OFFICIAL JOURNAL OF THE AUSTRALIAN AERO CLUB.

Vol. I.—No. 11 February, 1919 Price Ninepence

THE "SARDINIA" INQUIRY.

For weeks past the above headline has appeared daily in nearly every newspaper in the Commonwealth.

The *Sardinia* has been given great prominence in the Press and a stigma cast upon her owners.

It is not our intention to unduly belaud the P. & O. Company (for whom this vessel was built in 1902), nor to pass judgment on a matter at present *sub judice*, but, as semi-official journal of the Australasian Mercantile Marine, we should be lacking in our sense of duty if we hesitated to point out certain simple facts regarding this inquiry.

In the first place, the "*Sardinia* Inquiry"—as the Press still terms it—is not an inquiry into the conduct of the captain or crew of that vessel. The proceedings have been instituted by the Department of Defence for the purpose of investigating certain occurrences alleged to have been due mainly to want of discipline among the troops on board and to want of proper supervision on the part of their officers.

It has been publicly admitted that discipline aboard the *Sardinia* was bad—verging at times on open mutiny—but neither captain nor crew are charged with responsibility for a duty entrusted to the commanding officer of a military transport.

"It takes all sorts and conditions to make an army" is a phrase which has become almost axiomatic, yet not more so than another which proclaims that "a soldier has but two privileges: to 'parade sick' and to 'grouse about his tucker' "; and it may be said without exaggeration that the spirit of these two axioms is prominent today in every branch of the A.I.F.

A battalion, a company, or even a platoon, which did not include at least one agitator would be something almost exceptional

Our troops have not yet begun to return in complete units. Each transport brings back men of perhaps sixty separate battalions in addition to those of the Light Horse, Artillery, Engineers, Signallers, Army Medical, Army Service, Machine Gun, Trench Mortar, and Flying Corps, besides Pioneers, Veterinary, Salvage, and Cyclist Corps, Wireless and Camel Corps, Pay Corps, Military Police, and a dozen other "fancy regiments," each of which is in turn subdivided into squadrons, batteries and so on, and representing fifteen distinct brigades.

In every troopship then we find a very mixed body of men, with a large number of conflicting elements, each possessing its own pet agitator and, among them, a certain percentage who invariably bring discredit upon the particular branch of the Service to which they may be allotted.

Himself a private in the A.I.F., it has been the writer's experience to travel in no less than seven transports, which form a fairly representative group. These were the *Mooltan*, *Franconia* (both torpedoed and sunk), *Minnetonka*, *Llanstephan Castle*, *Inkosi*, *Runic*, *Oxfordshire* and *Nile*, owned, respectively, by the P. & O., Cunard, Atlantic Transport, Union Castle, Rennie, White Star, Bibby, and Royal Mail Steam Packet Companies.

Life aboard a troopship is, therefore, a subject not entirely new to us, and we assert that, with but one exception (on a short voyage from Alexandria to Gallipoli), the food was invariably good—or at any rate as good as could be reasonably expected in the circumstances.

It is instructive to observe the extreme contrasts which may be found among the men in any troopship. There is the real soldier, who accepts his lot with cheerful philosophy and thanks his Maker that it isn't any worse; then again, we have his direct opposite, the born agitator, who overrates himself on every possible occasion and never misses an opportunity to ventilate a grievance, whether real or imaginary. Between these two types is a long range of intermediate types, the one half easily influenced and ever ready to "stand in with the mob," the other, capable of doing its own reasoning and remaining discreetly "neutral." This latter half sometimes play a fair game of Bridge or Euchre, and frequently has a taste for useful literature; the former has more important matters on hand, for our agitator can always muster an audience, particularly during the tedium of a long, idle voyage, devoid, perhaps, of any other form of recreation.

Amusement may likewise be derived from some of the daily grievances voiced along the mess-decks. When porridge has been omitted from the breakfast menu we have heard vociferous complaints even in the heart of the Tropics, and on its reappearance next morning further complaints because this has been served instead of the item which they had refused the day before. We have known men to parade sick "to dodge a fatigue," and then, having been admitted to the ship's hospital and placed on a milk diet, to complain that they were being deliberately starved. Subsequently, on discharge from hospital, we have heard the malingerer start an agitation against the whole of the medical staff.

But in no sense of the word can these be described as soldiers.

The vessel makes port. Newspaper representatives come aboard and encourage the men to talk of the trip. The agitator is fetched. Grievances flow freely. The reporter, as likely as not, has never set foot outside of Australia; to him these complaints make distinctly welcome "copy," to be worked up into a story that shall wring the heart of many a sympathetic reader and, from his own chief, a word of commendation.

For, to the sympathetic reader aforesaid, every returned soldier is a hero who has fought and bled for Australia on one or more battle-fronts. Unfortunately this is not always the fact. The percentage of returned soldiers who have never heard a shot fired is large. There are men of our acquaintance who sailed from Australia with the First Expeditionary Force and are now returning on furlough, who, during four-and-a-half years' alleged "Active" service, have never been within sound of the guns, either the enemy's or our own.

It is from men who have done nothing really worth while that the majority of these so-called grievances emanate, and it is on the word of such as these that a vessel, owned by one of the most highly respected shipping companies in the world, is exposed to the adverse criticism of a sometimes unreflecting public.

The ration scale adopted in troop transports during the past few months has been far from lavish—but certainly no less so than that which obtains among the civilian population of Europe to-day under the compulsory rationing scheme. And whatever criticism may be passed as to the last voyage of the *Sardinia*, it should be remembered that this vessel is no longer under the control of her owners.

AT LAST!

AN ALL-AUSTRALIAN AERIAL SERVICE.

New Company to be Formed.

In England nine years ago—when Commercial Aviation lay far back in the womb of Time—a young Australian set out to study the science of aircraft and their engines in theory, design and construction.

His name was Murray — Lee Murray, junior, and in his veins ran the blood of two generations of well-known Australian engineers; that of his father, Mr. Lee Murray, senior, much esteemed in Sydney and Melbourne some twenty years ago and now following his profession in London; and that of his father's father, the late Mr. K. L. Murray, long and prominently associated with the engineering department of the Commonwealth Railways.

Major Lee Murray, A.F.C.,
Originator of the proposed All-Australian Aerial Service.

A worthy chip of the old block, Lee Murray, junior's interest in aeronautics dates almost from his early boyhood, and when, in 1911, some half a dozen model aeroplanes were demonstrated in England, one of the very few which successfully responded to every practical test was that designed and constructed by the young Australian engineer whose portrait adorns this page.

These were the pioneer days of the British aircraft industry, and as early as 1912 "young Murray" — as he was then popularly known — made a practical ascent at Brooklands, England, on a Blériot monoplane.

Leaving him at his experiments for the next three years, we pass on to 1915. In February of that year he joined the Royal Flying Corps (now the Royal Air Force) and saw active service in France. Here his absolute fearlessness, coupled with an almost uncanny inside-knowledge of the various types of aeroplane then in use, combined to gain for him an appointment as experimental test pilot. In this appointment it became his duty to take new

machines off the ground for the first time and test them for speed, climbing powers, and their suitability for the execution of certain "stunts," all of which had to be ascertained while at various altitudes and at no small personal risk to the pilot. If the machine proved satisfactory it was then officially passed for active service. If, on the other hand—but perhaps the alternative were better left to the reader's imagination, an imagination which may be stimulated by the perusal of an article entitled "Two Test Flights," which appeared in the December issue of this journal.

In the above capacity, Lee Murray, junior—now Major Murray, R.A.F.—personally tested between 750 and 800 brand-new aeroplanes, his sole mishap being in 1917, when one of them caught fire in the air and was burned to the proverbial cinder a few seconds after its pilot had managed to effect a landing. It is for the detection of these and other defects in a machine that the experimental pilot makes his tests. Major Murray has flown 74 different types of aeroplane and tested a like number of aero engines. Altogether he has spent more than two thousand hours in the air while thus engaged.

Nor is this the full record of his experience as a practical airman. Far from it. An appointment held by him under the Aeronautical Inspection Department has given him a thorough knowledge of all materials utilised in aircraft manufacture, besides bringing him into close association with the assembling and erecting of practically every type of aeroplane adopted by the Imperial armies during the war.

The last overseas appointment held by Major Murray was with the Imperial Air Ministry in England. Here he was chief inspector of the work of some 300 officers and nearly 6,000 non-commissioned officers and men, whose duty it was to assemble and test every machine built for service in the Royal Air Force in France, Egypt, and in training squadrons in Great Britain. In this appointment he was promoted to the rank of Major.

Returning to Australia during the latter part of 1918, Major Murray took up instructional work at the Central Flying Schools, Laverton (Victoria), which position he has, we understand, relinquished during the past few days.

Major Murray now proposes to devote the whole of his technical knowledge, skill, experience and energy to organising and operating an All-Australian Aerial Mail, Freight and Passenger Service, to be run according to a scheduled time-table.

This proposal to link up the various portions of the Commonwealth now makes its initial appearance in print. "*Sea, Land and Air* shall make the first public announcement," declared Major Murray in December last, and he has proved as good as his word, for although the scheme has been worked out to the final detail, no reference has yet been made to it in any other section of the Press.

The All-Australian project is of considerable magnitude and one which must soon revolutionise our existing methods of communication. It is, of course, far too big for a one-man job and should either be carried out on a large financial scale or left alone. Capital will be required to ensure its successful accomplishment and for that purpose it is proposed to form a company as soon as the necessary formalities have been concluded. Now that Mr. Reginald Lloyd has secured the official registration of "Aerial Services, Limited," and his survey expedition actually started, we hope to be able to announce at an early date the formation of an independent company under the style of "Commonwealth Aerial Services, Limited," or some similar title.

Aerodromes will be erected by this new Company in or near all the principal cities of the Commonwealth, and emergency landing grounds laid out at intervals of from two to three hundred miles along the main routes. Each aerodrome will be staffed by competent aeronautical mechanics.

The aeroplanes to be used are large multiple-engined bi-planes or tri-planes. Big machines nowadays have a lifting capacity of about four tons, in addition to their full load of fuel, and can comfortably carry, exclusive of their machine crews, some two tons of freight and ten or twelve passengers. They have a maxi-

mum speed of over one hundred miles per hour, which, for long distances, gives a very comfortable and efficient cruising speed of seventy-five miles per hour. Machines of this type are claimed to be remarkably simple of operation, inherently stable and unsurpassable in the matter of personal safety.

Aerial accidents are due to one of the four undermentioned causes:—

(1) Forced landings in bad country, owing to engine failure.

As these machines are quadruple-engined and will fly with perfect safety on two engines, the danger is almost entirely eliminated as it is almost inconceivable that three of the four engines would break down simultaneously during a six-hour trip.

(2) "Stunting" (trick flying).

With a machine of these dimensions, trick-flying is not possible, and even if it were, this would only be necessary on exhibition flights or in Active Service conditions.

(3) Faintness of the pilot.

Every machine will have a crew of three, each of whom would hold a pilot's certificate and be capable of flying the machine single-handed.

(4) Mechanical breakdowns.

While this danger is unavoidable, the science of engineering has, however, reduced it to an almost negligible degree.

The following services are proposed by Major Murray and will be operated each way daily:—

Melbourne to Sydney, in 6 hours; Melbourne to Adelaide, in 5½ hours; Melbourne to Hobart, in 8 hours (landing *en route*, at King Island, Burnie and Launceston. The greatest sea stretch on this trip is 43 miles, which would be covered in less than 40 minutes); Sydney to Brisbane, in 6 hours; Sydney to Adelaide, in 11 hours; Adelaide to Perth, in 18 hours. On the Adelaide-Perth trip it is probable that the services will at first be bi-weekly, the machines descending on the Nullabor Plain or Kalgoorlie, at one of which stations the night will be passed.

These services will later be considerably extended.

Every station and machine will be fitted with wireless telegraphic installation, thus the machine will be in constant touch with the ground stations during its flights.

The machines would not leave the ground in any of the following:—

(1) Hurricanes, or gales exceeding 50 miles per hour.
(2) Fog.
(3) Thunderstorms.
(4) Tropical rain (slight rain would not affect the service).

But as Australia is singularly free from any of the four conditions indicated above, the service would be very rarely held up.

In connection with the foregoing paragraph it is curious to note that the present American Air Service has shown an efficiency of eighty per cent. in a country where the weather is changeable. The machines used in the American service are of single or twin engines, while those proposed for the all-Australian service have four engines, and will be infinitely less susceptible to climatic conditions.

It is proposed to establish the repair works in Melbourne, which also will be the headquarters of the proposed Company and its manufacturing base.

In time of war these machines would be of incalculable value for the defence of Australia, for, as Major Murray desires this journal to point out, every aerodrome would be at the entire disposal of the Department of Defence, and every facility afforded to Defence pilots in the use of the Company's landing-grounds. Similarly, the machines themselves would be available to the Department of Defence in case of emergency, and are easily converted into bomb-carriers at very short notice.

In summarising the manifest advantages of the proposed service we would particularly stress the following points:

(1) Bringing the principal towns closer together by reducing the present travelling time to about

a third. For instance, the journey from Melbourne to Sydney, which at present occupies from seventeen to eighteen hours by rail, could be covered by aerial route in six hours at a very slight additional cost, and with an increased degree of comfort.

(2) By a series of circular routes the outlying districts would be linked up with the nearest main town.

(3) A quicker mail service.
Under existing conditions a letter posted in Melbourne early on Monday afternoon would not be delivered in Sydney until Tuesday afternoon. With aerial mail services the same letter could be posted in Melbourne at midnight, and reach Sydney at the same time as the train mail. Similarly, a letter for Brisbane posted in Melbourne at midnight on Monday, would reach its destination by Wednesday morning's first delivery.

The foregoing pages give but the barest outline of the scheme, but it will be seen that the adoption of Major Murray's project will do much to promote and encourage civilian and commercial aviation and the manufacture of aircraft throughout the Commonwealth. It is Major Murray's intention that the Company shall be entirely Australian, capitalised by Australian money, and operating a service within the boundaries of the Commonwealth.

While it will be necessary to go outside Australia to procure the first batch of aeroplanes, it is, however, confidently predicted that by the time these machines have become obsolete the Company's own manufacturing base will be producing more machines than are required for the upkeep of an efficient service.

AERIAL SERVICES (SYDNEY-LONDON), LTD.

DEPARTURE OF SURVEY EXPEDITION.

These are of us, they are with us,
All for primal needed work, while the followers there in embryo wait behind,
We to-day's procession heading, we the route for travel clearing,
Pioneers! O pioneers!

(—Walt. Whitman.)

Before these lines appear in print the aerial survey expedition of which so much has been written during the past few months will have actually departed from Sydney on the initial stage of its journey to England.

If ever an enterprise were deserving of success it is this, for, practically from the day of its conception, hindrances, delays and obstacles have faced it at every turn.

The culminating point in its chequered career was reached on December 31 last, when the Federal Government definitely announced that registration of the proposed company would not be granted; and this after endless work on the part of the initiator, Mr. Reginald Lloyd, in New South Wales, Victoria and South Australia; the gathering together of prominent citizens in each State; the raising of capital sufficient to cover the preliminary expenses of the proposed survey and, finally, the purchase by Mr. Lloyd of a complete equipment for the expedition, the departure of which was originally planned for November 14 of last year.

During the first week of the present year, however, the outlook brightened. The Acting Prime Minister communicated with the High Commissioner in London (Hon. Andrew Fisher), who, after consultation with the Imperial authorities, cabled back to Melbourne the decision of the latter, that private and commercial aviation in Australia be fostered to the fullest extent, and that every facility be accorded to private enterprise for the purpose of co-operating with certain international aerial services now under contemplation by the Imperial and Allied Air Boards.

The desired permission was then granted, and "Aerial Services Limited" duly registered under the Companies Act on January 16, its primary object being to survey a direct route from Sydney to Calcutta (or Port Said or Bagdad) as a preliminary to the inauguration of regular aerial services between Australia and India, linking up with similar services between the latter country and England. Details of the above proposals have been fully set out in earlier issues of this journal.

Personnel of the Expedition.

Mr. Reginald Lloyd, managing director and initiator of the new company, will leave Sydney, at the head of his expedition, on Friday, January 31, at 8 a.m., and will accompany the survey party throughout its journey. Business interests in many parts of the world have given him a clear insight into the commercial requirements of five continents, and he has travelled extensively in the countries through which the aerial service will pass; particularly in the Dutch East Indies, Federated Malay States, Straits Settlements, Siam and Burma.

Second in command of the expedition is Mr. Harry B. Manderson, a Melbourne journalist who has traversed the highways and byways of Asia and South America. Formerly on the literary staff of the *Age*, Mr. Manderson visited London during the Coronation ceremonies in 1911 and identified himself very closely with the Australian political delegations. Later he represented the London *Daily Chronicle* as special correspondent at the Delhi Durbar, and afterwards contributed some excellent stories of his experiences around Thibet and the Khyber Pass during the flight from Lhassa of the Dalai Llama on the approach of the Chinese. Mr. Manderson, in his official capacity of recorder to the expedition, has undertaken a series of descriptive articles for publication in *Sea, Land and Air*.

The surveying and general scientific work of the party will be in the hands of Mr. J. J. Waldron, of the Northern Territory branch of the Home and Territories Department (Melbourne). Official permission has been granted to Mr. Waldron to accompany the expedition as survey officer. He has had considerable experience in pioneer survey work in the Northern Territory, and possesses first-hand knowledge of the greater portion of the Australian route to be traversed. The outfitting of the expedition for the "wilderness" section of the journey has been completed under Mr. Waldron's supervision.

For the purpose of reporting on the suitability of locations for aerial landing-grounds and the erection of aerodromes Mr. J. C. Marduel (late of the Australian Flying Corps) will accompany the party as aeronautical expert, besides being in charge of the motor equipment.

Mr. W. Ousley and Mr. H. Seabrook, well known in motoring circles as expert mechanics, will help the cycles through their arduous journey, while Mr. Kenneth Hunter (second son of Mr. Percy Hunter, who perhaps is best known to our readers as honorary organiser of the recent Jack's Day movement) will act as general assistant.

Equipment.

The equipment of the party may be classified under five separate headings: Personal, Scientific, Mechanical, Commissariat and Medical.

Each member has been issued with the following kit:—2 pairs boots (black), 2 pairs swag straps, 2 pairs service breeches, 2 khâki jackets (drill), 2 shirts (black), 6 khâki handkerchiefs, 1 pair leggings, 1 pair slippers, 2 pairs socks, 1 pair puttees, 1 pair khâki "shorts," sweater, wide felt hat. cap, cholera belt, towel, soap (cake of "Lifebuoy" and bar of "Sunlight"), 2 blankets, waterproof ground-sheet, water-bag, aluminium water bottle (emergency),

motor goggles, 1 pair leather wristlets, "housewife," sheath knife, electric torch, pannikin, knife, fork, spoon, Colt revolver and cartridges, and a 'flu mask.

The scientific branch is represented in the following articles:—Two "Graflex" cameras (half-plate) with accessories for developing and printing, aneroid barometer, theodolite set, compasses, sextant, field glasses, maps, log-books and numerous items of minor interest although of equal importance.

In addition to a fully-stocked medicine chest, a tent and two rifles, the expedition will carry a very large supply of implements and spare parts for the repair and maintenance of the four motor-cycles; this assortment includes 200 wheel-spokes, a portable vice and monkey-grip outfit, 2 spools of piano-wire, a quantity of split pins, washers, bolts, nuts, valves, pumps, carbide lamps, rubber tubing, wire pliers, axes, tomahawks, shovels, a crowbar, emery wheel, block and tackle, pulleys and a long list of other accessories sufficient for the entire reconstruction of each of the machines.

The motor cycles are fitted with non-skid chain tyres of which a number of spares are carried, also, of course, a liberal supply of petrol for which four special tanks are fitted in the rear of each machine.

Route to be Surveyed.

Members of the expedition will assemble at 7 a.m. on Friday, January 31, at "Airlie," Garfield Street, Five Dock (N.S.W.), the residence of Mr. George A. Lloyd, J.P.—father of Mr. Reginald Lloyd, and for 22 years Chamber Magistrate of the Glebe Police Court. Here the party will breakfast, departing at 8 a.m. on its journey to England.

The official photographer to *Sea, Land and Air* will be in attendance, and exclusive photographs of the departure of the expedition will be published in our next issue.

The Australian route will cover the following stages:—Windsor to Wiseman's Ferry and thence to Woolombi, where the first night will be passed. Leaving Woolombi at daybreak on February 1 the expedition will proceed through Singleton, Muswellbrook, Murrurundi and Quirindi to Werris Creek; next to Narrabri and thence to Moree, where the first landing-ground is to be selected and officially mapped out.

The Queensland border will be crossed between Moree and St. George. From here the journey to Port Darwin will be resumed *viâ* Mitchell, Charleville, Blackall, Longreach and Cloncurry, the final stage of the Australian survey being completed by way of Katherine.

