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THE MERCANTILE MARINE WAR SERVICE ASSOCIATION OF AUSTRALASIA.

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THE SYDNEY-BROKEN HILL FLIGHT AN ILL-ADVISED EXPERIMENT.

During the month of November a flight was made—under Government auspices—from Sydney to Broken Hill and return.

The machine flown was of by no means modern design; it had long been in use for instructional purposes, and at its best is but a fair-weather bus.

While comparatively good times were recorded on the journey to Broken Hill, the return trip was made in unfavourable weather, with the result that the machine, unable to face the storm, was compelled to descend in an unprotected area, where it sustained considerable damage.

We have long advocated the establishment of regular aerial communication between Sydney, Newcastle and Broken Hill, and while none will doubt the feasibility of a service by machines of suitable type (capable of weathering such conditions as those overcome by Captain Ross Smith during his recent flight against a monsoon from Singora to Singapore), it will be recognised with equal certainty that an instructional 'plane, of horse-power barely one-tenth of that flown from England, is little better than useless for the job to which it was set.

And to make matters worse, this Government venture was backed by a publicity campaign of the most glaring type, which, although gratifying enough while a genial sun was scorching the airman's countenance, reacted with boomerang force during those days when his aeroplane remained lashed to a tree at Menindie awaiting the termination of a protracted storm.

Commercial aviation companies are now purchasing high-powered machines for the service on which the New South Wales Government has made its premature experiment. Meanwhile, Private Enterprise, whose interests this journal will always endeavour to protect, may justly complain of any action which might, however unwittingly, militate against the success of their plans.

Apparently the lesson of the flight from England to Australia—the lesson of the high-power—has yet to be fully learned.

Captain Wrigley, flying a low-powered machine, left Point Cook (Victoria) for Darwin on November 12; Captain Ross Smith, on a high-powered machine, left London on the same day and reached Darwin two days ahead of him.

World's Record Flight

THE PLANET 'PLANED

ELEVEN THOUSAND MILES IN 135 HOURS.

Especially Written for "Sea, Land and Air" by EDWARD J. HART.

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Since the initial announcement—nearly nine months ago—so many conflicting reports have been circulated regarding the prize flight from England to Australia, and so widespread the interest which it has evoked, that it may be well to set forth a bald summary of the essential facts.

THE INITIAL ANNOUNCEMENT.

On Wednesday, March 19, 1919, the Acting Prime Minister, Hon. W. A. Watt, speaking in the House of Representatives, Melbourne, made the following official announcement:—

"With a view to stimulating aerial activity, the Commonwealth Government has decided to offer £10,000 for the first successful flight to Australia from Great Britain, on a machine manned by Australians.

"The rules and conditions governing the contest are now being drawn up, and it is proposed that competitors be required to supply their own machines and to make all other necessary arrangements in connection with the flight."

This proposal, said Mr. Watt, had been communicated to the British Air Ministry by the Prime Minister, Hon. W. M. Hughes, some weeks previously and had been commended by the authorities in England.

In London on the following evening (March 20) a banquet was held at the Savoy Hotel under the auspices of the Society of British Aircraft Constructors, Ltd. The Chairman of the Society, Mr. H. White Smith, C.B.E. (who is also chairman and a director of the British and Colonial Aeroplane Co., Ltd., Bristol), proposed the toast of "The Royal Air Force," which was responded to by the Right Hon. W. S. Churchill, Colonel T. J. C. Moore-Brabazon, M.P., Major-General

the Hon. J. E. B. Seely, C.G., C.M.B., D.S.O., and Major-General Sir F. H. Sykes, K.C.B., C.M.G. (former Chief of the Air Staff, and now Controller of Civil Aviation in Great Britain).

In supporting the toast, General Sykes said:—

"There is one announcement I want to make, and that is, that this afternoon I had a wire from Mr. Hughes in Paris, to say that his Government had agreed to the offer of a £10,000 prize to an Australian-manned machine which flies to Australia. If Australia takes that lead, I hope all the other Dominions will follow; then we shall be able to have great prizes hanging out a bait to all the ends of the world, and at all events it will help us." (Applause.)

