at the excellent repair work carried out in the Government shops at Ipswich.

### NEW SOUTH WALES SECTION.

A committee meeting was held on January 27, at 5 O'Connell Street, Sydney. Lieutenant-Colonel W. Oswald Watts, O.B.E., presiding.

Minutes of previous meeting were confirmed and correspondence received.

Resignations from the committee by Mr. S. H. Harper and Mr. W. E. Hart were accepted with regret. Captain E. Telford Simpson and Mr. H. E. Broadsmith, F.R.Ae.S., A.M.I.A.E., were elected to fill the vacancies.

A Technical Committee comprising the following officers was appointed for the



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purpose of inspecting aeroplanes and aerodromes, and for the recommendation of certificates of airworthiness:—Lieutenant-Colonel W. Oswald Watt, O.B.E., Major T. M. Scott, M.C., Captain G. H. Blaxland, Captain L. H. Holden, M.C., A.F.C., Captain G. F. Hughes, M.C., A.F.C., Captain E. W. Cornish, M.C., Captain G. F. Malley, M.C., A.F.C., Captain E. Telford Simpson, Captain J. W. Wright, D.F.C., Lieutenant F. W. Follett, Lieutenant S. H. Harper, Lieutenant H. W. Ross, D.F.C.

Nine new members were elected.

The following resolution was unanimously carried:—

“That the annual subscription, as hitherto, be one guinea, payable on the 1st January of each year or upon election; but that if a member be elected after June 30, in any year, he shall only be liable for half-a-guinea subscription for that year. In the case of a member who was elected after June 30, 1919, and has paid one guinea subscription for that year, he shall only be liable for half-a-guinea subscription for the year 1920.”

All subscriptions for 1920 are now due and should be remitted to the honorary secretary. Membership cards (facsimile of which is reproduced below) will be issued to members who have made themselves financial until the end of the current year.

Members who are liable only for half-a-guinea are requested to forward this amount immediately, instead of waiting until the end of the half-year, as this will greatly help to stabilise the finances of the Club.



Facsimile of Membership Card.

A draft of the Certificate of Airworthiness was considered and approved. It was decided that the Initial Fee for such certificate be 10/6, and Renewal Fee 5/-.

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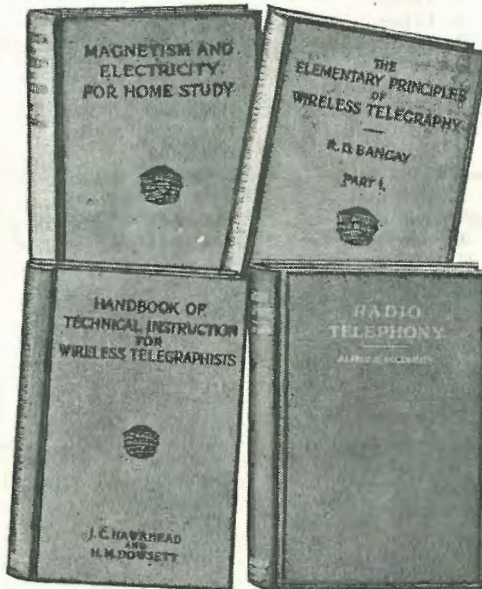
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Revised to February 7, 1920.