Mr. Lloyd is confident of reaching Port Darwin within ten weeks from date of departure from Sydney and, unless detained on the Queensland border, expects to arrive on April 11th. In the event of quarantine regulations being enforced he anticipates that the expedition will make Port Darwin not later than April 18. Here the cycles will be thoroughly overhauled and refitted and passports secured by all members of the party before proceeding to Timor.

Landing stages will be mapped out at intervals not exceeding 300 miles, and will probably be charted at Moree, Charleville, Longreach and Cloncurry, on a direct, as-the-crow-flies line from point to point throughout the route. It is estimated that not more than 80 miles per day will be surveyed.

Leaving Timor, the expedition will continue to Java and thence, by way of Sumatra, Singapore (Straits Settlements), Bangkok (Siam) and Burma, to one of the three alternative terminal points, *i.e.*, Calcutta, Bagdad or Port Said.

On completion of the survey, which is expected to occupy not longer than six months, the entire party will proceed by steamer to London, each member having joined the expedition on a 12 months' engagement and under guarantee of return passage to Australia.

Mr. Lloyd states that arrangements have been concluded whereby spare parts and accessories will be available to the expedition at various points throughout the Dutch East Indies, Siam and India and that constant supplies of oils and petrol during the entire journey are guaranteed by the Vacuum Oil Company Proprietary, Limited.

It is promised that aerial passenger services to Australia will commence within nine months of the arrival of the expedition in England.

THE R.A.F. PILOT

AN APPEAL TO BRITISH AIRCRAFT WORKERS.
Especially Written for "Sea, Land and Air."

What is it that stirs when night turns to morn,
And peace has its sway in the hush of the dawn?
Is it vulture or hawk, or is it an owl
Who, with a shrill hoot, has returned from a prowl?
What is it that sallies from out of its lair
And gambols and buzzes far up in the air?
It dodges and circles, it flies at great speed;
It is something that from its dull fetters is freed.
It dives and it spins, it zooms and it banks,
As if for its freedom it wants to say "thanks"!
Like "Parker's Patrol of the Kimash Hills"
It fills us with wonder, it fills us with thrills.
King of the air, with a true British soul,
'Tis the R.A.F. pilot, now out on patrol,
Who for periscopes hunts on the route of our trade;
Who will drop bombs on U-boats that lie in the shade.
With torpedo-tubes loaded, they don't care a curse
If they sink a Red Cross ship or machine-gun a nurse.
Single-handed he meets the Hun squadron a-coming
To take British lives with their devilish bombing.
His alert and keen eyes watch the mist scan the sky,
His machine-gun is trained to let bullets fly.
He will fight like a demon, forgetful of life,
His sweetheart, his home, his parents and wife.
If he comes out victorious, again and again
He ascends and he fights until he is slain.
The spirits of men who have bitten the dust,
Are beseeching us daily to merit the trust,
To stir and be doing so that we may gain,
And their lives are not forfeit or given in vain.

* * * *

The strikers and shirkers and aeroplane workers
Who with children and wife are earning good pay,
Would they like to change jobs with the men in the trenches
And work hard and fight at one shilling per day?
Would they like to be canned in a submarine hold?
Would they choose on "Vindictives" then to be bold?
Would they like to be sweeping for sea-mines adrift,
Or to sit on a charger galloping swift?
Or a place in a tank they might like, just for fun,
Or a fight in an armoured car out for a run!
In the air would they fancy their courage to test
In a land or seaplane, whiche'er they think best?
Ah, they should be grateful for home and for ease,
And do their damned utmost the airmen to please
By turning out aeroplanes, sound at each spot,
By thousands and thousands—Yes, that is their lot!

O. R.

Marconi House,
London, November, 1918.

NAURU ISLAND

A WIRELESS INCIDENT OF THE AUSTRALIAN OCCUPATION.

Especially Written for "Sea, Land and Air."
BY THOMAS J. McMAHON, F.R.G.S., F.R.C.I.

Thirty-three miles to the south of the Equator and 2,300 miles from Sydney, is Nauru Island (or "Pleasant Island") a mere dot upon the map, and a spot of land hardly twelve miles in circumference. But on account of its vast deposit of high-grade

Oweida, King of Nauru Island—who hates Germans and desires the British to take possession of his valuable island in the Central Pacific.

phosphate of lime, this tiny island is probably one of the richest in the world. German-owned, it is at present under Australian Military occupation, with British Civil Administration carrying on German civil laws in accordance with the terms of occupation.

The natives, though few in number, are considered the handsomest in the Pacific, and, from their chief, "King Oweida," down to the humblest melon seller, are anxious to secure British ownership or protection for their valuable little island. To that effect they recently forwarded a petition to the British Government, praying that "in no circumstances be they returned to German Administration, which cruelly oppressed them." There is no argument more insistent against any claims the Germans may make for the return of this island than the palpable facts of their oppression of the natives and their neglect of the rich treasure of nature, phosphate of lime, the most wonderful plant food and tonic known to agriculturists the world over, and one which the Germans did not bother to work and distribute for the benefit of mankind.

It is British enterprise that is responsible for the magnificent industry on the island; for the mining, crushing, and drying of the phospate, thousands of tons of which are annually sent to Australia, and in which industry many Australians are employed, not a few being in charge of departments.

The Hunnishness of the German character manifested itself even on this island the moment the declaration of war in 1914 between England and Germany was made. The officials of the German Administration and the Germans employed in the phosphate industry turned on the Britishers, insulted and abused them and finally practically denied them freedom, while seizing every opportunity of insulting the ladies.

They closed down the phosphate industry, and for weeks gave themselves up to an orgy of drink, gluttony and vulgar riot. For weeks they tyrannised the Britishers, refusing all information of the war, raiding and stealing from their houses and actually curtailing their food supplies, having already forcibly taken possession

of all beers and spirits they could lay their villainous hands on, and bringing their cowardly *kultur* to a climax by an especial ceremony of insulting the British Flag, in the presence of the natives and in a manner too abominable for publication.

But the tables were soon turned, for the Australian Navy was out upon the Pacific, and, as all the world knows, was wasting no time. Very soon every German warship was driven from its waters, all German possessions in the Pacific coming at once under Australian and Japanese military and naval occupation.

The Germans of Nauru were removed from the Island and are at present interned in New South Wales. The moment the Germans realised their game was up they set to, with childish madness, to destroy machinery, the Britishers' homes and furniture and, naturally, the splendid wireless installation; one of the most powerful in the world, and which, it is said, could hear Berlin distinctly.

When the Australian Military Wireless Operators arrived at Nauru a scene of destruction met their eyes, which grew to chaos when they gazed upon the demolished wireless plant, in its various parts a veritable triumph of German mechanical skill.

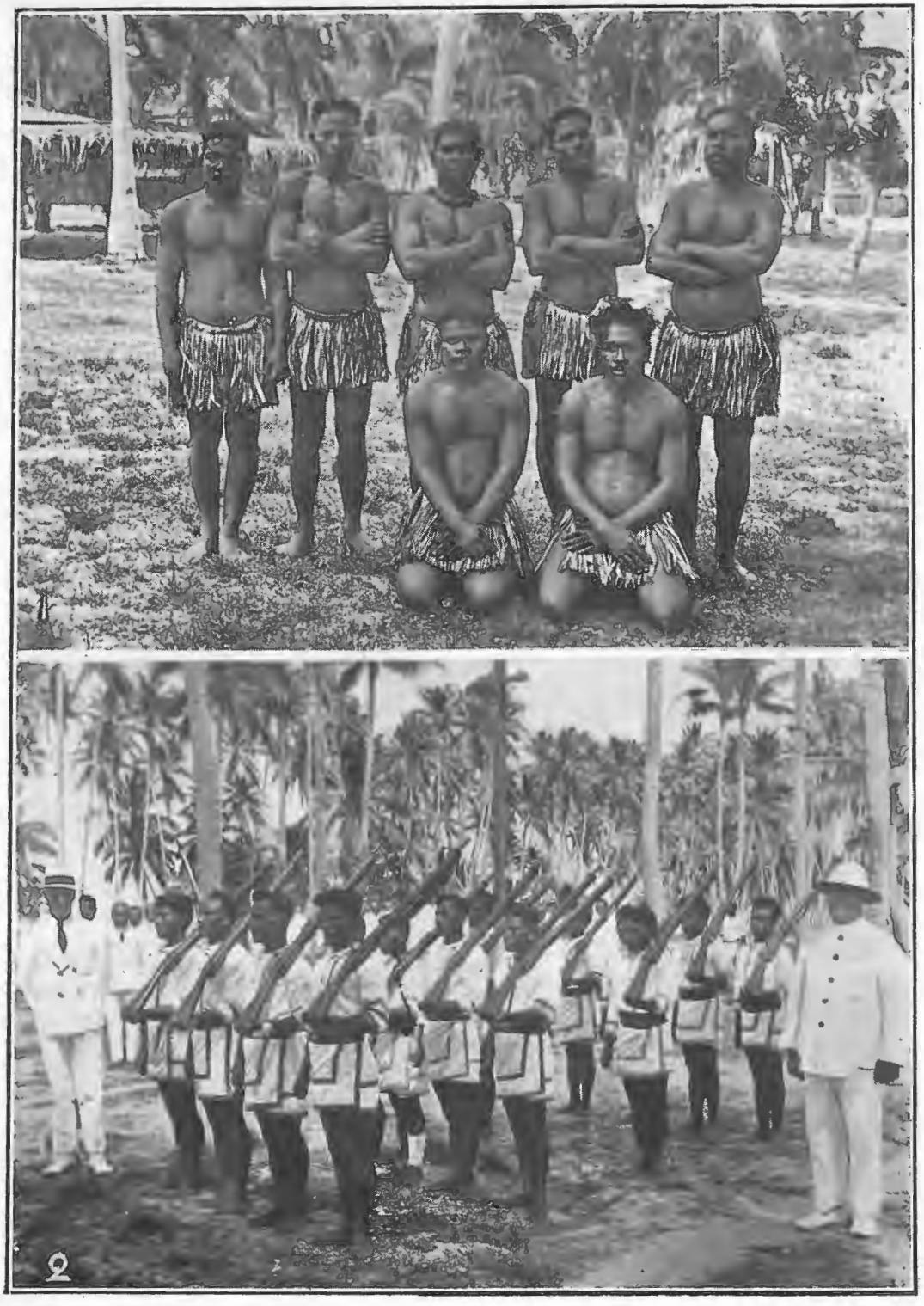
However, with that resourcefulness and promptitude characteristic of the wireless men, or boys, as they often are, messages were soon flashing to and from Nauru, and the installation as it stands to-day is equal in every respect to what it was in the German days; operated by a keen and energetic staff of young Australians, who are doing, and have done, their duty faithfully for King and Country.

The history of this late war cannot be complete without those many chapters which will tell of the deeds, the work, the bravery and the noble duty, ably performed, of wireless men and boys.

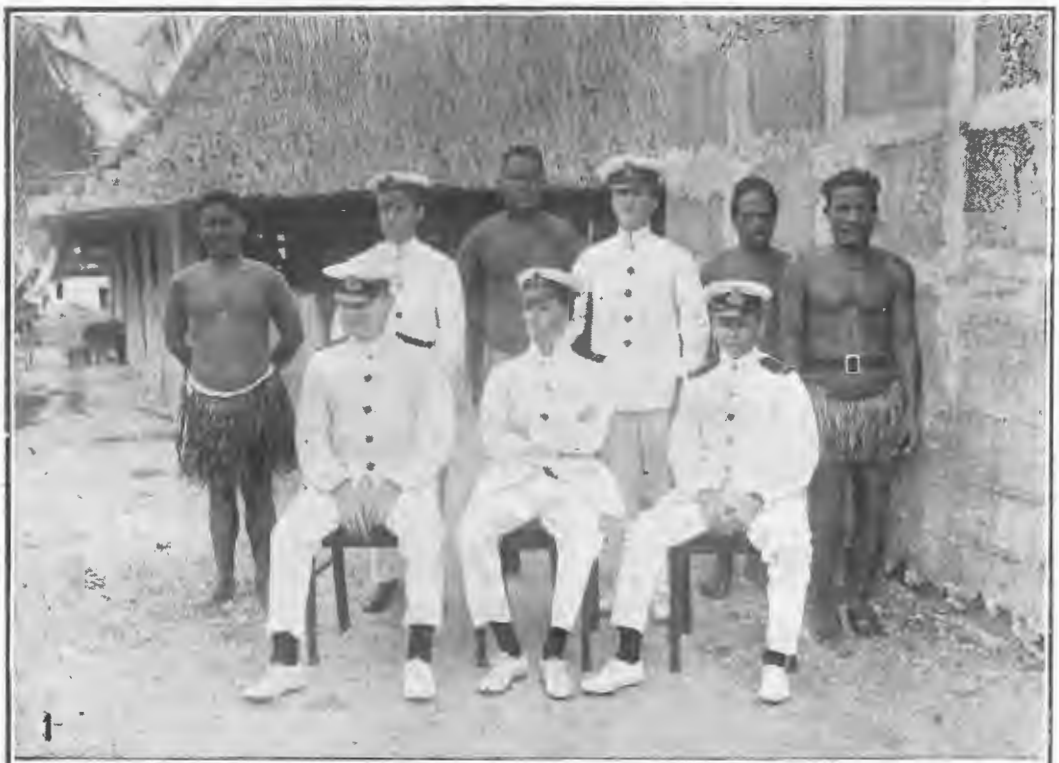
The Australian troops set up their garrison adjoining the wireless station and the first creature they met was a dog, of

Nauru Island.
A street in the residential district.

Nauru.



(1) Men of Nauru Island.
(2) Native Police; a fine body of men.



(1) The Australian and Native Wireless Staff at Nauru Island.
(2) The British Administrator, Mr. G. B. W. Smith Rewse, with wireless officers, also the dog which located the wireless plant buried by the departing Germans. The wireless officer holding the dog is here shown standing waist-deep in the German cave.

mongrel breed, which eventually attached itself to the wireless staff. The poor animal was kindly treated and, as if to show its gratitude, was the means of unearthing a German hidden treasure. This dog is, indeed, the heroine of the present remarkable narrative.

The soldiers noticed that frequently, day and night, the dog ran off towards a rocky knoll about a hundred yards from the wireless shed, whining, yelping, barking and scampering to and fro, as if bent on attracting attention.

One day, out of mere curiosity, some of the soldiers followed the dog, obviously to her great joy, for she displayed more eagerness and energy than ever. Coming to a small flat patch of ground between two huge rock boulders on the top of the knoll, she suddenly began to paw up the earth, looking around every now and then, as if soliciting assistance. The soldiers, however, could see nothing unusual and were about to depart when recalled by fresh cries of the dog, which had continued to paw the earth away until a number of evenly placed stones were exposed, certainly indicating some hidden treasrue.

Picks and shovels were quickly at work and, at five feet down, the entrance of a cave was discovered. With the aid of ropes and lights two soldiers picked their way in for a distance of about twenty yards when, to their great surprise, they came across piles of boxes, furniture and innumerable personal effects, but more especially many of the essential parts of the dismantled wireless plant.

The boxes contained books and clothing, all carefully put away, and the whole lot stored so as to be secure from damp. One corner of the cave was filled with dozens of bottles of lager beer and whisky, some few open as evidence of a parting toast to "a safe and speedy return."

No doubt the articles found belonged to the German wireless men, who went away fondly believing that it would not be long before they returned, and that Germany would then be "Master of the World."

The dog is still at the wireless station, well cared for, a popular pet, one of the important celebrities of the island, and much petted by tourists and visitors.

The future of Nauru is of vital interest to Australians. It is one of the most valuable islands in the Pacific and of particular value to Australia in its supplies of the rich and magic fertilizer, phosphate of lime.

The island, too, is one of the Central Pacific group, which is equi-distant from Australia, America and Japan, and has been named "The Gateway of the Pacific."

So, both stragetically and commercially this part of the Pacific is of the highest importance, and to no nation more so than to the Commonwealth of Australia.

Already the Central Pacific is the hive of a keen trade, and whereas before the war Australia had one rival—the Germans—she now has two, energetic and pushing.

Let Australians look to the Central Pacific and its prospects, and the greatest factors in helping our interests will be the wireless men.

WIRELESS EXPERIMENTERS.

At a largely attended meeting of the Wireless Institute of New South Wales it was decided to link up all Experimental Associations throughout the Commonwealth with the object of forming an all-Australian Association for the furtherance of experimental work, procuring licenses and protecting the interests of all experimenters and private users.

All who are interested in this work are invited to communicate immediately with the Secretary, Wireless Institute of N.S.W., Box 2 King Street P.O., Sydney.

SHIPS THAT HAVE PASSED

Especially Written for "Sea, Land and Air"

BY CAPTAIN J. H. WATSON, J.P., F.R.A.H.S.

Since the last article on shipbuilding was written, much has appeared in the Press respecting the eighteen wooden ships that were contracted for by shipbuilders in Sydney.

Whether they shall be built or the contracts cancelled is a question of absorbing interest, or rather of exigent importance.

Timber as a material to be used in the construction of ships had, previous to the war, been all but abandoned, and the gradual disappearance of vessels so constructed, from the waters of Port Jackson, except in ketches and other small coasters, was rapid when iron was introduced for the purpose.

Iron was first used in 1787 to build a vessel. This was on the river Severn; subsequently spasmodic attempts were made to bring it into use. But it was not till the fourth decade of the last century that it came to be recognised, by some builders, that iron had many qualities which made it a more suitable material for ships, although even then few were built of over 300 tons; the register of 1848 gives only eight sailing vessels of such dimensions, the largest being the *John Garrow*, an Aberdeen built ship of 685 tons, a large ship for that period. There are also nine steamships on the list, the largest being the *Troubadour*, 409 tons, built at Liverpool in 1841. The register of 1848 does not contain the name of the great ship of the age, the *Great Britain*, an iron screw-steamer of 3,443 tons which, although launched in 1843, was at the time the register was compiled laid up in the Mersey, after having been ashore in Dundrum Bay, on the coast of Ireland; and it was not until 1852 that she, on being purchased by Messrs. Gibbs, Bright & Company, of Liverpool, and put in the Australian trade, became a paying proposition.

One of the nine steamships above alluded to had a very close connection with Australia, indeed, so close as to cause her destruction. The *Osmanli*, an iron screw-steamship of 346 tons, built at Dumbarton in 1846, arrived at Melbourne on July 6, 1853, from Liverpool, with the largest mail ever brought in a ship up to that date. She was eighty-one days on the passage. She also had 10,000 sovereigns for Melbourne, which, while being taken by a tug up the Yarra, by some means were dropped overboard, causing considerable excitement and anxiety to the underwriters before the recovery of the specie.

The *Osmanli* came on to Sydney, arriving July 20. Here she was put on the patent slip, which was situated in Sussex Street, just north of King Street. This slip was the only means of sighting a ship's bottom at the time, although a patent slip brought out by the Australian Steam Navigation Company was erected at Darling Island, Pyrmont (N.S.W.), the following December, Mr. Scott, the patentee, coming out from England to superintend the work.

The *Osmanli*, after a thorough overhaul, sailed from Sydney on August 18 for Melbourne and Adelaide. She arrived at the former port on the 22nd and left again on the 25th for the latter. She continued to make these trips between Sydney and Adelaide until the end of November, when about sundown on the 25th she had land in sight on both bows, and Captain Corbett concluded he was in Backstair Passage. But he was out of his reckoning, and shortly after, "this splendid screw-steamer" ran on to Cape Linois in D'Estree's Bay, Kangaroo Island, and there terminated her career.

It was as late as 1851 that the question of the advantages possessed by iron vessels over wooden ones was thrashed out, and it

was shown that iron possessed eight points of superiority:—

Great strength combined with lightness.
Capacity for stowage.
Safety.
Speed.
Durability.
Economy in repair.
Draft of water
and Cost.

In comparing iron with wood for durability, the comparison was made of course with the timbers used in English and Scotch yards; colonial timbers had no place, although of the very best for the purpose.

After Governor Hunter had left New South Wales he made, in 1802, a long report to the Admiralty on "Colonial Timbers," and after speaking of the various kinds and the uses in shipbuilding they could be put to, said: "I am therefore induced to think the wood of New South Wales more durable than oak or teak."

One of the most noted builders of wooden ships in this part of the world seventy years ago was John Watson, of Battery Point, Hobart Town. He built ships to last, and many of his vessels, built in the 'forties, were regular traders between London and Hobart.

An attempt is now being made to revive the industry on the old spot, and if those who have the matter in hand follow in the footsteps of the early builder both they and their ships will be able to give a good account of themselves.

Mr. Watson had built many small craft in the 'forties, among them the schooner *Miranda,* 127 tons, in 1847; and the *Fair Tasmanian,* 200 tons, built in 1848 for the New Zealand cattle trade; but the discovery of gold in California caused her to be diverted to San Francisco; and the *Circassian,* in 1848, for the Port Philip trade. These were followed by the *Runnymede,* a whaler which was known in southern waters for some years.