THE PRESS.

Public comment was by no means unanimous.

The *Argus* (Melbourne) declared that the achievement would be a commonplace in aviation, and that there was no necessity to throw away thousands of pounds on the project.

The *Age* (Melbourne), in a leading article, described it as "a circus flight—a poorly disguised attempt at self-advertisement at the expense of the Australian public," and predicted that "the person who pays would cling to the * hope that the prize would not be claimed before Parliament reassembled, when the Ministry could be forced to retract its offer."

Punch (Melbourne), remarked that "we seem to have plenty of money in this country."

* In its issue of December 9, the *Age* commented thus:—*It is to be hoped that Captain Ross Smith will succeed . . . It will occasion the utmost disappointment if the intrepid air-men are robbed of the monetary fruits of their wonderful and unparalleled achievement.*

The *New York Times* asserted that "Christopher Columbus did not take one-tenth the risks that these air pioneers will face. They will be throwing dice with death." A morbid prophecy which, alas! has proved all too true.

"Our own Government," commented *Aircraft* (London), "might take a leaf out of the book of Australia. The record of the Australian aviator is one of heroism and splendid achievement, and with the experience and the daring inherent in the race, it will not be long before the old world and the new are linked up."

The *Corowa Free Press* (New South Wales) inquired:—"How many people care whether there is an aerial mail between Great Britain and Australia or not?" and added the following original suggestion: "They ought to carry as passengers on the experimental voyage as many Federal Members as possible—and leave them somewhere else!"

THE ROYAL AERO CLUB IS CONSULTED.

Next came the drawing up of rules and regulations governing the flight, and for this purpose the Technical Committee of the Royal Aero Club of the United Kingdom (as under) met at 3 Clifford Street, London, on May 5.

Brigadier-General Sir Capel Holden, K.C.B., F.R.S. (in the chair); Lieutenant-Colonel D. Harries, A.F.C., R.A.F.; Lieutenant-Colonel T. O'B. Hubbard, M.C., A.F.C., R.A.F.; Major R. H. Mayo; Lieutenant-Colonel Alec Ogilvie, C.B.E.; Captain Howard T. Wright and Mr. Griffith Brewer.

In attendance were:—Lieutenant-Colonel H. F. Towler (Director of Flying Operations), and Major W. R. Bernard, of the Air Ministry; Mr. H. Fulton, Mr. A. R. Fenn and Mr. C. V. Allen, of the Society of British Aircraft Constructors; and Commander Harold E. Perrin, Secretary of the Royal Aero Club.

Three weeks later (May 25) the Hon. W. M. Hughes, Prime Minister of Australia; the Hon. Andrew Fisher, High Commissioner for Australia, and Senator G. F. Pearce, Commonwealth Minister for Defence, acting in consultation with the above Committee, decided upon the following conditions of the proposed flight, to be

conducted under the Competition Rules of the Royal Aero Club:—

RULES AND REGULATIONS.

(1) The Australian Government have offered the sum of £10,000, to be awarded to the first pilot who shall accomplish the flight in an aeroplane or seaplane from Great Britain to Australia in 720 consecutive hours (30 days).

(2) The offer will remain open until midnight, December 31, 1920, by which date the flight must have been completed.

(3) The complete aircraft and all its component parts must have been entirely constructed within the confines of the British Empire. Raw materials may be obtained from other sources.

(3) The pilots and all the crew must be of Australian nationality, in accordance with the laws of the Australian Commonwealth.

(5) Entries.—Entries are to be made to the Royal Aero Club, 3 Clifford Street, London, W.1. The entry form, which must be accompanied by the entry fee of £100, must be sent to the Secretary of the Club at least seven days before the start is made. All entry fees received will be applied towards payment of the expenses of the Royal Aero Club in conducting the competition. Any balance not so expended will be refunded, *pro rata*, to the entrants.