SHIP.	OPERATOR.	SHIP.	OPERATOR.
<i>Apolda</i>	J. W. McKay	<i>Moana</i>	{ J. F. Hutton (s)
<i>Arawatta</i>	V. Blight		{ A. E. Lawrence (j)
<i>Arahura</i>	V. M. Simpson	<i>Moeraki</i>	W. D. Bostock
<i>Aramac</i>	R. D. Thompson	<i>Monowai</i>	G. Donnelly
<i>Australbrook</i>	R. E. Haddock	<i>Mokoia</i>	L. V. B. Sutton
<i>Australcrag</i>	V. E. Stanley	<i>Montoro</i>	A. L. Dixon
<i>Australford</i>	C. F. G. Taylor	<i>Morialta</i>	E. F. Hayes
<i>Australglen</i>	J. R. Gilligan	<i>Morinda</i>	F. C. Davies
<i>Australmead</i>	G. Pow	<i>Navau</i>	{ H. Speed (s)
<i>Australmount</i>	A. R. Catford		{ R. P. Ginders (j)
<i>Australpeak</i>	C. H. Kidman	<i>Ngakuta</i>	H. Bargrove
<i>Australplain</i>	S. R. Dixon		{ H. M. Lamb (s)
<i>Australpool</i>	K. J. Dines	<i>Niagara</i>	{ M. A. Prudence (j)
<i>Australport</i>	A. H. Jeremy	<i>Ooma</i>	E. A. Miller
<i>Australrange</i>	C. Black	<i>Oonah</i>	R. M. Flrminger
<i>Atua</i>	L. N. Callaghan	<i>Paloona</i>	T. W. Bearup
<i>Bingera</i>	H. L. Miller	<i>Paringa</i>	
<i>Bombala</i>	T. Bannister	<i>Pateena</i>	J. H. Bennett
<i>Bundarra</i>	H. K. Burbury	<i>Rakanoa</i>	W. C. Brown
<i>Canberra</i>		<i>Riverina</i>	J. F. McGinley
<i>Cethana</i>	K. L. Freeman	<i>Rotomahana</i>	W. E. C. Sawyer
<i>Challamba</i>		<i>Rupara</i>	G. Cook
<i>Changsha</i>	R. H. Alexander	<i>South Africa</i>	C. Williamson
<i>Charon</i>	J. E. Cleary	<i>St. Albans</i>	W. H. Harris
<i>Coolgardie</i>	R. S. Taylor	<i>Taiyuan</i>	E. J. Giles
<i>Cooma</i>	J. H. Hawkins		{ E. M. Bain (s)
<i>Culburra</i>	A. R. D. Davis	<i>Tahiti</i>	{ G. M. Whiteside (j)
<i>Dimboola</i>	A. F. Vipan		{ H. F. Harman (s)
<i>Eastern</i>	P. C. Gillon	<i>Talune</i>	{ T. H. McWilliams (j)
			{ G. H. Hugman
<i>Indarra</i>	{ T. A. Jones (s)	<i>Tarawera</i>	{ W. A. Hawkins (s)
	{ C. F. Green (j)	<i>Tofua</i>	{ J. G. Campion (j)
<i>Kaiapoi</i>	A. E. Shepherd	<i>Ulimaroa</i>	
<i>Kaitangata</i>	R. W. Barnes	<i>Victoria</i>	F. A. Hunter
<i>Kaituna</i>	G. Illingworth	<i>Wahine</i>	E. N. Williams
<i>Kaiwarra</i>	C. Smith	<i>Waihemo</i>	F. A. Cook
<i>Kanowna</i>	H. Tuson		{ V. M. Brooker (s)
<i>Karori</i>	S. G. Jones	<i>Waihora</i>	{ F. L. Dawes (j)
<i>Karoola</i>	M. Sedgers	<i>Waikawa</i>	F. L. Scott
<i>Katoa</i>	B. Boni	<i>Waimarino</i>	A. Cuthill
<i>Katoomba</i>		<i>Waipori</i>	H. E. Young
<i>Kauri</i>	N. W. G. Scott		{ A. S. Smith (s)
<i>Koromiko</i>	F. N. Davidson	<i>Wairuna</i>	{ H. G. Reilly (j)
<i>Kowarra</i>	H. Fullerton		{ C. F. Griffiths (s)
<i>Kurow</i>	D. C. Lane	<i>Waitemata</i>	{ N. H. Brown (j)
<i>Levuka</i>	S. J. McVeigh		{ A. S. Dening
<i>Loongana</i>		<i>Waitomo</i>	R. R. Robinson
<i>Macedon</i>	N. W. Marshall	<i>Wanaka</i>	T. Chalmers
<i>Mackarra</i>		<i>Wandilla</i>	M. A. H. Ryan
<i>Maheno</i>	L. R. Dickson	<i>Westralia</i>	{ A. O. Sutherland (s)
<i>Makambo</i>	L. S. Lane		{ F. D. Cunnold (j)
		<i>Whangape</i>	J. Welch
<i>Makura</i>	{ D. N. Quinn (s)	<i>Wodonga</i>	L. G. Devenport
	{ E. A. Hunter (j)	<i>Wyandra</i>	W. J. Washbourne
<i>Manuka</i>	J. A. Heavey	<i>Wyreema</i>	L. J. Glyde
<i>Maori</i>	F. E. Duggan	<i>Zealandia</i>	E. A. Burbury
<i>Mararoa</i>	H. A. Bloxham	<i>Zealandic</i>	
<i>Marsina</i>	W. H. Richardson		
<i>Mataram</i>	S. A. Ludlow		
<i>Maunganui</i>			
<i>Mawatta</i>	H. W. Barnfield		
<i>Mehusia</i>	R. R. Pilmore		
<i>Minderoo</i>	J. Darley		
<i>Mindini</i>	A. Stuart		

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A. G. Ross            H. F. Hartley