In 1850 as the home trade was growing he catered for that by building ships especially adapted to the colonial trade, one of the first of these being the *Panama.* a barque of 350 tons, which was launched in April, 1850. She is described as a handsome vessel built entirely of Tasmanian oak, with Huon pine and kauri decks. She was built for Messrs. Burns, White & Co. of Hobart, and cost £5,000, which works out at about £14 per ton. Her first voyage was to San Francisco, the rush to which place was claiming every available vessel in Australia.

She was towed down the Derwent by a steamer named *White Hawk,* which had been recently launched at Battery Point, and which, after returning to Hobart, was partially destroyed by fire. She made a second trip to San Francisco, and then to England, passing into the Mediterranean trade for English owners.

Captain Storie, of the "Middleton."

Another vessel built during the same year as the *Panama* (1850), was the *Middleton,* also at Battery Point, by Mr. Watson. She was a ship of 340 tons, and the command was given to Captain Storie, who was well known in vessels trading between London and Hobart. The *"Hobart Town Britannia"* in an issue at the time said: "The *Middleton* is about to sail for England, thus adding another to the list of colonial Lon-

don traders. . . . The arrival of such ships in the Thames must arouse the attention of the British public to the capabilities of the blue gum in this colony for shipbuilding purposes."

The present-day reader will probably think that there is not much in a 340 ton ship to attract the attention of anyone, but it must be borne in mind that 1850 was before the day of either the clipper or the big ship, and that although there was an occasional large ship coming into Australian waters, that is one up to 900 tons, the average in Sydney harbour of twenty oversea ships was 535 tons, and those trading to Hobart then would be considerably less. Therefore the *Middleton* would be a fair ship of the period, and whatever shipping people might think of blue gum the British public would be quite unconcerned.

This ship traded between Hobart Town (as the southern town was then called) and London for many years under Captain Storie, whose portrait (reproduced herewith) shows him to have been a typical master mariner of his time. He lives in the family history of the writer as a large-hearted and generous man, whose officers and crews were his care. He came into prominence during the notorious trial of Arthur Orton, the claimant to the Tichborne Estate, when the ship's articles of the voyage of the *Middleton* (London to Hobart, which port was reached on April 27, 1853), were produced showing Arthur Orton's signature as butcher, thus upsetting the claimant's story that he (as Tichborne) was saved from the wreck of the *Bella,* off Rio de Janiero, by a passing vessel, the *Osprey,* which never existed.

It is a matter of history that Orton, after serving a fourteen years' sentence, confessed to the fraudulent attempt to get possession of the estates.

A paragraph in the papers of September, 1853, announced that news from Java stated that the *Middleton,* under Captain Storie, from Australia was lost on a reef in Allas Straits, that the master and crew set fire to the ship, and arrived at Sourabaya in July of that year. This obviously was a mistake, for ten years later she was still in the same Hobart to London trade under the same command.

Another vessel launched from the same yard in 1850 was the *Derwent,* 403 tons, which on her first voyage to London landed her mail in 98 days, and on the return voyage Captain Harmsworth brought her out in 96, and had reason to be proud of the feat, when an average passage was 120 days. She, like the *Middleton,* for many years sailed to London, and so made a good name for Australian built vessels.

Numerous other vessels came from the same yard, proving what well-seasoned timber properly put together could do.

As in contrast to this, take the ship *Harpley,* built on the Tamar (Launceston), in 1847, and said by the papers of the day to be "a most perfect specimen of marine architecture and looks like a clipper." This latter word is used here rather early, because as yet there were no clipper ships in the Australian trade, although the Americans were beginning to use the word in relation to some small vessels built both in that country and by Hall of Aberdeen.

The *Harpley* was much "cracked-up," and went into the English trade with a flourish of trumpets. On her first voyage to England, April 29, 1847, she carried a large cargo, and was commanded by Captain Buckland, a number of cabin passengers going by her.

Just five years later, when in England, she was taken up by the authorities as an emigrant ship for the colonies, and on undergoing the usual survey was pronounced rotten. It turned out that the builder, a Mr. Paterson, had used green timber, which possibly gave him a cheap advertisement at the time, but was a bad foundation on which to build a reputation, and as the ship was condemned and not allowed to go to sea, the owner would be the loser.

In the comparison between the *Harpley* built at Launceston, of unseasoned timber, which had a life of five years, and the vessels turned out at Battery Point which traded between England and Australia for many years, there is an analogy in the present discussion of wooden ships. But because vessels built in America arrived here with open seams, and consequently damaged cargo that is no reason why properly constructed ships cannot be built here. What has been done in the past can be done again, and improved on.

Another argument, used against the motor engines giving a six knot speed, is that the rate is useless. Those who know the Pacific, and the calm belts, hold quite an opposite opinion. The question there-

fore is narrowed down to one of finance, and many hold that with good management (that is constant employment and a fair working expense) they would give a good return. At present American and Norwegian vessels do all our timber carrying.

Some years ago it became the custom to buy up the old English clippers and put them into the timber trade, but local merchants even passed these on to outsiders, keeping only the inter-State trade in their hands.

This may serve to introduce the history of a once noted clipper ship, the Aberdeen built *Windsor Castle,* commanded by the late Captain William Cargill (father of Mr. J. S. Cargill, solicitor for the Government Railways). When William Cargill was twenty-one years of age he was chief officer of the ship *Dunrobin Castle,* an important position for so young a man. This vessel was of 525 tons and built at Aberdeen in 1851 for Donaldson, Rose & Company. In 1864 he passed on to the *Sir John Lawrence*—same owners—and made two voyages in her under Captain A. D. Fernie. In 1866, having passed his examination for extra master's certificate, and in steam, he was given command of the *Ben Lomond,* of 986 tons, built at Dumbarton, and belonging to the same owners as the other vessels. This was Captain Cargill's first command, and he was then twenty-five years of age, he retained it for four years, and was, in August 1869, sent to Aberdeen to superintend the building of the *Windsor Castle,* a ship with which his name was associated for five years. She was built by W. Duthie & Company and launched on December 20, 1869, the christening being performed by Mrs. Cargill, a daughter of Captain Robert Troup Moodie of the Marine Board of Sydney.

On the completion of the fifth voyage to Sydney in command of this ship Captain

The "Windsor Castle," re-named "Lumberman's Lassie."
Built at Aberdeen, 1869, for the Australian timber trade.

Cargill severed his connection with her, and she passed into the hands of other owners in the 'eighties. Mr. James Rust of Aberdeen, who was her owner, changed her name from the abode of royalty to a more humble one, and as he no doubt thought, more appropriate, for as she was to be a timber carrier he named her the *Lumberman's Lassie.* As such she traded in and out of Sydney Harbour for many years, visiting New Zealand, the North American Coast and England.

A bottle picked up on the island of Vulaga on November 15, 1892, contained a letter thrown overboard from this ship more than two years previously, when in 35° 18′ South, 178° 20′ East, from Kaipara, New Zealand, to Glasgow. It was stated that they had left Kaipara on September 9, 1890, and six hours later had met a terrific gale which had thrown the ship on her beam ends, that she had sprung a leak, some of her sails had been blown away, the bulwarks smashed in, and that she was making water at the rate of two inches an hour, "and God grant we may get home."

Captain Masson, who was in command, finishes the letter with the request that whoever may find it will forward it to the owner. But the ship got home long before the letter was found, and she came and went as before, carrying the timber which was cut into blocks to pave the streets of London.

With Captain J. Stewart in command she left Hobart with a cargo of ironbark logs in April, 1895, for London. When in the neighbourhood of the Snares she ran into bad weather, and her dead weight cargo caused her seams to open, and she leaked badly. Sydney was made for, and she was put into the Jubilee Dock and surveyed. It was ultimately decided to unload and sell her, and coming under the hammer on July 18 she became the property of the late Mr. Dan Sheehy, with all her equipment and gear.

She was dismantled and converted into a coal hulk, and was a well-known object in the harbour, as she was towed from place to place. But she has terminated her career, and her last owners, the Southern Coal Owners' Agency, have passed her on to the shipbreakers, so Sydney Harbour will know her no more.

But on the shady lawn of Mr. J. S. Cargill's residence at Neutral Bay are preserved with loving care the figure head and fife rail of the *Windsor Castle,* placed there by the late Mrs. Cargill as mementoes of that December day, 50 years ago, when, as the young wife of Captain Cargill, she broke the bottle of wine on the ship's bow as she left the ways, to commence a life just completed.

[The introduction of the above series has brought us many inquiries regarding old-time vessels, a subject on which Captain Watson is an undoubted authority.

Hitherto these letters have been passed on to our contributor, who has posted individual replies. Captain Watson will be pleased to answer all future questions of a similar nature in the columns of this journal.

Letters should be addressed as follows:
Captain J. H. Watson, J.P., F.R.A.H.S.;
C/o. the Editor, *Sea, Land and Air,*
97-99 Clarence Street, Sydney.]

SALE OF GOVERNMENT AEROPLANES AT POINT COOK

Real Importance of Event to Encourage Commercial Aviation.

By our Melbourne Correspondent.

Within the next two or three weeks, certainly within the next month, there will be conducted at Point Cook, under the auspices of the Federal Government, the sale of a number of aeroplanes. This is a unique event in the history of Australia, and may be said to mark a definite advance in aviation in the country in what may be described as its commercial aspect.

With commendable frankness the Minister for Defence has issued to the daily Press a statement in which this sale is discussed, and the hope is therein expressed that the sale will be the means of inaugurating commercial aviation in Australia. So much then for what the public knows of this interesting function. It is instructive to turn to some of the other situations or conditions which present themselves when the sale is considered.

To assume that the planes to be offered at public auction are useless would be foolish. As a matter of fact they are all two-seaters, and in military operations would be found extremely useful. However the military position has undergone such a profound change recently that the authorities have given a practical proof of their desire to popularise aviation among civilians. They argue that the sooner the people know how to fly the better, for it must be confessed that taking the population of Australia as a whole the people may be said to know nothing whatsoever about aviation. That such a state of things is to-day highly undesirable is generally admitted, especially when the future of aviation is taken into account. Four years ago flying may be said to have been in its infancy, but its advance in all directions has supplied one of the romances of history.

It might be argued that a two-seater plane could not possibly be employed in a commercial sense. Everything depends on the construction placed on the word "commercial." To limit it to carrying heavy mails, large numbers of passengers or considerable quantities of merchandise would be to place an unduly confined interpretation on the word. A man, for argument's sake, living say 100 or 200 miles from Sydney or Melbourne or Adelaide or Brisbane, proceeds to the Point Cook auction sale and purchases one of the two-seaters. He will in all probability learn to fly his machine in the earliest time. He will then be able to go into either of these cities he may happen to be located near, transact his business and return with a friend as passenger. Here would be furnished an example of the early application of the commercial principle to aeroplanes in Australia. If a parallel is to be sought one has only to look at the history of motoring in the last quarter of a century, and experts confidently predict that what has happened here may most reasonably be expected to happen in the case of aviation.

The sale of the planes could have been held earlier no doubt, but, and the case applies to motor cars, there are certain parts of every machine it is highly desirable to have in duplicate, and these parts for the planes to be disposed of are at present being made. All the machines are having a thorough overhaul and wherever necessary new parts are being put in. Thus when the machines come under the auctioneer's hammer they will be structurally as perfect as human skill, directed by the most recent experience, can make them.

It would be an impossible and thankless task to attempt for a moment to speculate upon the position of aviation ten years hence. That it will enjoy an even greater popularity than the motor car is a view firmly held. Australia has only to get over its ignorance, and then rapid advance will be the order and at the same time a new and important industry in the construction of machines established in

the Commonwealth. But aviation will not be alone or single-handed.

Wireless telegraphy will be called into vogue to an extent little dreamed of at present. Every plane will have to be equipped with wireless, save those which go up during the day for short trips with "excursionists" or pleasure parties on board. Every hangar will also be compelled to have its wireless installation, especially for machines flying in the night where by this means they can be directed exactly where to land, and thus accidents would be avoided. The application of wireless as an absolute necessity is further seen in the need for reporting meteorological disturbances which a machine might encounter "up above," as well as for the

Government Aeroplanes for Sale.

De Havilland 6-Cylinder Tractor Bi-plane. Two-seater. Fitted with 90 h.p. R.A.F. engine. Machine can be controlled from either seat.

Maximum speed, 65 m.p.h. Minimum speed, 40 m.p.h. Landing speed, 20 m.p.h. (about). Air duration 3½ hours.

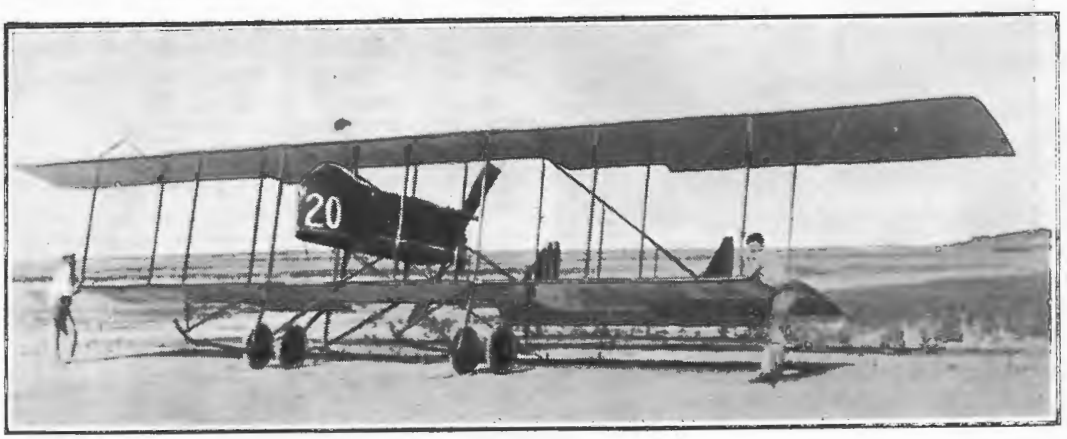
Two aeroplanes of the type described and illustrated above are for sale, and are fitted with the following instruments:—Aneroid, Tachometer, Air Speed Indicator, Air Pressure Gauge.

A limited number of aeroplane and engine spare parts will be offered for sale with the machines.

(*Photographs by courtesy of Major-General J. G. Legge, C.M.G., C.B., Chief of Commonwealth General Staff, Department of Defence.*)

direction of courses, and numerous other forms which will suggest themselves.

To return to the auction of planes in the early part of February. It is essential to keep in view the real objective of the transaction, which is to encourage commercial aviation, or, perhaps it would be more correct to say, to give a start to a movement which will soon produce commercial aviation. Should this eventuate then the Defence Department will deserve well of the country. There is just another point to bear in mind in this popularisation of aviation. We should have in the unfortunate outbreak of another war a large body of highly trained flying men. Everybody knows the value of the trained motor car, motor cycle, and lorry driver in this war. Further comment or explanation is not necessary.



Government Aeroplanes for Sale.

Maurice Farman (Shorthorn) Pusher Bi-plane. Two-seater. Fitted with 70-80 h.p. Rénault engine. Machine can be controlled from either seat.

Maximum speed, with 80 h.p. engine, 65 to 70 m.p.h; with 70 h.p. engine, 60 to 65 m.p.h. Minimum speed, with either engine, 45 m.p.h. Landing speed, with either engine, 25 m.p.h. (about).

Air duration, with either engine, 3½ hours.

Four aeroplanes of the type described and illustrated above are for sale, and are fitted with the following instruments:—Aneroid, Tachometer, Air Speed Indicator, Oil Pressure Gauge.

A limited number of aeroplane and engine spare parts will be offered for sale with the machines.

(Photographs by courtesy of Major-General J. G. Legge, C.M.G., C.B., Chief of Commonwealth General Staff, Department of Defence.)

WIRELESS FOR AMATEURS

COMMONWEALTH AFFILIATION PROPOSED.

Official Report of Proceedings.

Following an interval of four years and seven months since the previous meeting, some fifty members of the Wireless Institute of New South Wales reassembled on January 7th in one of the class rooms of The Marconi School of Wireless, Sydney.

The meeting had been convened by Mr. Malcolm Perry, Honorary Secretary to the Institute, which, be it noted, enjoys the distinction of being the first Wireless Institute to be formed within the British Empire.

Mr. Malcolm Perry.
Honorary Secretary of The Wireless Institute of New South Wales.

The occasion was marked by the reunion of old acquaintances and for some time a continuous exchange of greetings passed between fellow-members who, for various reasons, had been out of touch with each other practically since the outbreak of War.

Among the assembly were men returned from active service with Wireless Squadrons overseas, operators from troop transports and vessels of the Royal Australian Navy, besides, of course, a large number of other persons directly interested in various branches of radio-telegraphy.

The proceedings were formally opened at 8 p.m. by Mr. Perry.

Mr. E. T. Fisk, managing director of Amalgamated Wireless (Australasia) Limited, having been invited to take the chair, said:—

"Before commencing upon the business which brings us together this evening, I propose to ask Mr. Perry to read the minutes of the last meeting." (*Laughter*.)

The minutes of the previous meeting (August 7th, 1914), having been read and confirmed, Mr. Fisk continued:—

"I am pleased to accept the chair at your first meeting under the new conditions. At present there is not a very great deal you can do—but as soon as Peace is definitely settled I think you should lose no time in getting together and recommencing work on much the same lines as before the War.

"You will understand, of course, that the conditions will no longer be identical. War has brought many changes, but whatever alterations may be made in the conditions under which new licenses will be granted, they will be alterations to your advantage.

"Wireless is going to be far more interesting to the *bona fide* experimenter than it has been in the past. But before obtaining a license you will be expected to satisfy the authorities that you intend to work conscientiously in the development of a great and wonderful science—not merely experimenting with a new toy and wasting time "tapping the æther," as many have been accused of doing in the past.

"Amateurs have, in my opinion, done some very excellent work in pre-war days, and have since abundantly proved to the world how much has been due to the preliminary experiments in which they had engaged. I do not think it necessary to remind you gentlemen that a considerable number of members of your Institute have gone away to the war, where they have done some very valuable practical work. That in itself is a clear indication of the value of united action in conducting experimental work.

"During the four years which have elapsed since your stations were closed, Wireless has gone ahead far more rapidly than during any other equal period. Before the War a message received at fifteen hundred miles was regarded by some as the utmost possible limit of wireless achievement; but recent messages have been received over a distance of twelve thousand miles, which is practically round the world. It might be possible to still further extend the range of wireless communication, but I can conceive no such necessity.

"These messages have been made possible by the use of a new type of receiver, so you will see there is some very interesting work to be done, not only with the old apparatus, when it is returned to you, but also with the new.

"Some people were apt to say in the past that amateurs were merely making use of Wireless as a toy. This is the sort of thing which you will have to guard against in the future—and the only way in which you can protect yourselves against a repetition of comments of this nature is to prove to those in control that you are carrying out *bona fide* experiments. You will be required to prove to the people in authority that you are following the work in a scientific manner, otherwise there will always be some difficulty in retaining your licenses.

"As a matter of fact considerable doubt has been expressed during the past four years as to whether amateur licenses would ever be restored. However, I am pleased to be able to announce that the Acting Minister for the Navy has recently stated that the apparatus will be returned to former owners as soon as Peace is definitely established. But there are indications that licenses will only be granted under conditions somewhat more stringent than in pre-war days. The licensee will have to show that he understands the fundamentals of wireless communication, also that he is able to work at a certain speed. I think, too, that you will have to satisfy the Government that you intend to carry out *bona fide* experimental work.

"Now, the question is—how are you going to meet these requirements?

"In my own humble opinion, your best plan would be to band yourselves together in a strong organisation; to make your plans collectively and work them individually and to decide upon some definite lines on which to work. If you do this, I have very little doubt that your Institute, as a whole, will then be able to go to the Government and claim a license for every member. (*Hear, hear.*)

"Another point which I venture to suggest as advantageous to all concerned, would be the amalgamation of every amateur wireless institute in the Commonwealth; to form one united body of the whole and to get together every man and woman interested in wireless work, including every private user of wireless apparatus whether he or she use it experimentally or for practical work. By this means you would, in a few years, have a very powerful body representing the combined wireless institutes in Australia—a body sufficiently strong to demand from the authorities every concession and consideration to which the importance of your work would entitle you.

"Further than this you would be able to convince the Government that if the study of so important a subject be encouraged, the knowledge thus acquired would be invaluable in time of war. Moreover you would have at all times a number of people, more or less skilled, all ready to offer their services to the country in time of public necessity.

"In facilitating the experimental side of wireless the Government would be laying for itself the foundations of a National asset.

"An organisation conducted on lines similar to those which I have attempted to indicate already exists in the United States. I refer to the National Amateur Wireless Association. This association is recognised in America as a nation-wide

affair. Its members are distributed throughout the length and breadth of the country, and by relaying a message from President Wilson, from one amateur station to another across a considerable distance they have fully demonstrated their capabilities to the entire satisfaction of the United States Government and of the general public.

"If it will not be taking up too much of your time, I will read an extract from the New York *Sun* which was reproduced in *The Wireless Age*:—

"'The founders of the National Amateur Wireless Association hope to interest the 200,000 amateurs in a greater development of their experiments by co-operative or group working, so that in case of emergency the nation may have a reserve body of operators.