(6) Identification of Aircraft.—Only one aircraft may be used throughout the flight. Incidental replacements and repairs to the aircraft and motors may be made *en route*, but neither may be changed as a whole. In the case of a seaplane, it may be taken ashore for such repairs and replacements. Five parts of the aircraft and five parts of each motor will be stamped or otherwise marked, and at least two marked parts of each of these five must be in place at the control and at the finishing point.

(7) Starting Place.—The start must be made from Hounslow Aerodrome or Calshot Seaplane Station. All starts must be made under the supervision of an official or officials appointed by the Royal Aero Club.

(8) Finishing Place.—The point at which the competitors must finish in Australia will be in the neighbourhood of Port Darwin, and will be announced later.

(9) Control.—A control station will be established on the route of the flight at Singapore. Competitors must alight at this Control for purpose of identification.

(10) Towing.—Towing on the water is not prohibited, but the total distance of such towing must not exceed 100 miles, of which not more than 50 miles shall be consecutive.

(11) Timing.—The time of starting will be the time the aircraft leaves the ground or water, and the time of arrival will be deemed to be the time of crossing the coast line in the neighbourhood of Port Darwin.

GENERAL.

(1) A competitor, by entering, thereby agrees that he is bound by the regulations herein contained, or to be hereinafter issued in connection with this competition.

(2) The interpretation of these regulations or of any to be hereafter issued shall rest entirely with the Royal Aero Club.

(3) The competitor shall be solely responsible to the officials for the due observance of these regulations, and shall be the person with whom the officials will deal in respect thereof, or of any other question arising out of this competition.

(4) A competitor, by entering, waives any right of action against the Royal Aero Club or the Australian Government for any damages sustained by him in consequence of any act or omission on the part of the officials of the Royal Aero Club or the Australian Government or their representatives or servants or any fellow competitor.

(5) The aircraft shall at all times be at the risk in all respects of the competitor, who shall be deemed by entry to agree to waive all claim for injury either to himself, or his passenger, or his aircraft, or his employees, or workmen and to assume all liability for damage to third parties or their property, and to indemnify the Royal Aero Club and the Australian Government in respect thereof.

(6) The Committee of the Royal Aero Club reserves to itself the right, with the consent of the Australian Government, to add to, amend or omit any of these rules should it think fit.

On August 21, the Royal Aero Club announced the following supplementary regulations:—

(1) No start will be permitted until subsequent to September 8, 1919.

(2) Machines must have a flying range of at least 500 miles.

(3) A competent navigator must be carried, who may be the pilot.

(4) Competitors must satisfy the Royal Aero Club that landing places are available.

(5) At the request of the Australian Government it has been decided that the motor or motors may be changed *en route*.

SURVEY BY BRITISH AIR MINISTRY

Meanwhile a report of the aerial route from England to Australia was in course of preparation.

Brigadier-General A. E. Borton, D.S.O., A.F.C. (R.A.F.), with Captain Ross Macpherson Smith, M.C., D.F.C., A.F.C. (No. 1 Squadron A.F.C.), were despatched by the Air Ministry to obtain reliable data concerning the section between Calcutta and Darwin, and to report as to its suitability. These officers circumnavigated the Malay Archipelago and surveyed the route as far as Koepang (Dutch Timor). A motor boat in which the party originally set out from Calcutta was burned to the water's edge while lying at the mouth of the Hooghly, and General Borton returned to Calcutta for a second boat, the *Minto*. On arrival at Koepang both the General

and Captain Smith were confined to their cabins with malaria, for which they were treated by a local Dutch physician, and returned to Calcutta without setting foot ashore at Koepang and without completing their survey from Timor to Darwin.

In London, on September 19, General Borton attended a conference between representatives of the Air Ministry, the Commonwealth Government, The Royal Aero Club and the Australian competitors. He reported that between Calcutta and the Dutch East Indies the only landing grounds suitable for immediate use were the racecourses at Rangoon (Burma) and Singapore (Straits Settlements). Beyond Singapore, where the route lies over the Dutch Islands, the next place at which good landing facilities existed was Bandoeng (Java), and thence no landing ground was (then) available on the intervening 1760 miles to Darwin.

THE AUSTRALIAN AERO CLUB TAKES A HAND.

At the Australian end there had been no preparations whatsoever prior to September 15 (four days before the presentation of General Borton's report to the Air Ministry), when a general meeting of the New South Wales Section of the Australian Aero Club was held at Sydney in the Lecture Hall of the Royal Society of New South Wales. At this period none of the competitors had left their aerodromes, and the question of providing suitable landing grounds in Australia was debated at some length, the discussion culminating in the following resolution, which was carried by a large majority:—

That a sub-committee consisting of Captain Geoffrey F. Hughes, M.C., A.F.C., R.A.F., Messrs. Reginald Lloyd, Sydney H. Deamer and Edward J. Hart (honorary secretary), be appointed to inquire into the conditions of the proposed flight from England to Australia; and that this sub-committee submit to the Australian Aero Club such information as it may obtain, together with its suggestions as to what action—if any—be taken by the Club.

The sub-committee, after due consideration, limited the scope of its inquiries to a series of nine questions, as under:—

(1) Conditions of flight.

(2) Are entrants debarred from starting before a given date?

(3) If so, what date?

(4) Will the flight be confined to a specific route, if so, which route?

(5) What provisions—if any—have been made for landing stations and supply depôts

in each country along the route; and where are these located?

(6) What provisions—if any—have been made for the assistance of pilots who may require same; particularly in Australia?

(7) Which is the terminal point of the flight?

(8) What arrangements have been made for the establishment of control stations and the appointment of officials?

(9) Will any entrant be permitted to attempt the flight before the authorities have satisfied themselves that arrangements have been completed for the prevention of disaster from avoidable causes?

The reply to question (1) is printed in the earlier portion of this article, under the heading "Rules and Regulations"; to the remaining eight questions, replies were given as under:—

(2) Yes.

(3) September 8, 1919.

(4) A specific route has been laid down, but as has already been proved in the case of Captain G. C. Matthews, this route is not being adhered to.

(5) The provision of landing stations between Great Britain and India has already been undertaken. Concerning landing grounds between India and Australia, the Prime Minister has received from the Minister for Defence (Senator G. F. Pearce) the following cablegram, dated London, September 22, 1919, a copy of which was forwarded on October 2, by the Secretary, Department of Defence, to the Honorary Secretary, Australian Aero Club (New South Wales Section):—

Only grounds now available past India are: Rangoon, Bangkok, Singapore and Bandoeng.

(6) A personal letter, dated October 29, was received by the Managing Editor of *Sea, Land and Air* from Major-General J. G. Legge, C.M.G., C.B., Chief of the Commonwealth General Staff, of which the following is an extract:—

"Two of our flying officers, Lieutenants McGinness and Fysh, have travelled by car from Cloncurry, via Burketown and Boorooloola, to Katherine River, and report the route quite unsuitable and dangerous for flying. They are now getting landing grounds ready at Darwin, Katherine, Avon Downs Station and Cloncurry. The route to Melbourne thence, via Longreach, Charleville, Narromine, Cootamundra and Albury, has been mapped. I will send you a copy when available. This should be sufficient for any machines that can reach Australia, but local machines travelling the same route can get petrol at any inland town."

(7) (Terminal point of route): Darwin.