"'It is the view of the organisers that the amateur wireless operator, whose efforts are generally frowned upon by Government officials as well as other individuals, should be encouraged; that the merest tinker may develop into an enthusiast and by proper study become a great radio engineer. The Association plans to help young men in this field. Co-operation, coupled with direction of experimental work, is the means by which this service is to be performed. Existing wireless clubs and organisations will be recognised and properly accredited officers may have a share in the councils of the National Association.

"'Every amateur who is properly endorsed may join as an individual. According to his abilities and geographical location he will be entered for eligibility in an existing club or association, published recognition of anything noteworthy he accomplishes will be given, and in due course admittance to an engineering body will be arranged. Progressive courses of study will be placed in each member's hands, experiments far removed from textbook humdrum will be added, and a monthly bulletin of new calls and other items included.

"'One arrangement that is being planned is this: Small clubs in their entirety or larger organisations divided into groups will be permitted to affiliate with some military organisation as accredited members and officers of signal corps. Next summer these corps will enter military training camps similar to those recently held in the East. Thus a third line of defence will be available. The importance of this is emphasised by the fact that 1,000 men employed by the Marconi Company were requisitioned by Great Britain for wireless service at the outbreak of the war.

"'It is pointed out that the United States in time of war would need hundreds of operators and these would be available.'

"I have read this because I consider it a very fine example for wireless organisation in Australia.

"We hope that war will never occur again, but it is best to be prepared. At the outbreak of the last war it was found that Australia had practically no reserve of wireless men to draw upon, because all the operators professionally employed in the mercantile marine and elsewhere were needed for the continuation of that work, and so in August, 1914, when large numbers of skilled operators were suddenly required at a few hours' notice there was considerable difficulty in rounding up the necessary men.

"True, we eventually managed to meet the call for wireless men—but that is a matter which I do not feel justified in discussing in detail at this meeting.

"The fact remains that if the necessary co-operation can be obtained from the authorities it would be a very fine thing to develop our institute into one which would speedily become recognised and respected by the Government. In times of necessity the Government would merely have to call for reserves and these would be at once forthcoming. Members could then enjoy the satisfaction of knowing that they were always in a position to respond to a national call at a moment's notice. (*Applause.*)

"Every member will have to fit himself for the job, and everything that is going to be achieved in this respect will of course be due above all to the organisation and training of the members.

"In conclusion I would point out that if you wish to continue to experiment and to protect yourselves against possible mistaken ideas concerning your work, you must be a big and strong organisation, working along general lines, which can

be respected and command a hearing from people in high authority.

"That, gentlemen, is all I have to say this evening. I have offered my views for whatever they may be worth, and as you will now wish to hear from Mr. Perry, I will, before resuming my seat, ask him, as convener of this meeting, to state his proposals concerning the business of the evening."

* * * *

Mr. Perry: "Well, gentlemen, the main object of this meeting is to form a small committee to interview the authorities with a view to getting back our interned apparatus, and also obtaining as good conditions as possible for experimental working. On getting our pre-war licenses formally renewed we would immediately hold a general meeting and discuss the business of the year.

"As we have some very influential people here, I propose to nominate Messrs. E. T. Fisk, C. P. Bartholomew and C. Maclurcan."

The above resolution having been proposed by Mr. Hamilton, who included Mr. Perry among the nominees, was seconded by Mr. F. T. S. O'Donnell (O'Donnell & Griffin Ltd.), and unanimously carried.

Mr. Stowe said that the committee having been appointed, he thought that the matter to decide upon steps to be taken for the return of the apparatus could quite confidently be left to this committee, and he formally moved that the committee be left to act in this matter entirely at its discretion, and that it subsequently meet and report progress at the next general meeting of the institute.

(*Unanimously carried*).

Mr. Maclurcan then moved that it be an instruction to the committee to approach inter-State institutes and obtain their views on the subject of combined action, and to send to them copies of the chairman's address to this meeting. (*Seconded by* Mr. O'Donnell *and carried unanimously.*)

Mr. Perry: "Mr. Fisk would naturally be of great help to us, and I think it would be a good idea to leave the matter in his hands. This would save a lot of time and trouble and get us ahead very quickly. I think Mr. Maclurcan's suggestion of writing to the other institutes of the Commonwealth and getting their ideas is a good one. Some time will elapse before Peace is declared. Meanwhile I think it would be a good plan to continue our monthly meetings. Even if nothing practical can be done we could arrange lectures, papers and other theoretical matters in order to keep members together. A great deal has been learned in the last few years; take for instance the message of twelve thousand miles just received—and we used to think we did well to get Suva and New Zealand."

To Mr. O'Donnell's question: "How are we off for funds?" Mr. Perry replied: "I am happy to inform our members that we are not "S.O.S." (Short of sugar.) I will finance the meetings for the time being, and as Mr. Fisk is lending us the room there will be no rent to pay. As a great number of our members have not yet returned from active service, I think the best idea would be to get a committee together for the purpose of revising our rules and regulations."

Mr. Bruce suggested "That a second general meeting be called early in February, when some definite plan of action could be arrived at, particularly in view of the many changes which are taking place in Europe every day. Much may happen during the next few weeks, and at the present time we are absolutely in the dark."

Mr. O'Donnell, in proposing a vote of thanks to Mr. Perry for calling the meeting, and to Mr. Fisk for presiding, added that the report which the latter speaker had read from the American journal, *The Wireless Age*, was, in his opinion, very interesting and had given them something to think of.

At the conclusion of the proceedings Mr. Perry announced that a second general meeting would be called early in February, due notice of which would be given to all existing members of the institute, and to all who were present at the meeting above reported.

The meeting was formally declared to be closed.

[*Information reaches us, just as we go to press, that on account of the influenza epidemic, the Council of the Wireless Institute of New South Wales will not meet until further notice.*—ED.]

THE P. & O. COMPANY

A MONUMENT TO BRITISH GRIT AND ENTERPRISE.

Especially Written for "Sea, Land and Air" by FRANCIS JOHN.

In the annals of the P. & O. Company, December 31 of each recurring year is a date of more than ordinary import, for it is regarded, and rightly, as "the natal eve" of this great maritime concern. On the first of last month (January) the Company celebrated the 79th year of its incorporation by Royal Charter. On that day, 1840, Queen Victoria granted to the shareholders of the then young company the Charter, which, while conferring certain rights and privileges, *per contra,* imposed specific liabilities.

An opportunity is provided by this event, almost unique in the history of British shipping, to glance, briefly, at the gradual growth of a company which has played a not unimportant part in the development of the Empire, east and south-east of Suez, and within the past four years done not a little to preserve that heritage from the hands of those who would have robbed us of it.

Curiously enough, Ireland and Scotland may be said to have produced the P. &. O. In 1829, a small paddle-steamer, the *Wil-*

Inaugurating the P. & O. Mail Service to Australia.

The P. & O. Company's *Chusan* (699 tons) entering Sydney Heads on her maiden voyage to Australia in the year 1852.

(Reproduced by courtesy of Mr. A. Gordon Wesché, General Manager of the Peninsular and Oriental Steam Navigation Company, Sydney.)

liam Fawcett, 296 tons gross, 74 ft. long, and 15 ft. beam, was launched for the City of Dublin Steam Packet Company, for the conveyance of postal matter between England and Ireland. Six years before, in 1823, this company, the oldest steamship company in the world, had despatched under charter the steamer *Royal William* to Calcutta, which port, after ten stoppages, was reached in 113 days from London.

In 1835, a Scotchman, Mr. Brodie M'Gregor Wilcox, having noted what the *Royal William* had accomplished, induced Messrs. Bourne & Company, who held the bulk of the shares in the City of Dublin Steam Packet Company, to start a line from Falmouth to Lisbon and Gibraltar. This was done in 1836, the *William Fawcett* being placed on the commission. Mr. Wilcox, who was joined by a Mr. Anderson, took a direct interest in the new venture, and in 1837 added the *Iberia* to the service. Thus it came about that in the year of Queen Victoria's accession the first regular mail service to the Peninsula was inaugurated. The P. & O. fleet sprang from these two small craft. The original capital and directors principally came from the City of Dublin Steam Packet Company, which claims to be practically the father of the P. & O. It was not until 1839 that the mail service, having Egypt as its eastern boundary, was secured by the young company, which to its title added the word Oriental, hence the designation Peninsular and Oriental Steam Navigation Company.

The year 1840, as has been pointed out, was the year of the granting of the Royal Charter, and it is from that date that people in these latitudes are chiefly interested in the history of the concern. On the Charter being secured the intention to conduct operations with the Far East was made plain so as to fully justify the additional title "Oriental." Such an extension, however, in those days was not a matter to be lightly undertaken. Precautions and preparations were elaborate, and marked at each step by all that human foresight and ingenuity could suggest.

In September, 1842, a year and ten months after incorporation, the company despatched its first steamer to India, the *Hindostan*, of 1,800 tons burthen and 500 horse-power. The route was *viâ* the Cape of Good Hope, and the departure of the vessel was regarded much in the light of a national event. Other steamers speedily followed and towards the end of 1844 the directors found themselves in a position to undertake a mail service extending from England to Alexandria and from Suez to Ceylon, Madras and Calcutta, together with a further extension from Ceylon to Penang, Singapore, Hong Kong and Shanghai.

What all this meant few present-day readers can understand. The difficulties associated with the establishment of what was then, and for many years afterwards, known as the Overland Route, had been overcome with marked rapidity. Coaling stations, docks, stores establishments and, in such places as Suez and Aden, water supplies, had to be provided for. The necessary capital for a novel and arduous undertaking had, after considerable trouble, been found. For many years antecedent to the construction of the railday between Alexandria and Suez, the important and valuable traffic developed by the company was carried through Egypt in a primitive manner. The Mahmoudieh Canal enabled the company to transport passengers and goods from Alexandria to the Nile, whence they proceeded by steamer to Cairo, and the land portion from Cairo to Suez was across desert, a distance of less than 100 miles. Still, this may be said, that the journey made up in picturesqueness what it lacked in comfort, but the difficulties associated with the conveyance of merchandise were stupendous. Some idea on this point may be conveyed by the fact that caravans numbering over 3,000 camels had to be employed to transport a single steamer's loading between Cairo and Suez and *vice versa*. Every package had to be submitted to three separate transfers in passing between Suez and the Mediterranean.

For nearly twenty years this system continued in operation, but it sufficed to carry on a trade which for value of merchandise in proportion to bulk has never been equalled. It attained sometimes the annual value of £40,000,000.

The mail routes to Calcutta and China established by the company 74 years ago were so successful that a short time after their inauguration the tonnage had to be doubled. As yet, the leading avenue to

India's commercial capital, Bombay, was closed to the young and energetic organisation; and it was not until two years after the Australian service had been inaugurated with the *Chusan*, of 699 tons and 80 horse-power, that the service between Suez and Bombay, to which the East India Commany had tenaciously clung, for the purpose of keeping alive its navy, fell into the hands of the P. & O. Company. This was in 1854, the *Chusan* having completed her first voyage to Australia in 1852. From then on the work of the various mail services rapidly expanded, but the directors had to wait until 1869 for the opening of the Suez Canal to utilise to the full the organisation they had built up in the preceding thirty years.

It is an instructive fact that the completion of the Canal synchronised with the practical adoption of the compound engine as the motive power of the mercantile marine. In 1871 the Overland Route became a thing of the past. The new conditions arising from the sweeping away of the high rates passengers and goods were subjected to for the transit through Egypt from Alexandria to Suez, led to a financial problem of such dimensions that the future of the company was, for a time, jeopardised. The company's work had to be entirely re-organised and a new fleet provided with such diligence as was possible under the adverse conditions of reduced and, at one time, vanished profits. The evolution of the company may be said to have been actively in progress in July, 1870, when the *Australia*, 3664 tons, 3,300 horse-power, the first vessel of the line to pass through the canal, made it perfectly plain that the Overland Route must come to an end.

In 1875 the reorganisation of the company was sufficiently accomplished to permit of a transfer of the whole Eastern and Australian services to the Canal route. Hard, truly, was the task. Apart from the inherent difficulties in changing the actual foundations of a large and highly-complicated business, the raising of a new fleet as it were from the ashes of the old ships, the Imperial postal authorities obstructed progress by objecting to the adoption of the Canal route for the conveyance of the mails on the ground of its inadequacy in comparison with the Egyptian railway. The authorities confessed they were open to conviction, but on singularly curious grounds the subsidy paid to the company was to be reduced. This was a matter not easy of arrangement as it was at a time when the company was struggling for its very existence. Concessions were, however, granted and the arrangement was that the heavy mail sent from the United Kingdom should in future be carried through the Suez Canal. It was not, nevertheless, until 1888, when the company had reduced the charges for the carriage of mails by nearly £100,000 per annum that the accelerated mails then sent *viâ* Brindisi for Australia, India and the Far East were also entirely transferred to the Canal route. The P. & O. connection with the Overland Route, through Egypt, was finally closed.

The history of the P. & O. from 1888 onward is so well known as to require no further mention, it may yet be of some interest, on an occasion such as this 79th birthday celebration to regard the company in a general way, and endeavour to appraise some of the work it has been able to accomplish beyond these strictly confined commercial boundaries within which its legitimate operations lie.

From July 29, 1852, when a vessel flying the house flag of the company delivered the first steam-conveyed mail in Australia by the then Overland Route, the P. & O. has been regarded here, as in other parts of the Empire, not so much as a private as a national concern, and thus contributed to the creation of that sentiment which has made the unity of the Empire just what as the last four years have proved to the world it is. In times of war, notably the Crimean, Indian Mutiny, Egyptian, South African and the greatest struggle just concluded, the vessels of the line were of the utmost possible value in the conveyance of troops, stores and ammunition and acting as armed cruisers. In times of peace, when Imperial celebrations required the representatives of British powers from overseas to assemble at the Empire's capital, the P. & O. provided much of the transport machinery. In every branch of Imperial development east of Gibraltar it has played its part. Conservative the company unquestionably is, but may not this same conservatism be taken as, in a great measure, typical of the race?

AERIAL AUSTRALIA

Especially Written for "Sea, Land and Air."
BY TED COLLES (A.I.F.).

[The writer of the following contribution is well known, not only in the A.I.F., but to Australians generally, as a black-and-white artist long associated with the *Sydney Bulletin*. While on active service on Gallipoli Mr. Colles was among the contributors to "The Anzac Book," and later served in Egypt and France, where he developed a keen interest in military aviation.

The article which we print below is first of a series especially written for this journal, and was mailed to us on November 6, 1918 (less than a week before the signing of the Armistice), from London, where Mr. Colles is attached to A.I.F. Military Headquarters.—*Ed.*]

In the mind of the average Australian citizen the word "aeroplane" has become almost entirely associated with mental pictures of the far-flung battle-fronts of Western Europe. And if the war continues much longer few people will remember the fact that experiments in flying with heavier-than-air machines actually took place long before the present upheaval commenced.

Anyway, such is the case; and further experiments will certainly be made, with much quicker advances, and along lines of more definite, useful purpose, as soon as the present war is ended.

In considering the question of aeronautical development, we may pass over Leonardo de Vinci's flapping-wings and lifting-screw designs of the fourteenth century; also Francesco Lana's conception, in 1670, of an aerial vessel supported by vacuum globes lighter than the air. Then we come to Montgolfier's improvement on the latter principle; a hot-air balloon invented in 1782; and Rozier's ascent in the following year. A period of development in that branch of aeronautics continued until 1842, when Stringfellow made a large model aeroplane designed to be driven by steam. But no further advances were made in heavier-than-air craft and meanwhile balloons came into use in the French army in their campaign against the Italians in 1859. Then in 1874 Pénaud produced an elastic-driven toy-aeroplane; but the lighter-than-air craft continued to slowly develop. And in 1884 an electrically-driven dirigible, built by Renard, was regarded as the highest achievement in aeronautics up to that date.

Some important gliding experiments were next carried out by Otto Lilienthal, in Germany, in 1891; and together with the invention of the box-kite by Lawrence Hargrave, in Australia, in 1893, these were really the first manifestations of the primary principle of support-by-air pressure as it is understood and applied by the aeroplane builders of to-day (though it is known under a more technical name). And Maxim's accidental free flight with a captive glider, or aeroplane, in the same year, was an even more striking demonstration of the basic principle of flight as it is in operation at the present time.

Of course, these and later efforts in heavier-than-air machines were merely hop-off-the-ground performances in engineless machines, with brief glides through the air before coming to earth again; more often than not with considerable suddenness. And the machines in use were really glorified composites of box-kite-*cum*-glider.

It is claimed that the first machine to actually fly off-ground under power was Ader's "Avion," in 1897; but in appearance this machine was more like a bat with curved "umbrella-ribbed" wings. However, it was Orville Wright, of the United States of America, who really stirred up the Thinking World, by accomplishing, in December, 1903, a brief, overhead flight in a controlled machine (of a more orthodox

shape) carrying an engine. The duration of his passage was only a matter of seconds; but the fact that the heavier-than-air machine could overcome gravitation, even to such a small extent, demonstrated beyond doubt that the elementary principle of modern flying had been discovered and proved. Three years later M. Santos Dumont navigated the air, in an improved machine, for twenty-one seconds; and subsequent thirty and forty-mile flights by Wilbur Wright in 1908, and further advances by M. Blériot and Henri Farman in 1909, set the aeroplane on the road of peaceful development along which it was travelling when the fateful August of 1914 arrived.

Now, man's proverbial cunning in the art of devising pain and encompassing destruction is greatly to be deplored. Nevertheless, the harsh and urgent demands of the God of War speeded on our thinkers and artisans to deeds of mechanical achievement in four years which, otherwise, might not have been accomplished in as many decades. And their successful response to the extreme and harassing requirements of the period makes manifest to all interested in flight the simple certainty and comparative ease with which the prowess we now possess will be diverted to more useful State and commercial purposes when normal peace-time conditions prevail again. Already aerial mail services are in existence in America and Europe; and, no doubt, also will be in Australia by the time this reaches you. (* * * ? ? ?)

As far as the public was concerned, previous to 1914, flying was commonly regarded as a new and thrilling mechano-acrobatic stunt, to be performed only by a few super-showmen of the toss-dice-with-the-Devil type; and a pastime which only one abnormally lucky person in a hundred might survive. But, as we have seen, war-time developments (apart from casualties in aerial conflict) have demonstrated very definite facts to the contrary: though most people are not as well acquainted with the known and proved non-combatic capabilities of the aeroplane as they might be.

For instance, during the past four years thousands of young men, many of whom had previously neither seen, nor been interested in aeroplanes, have gone through a course of training barely exceeding three months in the same way that they might set out to learn to drive a motor-car or cycle. Eventually they were "driving" their aero-vehicles with the same confidence and simplicity that might have marked their "horseless" progress through their native cities and townships in the early auto-car days.

In addition to these, thousands more are now undergoing instruction; and at time of writing there are about two thousand Australian-born pilots "driving" various types of air-craft about Europe. And latter-day aeroplanes are simply regarded by such men as a safe and normal method of locomotion; far pleasanter and speedier than any other form of transport yet utilised by man. Flying over the firing-line is a different matter, of course; but the fact that much of the matter there transported consists of armour, machine guns, heavy loads of bombs, etc., only points out the fact that such will certainly be replaced by mail-matter and other important cargoes when the days of peace return.

Incidentally, available statistics show that there is *an average of only one fatal accident for every 125,000 miles flown* by these men to-day; and note that *these are mostly due to conditions peculiar to war-time aviation only.*

With mostly wrong conceptions, gained from the extravagantly-worded war-correspondence of writers who live by the sensations they can conjure up for their helpless readers, some may find this difficult to believe. But it will be amply verified as we proceed.

* * * *

In the matter of actual aeronautical development, the early experimenters had a hard row to hoe. At first they were regarded as reckless but entertaining cranks, who might, or might not, fluke some amazing results that would excel in spectacular effect, but would be quite unprofitable commercially; also, the cost of material utilised and destroyed in their constructional experiments had to be borne by themselves. But later, when the newly-discovered principle of sustaining weight in the air became thoroughly understood and more convincingly applied, and the duration of actual flights increased from minutes to hours, more advanced observers began to think of the possibilities of aircraft in warfare; though no material support from

Government or private patrons was forthcoming for a very long time after. Eventually the English Northcliffe press came to the fore, and did much to encourage and assist earnest fliers to further achievements by its endowments of big money prizes; and by August, 1914, what was then considered a very high standard of efficiency had been attained—fortunately for our more-than-urgent national requirements at that period.

But it was the threatening aerial supremacy of Germany that did most in whipping us into real live activity, and though many things continued that would best not have been, the British Government was at least no longer allowed to sit nervously quibbling over the expense and probable magnitude of an aerial programme. It had to get down to hard work, and the best brains were called on for assistance in its development, and money was spent on experiments and the education of aviators to an extent that could never have been imagined by the unfortunate early pioneers of flight.