(8) An official of the Royal Aero Club is stationed at the Singapore control. Between Singapore and Darwin there are no officials. With reference to appointment of officials between Darwin and Melbourne, a statement was made by Sir Joseph Cook, Minister for Navy, on October 24, as under:—

"The Australian Navy (H.M.A.S. Brisbane) will co-operate by maintaining a patrol at sea between Koepang, on the Island of Timor, and

Darwin. Stocks of petrol will be made available at Darwin, Cloncurry, Charleville and Narromine. At these places there will be a flying officer with instructions for the guidance of competitors, and to assist generally. Arrangements for the flight prior to reaching Australia are in the hands of the Air Ministry and the Royal Aero Club in England."

(9) See reply to (1) re conditions governing entries—as laid down by the Royal Aero Club.

In a letter to the present writer, dated Melbourne, October 2, 1919 (more than six months after the initial announcement by the Acting Prime Minister), Mr. T. Trumble, Secretary to the Department of Defence, wrote:—

"You are informed that the conditions of the flight from England to Australia were published in England, and details of these have not been received here As the conduct of the flight is understood to be in the hands of the Royal Aero Club, the Defence Department is not arranging control stations."

Enclosed with Mr. Trumble's letter was a copy of the cablegram received by the Prime Minister from the Minister for Defence, as under:—

LONDON, 22nd September, 6.30 p.m.

Hughes, Prime Minister, Melbourne.

International flying now possible over France, Italy and Greece. Have been in touch Dutch Embassy and cables have been despatched to Holland and Batavia for permission fly over Netherlands East Indies, no permission for this had previously been obtained so far as Air Ministry aware. General Burton now arrived London had conference our representatives and competitors nineteenth. Only grounds now available past India are Rangoon, Bangkok, Singapore, Bandung. Racecourses at Singapore and Rangoon must have hurdles, other obstructions removed for aeroplanes. Have cabled Rangoon, Singapore to have this done for last week October, first two weeks November. This considered best weather by meteorologists. Four competitors Alliance, Sopwith, Martinsyde, Kangaroo, expect start from here between middle and end October. Other machines withdrawn owing insufficient range. No competitor willing start before this, and none have announced their readiness to start up to present date. Cannot therefore understand alleged dissatisfaction among competitors.

PEARCE.

Before submitting its final report to the Australian Aero Club, the three other members of the sub-committee met in the present writer's office and drew up the following recommendations and general observations, a resolution being subsequently passed (at a general meeting) that the report be adopted and made available for publication:—

The sub-committee desires to urge the following recommendations:—

- (1) That a proper landing ground (to be approved by an official of the Australian Aero Club) be provided at Darwin.
- (2) That suitable hangar accommodation be arranged, with an adequate staff of efficient air mechanics.
- (3) That means be provided whereby assistance, food, and other necessities, could reach competitors requiring same.
- (4) That the Department of Defence provide one or more aeroplanes from Point Cook to be stationed at the landing place at Darwin, and that, from the time the competitors are expected to arrive, these aeroplanes shall patrol the coast daily, within reasonable distance of Darwin, keeping a lookout for competitors who may be in difficulties through forced landings.
- (5) That these aeroplanes shall carry supplies of food and water, which could be dropped to distressed airmen by means of parachutes.

GENERAL OBSERATIONS.

The sub-committee is unanimously agreed that a flight from England to Australia by single machines should not, under present conditions, be regarded as a fair indication of the commercial possibilities of aviation.

In the present attempt the competitors are exposed to grave, unnecessary risk, due to inadequate preparation and to lack of suitable landing stations.

The sub-committee is further agreed that there is no single stage of the proposed route which could not be successfully flown by existing machines, if ordinary aerodrome facilities were provided, and that the flight could be satisfactorily accomplished by relays of machines, assisted by aerodromes properly equipped along the route.

The above recommendations having been conveyed to General Legge, the latter wrote in reply:—

- (1) "A landing ground is practically ready at Darwin, and we have a flying officer, Lieutenant Fysh, stationed there for the competition. I hope to send some mechanics there, and stores of petrol, oil, etc., will be available. At Katherine River there is also a landing ground now in construction.
- (2) "A hangar at Darwin is impracticable in the time. The weather is far more serious than the white ant, which can be guarded against.
- (3) "As regards forced landings in desert places, we are trying to organise something, but there are great difficulties—much more than people realise.
- (4) "As to stationing planes at Darwin and sending them by steamer, I would point out that the radius of all our teaching machines is so small that a motor car could do as much, and they could not be sent over the sea. A warship will, however, be stationed there.

"I shall be glad to receive your suggestions at any time."

Subsequently General Legge visited Sydney, where he addressed a general meeting of the New South Wales Section of the Australian Aero Club, and from his remarks it becomes abundantly clear that the Department of Defence has used its best efforts to cope with the preparatory work from the Australian end, and none can doubt the sincerity of General Legge's enthusiasm or question the practicability of the efforts which were carried out under his supervision. Nor can one fail to realise that until the eleventh hour the Defence authorities in Australia were kept entirely in the dark concerning any arrangements which may have been made, or contemplated, from the London end.

With regard to the actual route between Singapore and Melbourne and the difficulties and dangers to which competitors are exposed, an interesting article is contributed (in another section of this journal) by Mr. Harry B. Manderson, who recently returned to Sydney from a survey between Australia and Koepang, the terminal point of the survey conducted, a few months earlier, by General Borton and Captain Ross Smith; as a matter of fact, Mr. Manderson (acting on behalf of Aerial Services Ltd., Sydney), arrived in Koepang before the British Air Ministry's representatives had reached England on their return journey from Calcutta.

So much, then, for the preliminaries of the flight from England to Australia.

ENTRIES AND WITHDRAWALS.

In London, before the original regulations were formulated, the first entry for the flight was received by the Royal Aero Club from Lieutenant Bert Hinckler, D.S.M., R.A.F., of Bundaberg, Queensland, who stated that he had already devoted two months to preparations for the contest. Lieutenant Hinckler's machine was a Sopwith *Dove* biplane, fitted with a single 80 h.p. Le Rhone engine, similar to that recently landed in Melbourne by the Larkin-Sopwith Aviation Company of Australasia, Ltd., and which is to be flown from the southern capital to Sydney during the next few days.

After having stated that it was his intention to fly alone and to drive the *Dove* in sections of 1,000 miles, Lieutenant Hinckler subsequently withdrew from the contest, his machine having insufficient flying range to comply with the supplement-

tary regulations announced by the Aero Club on August 21.

It should be noted, however, that Lieutenant Hinckler's machine performed a non-stop flight from Brooklands to Edinburgh, and a similar flight round the South Coast of England.

On May 26 an entry was received from the Blackburn Aeroplane and Motor Co., Ltd., of Leeds and Hull. This is the *Kangaroo* biplane which left England on November 21, and is manned by Captain G. H. Wilkins, M.C. (South Australia), Lieutenants D. R. Williams (Victoria), G. H. M. St. C. Potts (New South Wales), and V. Rendle (Queensland). The original crew of the Blackburn-*Kangaroo* were Lieutenant Rendle, Lieutenant C. E. Kingsford Smith, and Lieutenant Cyril Braden Maddocks, the two last named subsequently withdrawing.

On June 27, it was stated that Lieutenant Raymond J. P. Parer, A.F.C. (son of the proprietor of the Crystal Café, Bourke Street, Melbourne), would compete for the prize, but there appears to be no record of the entrance fee having been lodged, and as recently as November 24, it was stated that Lieutenant Parker was * still endeavouring to obtain financial backing and that he was then in negotiation with William Beardmore & Co., Ltd., manufacturers of the Beardmore Aero Engine.

On July 24, came the announcement that Captain H. A. Rigby, M.C., R.A.F., of Melbourne, would compete in a Nieuport machine, fitted with a 220 h.p. Zeitlin engine. Captain Rigby, however, withdrew on September 23, and stated that his attempt would be postponed until 1920.