And what is the result of all this concerted effort? As far as it applied to military uses, the whole world has a tolerably good idea of what has been accomplished. But to arrive at a true and accurate conception of the present stage of aerial progress, from the viewpoint of a student of aeronautics as a science apart from a means of destruction, we must allow for the size and carrying power and the simplicity and solidity in design that would have developed (as in the case of the steam engine and steamship), had not military utility necessitated such being sacrificed in the interests of speed and the light acrobatic requirements of aerial combat.

Revert and apply these powers to their original simple purposes of aerial flight and human transport: and we would have, minus the dangers of war, a vehicle quite as safe, and even simpler in its control mechanism, than the ordinary motor-cycle and car of to-day.

In fact we have it now, as can be told by hundreds of men who, without previous mechanical experience, entered military schools and mastered the art of advanced acrobatic flying as well as that of plain, steady flight. But at present it is merely being diverted to abnormal uses.

In comparison with other methods of transport aircraft have certain advantages and disadvantages which it is well to consider in the light of future developments; and as it will naturally occur to the somewhat misinformed public mind that that of danger is the first and foremost disadvantage it will be well to deal briefly with that point here, before we go into more important considerations.

Flying men know that fatalities have occurred quite apart from shell-fire, bullets, etc., etc., and we have already seen that such have averaged once for every 125,000 miles flown; or, if all flying done had been in a straight line over the earth's surface, the average of fatal accidents would be one in every five trips around the globe. In considering even this surprisingly low percentage, it must also be realised that *these have occurred in times when pupils have had to be trained and turned out quite efficient in performing even the most intricate aerial evolutions in the shortest possible time.* And to a very great extent such fatalities have fallen to the lot of certain ambitious young students who, having barely "passed" in *solo,* or independent flying, have attempted to perform the most interesting but difficult "stunts," or evolutions, before they were properly qualified. On the other hand, when older and more experienced pilots *do* strike trouble, it invariably turns out that they are men who have long been "marked" by their comrades for the inevitable "crash," on account of their incurable hankering after the daring and bizarre in aerial travelling. So, eliminating fighting risks, and those evolutions which are otherwise unnecessary, the man who flies "steady" has less dangers to fear than the ordinary city taxi-driver; for even a high wind is of no more vital inconvenience to an aerial pilot than a bad road is to an auto-driver. And the highways of the air are limitless and traffic complications few.

Now we come to the objection to fragile construction. But before dealing with this it might be well to make quite clear one or two elementary principles of flight; and to do this we might start to inquire how it is that the ordinary toy kite remains in the air. Now, the small boy about to fly a large kite does not lay it on the ground and stand still at the other end of the line waiting for it to rise, because he knows

that it never will; instead, he finds a playmate who will hold it up facing the wind, with its top end inclined slightly forward; and then he lends motive power to the kite by commencing to run forward towing the kite after him. It immediately commences to rise steadily.

The reason for this is that the force of the air current against the almost horizontal "face," or under surface of the kite,

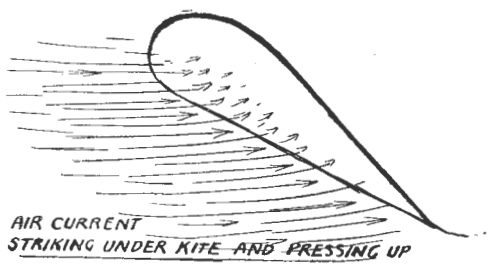


Plate I.

indirectly tends to press it upwards (see plate I.). But should the kite, through faulty construction or lack of "tail" balance, assume the flat and entirely hori-

Plate II.

zontal position (see plate II.), the air current would simply pass by above and under its flat surfaces without any result. Of course, the kite could then be made to "slither" more quickly through the air because there would be no wind-pressure against it; but that same force when applied under an overhanging surface (see plate I.) has an upward tendency to "lift." And because it would be absent in the horizontal position (plate II.) there would be nothing pressing underneath and holding the kite up; so it would come to the ground as well. Again, should the kite assume the vertical position (see plate III.) the boy would not be able to drag it forward so easily because it would be resisting the direct air or wind-pressure in its "face." But, at the same time, there would *still* be no overhanging under-surface for the air to beat up against; and, again, the kite would refuse to rise or remain in the air.

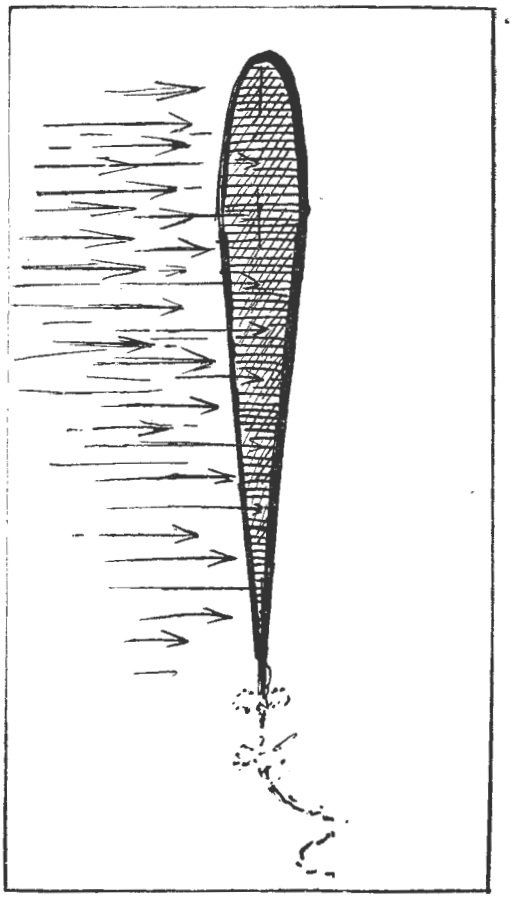


Plate III.

Now the same principles apply to aeroplane flight. If you examine an aeroplane at close quarters you will notice that the planes, or wings, are not set horizontally, but are inclined slightly at an angle, more like that of the kite in its proper flying

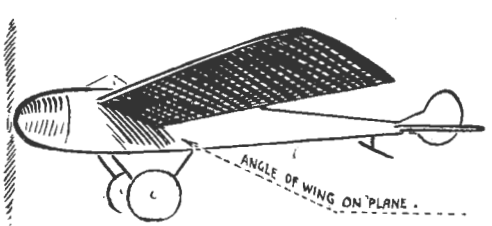


Plate IV.

position (see plate IV.). But instead of the aeroplane being drawn forward at a great speed (as in the case of the kite towed by the boy), it provides its own forward motion with an engine and a propeller, that drives or draws it along through the

air according to the type of aeroplane it may be. The angle of slope referred to is technically known as the angle of incidence; the upward action of the air-current upon the under-surface of the plane is known as lift.

In the case of aeroplanes designed for fast flight at low altitudes, the angle of incidence is reduced as near to the horizontal as is possible without losing all the the lift (as with the kite in plate II.).

But in the case of an aeroplane designed to rise rapidly to a great height when called upon, rather than travel at a fast horizontal speed, the planes are set at an angle of incidence much further removed from that of the horizontal kite (in plate II.), yet not so extreme as the vertical kite (in plate III.); for in the latter case they too would lose the lift and the machine would come heavily to the ground.

Now the forward motion of an aeroplane is known as thrust; and the opposite force (equivalent to what might be called "drag," or even "deadweight," in an earth-drawn vehicle) is called drift. Thus we have thrust, lift and drift. The aeroplane which has its angle of incidence set more at the horizontal possesses more thrust than lift, or it travels faster forward than it rises, while the machine with an angle of incidence nearer the vertical has more lift than thrust, or it has more rising or "climbing" power than it has speed. So, in the average machine a compromise between the two is preferred, with a bias in favour of the horizontal surface, of course; because, while too much of the latter is a handicap to lift, too much of the vertical is a deadly enemy both to lift and thrust, as was seen in the case of the vertical kite (plate III.). And a kite or an aeroplane suffering from the latter handicap is doomed to a more direct and heavier fall than one with a "slithery" plane surface.

But before leaving this phase of the subject, it might be mentioned that there is another element in sustaining a surface in the air, which might be called suction. As the inclined plane rushes forward through the air, it leaves a vacuum close behind in its course (see plate V.); and this absence of air-pressure on the top or "back" surface of the plane makes it easier for the lift underneath to push the plane up. (In the same way that if you bend your head

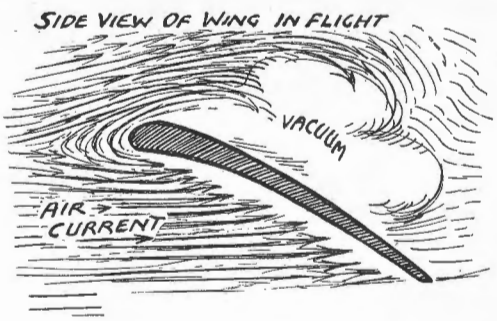


Plate V.

over a loose piece of thin paper, and, placing your lips on its surface, draw a deep breath, you thus form a vacuum over it, and the pressure of the atmosphere underneath forces the paper up against your lips.)

As this element in flight is so co-incident with the action of lift, it had better be included under that name for the purpose of this article.

To return to the subject of fragile construction, probably the first machines were built almost entirely of wood in the interests of lightness; but at that time little was known about head resistance, or "frontal drift," and the way in which its serious drawbacks might be minimised. However, the development of the speedy war machines has been responsible for the designing of properly shaped metal parts, adding weight as well as strength, yet minimising head or wind resistance to an extent that not only compensated for the additional weight, but actually gave an advantage of speed or thrust over the old flat, or clumsily-shaped, wooden parts. In regard to weight, broadly speaking, a pound saved in head resistance (which also means drift) allows of six extra pounds in weight and strength, without being detrimental to the machine's speed efficiency. Of course much of this gain in weight (and strength) may safely and preferably be sacrificed in the interest of improved speed, while still allowing an appreciable gain in the strength of the metal parts desired.

However, in many machines, for certain purposes wooden parts are still preferred, mainly because of their easiness to replace; and great attention is given to their preservation and protection from undue strain. But even these are utterly reliable and quite safe unless subjected to foolish treatment and careless handling.

It is deterioration from climatic conditions that is the main factor in structural fragility in the aeroplane; and although most of the parts likely to be affected are easily replaced, the keeping in order of the planes, or wings, at present provides a financial problem that would stagger the private owner.

These parts, which play the most important *rôle* in actual flying, at present invite much improvement for purposes of general utility.

machines, and the many alterations in designs in consequence thereof, it would seem that the present-day Government machine is hardly expected to be long-lived. Nevertheless, experiments are now being made in metal coverings for planes instead of the present perishable fabric, and results will probably be forthcoming before this article sees print. In any case, it is certain that as soon as the staider and more practical, profit-making machine of peace-time demands it, the necessary improved article will not be long in arriving.

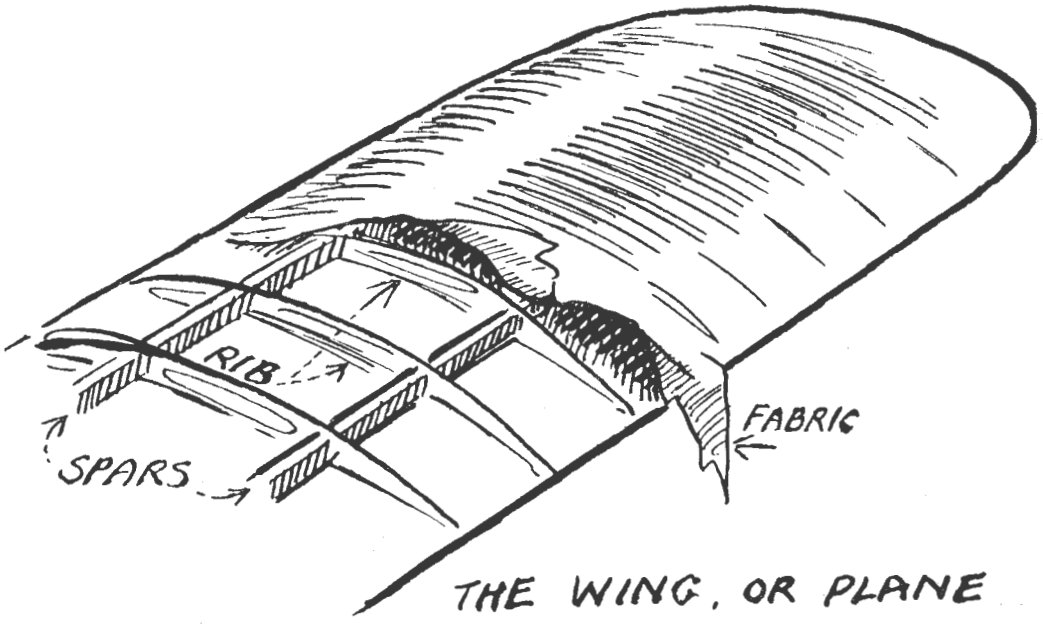


Plate VI.

They consist of a couple of long spars connected by short wooden ribs at intervals along their length; over the whole of which framework a covering of linen fabric, preferably woven from flax, is spread and attached at the outer edges (see plate VI.).

A varnishing process converts this fabric into a parchment-like material which cannot be removed from its framework without being damaged. This renders the repairing of the easily-damaged ribs an expensive matter; for the cost of "doping," or varnishing, a machine is something like £100. The fluid used contains celluloid in solution.

So far little has been done in the improvement of the fabric parts of aeroplanes. In fact, owing to the incessant demand for faster and yet faster military

The above reference to cost will naturally claim attention of those interested in the case for and against the aeroplane as a privately owned machine for profit or pleasure.

Admittedly, fuel consumption is heavy in the aerial vehicle because it starts out with a great handicap in one respect inasmuch that besides the power required to give it its simple forward thrust, or motion, like any other vehicle, some is also required to sustain it in the air.

The principle is that of lift and thrust again. Broadly explained in its present application, it is a vertical, upward pressure of lift on the underside of the planes that holds the machine up in the air; in the same way that it is the downward force of gravitation that holds other

vehicles down on the earth. And in the same way that this downward drag of gravitation causes tractive resistance to anything moving along the ground, so the upward force of lift has its drawback on the moving aeroplane in the form of drift, or "drag." Not only has this force to be artificially produced by engine power (unlike gravitation) to keep the machine in the air, but it is actually six times as disadvantageous to a travelling aeroplane as it is to an automobile moving along at the same speed on the ground. And to make good this handicap the aeroplane requires the inevitable extra expenditure of fuel to compete with earth-travelling vehicles.

But there are two important points to be considered in favour of aircraft. One is that under the best of traffic conditions, few earth-moving vehicles can travel continuously for any distance at the same rate of speed as the aeroplane; the other is that the latter almost invariably travels in a straight line. And even then much aeroplane speed could be reasonably sacrificed for weight and carrying capacity for commercial purposes. So apt are we to regard them as essentially speedy conveyances that this attainment may easily be carried too far for practical purposes. (In the same way, if all farmers took to breeding race-horses instead of heavy draughts, much enterprise would be wasted and little useful work would be done.)

In any case, the real economy of air transport will lie in the fact of its being a straight line, time-saving means of travel. Mountains, rivers, forests, etc., will be no hindrance to its progress. The advantage it thus offers over rail and road routes in the matter of time and track expenditure and maintenance becomes obvious at once. Considering the limitations of ordinary methods of transport, the economy of the air route in the respect just mentioned will alone enable it to counterbalance its higher costs in other directions.

Although railways and automobiles are used economically enough as everyday means of transport, it must not be forgotten that enormous expenditure of capital is necessary before they can be put into profitable operation. In the case of railways, road beds have to be constructed costing anything up to £24,000 per mile, while even a bush track means considerable cost in clearing and laying and providing culverts, etc., etc. Also both must follow the easiest contours and travel unnecessary distances, far divergent from the direct or as-the-crow-flies route used by the aerial service. This phase of earthly travelling alone has always meant much unreproductive expenditure, and it always will while roads and railways exist, while the cost of their after-maintenance is too well known to Australians to require further reference in this article.

Of course, it cannot be denied that compared with aircraft results so far produced under war conditions, railways are far more suited for bulk transport. Still there are places now where even some of the present types of weight-lifting machines could give good and profitable service between points where possible rail traffic would not be sufficient to justify the expenditure of laying down a branch line.

This could soon be demonstrated if one of our smaller towns, standing about a hundred miles from a railway, were selected and given the chance of benefiting by the experiment. The pilot-operator would inaugurate the service by beginning to carry the mails and lighter articles of merchandise. Having proved the reliability and speed of the small machine to officialdom, he could then introduce the heavier and bigger machine and commence the carrying of practically every article required by that community—including machinery.

The latter, of course, would be the heaviest item he would ever be called upon to transport; but machinery seldom has component parts weighing more than a ton each (and present-day machines can carry more than twice that weight). So it would be a matter of taking apart the really heavy pieces and carrying them in two-ton loads; as is invariably done in the transport of heavy articles by rail to-day. (No railroad manager would dream of carrying a small iron bridge, or similar structure, whole.) In any case, the requirement of such commodities would not be a daily occurrence in a small town, and when such an occasion did eventuate the speed with which the number of journeys necessary could be accomplished would more than equal the time in which the whole article might have been transported in bulk on a goods-train *had* there been a railway in existence.

In regard to weather conditions, the circumstances which might handicap such a service as that outlined above would only be the same that would inconvenience wheeled traffic over bad roads, and, very often, rail traffic as well. For wind, by itself, is no obstacle to an aeroplane, unless it be of hurricane-like violence. And conditions of that kind might be said to exist in Australia for not more than fifteen days in the whole year. Fog is even a more serious obstacle to the aviator, but fortunately *that* is certainly not a prevalent weather condition in Australia. So such a service could be carried on punctually for three hundred and fifty days in the year; and, except for the fifteen days on which there would be no flying at all, the others would show delays of but a few hours each.

Hence, the service would not be *perfect;* but what enterprise ever undertaken by man did have its highest point of efficiency from the jump-off?

Even the longest established railway services of to-day have a cumulative period of stoppage from causes accidental, climatic and otherwise.

In any case, it must not be forgotten that the cost of surveying, clearing and laying a railway track would for many years be far in excess of the running expense of an aerial service of the kind set out above.

And when at last the ambitions of our designers and builders become divorced from the war-time ideals that at present obsess them, it is certain that there will be such a magical development along the lines of stability and strength in machines designed for state and private commercial uses, that even the most sceptical amongst us will become keenly interested and convinced. And as the impossible little "Rocket," produced by Stevenson in 1829, has given place to the giant locomotives of the American and British railroads of to-day, so will the present two-ton aeroplanes be superseded by the great aerial liners of to-morrow.

[*A second article by Mr. Colles on this subject will appear in our next issue.*—ED.]

England to Australia at 100 Miles an Hour.

Mr. Holt Thomas (in silk hat) is here shown escorting Their Majesties King George and Queen Mary, accompanied by Princess Mary, through the workshops of The Aircraft Manufacturing Company, Limited, of which he is managing director and on whose directorate he has recently been joined by Major-General W. S. Brancker, C.M.G., former Comptroller-General of Equipment of the Royal Air Force.

Interviewed in London a few days ago by a representative of the *Daily Chronicle*, Mr. Holt Thomas is reported to have stated that the air journey from England to Australia can now be made at a speed of 100 miles an hour, including stoppages.

HOW WIRELESS MESSAGES ARE SENT

Especially Written for "Sea, Land and Air."
BY ERNEST T. FISK, M.Inst. Radio-Engineers.

[It is claimed that any non-technical reader who carefully follows this series of articles will gain a clear understanding of the main principles which govern the sending of wireless messages. Should the reader find difficulty in grasping any of the points dealt with, we shall be pleased to assist him if he will write, indicating his difficulty.—Ed.]

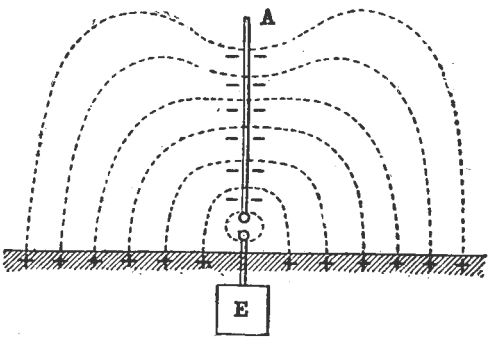
The first article of this series appeared in the November issue of *Sea, Land and Air*. In that article we explained the fact that a wireless impulse travels at such an enormous speed that it reaches Australia from England almost instantaneously. That article also described the oscillating electric charges and currents which exist in the aerials when a message is sent, and which change their direction with enormous rapidity. Finally we explained how those oscillations are produced, and showed their analogy to the mechanical oscillation of a weight and a spring.

In order to create, in the ether, a disturbance which will be radiated across a distance, violent oscillations are necessary. If we put an electric charge into an aerial wire and allow it to leak away slowly no disturbance will be radiated. The analogy of this can be seen in the spring and weight previously described; if the weight is pushed up so that the spring is compressed energy is stored in the spring which is ready to push the weight down again as soon as we release the weight. If thus suddenly released the weight will oscillate, and if the oscillations are sufficiently rapid a musical note will be produced. The musical note is direct evidence that energy is radiated from the moving weight and spring. The weight would not oscillate if it were released slowly and allowed to return steadily to its normal position because it would have no "momentum," and consequently no energy would be radiated.