On August 3, the Alliance Aeroplane Co., Ltd., of Acton (near London), entered their 450 h.p. Napier-*Lion* biplane, in which Lieutenant R. M. Douglas, M.C., D.C.M. (Queensland), and Lieutenant J.

S. Leslie Ross (New South Wales), were killed at Surbiton (Surrey), on November 13. One may add the little-known fact that Surbiton is the residence of the famous Australian airman, Mr. Harry G. Hawker, whose recent brilliant failure to complete the Transatlantic flight is still fresh in the public memory.

On August 11, Monsieur Etienne Poulet announced his intention of attempting a project which had been contemplated by his comrade, the late Jules Védrières, whose plans embraced an aerial tour of the world, as detailed in the May issue of *Sea, Land and Air*.

On August 15, Martinsyde, Ltd., of Woking, entered their *AI* biplane in the name of Captain Cedric Ernest Howell, D.S.O., D.F.C., M.C., R.A.F., of Adelaide.

On September 16, the Sopwith Aviation Co., Ltd., of Kingston-on-Thames, entered their second machine, the *Wallaby* biplane, as a substitute for the *Dove* withdrawn by Lieutenant Hinckler. It is on this machine that Captain George Campbell Matthews, A.F.C. (Adelaide), and his mechanic, Sergeant T. D. Kay (Ballarat), have at the time of writing, just reached Vienna.

Finally, on October 18, Vickers, Ltd., entered their *Vimy* biplane, which is now being flown by the brothers, Captain Ross Macpherson Smith, M.C., D.F.C., A.F.C., and Lieutenant Keith Macpherson Smith, R.F.C., and Sergeant-Mechanic W. H. Shiers (all of South Australia), and Sergeant-Mechanic J. M. Bennett, of Victoria.

Competing machines left their respective starting points in the following order:—

October 14: Poulet, Caudron *G-4*, Villa Coublay, Paris, 6.57 a.m.

October 21: Matthews, Sopwith-*Wallaby*; Hounslow, 11.44 a.m.

November 12: Ross Smith, Vickers-*Vimy*; Hounslow, 8.55 a.m.

November 13: Douglas, Alliance-*Endeavour*; Hounslow, 11.33 a.m.

November 21: Wilkins, Blackburn-*Kangaroo*; Hounslow, 10.38 a.m.

December 4: Howell, Martinsyde-*A.I.*; Hounslow, 9.45 a.m.

* A subsequent cable, dated November 28, announced that Lieutenant Parer had now definitely entered for the flight for Australia on a machine to be later decided upon, and of which the construction had not yet been commenced.

Competitors and Machines

In Order of their Departure

TEAM No. 1

M.M. POULET AND BENOIT (Caudron G4).

The machine flown by M. Poulet is of French manufacture, a Caudron G4 biplane, fitted with twin 80 h.p. Le Rhone rotary engines, developing a speed of 94 m.p.h.

The Caudron G4 was the first twin-engined aeroplane to be used by any nation over the lines. It was in extensive use for observation purposes by the French Army and, to a lesser extent, by the British and Italian Air Forces. For its horsepower it is claimed to be the most efficient machine of its class in the world. It differs from other multi-engined aeroplanes in that it has no fuselage.

Two rotary engines are carried in the small nacelles between the planes, the pilot's nacelle being situated between the engine-nacelles. The empennage is carried on four outriggers running back in line with the engines, the lower outriggers serving as landing skids. Four vertical fins and four triangular rudders are fitted above the tail, while the lower plane is approximately three-quarters of the length of the upper, and has a smaller chord.

Its petrol capacity is 650* litres (143 gallons), sufficient for 13 hours' flight, the consumption being 11 gallons per hour.

Before commencing his flight, M. Poulet increased the flying range of his machine by the addition of two petrol tanks. The loaded weight of his aerial steed is 3,170 lbs.; empty, 2,074 lbs.