This is analagous to the electrical conditions for sending wireless messages. The aerial wires form an electrical oscillator in which electrical energy can rush to and fro very rapidly.

If an electrical charge is put into the aerial and is permitted to leak away slowly oscillations will not occur, because the moving charge will have no momentum, and no energy will radiate through the ether. To produce the oscillations therefore, we must either find a means of storing the energy and releasing it suddenly or we must have some other means of continually charging and discharging the aerial system.

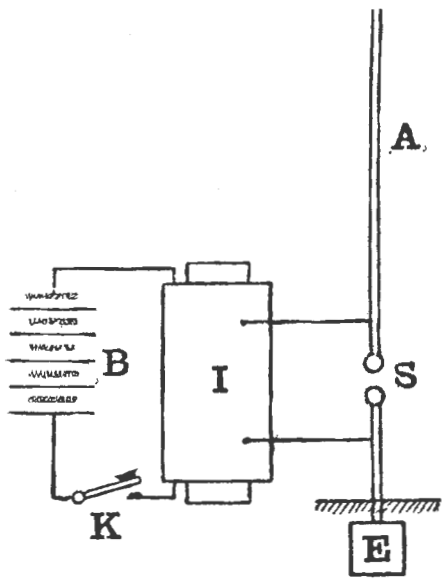
In the early form of aerial as invented and used by Marconi 22 years ago, the first method was used. The aerial system, or radiator, consisted of an elevated wire which was connected to a large metal plate at the top and connected to the earth at the lower end; this formed an electrical condenser which could be supplied with an electrical charge. As explained in our first article the electrical condenser is analagous to the steel spring and the charge in the condenser is equivalent to the energy stored in the spring when it is compressed. In the case of the spring and weight the "charge" is released and the oscillations commence when



Lines of electric strain between a charged aerial wire (A) and the Earth (E).

the hand is suddenly removed. Similarly in the electrical case the charging force must be removed and the stored up energy must be released suddenly.

In order to prevent the charge leaking away steadily while it is being put into the aerial the wire is broken near the lower end by an air gap, technically known as the spark gap or discharger. The air gap offers a great resistance to an electrical current, therefore the charge cannot leak away. The resistance of the gap however, is not infinite, and as more and more energy is stored in the aerial a point is reached where the energy is great enough to overcome the resistance of the



Diagrammatic representation of early Marconi wireless transmitter (1896): A, aerial wire; S, spark gap; E, earth; I, induction coil; B, battery; K, Morse key.

air gap. The charge then rushes across the gap with all its force; this rush is so sudden that it becomes equivalent to the released weight, and by reason of its electrical inertia it overshoots the mark and charges the aerial in the opposite direction. As soon as the gap is crossed, by the moving charge, its resistance is lowered and it provides a conductive path for the current so that the oscillations can continue as long as sufficient energy remains in the charge.

When the aerial is charged the space between the top of the aerial and the earth is in a condition of electrical stress because the charge at the top of the aerial is facing an equal and opposite charge in the earth, and these two charges are "straining" to meet and neutralise one another. Here an analogy can be seen with the spring and weight. While the hand holds the spring compressed the spring is pushing or straining in a direction opposite from the direction of the hand's pressure with a force equal to that exerted by the hand; this is, of course a simple illustration of Newton's third law of motion, viz.:—*To every action there is always opposed an equal reaction.*

As soon as the aerial charge commences to move (i.e. discharge) by virtue of overcoming the resistance of the air gap the strain disappears, but it is replaced by another phenomenon in the nature of a magnetic force which always accompanies a moving electrical charge or current.

From the foregoing it will be seen that two distinct conditions are created in the ether surrounding an aerial which is charged and discharged. These are first the electric strain when the aerial is charged and secondly the magnetic force which arises from the discharging current. There are really four different conditions created in the ether when a wireless impulse is radiated. First the electric strain from the aerial charged in one direction, then the magnetic force from the discharging current, thirdly another ether strain when the aerial is charged in the opposite direction and fourth a magnetic force opposite in direction from the first force when the second or reversed discharge current flows. Those four conditions make up that wonderful effect known as a Wireless or Hertzian wave.

In order that the reader may remember what a wireless wave is like we must give some picture which can be seen and recalled in the mind's eye. The term wave is not used here to describe something like the waves of the sea, there are no huge combers rolling along and eventually losing their energy by breaking on a sandy beach or a rocky coast. The term is used in its *true* sense which, however, is not so popular as its "half true" sense of the seaside waves.

"A wave or wave motion is a motion which repeats itself in all its stages several

times within a given period and at regular intervals, and which travels forward in a direction at right angles to the direction of the motion itself.''

This definition is put as simply as is possible, and readers who do not comprehend it at the first reading will do so if they read it carefully a number of times.

The wireless wave radiated from an aerial consists of those four ether disturbances: (1) electric strain in one direction, (2) magnetic force in one direction, (3) electric strain in opposite direction, (4) magnetic force in opposite direction. These disturbances are radiated through the ether in all directions, and they travel outwards with the velocity of light; that is approximately 186,000 miles per second. The electric strain can be pictured as closed loops rushing outward from the aerial and extending upwards from the ground as illustrated; while the magnetic forces may be pictured as closed loops or rings at right angles to the strain lines.

In the first article we explained that a weight and spring will oscillate a certain number of times per second, and the number (or frequency) is fixed for a spring having a certain amount of elasticity and a weight having a certain mass; also that in the electrical case the frequency of the oscillations is fixed by the ''capacity'' of the condenser and the ''inductance'' of the circuit.

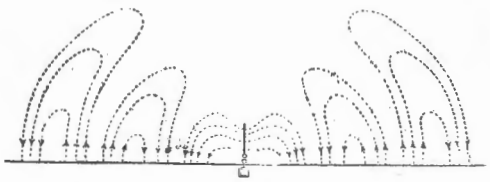
In the case of our aerial this has a certain capacity and inductance, and consequently the electrical charges and discharges will occur with a fixed frequency, and the lines of electric strain and magnetic force will follow one another at fixed intervals of time.

Wave-Length.

This is a term frequently spoken of, but not generally understood by the layman. We will consider first the wave-length of something that can actually be seen—for instance, sea waves.

If we sit in a boat moored some distance from shore, when an ocean swell is rolling past we shall notice, by paying careful attention, that the distance between the crests of any two succeeding waves is the same in all cases. (Note: This observation can only be clear at sea when the disturbance comes from one storm centre, and is not complicated by disturbances from two or more centres.) The same distance will separate the trough of one wave from the trough of the next, or from any other point in one wave to a similar point in the next. That distance is the ''wave-length,'' and it is governed by the velocity with which the wave-motion travels forward and the frequency of the waves or the number of waves per second or per minute.

For instance, if from the boat we count ten waves passing in one minute, and we notice also that each wave passes the boat at a speed of 100 feet per minute, then the wave-length—or distance between waves—is 10 feet. This can be made more clear when we consider carefully that if a distance of 100 feet is travelled in a minute, and in the same time ten waves occur, then the distance of 10 feet is divided into 10 equal waves, which are 10 feet apart from one another.



Lines of electric strain radiating from an aerial.

The foregoing paragraph is a simple explanation of a scientific fact which connects wave-length—velocity and frequency, and which states *that in all wave motions the wave-length is equal to the velocity of the wave-movement divided by the frequency of the waves.* Whether we consider waves in the water, air or ether these facts are unchanged.

If the reader will now imagine that he is standing at a point some distance from the aerial when a wireless message is being sent, and imagine also that he could see and count these loops of electric strain and magnetic force as they rush through the ether, he will be able to understand more clearly these matters of wireless waves, wave-lengths and the radiation of this wonderful form of energy.

A person so situated would watch first a loop of ether strain in one direction, next a loop of magnetic force, then another loop of strain—opposite in direction from the first—and fourthly a loop of magnetic force swinging round an imaginary centre in a direction opposite from the first magnetic loop. The two loops of strain are equivalent to the crest and trough, respec-

tively, of the water wave or equivalent to the compression and extension of the steel spring when the weight is either at the upper or lower limit of its oscillation. The loops of magnetic force are not analagous to anything that can be seen in the water or in the weight and spring, yet they represent the effect of the inertia of the weight which carries it past its normal position; when the weight is going down the force of inertia is in the downward direction, and when the weight is returning the force is in the opposite direction.

(To be Continued.)

LETTERS TO THE EDITOR

Head Office,
Australian Mutual Provident Society,
87 Pitt Street, Sydney,
January 18, 1919.

To the Editor, *Sea, Land and Air.*

Dear Sir,—

In reply to your inquiry as to the A.M.P. Society's practice with regard to aviation risks, I have to say that the clause which for some time past has been inserted in our new policies, is as follows:—

"Aviation or submarine risk (i.e., employment in an aeroplane or other flying machine whilst in actual flight, or in a submarine vessel which engages in submerging operations), whether in times of peace or war, is not covered by the Society under the within policy unless an extra premium, at a rate to be fixed by the Board, be paid in advance for such period as may be required by the Society. Failure to pay such premium renders the policy void."

I may say that the word "employment" was used advisedly so that the restriction only applies to those who take up aviation as a means of livelihood. For instance, in the event of an aerial passenger service being established, the pilot and crew of the aeroplane or airship would be liable to pay an extra premium, but the passengers would not. Similarly a person using his own aeroplane for pleasure trips would be free to do so without incurring any extra premium charge.

Yours faithfully,
H. W. APPERLY, General Manager.

To the Editor, *Sea, Land and Air.*

Dear Sir,—

I read with much interest your article under the heading "Australia will be the Last," which related an interview between the Hon. William Webster, P.M.G., and your good self.

May I ask the following questions?

Am I, as a member of the public, to understand that nothing can alter the mind of the P.M.G., not even if it is proved to him that his theories regarding the transport of mails by air might be wrong?

Has a practical aeronautical man, who thoroughly understands exactly what aeroplanes can and cannot do, ever put the points to the P.M.G.?

Where exactly is the line drawn between "consideration" and "adoption"? America has been running an aerial mail service for some time now; am I to take it that their scheme is still being considered?

Certainly, New Zealand has nothing to do with Australia, but will the Australian public be content to play "second fiddle" to N.Z.?

I do not agree with the P.M.G. when he says that aeroplane mails may be of some use over short distances in densely populated countries; to my mind they will not be of *any* use under such circumstances.

Where aerial mails and passenger services *will* be of immense value is on long journeys between centres of population, such as we have in this country. If the P.M.G. does not agree, allow me to suggest the motto of one of the late Prime Ministers of England, namely "*Wait and See.*"

Yours faithfully,
"ONLOOKER."

Melbourne, 14th January, 1919.

To the Editor *Sea, Land and Air.*

Dear Sir,—

On account of the influenza epidemic there will be no meeting of the Council until further notice.

Yours faithfully,
MALCOLM PERRY, Honorary Secretary
The Wireless Institute of N.S.W.
Sydney, 28th January, 1919.

MELBOURNE PREPARES FOR AFTER-WAR SHIPPING

Especially Written for "Sea, Land and Air"
BY F. J. WAYMAN.

Melbourne, as represented in its shipping relation by the Melbourne Harbour Trust Commissioners, is preparing to meet the extraordinary "rush" of shipping which is confidently expected, in fact practically assured, after peace between the warring nations shall have been officially announced.

Mr. G. F. Holden, J.P.
Chairman of the Melbourne Harbour Trust Commissioners.

Of course the war has to a certain extent retarded the progress previously being made towards the completion of that great harbour scheme which the genius of Harbour-Engineer McKenzie designed. That scheme in its completed form has been sketched and outlined in most of the daily papers of Australia and the shipping and engineering magazines of the Empire and the United States. However, the main purport of this contribution is not, so to speak, to cover ground that has so well been gone over already, but to endeavour, briefly, to see how this big influx of shipping will be handled. Of course it is necessary, in the first place, to state precisely what will be the extent of that influx, both as regards numbers and tonnage of vessels, but unfortunately this is not possible as the international situation is of such a character, and in quarters so disturbing, that it would be futile to hazard the date when official control was absolutely relaxed, or if so absolutely relaxed, when it might be imposed upon. This being the case the subject will have to be regarded more in a general than in a mathematically definite form.

It is occasionally said that Melbourne will soon be visited by some of the largest vessels afloat, war and mercantile. This is a statement born of enthusiasm and city pride, but certainly not correct. Now it is an obvious axiom that any port or harbour is governed absolutely by the depth of water over the entrance respecting the size of vessels it can accommodate. The vital "controlling governor," as concerns Melbourne, is that entrance from the sea to Hobson's Bay, at Queenscliff, known as The Rip.

The work of deepening the channel here is one of extreme and delicate difficulty. The channel has now been deepened to 32 feet, and this depth has been made available by work that was completed since that fateful day in August, 1914, when "the lurid red flame of war blazed over the world."

Coincident with this work the channels connecting The Rip with the Port have also been deepened. Work is still in progress at The Rip to secure a depth of 37

feet, and the ultimate aim is 40 feet, as recommended by the Dominions' Royal Commission, under the chairmanship of Lord (then Sir Edgar) Vincent, who arrived in Australia early in 1913 by the R.M.S. *Medina.*

So much then for the governing entrance to the port; now for the port itself. Of course during the war large wharf spaces, both in the Yarra and in Victoria Dock, were unoccupied, but there would appear to be ground for the belief that all of this will be severely taxed. Still the Harbour Trust are not altogether unprepared. There is the new Town Pier at Port Melbourne, one of the finest structures of its kind in the world, recently completed, which can accommodate six of the largest steamers that can use the Port of Melbourne to-day. Then there is the old Railway Pier, where the mail steamers previously made fast, and the same accommodation is available here. Last there remains the old town pier and the extensive improvements there proceeding would indicate that the Commissioners are desirous of being in a position to utilise it should necessity arise.

At Williamstown, for a variety of reasons, the accommodation available will not materially differ from pre-war days, save in increased area both at this port and adjacent towns such as Spotswood, Newport and Brooklyn, have been utilised for the storage of wheat.

At the Yarra River wharves and Victoria Dock berths every effort is being put forward to utilise the existing facilities to the utmost, and it is believed that when the "rush" comes greater expedition in handling vessels will be witnessed than in "the good old days." It is important to remember that improvements in the modernising of the port would have advanced out of all proportion to what has taken place in the last four years had peace been present, but everyone is more or less acquainted with the extraordinary financial situation the war created, and that the Commissioners have been able despite this severe handicap, to accomplish what they have speaks volumes for the administrative ability of the chairman, Mr. G. F. Holden, J.P., his colleagues and the permanent staff.

In connection with the staff of all departments a final word. The Honour Board displayed so prominently in the entrance hall calls to mind how noble was the response to the Empire's call for men who while striving, each in his own way to make Melbourne one of the world's greatest ports, when the still greater call came, answered, and alas! in many cases gave their all, that peace and freedom might govern this world, for only under those conditions could the Port of Melbourne ever achieve that position for which they had previously laboured

OUR "QUESTION-BOX."

To the Editor, *Sea, Land and Air.*

Dear Sir,—

On the return of all interned radio apparatus and the issue of new licences, there is sure to be a lot of inconvenience which the amateur will have to meet, and it is on this point that I wish to consult you.

Would you be willing to undertake to answer all questions submitted to you, under a heading thus: "Question Box" or any other suitable name, that will lead to the correct working of a station?

P.S.—If you are willing to undertake the above course, I will start the ball rolling by asking, if it will not inconvenience you in any way, what wave-length was used in the transmission of the message that was received in Sydney from Carnarvon, England.

Thanking you in anticipation,

Yours faithfully,

W. EARLE.

12 Gloster Street, Kensington.

January 22nd, 1919.

[We shall be pleased at all times to answer questions of this nature.]

[The Sydney-Carnarvon wave-length was 14,000 metres.—*Ed.*]

THE WINGS OF TIME

Especially Written for "Sea, Land and Air" by "PROP-BOSS."*

Aviation has come to stay. Possibly, when I say that to you, you will reply that Queen Anne is dead. Both facts are equally certain, and consequently I feel that I cannot refrain from adding my little say to the large amount of Aeronautical Gossip that one hears at every street corner and reads in every paper.

I want to start off with a few words about aviation as it was in the beginning of this century. With the exception of some individuals who constructed wings of birds' feathers, which they fastened to themselves, and jumped off high cliffs, practically nothing was done to make an efficient heavier-than-air machine, although balloons and such like were quite the fashion.

Early in this century several people began to show an interest in heavier-than-air machines, notably Louis Bleriot, in France, and the Wright Brothers, in America. Both achieved fame as brave and daring men, who really broke the back of aviation.

About the same time many other people of almost every nationality commenced to dabble in aviation, with the result that in 1910 Louis Bleriot flew the English Channel in one of his own designed monoplanes.

I do not intend to give any kind of a *resumé* of the stages of the advancement of aviation, it would take much too long, and has been written so often that it can be bought on almost any bookstall, but I do intend to give a rough outline of flying as it is at present, and to do that it will be necessary to quote a few instances of what aviation has been and perhaps what it might be in the near future.

In 1914, when the war broke out, there were a few machines which could be called really efficient; these machines had a maximum speed of about 75 to 80 miles per hour, and could climb to a height of eight to ten thousand feet.

Once the need of good fast machines for war work became apparent, and also our desire to have and to hold the supremacy of the air against Germany, aviation came along in seven-league boots. Aeroplanes of every description and for every use were thought out and built. Each new design was better than its predecessor, until at length we have aeroplanes which fly at over one hundred and fifty miles an hour and can climb to over five miles high. I am not merely repeating what I have heard but what I have actually seen with my own eyes.

This is not intended to be the least bit technical, otherwise I would go into the various technical points of the machines themselves.

A few words regarding accidents. The majority of people consider that flying is dangerous. Familiarity breeds contempt, but I am not exaggerating when I say that I would just as soon go up in an aeroplane as I would travel in one of the express cable cars in Melbourne. Further, I should feel quite as safe.

It is a fact that during the period from 1909 to 1914 there were more fatal accidents percentage of miles *motored* than percentage of miles *flown*. Most people do not believe this; nevertheless it is a true statement. Again, of course, a flying accident is dramatic, and consequently a great deal more notice is taken of it than of a motor accident.

Yet again, the majority of accidents can be traced to a definite cause, *i.e.*, the personal element, but as time has gone on accidents grow less and less daily.

For instance, a man on his first trip alone is all right as long as everything goes well. If an emergency arises and the embryo pilot does not know what to do a fatal accident possibly results. Obviously this is not the pilot's fault; it is

* "Prop Boss" is the *nom-de-plume* adopted by a returned A.F.C. airman, who still retains his high military rank and whose identity for that reason must remain anonymous.—Ed.

not anybody's fault, but simply an Act of God.

Once the initial stages are through there is no more danger in aviation than in motoring. Occasionally an experienced pilot meets his end while flying, but it is usually found that he was testing a machine.

During the year 1918 hundreds of miles were flown daily, but there was not one fatal accident per six thousand miles covered by aeroplane.

I affirm, in all seriousness, that flying accidents are almost a thing of the past, and in a few years aeroplanes will be the principle mode of travelling. If you do not believe this, just mark my words and wait and see, you will find that I am right.

When motoring was at first introduced people would not go in them, and the few who owned a motor car were regarded as lunatics. After a few years people ceased to scoff and began to realise that motorists were not mad. Now almost everybody has a motor car.

Compare this with aviation.

Ten years ago aviators were looked upon as foolhardy idiots. In the war they proved their worth, and now to meet people who have been "up" is a daily occurrence.

Rumour has it that aerial services are starting all over the world, big machines capable of lifting four tons of passengers or freight are in use at the moment. In a matter of months, not years, the majority of people will travel by air.

On trips of three and four hundred miles air travel will be accomplished at less than one-third the present cost of train travel; it is therefore obvious that aerial services will be of immense commercial value.

England to Australia in less than a week is very far from being impossible; there are actually machines built in England now that are capable of doing this trip, and as soon as landing grounds have been established along main routes daily regular services will be running all over the world.

Now I am going to say something against the Press—but I am confident that they will agree with me if they think it over carefully—*viz.*, in many cases the Press does aviation a certain amount of harm. I fully realise that part of its work is to criticise, but I would submit that the individual responsible for these criticisms should thoroughly understand the subject. I say this from personal experience. I was once interviewed by a reporter on the subject of aviation. He admitted that he knew nothing about aeroplanes, so I tried to put one or two things as simply as possible. Later his effort appeared in print; the reporter had added a great amount of his own composition, which was at least amusing, but then he had pulled the whole thing to pieces and criticised it. The result was very misleading because the report was simply nonsense from start to finish, consequently anyone reading it who had no knowledge of aviation would receive an entirely false impression.

I am giving away no secret when I say that there is a movement on foot to unite Australia by means of an aerial service. I am acquainted with the prime mover of this project, which I consider very sound and quite feasible in every detail. It is purely a scheme to unite the Commonwealth and has no relation with any International scheme, or any scheme touching other parts of the British Empire, such as that of Mr. Reginald Lloyd, to whom I wish the very best of luck in his new venture.

To return, however, to my remarks concerning the proposed service throughout Australia. There are many difficulties ahead, but up to the present not one has proved insurmountable, in fact if nothing more serious crops up than has cropped up already the whole scheme is now complete.

The chief difficulty is to gain public confidence quickly, and there is no doubt that public confidence will be won as time goes on, and the efficiency of an aerial service has been conclusively demonstrated.

Only to-day I had to "set-to" with a well-known business man who ridiculed the idea of aerial passenger services. His one statement was, "Just think of an aeroplane carrying three or four passengers having an accident with its engine, and everybody on board being dashed to perdition from hundreds of feet!" He would not believe anything I told him, and became exceedingly annoyed when I contradicted him. He is, of course, quite welcome to his views. but, fortunately,

this class of person is seldom encountered.

Day after day one reads of the rapid advance in the construction of aircraft; this surely proves that aeroplanes have come to stay. America is building a machine to carry one hundred passengers. Theoretically there is a limit to the dimensions to which an aeroplane can be built, as the weight does not grow in proportion to the size, and there comes the difficulty of having either engines of huge horse-power (which are being rapidly developed to-day), or, as an alternative, large numbers of smaller engines. Germany has produced a machine with six engines, and other nations have probably done likewise; but that is giving away a secret.

In conclusion, I wish to say a word or two regarding the possibilities of manufacturing aeroplanes and aero-engines in Australia. I know of one or two firms who would start making engines to-morrow if they saw a market for them. These firms will very soon find that the demand will be greater than they can at first cope with.

Regarding the aeroplanes themselves there is everything in Australia with which to build one, and all that is necessary is to obtain the services of a few aeronautical engineers who know their job, and start straight away.

In a later issue I intend to deal in detail with the construction of aeroplanes, but—"Sufficient unto the day is the evil thereof."

THE AUSTRAL MONOPLANE.

A set of plans and specifications referred to in the above advertisement has, at our request, been forwarded to the Editor of this journal and carefully perused by Mr. P. J. Humphries, M.I.M.E., who, for the past three years has been identified with the production of aero-engines in England.

In Mr. Humphries' disinterested opinion the plans submitted to us by Mr. F. Kay-Stratton are quite practicable for the purpose of aeroplane construction by amateur engineers.

THE RECENT AND FUTURE GROWTH OF AERIAL LAW

BY DR. H. D. HAZELTINE,
Reader in English Law in the University of Cambridge.

Melbourne, January 14, 1919.

The Federal Government desires to encourage commercial and private aviation in Australia and is now considering rules for and regulations of air traffic and navigation.

—*Sydney Morning Herald.*

[Taken in conjunction with the foregoing telegram, Dr. Hazeltine's lecture (reprinted from a British aeronautical journal) is of particular interest.—*Ed.*]

National and Imperial Laws.

In his historical introduction Dr. Hazeltine drew attention to the fact that the legal systems of civilised peoples have always embodied rules in regard to the use of the air and the control of the air-space immediately above the surface of the earth. In the course of time there emerged certain principles applicable to the upper as well as to the lower zones of air-space. In Roman law and mediæval jurisprudence these elementary principles of aerial law had already taken definite shape, as, for example, the principle that the landowner owns *usque ad coelum*. Owing to the Reception of Roman Law, these principles have been embodied in modern legal systems. Until our own times the rules of this older aerial law had been applied in practice only to the lowest zone of air-space, for only in this zone had man's activities been possible. With the recent development of the means of communicating and navigating through air-space, the old principles have acquired new and special importance, for the activities of man now reach to the upper aerial zones. From the historical point of view the striking thing about recent growth is not that the air-space as such is subject to law, but that the entire air-space above the surface of the whole earth has now come, in theory if not yet fully in practice, within the domain of human laws.

The recent growth of aerial law throughout the world has led to the study of its principles, and the literature of the new branch of legal science is already voluminous. Draft codes of national and international law have been formulated, anticipating in many directions the legal needs of the future.

Lawyers are devoting special attention to the study of the history and principles of the aerial laws of their own countries, thus preparing the way for comparative legal studies, which will be most valuable as the demand increases for uniform laws throughout the world in regard to aerial navigation.

Up to the present time public aerial law has been more fully developed than the various branches of private law, such as property, contract and tort. In the constitutional law of states the most marked feature of growth has been the firm establishment of the principle that each state possesses full and absolute sovereignty in the entire air-space above its territory and territorial waters, unlimited by the right of innocent passage. The furtherance of international aerial navigation will thus depend upon national legislation and international conventions. The war has swept away the old unsound theories of the freedom of territorial air-space based on the false analogy of the freedom of the the high seas. It is universally recognised, however, that the air-spaces over the high seas are free to all as are the high seas. These spaces will constitute the world's aerial highways of the future. In constitutional law there has been also the development of governmental institutions for the enforcement of state sovereignty in territorial air-space. Prior to the war there had grown up in several countries bodies of administrative law whereby the state regulated and controlled the use of the air-space for wireless communication and aircraft navigation. After the war these

administrative laws will be much more fully developed and in accordance with whatever international conventions may be concluded. There are, too, criminal aerial laws in several countries, which deal with offences committed in the territorial air-space.

The main part of the lecture was devoted to the recent and future growth of the public aerial laws of the various parts of the British Empire. The lecturer considered in some detail the fundamental principle of the imperial constitution that aerial as well as territorial sovereignty is an attribute of the state, drawing attention to the fact that political and legal thought has come to distinguish between the sovereignty of the state and that of the organ or organs exercising the powers of the state. He reached the conclusion that Parliament possesses in theory sovereign legislative power over all the air-spaces of the Empire, although up to the present this power has been exercised in respect only to the air-spaces of the United Kingdom and the British Islands. Others parts of the Empire have established their own aerial laws and ordinances. The leading principle of British constitutional practice is that in each of the political units of the Empire the legislative, executive and judicial institutions of territorial government exercise also the powers of aerial government. The idea underlying this practice is that all the air-spaces above the Empire are as much a part of the Empire in its physical aspect as are its territories and territorial waters. The air-space is so closely related to the territory that it may be viewed as a vertical extension of the territory itself.

Certain institutions of British executive government have undergone a process of adaptation for the purpose of enforcing aerial sovereignty; besides which there is now a tendency to create new agencies of government. The most striking illustration of this latest phase of constitutional development is the establishment of the Air Council, charged, under the Air Force Constitution Act, 1917, "with the administration of matters relating to the Air Force and to the Defence of the Realm by air." The able speech of Major Baird, Parliamentary Secretary to the Air Council, on the Air Force Estimates, presents a record of constitutional re-organisation and of aerial activity on all fronts of which the United Kingdom and the Empire may well be proud.

The lecturer then examined the provisions of the laws of the Empire in regard to state regulation and control of the use of territorial air-space for purposes of wireless communication and aerial navigation; and he referred also to the international wireless conventions which bind the Empire. The Wireless Telegraph Act, 1904, various statutory rules and orders issued thereunder, and the legislation of the oversea possessions embody certain common principles. Two of these are that no one shall establish a wireless station on land or on a British ship except under Governmental licence and that the licensed station is subject to the control of the competent civil, military or naval authorities.

In dealing with the law of aerial navigation, the lecturer pointed out that the Aerial Navigation Acts, 1911 and 1913, and the legislation in India and many other oversea possessions confer powers upon executive authorities to prohibit or regulate the flight of aircraft within territorial air-space. Acting in accordance with his statutory powers, the Home Secretary had, prior to the beginning of the war, issued various orders in which he prescribed not only the areas in which the navigation of aircraft of all kinds, except British naval and military aircraft, was prohibited, but also the portions of the coastline prohibited to aircraft from abroad, and the areas within which and the conditions under which such aircraft might land. The conditions imposed upon aircraft from abroad are of particular interest. In the case of airships, as distinct from aeroplanes, the analogy of the maritime ship is followed. Before commencing a voyage to the United Kingdom the person in charge of an airship must apply to a British consular officer for a clearance. The application must contain particulars in regard to various matters, such as the name and registered number of the airship, the name, nationality, and place of residence of the owner, of the person in charge and of each member of the crew, the nature of the cargo and the proposed object of the voyage. These and other detailed provisions of the Home Secretary's orders may well serve as precedents for after-war regulation, when the existing prohibition of civilian flight shall have been revoked.

Two main purposes underlie the entire body of enacted law regarding aerial navigation; first, the protection of the public from the dangers incident to aerial navigation, and, secondly, the defence and safety of the realm and of the oversea possessions. In the shaping of future legislation these ends will be held in view.

Another branch of British public aerial law is that dealing with criminal acts committed in the air-space, such as flight over prohibited areas. The penal provisions of the Aerial Navigation Acts and the Ceylon Ordinance of 1912 are of special interest.

In sketching the possible lines of future growth, the lecturer expressed his opinion that state sovereignty in the air-space would form the foundation of the whole structure of national, imperial and international aerial laws. We may not expect to see special legislatures established for the making of aerial laws, but we may look forward with assurance to the creation of new institutions of an executive character. The establishment of the Air Force and the Air Council points the way to the organisation of other governmental agencies charged with duties and invested with powers connected in one way or another with air-spaces of the Empire and their use for wireless telegraphy and aerial navigation in public and private interests. For many purposes the adaptation of existing institutions will probably suffice. Thus, the aerial post would naturally be administered by the Post Office, which already, under the laws of the United Kingdom, possesses governmental powers over the wireless system. So. too, many matters of commercial aerial navigation will probably be controlled by the Board of Trade. But for such purposes as aerial police and aerial customs new governmental agencies may be evolved in course of time, although even for these purposes we may see only the adaptation of existing agencies. The marking out of aerial routes—provided with aerial ports or aerodromes, lights, beacons, and pilotage—may lead to the establishment of bodies with duties corresponding to those of Trinity House in maritime matters. The development of life-saving appliances for the air (some of which, such as the parachute, have already undergone successful experiments) will lead to governmental control. It is possible that the Board of Trade may be invested with power to issue regulations for ae al life-saving apparatus exactly as they have already done for life-saving equipment at sea. It is also possible that in course of time new Air Courts on the analogy of Admiralty Courts, may be evolved to deal with cases under the ever-increa ing mass of law, in regard to oversea commercial aerial navigation. In this event, the expert aerial navigators of the Trinity House of the Air might serve as assessors, on the analogy of Trinity Masters in Admiralty Courts. But the close connection between the sea and the air-space over it may result in Admiralty jurisdiction in this vast air-space.

Aerial administrative law will be far more important in the future than it has been hitherto. As wireless stations and aircraft increase in number after the war, legal regulations will be more and more necessary. Some of these regulations will be local in character, and will apply only to the separate air-spaces of the various parts of the Empire—the United Kingdom, the colonies, dependencies, and protectorates. This is the system already in force. But certain fundamental principles of legal regulation might well be embodied in an Imperial Act applying to the entire Empire, on the analogy of the Merchant Shipping Act.

Dr. Hazeltine drew attention to two or three special problems in administrative law. The distinction between public and private wireless stations and aircraft is already a fundamental feature of the aerial laws of the Empire; but in the future this distinction will be even more important, not only in municipal but also in international law. It will be necessary to have a legal criterion of the public character of aircraft, which might, the lecturer thought, depend upon the presence of two conditions: (1) that the aircraft be engaged in the service of His Majesty's Government; (2) that it be at the same time under the control of an officer of one of the three armed forces of the Crown, the Army, Navy, or Air Force, or of some other official duly commissioned by the Government. Under this definition there would be military and non-military public aircraft. Under the latter category would fall aircraft engaged in police, revenue, postal, pilotage, life-saving and other services of the State. Even aircraft owned by private individuals

or companies would be public aircraft if engaged in public service under the control of an officer of one of the armed forces of the Crown or of some duly commissioned official of the Crown Government.

There is general agreement among jurists that, for the purpose of international aerial navigation, aircraft ought to be invested with nationality, on the analogy of the nationality of seacraft. All British public aircraft will of course be possessed of British nationality. In the case of private aircraft one possible solution would be to follow the principles of the Merchant Shipping Act, and to make British nationality of aircraft depend upon ownership by British subjects or bodies corporate established under and subject to the laws of some part of the His Majesty's Dominions. Inasmuch as nationality implies the right to fly the British flag and to receive consular and other governmental assistance and protection, some safe principle, such as that of the British shipping laws, will be necessary after the war.

Dr. Hazeltine drew attention to the fact that the problem as to registration of private aircraft is distinct and different from that of nationality. The primary purpose of a system of registration should be the proper regulation of aerial navigation in British air-spaces, with a view to the safety of the public, and of the persons and goods carried by aircraft, and the safety and defence of the realm and of the oversea possessions. To effect this purpose all private aircraft should be registered at official state registers. An aerial Lloyd's might well be established. Registration will not confer British nationality, but it will simply license to navigate in British air-spaces. All private aircraft, British and foreign, should therefore be required to register before being allowed to navigate. Before granting a licence of navigation the official registrar should satisfy himself that the pilot and crew are competent and that the aircraft itself is airworthy or fit for navigation. Every aircraft entered on the register should be provided with a number and other marks of identification, and the pilot or other responsible person should be in possession of the official licence containing all necessary information, such as the place of registration, the names and addresses of the pilot and crew, and the tonnage of the aircraft. Registration will render the aircraft, whether of British or foreign nationality, amenable to British law within British air-spaces, including all legal regulations in regard to aerial navigation such as frontiers, prohibited areas, prescribed landing places, lights, pilotage and life-saving appliances.

The speaker drew attention to the fact that the principle of licensing wireless stations is already a part of British laws. The same principle ought to be applied to aircraft. The licence, as in the case of wireless, should be revocable on due cause or in case of emergency. The principle of revocable *licence* to navigate is far safer, from the point of view of public safety and national and imperial interests, than that of the *right* of innocent passage. The adoption of the principle of the revocable *licence* would be quite as favourable to legitimate aerial navigation by British and foreign aircraft alike as the concession of the dangerous principle, by international agreement, of the *right* of innocent passage. The great advantage of the licence is that it is revocable, for due and sufficient cause or in times of national or imperial emergency, by the State.

The lecturer also considered problems in the future growth of criminal and private aerial law. He thought that the existing maritime and commercial laws of the Empire could be applied in many directions to carriage of persons and goods by aircraft.

In concluding his lecture, Dr. Hazeltine expressed the view that in the future aerial communications will share with sea communications in binding the scattered parts of the Empire together. He appealed for a closer study of aerial legal problems on the part of the lawyers and statesmen of the Empire.

SHIPBUILDING

THE STRAIGHT TRANSVERSE FRAME.

New Type Described.

The Government have under consideration the construction of two or more ships of about 10,000 tons deadweight, designs for which have been prepared by the Chief Executive Officer of Commonwealth Government Shipbuilding, who has authorised this journal to publish the following description of the new vessels.

The vessels are 450 feet long and 56 feet broad by 38 feet 6 inches deep, of the shelter deck type, with two decks laid and with short top gallant forecastle. They will be propelled with twin screws driven by two sets of triple expansion engines or geared turbines, steam being generated by six water tube boilers working at a pressure of 200 lbs. per inch, and giving a sea speed of about 13 knots.

The boilers will be arranged to burn oil or coal, the former being carried in cross bunkers and in double bottom under engines and boilers.

The vessels are to be built on what is known as the "straight transverse frame type," that is, the sides and bottom will be flat surfaces, carrying the midship form of vessel as far forward and aft as possible. The bilge instead of being of the usual round type will be sniped away or angled. The frames throughout will be straight, joining the angled bilge which is carried forward and aft in a rising line until it disappears at the extreme ends.

The advantage of this system is that frame turning is reduced to a minimum and the furnacing of plates, involving the use of highly skilled labour, is avoided to a large extent. Template work can be utilised to the fullest advantage and the design lends itself to multiple punching and what is known as fabrication.

With the consequent saving in time and labour the hull should be quickly and economically built.

The straight line form is no detriment to the speed of the vessel. The result of experiments made in the experimental tank at Teddington show that the type compares satisfactorily with the usual ship-shaped form with curved frames.

The vessels will have a good equipment of cargo derricks and winches, and large hatchways are provided for the rapid and easy discharge of cargo. Good accommodation is provided in houses on shelter deck amidship for captain, officers, wireless telegraph operators and engineers and for the crew in the after end of shelter 'tween decks.

About 140,000 to 150,000 cubic feet of insulated space for the carriage of frozen or chilled produce will be provided in two holds, one forward and one aft of the machinery room, each hold being cooled on the brine pipe system.

Steamers of similar type, but slightly smaller have been and are being built in England.

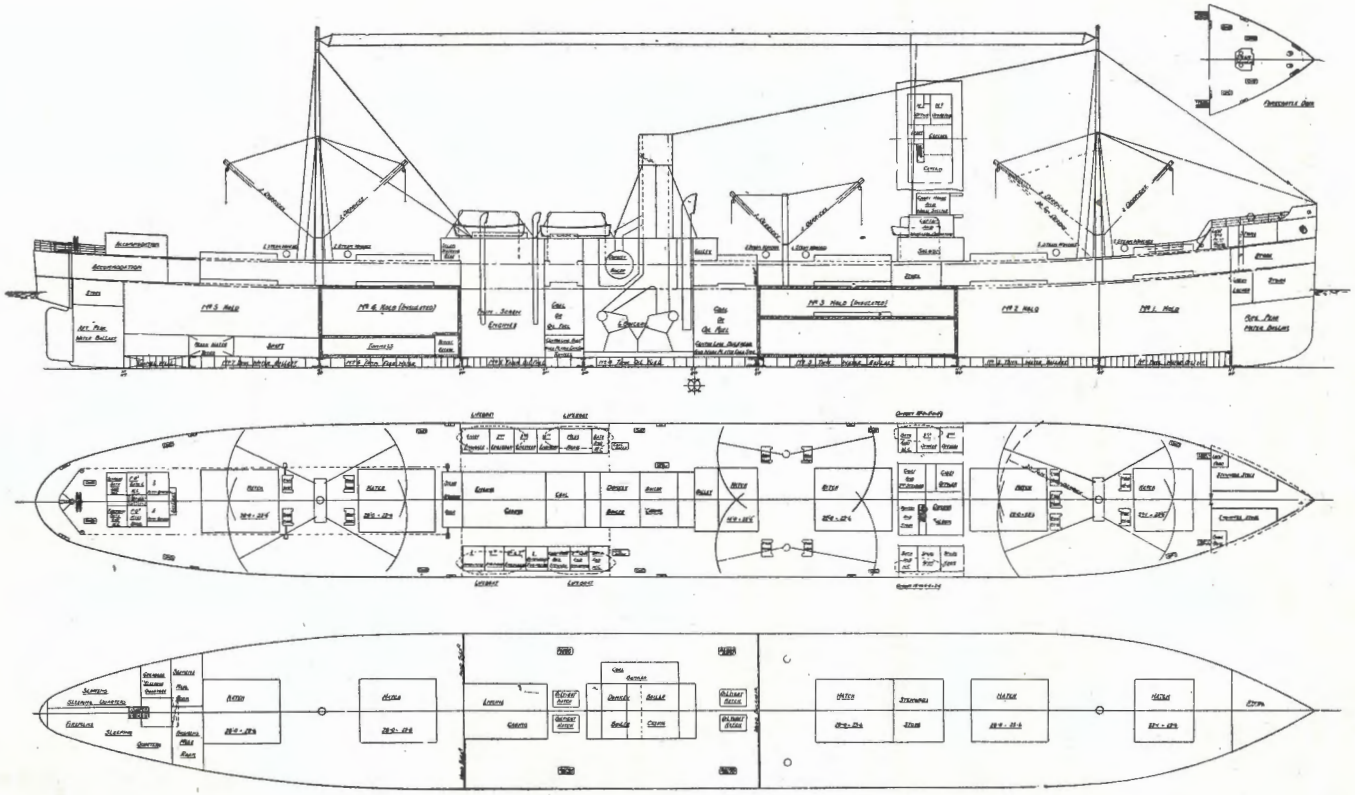
It is considered that ships of this type and size are particularly suitable for Australian overseas trading requirements.

SHIPBUILDING REPORT.

In his last monthly report for the information of the Federal Cabinet, Mr. H. W. Curchin, Chief Executive Officer for Commonwealth Ship Construction, set out the progress made in shipbuilding to the end of November.

Steel Ships.

Williamstown.—The framework of the first steel vessel is now complete in every detail, the bridge, poop and forecastle erections having been finished during the month. The work of fitting in position the shell, decks, tunnel and other plating is proceeding as material comes to hand. For the second steel vessel the whole of the double bottom water ballast tank is



The "Straight Transverse Frame" Illustrated.

General plan of the twin-screw cargo steamer to be constructed by the Commonwealth Government. Scale: One-sixteenth of an inch to the foot.

(Reproduced from official designs by courtesy of the Chief Executive Officer for Commonwealth Ship Construction.)

now erected and riveted. One or two strakes of the bottom plating, and all the available tank top plating are in position. The whole of the transverse and longitudinal frames and beams are being riveted ready for erection. From the Broken Hill Co.'s works 141 tons of steel plates and 6 tons of bars were delivered during the month.

Cockatoo Island.—For the steel vessel which is being built at the Commonwealth Naval Dockyard at Cockatoo Island, the prepared material amounts to 437 tons, and of this total 365 tons are now erected on the slipway. The double bottom water ballast tank is completed, and a large proportion of the side framing erected. A number of shell plates and tank top plates have been fitted in position. Fair supplies of material have been delivered during the month.

Walsh Island.—The shell plating of the first steel ship is proceeding as material becomes available. The stern plating is in hand, and part of the upper deck plating has been fitted. On the second vessel the double bottom water ballast tank is completely framed, and part of the shell plating is in place. A start has been made with the erection of the transverse and longitudinal framing. The work on the third vessel is sufficiently advanced to enable a start to be made with the framing. A large quantity of material has been delivered into the yard during the month.

Wooden Ships.

Actual shipbuilding work is now proceeding in the yards of Messrs. Kidman and Mayoh, who have a contract for the construction of six wooden ships. At Messrs. Hughes, Martin & Washington's yard, where six ships are to be built, two keels are laid and a commencement made with the main timbers. The Wallace Power Boat Company, which also has a contract for six vessels, has a number of main frames erected, and work generally is proceeding satisfactorily. At each of these three yards additional supplies of timber have been received.

Shipment of Plates.

The report indicated that there was still room for improvement in the delivery of plates from America. Vessels on the water have 2303 tons on board. This quantity leaves a balance of about 1,000 tons to be shipped. Mr. Curchin anticipates that at least two steel ships will be launched early this year.

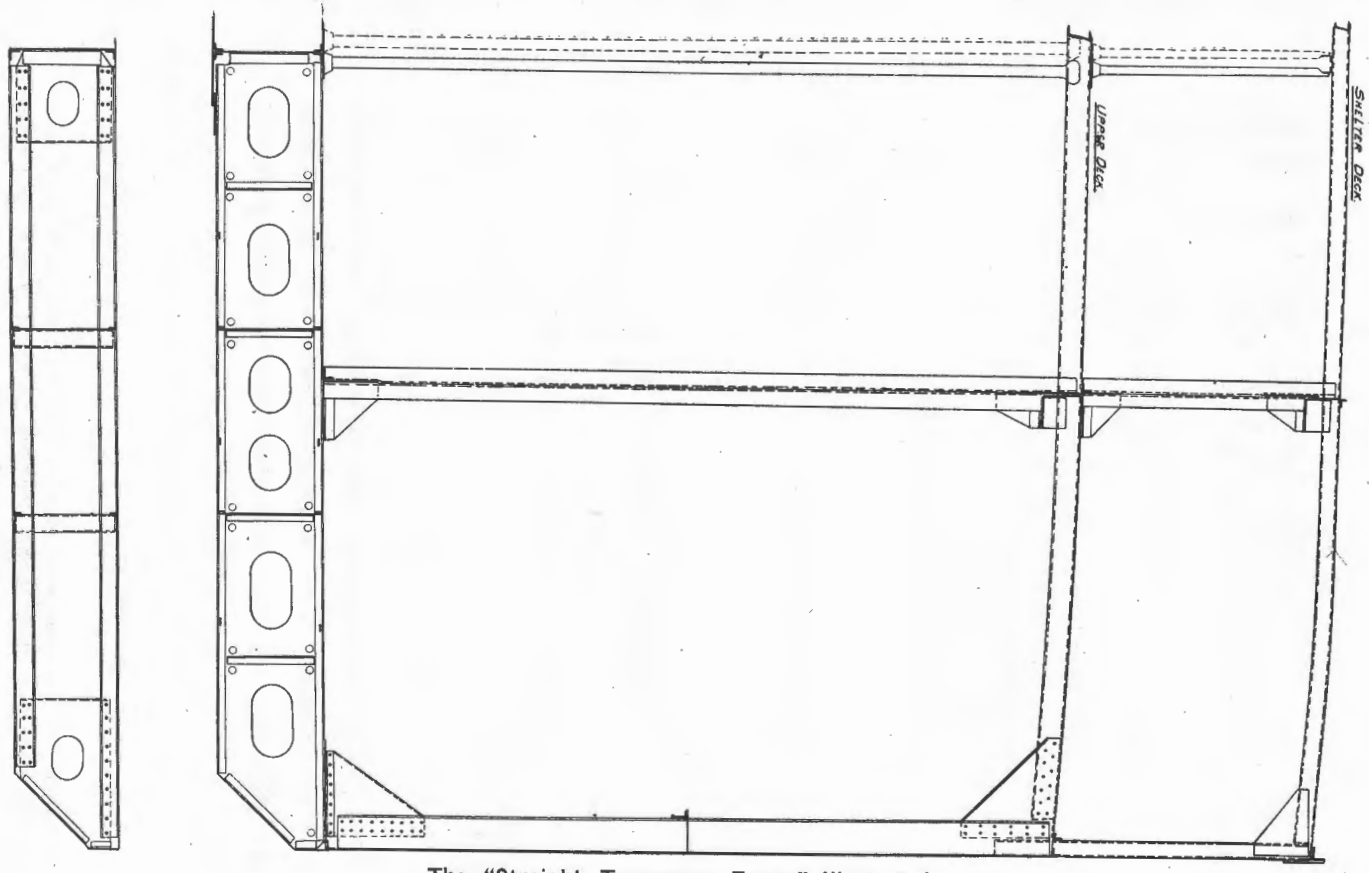
Machinery.

Progress in the manufacture of machinery was reported to be generally satisfactory, but there was still some difficulty in the making of large forgings. Steps were being taken, however, to overcome this.

Men Employed.

The men employed numbered 2,415, and were distributed as follows:—

On Hull Construction and Preparations—		
Williamstown	196	
Walsh Island	338	
Cockatoo Island	90	
Kidman & Mayoh	120	
Wallace Power Boat Coy.	188	
Hughes, Martin & Washington	74	
Mersey Shipbuilding Coy.	14	
Walkers, Ltd.	116	
	——	1,136
On Machinery—		
Thompson & Co.	250	
Walsh Island	204	
Various other contractors	200	
	——	654
On Timber Getting—		
Hughes, Martin & Washington	250	
Wallace Power Boat Coy.	250	
Kidman & Mayoh	125	
	——	625
		2,415



The "Straight Transverse Frame" Illustrated.

Outline diagram showing Midship section of twin-screw cargo steamer to be constructed by the Commonwealth Government, and described in the accompanying article. Scale: One-sixteenth of an inch to the foot.

(Reproduced from official designs by courtesy of the Chief Executive Officer for Commonwealth Ship Construction.)

THE RUBBER INDUSTRY

Especially Written for "Sea, Land and Air"

BY MRS. SELWYN LEWIS, B.Sc.,

It is in the sixteenth century that we first hear of the natives of South America playing with an elastic ball which they obtained from the exudation of certain trees.

This was india-rubber, the name given to the milky latex occurring in the bark of an evergreen.

Great excitement prevailed in England and France in 1730 when chemists of these countries after long experiments were able to efface pencil marks. One, Samuel Peat, went as far as to brush the hot rubber on to cloth thereby making it water-proof.

The rubber producing parts of the world may be roughly estimated as being the inter-tropical areas 250 miles both North and South of the Equator where the climate is warm and moist and the rainfall averages 80 inches a year.

It is in South and Central America, Mexico, Africa, Malay, New Guinea and new Caledonia that this enormous and ever-increasing industry is carried on.

The young rubber plants are raised from seed, generally in baskets or pots, as most of the seeds that fall directly from the trees in the hot dry weather are lost. Sometimes the nursery has for shelter merely the protection of older trees, sometimes a roof or open shed is employed, then the young seedlings are transplanted and very often other crops, such as indigo, coffee or tapioca, are intermingled for protective purposes against the ravages of insects, pests, and diseases.

Sometimes rubber plantations are separated one from another by jungle belts so that the micro-organisms may turn their attention elsewhere, the young trees have to be planted a good way apart to prevent their branches from touching one another

The rubber tree is an evergreen with a tall, gradually tapering stem rising straight from the ground. It generally attains a height of from 80 to 100 feet, and has a girth of from 4 to 7 feet.

In the dense forests of East and West Africa the bark is dark green and almost black, but in the plantations of Malay and Brazil, where light has more access, it is of a mottled grey colour.

These slender trunks bear their crown of leaves well at the top, where the branches resemble a small head with scanty foliage. In appearance they are not unlike the gum tree—so precious to all Australians not blessed with much shade from the burning tropical sun.

The leaves are oblong and laurel like, a much lighter and brighter green below, while the flowers, which are in wonderful white waxy clusters, load the air with a heavy fragrance.

The rubber is present in the form of an emulsion called *latex,* which is quite a different substance and occurs in quite a different cell system to the ordinary tree saps.

This laticiferous system is very near the outer bark, and generally only a very small area of bark has to be removed for the purpose of collecting all the latex from the tree. Rubber trees are not usually tapped until they are three or four years old; this tapping continues all the year round except in the Amazon districts where, for quite six months in the year, work is suspended by the flooding of the low-lying rubber areas.

The trees are tapped, by native labour, at a height of about six to ten feet. In some places they use knives, in others gouges are considered to be the best.

On the Amazon River they cut V-shaped notches round the trees, each notch having its own little collecting cup, but the usual plantation method is the half-herring-bone, in which only one collecting cup is needed. After the tapping design has been marked on the tree the central channel is cut and a narrow strip of bark pared away along the side-marks.

This process is repeated daily until the maximum of bark that can be safely removed has been cut, the latex is then collected in cups, or "tins," made of metal, glass or china, these being sometimes substituted by cocoa-nut husks.

To prevent any clotting of the rubber before it reaches the factory a very small quantity of water, dilute ammonia, or formalin solution is poured into the cups, nevertheless small clots of rubber do form during transport to the factories. These clots are termed "scrap" and contain all sorts of impurities, small pieces of bark, leaves and mud, splashed up by the rain.

In the East a tapper finishes his daily task when he makes delivery of the latex at the factory, but in Brazil the *seringueriro* not only taps his trees and collects the yield, but must also coagulate the latex before his work for the day is done. The appliances used in Brazil for the preparation of rubber are very different to those employed in the up-to-date Oriental establishments.

The Brazilian has only a thatched hut with a mud floor in the centre of which is a hole surmounted by a battered cone-shaped tin funnel for the smoking apparatus.

A basin receives the latex and a tin cup is utilised as a ladle to pour it little by little over the stick or paddle as the coagulation proceeds.

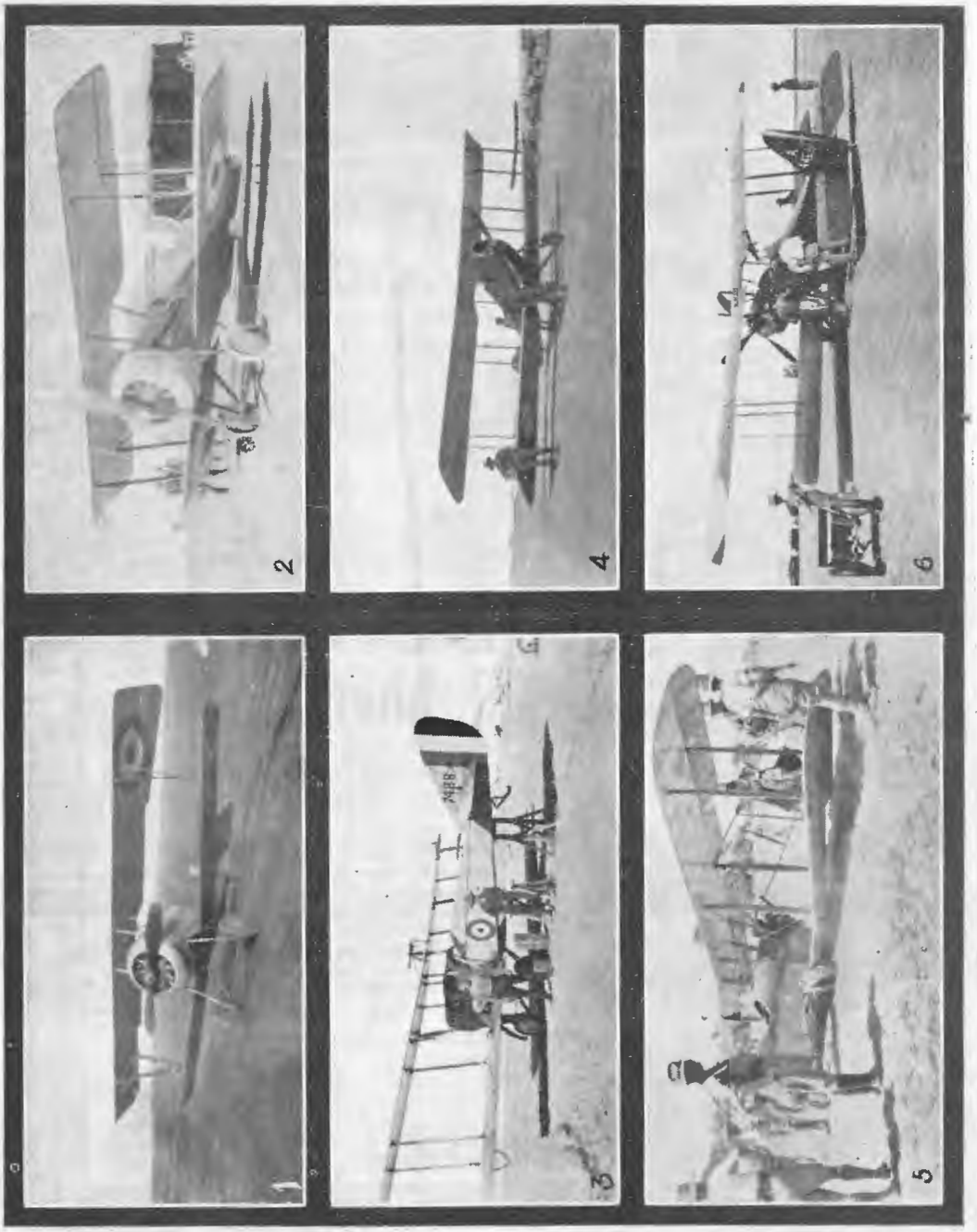
A fire of urucury nuts creates a dense smoke containing a large percentage of CO_2 and this, passing through the tin funnel, reaches the slowly hand-turned paddle, which is constantly basted with coatings of latex from the receiving basin.

This process continues until the balls of rubber accumulate to the required size, then it is begun afresh. In spite of the very crude method of the existing Brazilian system of preparing the latex, some of the compensations are that it is done on the spot, thereby saving travelling expenses, then cleaner rubber requires the equipment of a modern factory, also this method does not subject the rubber produced to any form of pressure, or to the maceration by the creeping machinery of the factories on Eastern plantations, therefore the higher standard of elasticity and the length of life of the Brazilian product may be due to the absence of crushing and tearing during its preparation.

In East Africa rubber trees are fast dying out, but on the West Coast around Sierra Leone the rubber is mostly from vines which attain a gigantic size, clasping the big trees, covering them with a mass of foliage and flowers, and forming wonderful webs from one tree to another, while branches of white, jasmine-like flowers render the stifling air still heavier with their perfume.

These vines can be tapped only once during each rainy season, collecting cups are not needed, for the latex, oozing slowly from the cut surfaces, is too thick to drop.

The tapper carries an earthenware pot containing a mixture of lime juice and salt water into which he dips his hand and grasps each cut surface, thus causing the ring of thickened latex to immediately coagulate. He collects the rubber by slowly rolling it off, piece by piece, to form a large ball.



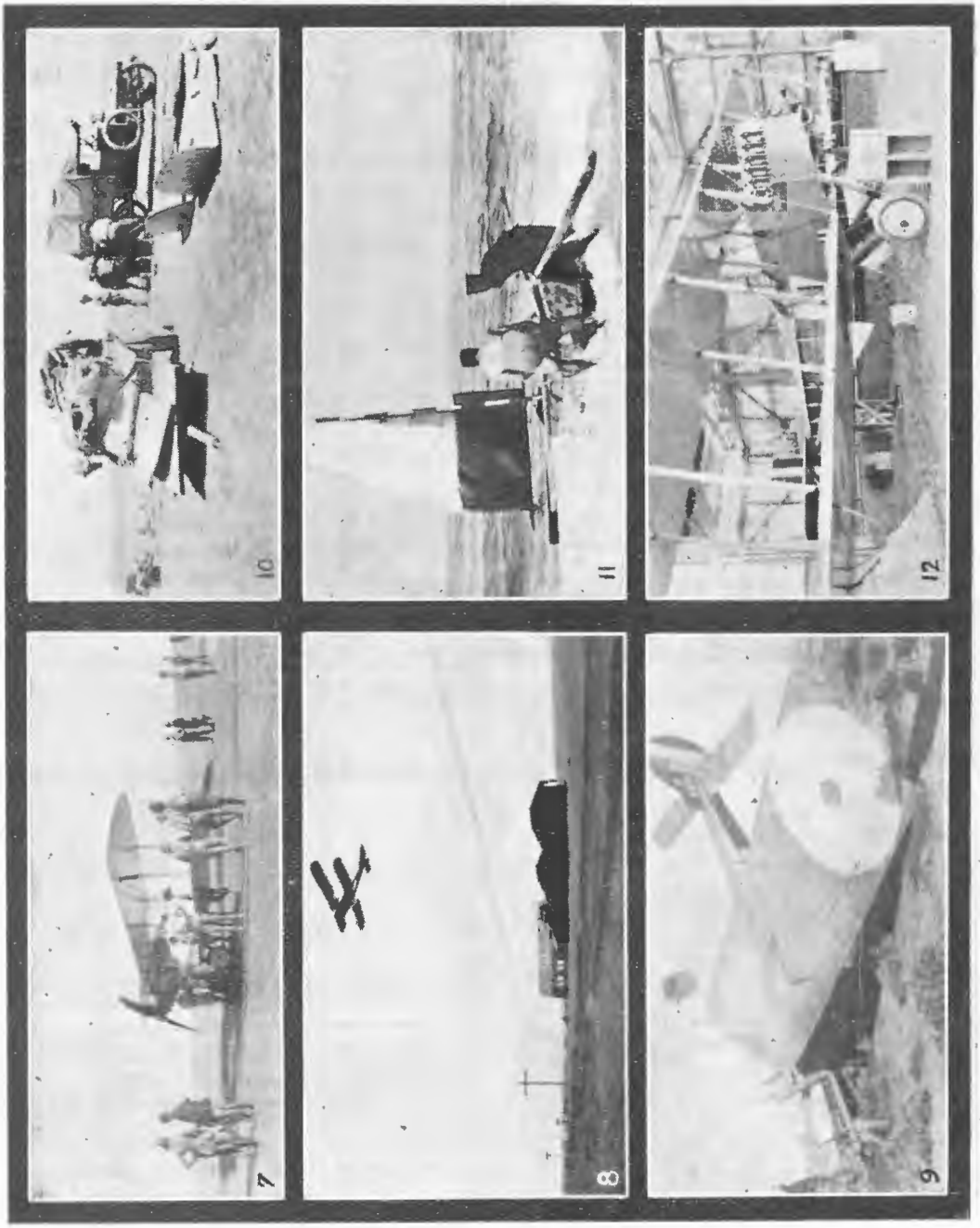
WITH THE AUSTRALIAN FLYING CORPS

Types of Aeroplane:

(1) Sopwith "Pup," (2) British "Scout," (3) and (4) Bristol "Fighter;" ready for a bombing raid on Turkish positions.

(5) A "crashed" battle-plane.

(6) "R.E.8." Off for an early-morning "strafe."



ON ACTIVE SERVICE IN PALESTINE.

(7) Off to "spot" for the Artillery. (8) En route for Turkey—this machine failed to return. (9) Brought down by the Enemy. (10) Brought down by the Aussies (Good-night Fritz!). (11) Sailing on the Red Sea, on a yacht constructed from petrol-tins. (12) A "Martynside" under repair.

(Photographs by courtesy of Captain S. Toombs.)

EDITORIAL ANNOUNCEMENT

Pressure on our space, due to certain recent developments in Aviation and Wireless, has compelled us to exclude from this issue a number of special features; even though these had already been set in type. Among the articles thus "overset" the following will appear in the March issue of *Sea, Land and Air*:—

WITH THE AUSTRALIAN AERIAL PATROL
(By C. A. Jeffries)

WOMAN'S SHARE IN VICTORY
(By Miss Kae McDowell)

THE STOKERS
(By Lewis G. Freeman)

THE "LIBERTY" MOTOR
(By P. J. Humphries, M.I.M.E.)

THE NEW METALLURGY
(By C. W. Nash)