Readers of this journal will remember an announcement, published in the May issue, of an ambitious flying project which had been conceived by the late French airman, Jules Védrines. *Sea, Land and Air* received a letter from Védrines' business manager in Paris (Monsieur J. L. Lhermit, proprietor of the French aeronautical journal *La Poste Aérienne*) indicating that Védrines would shortly undertake an

"Aerial Tour of the Five Parts of the World" (*Tour Aérien des Cinq Parties du Monde*), and soliciting detailed information regarding Australia. M. Lhermit's letter was received in Sydney early in April, but some weeks before the desired data could be conveyed to him Védrines had met his death.

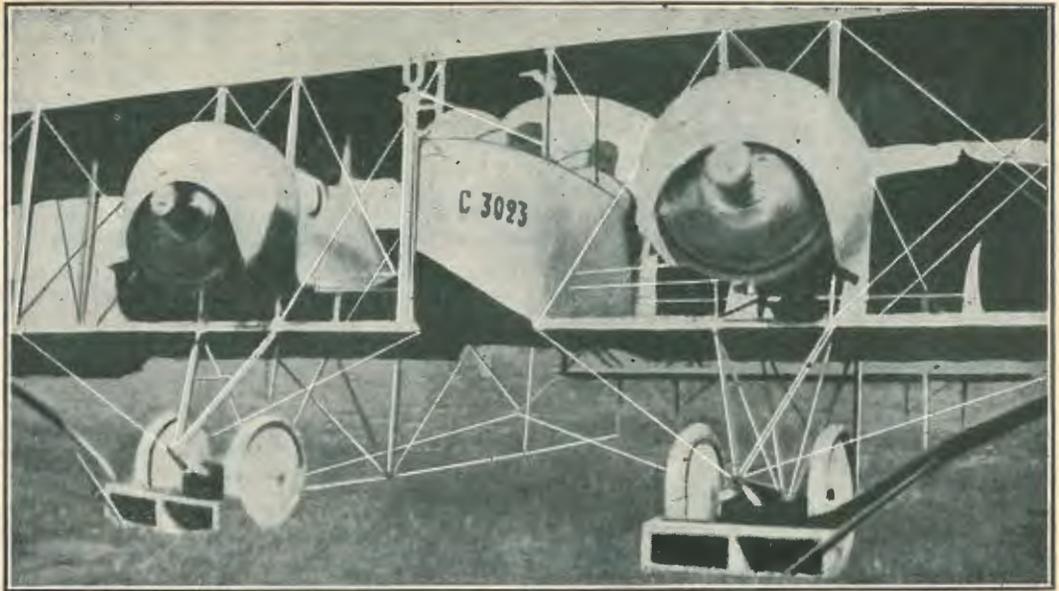
He had left Villa Coublay (the starting point of Poulet's flight to Australia) on Monday, April 21, 1919, at 6.29 a.m. with the intention of flying to Rome on a twin-engined machine with which he had planned to bomb Berlin, had not the Armistice intervened. He was seen at Laroche at 7 a.m., and the next news was that, at 10.30 a.m., his machine had fallen at Les Fauilloses, near St. Rambert d'Albon, South of Lyons, and about 350 miles from his starting point. It appears that one of his engines stopped and an attempt was made to land in a clover field. The machine, however, crashed among some vines, both Védrines and his companion, Monsieur Guillain, a photographer, being instantly killed, and the machine badly smashed.

It was in a Caudron biplane that Védrines, in January, 1919, achieved the remarkable exploit of landing on the roof of the Galeries Lafayette, in Paris, thereby winning a prize of 25,000 francs which had been lying dormant during the war.

In August, 1919, a committee was formed in Paris to erect memorials to Védrines at Villa Coublay and at St. Rambert d'Albon. It was also proposed to raise a fund for the benefit of his widow and orphaned children.

Little, however, appears to have resulted from this proposal, for on August 11, 1919, the *Pall Mall Gazette*, London, announced that Etienne Poulet, an intimate friend of the deceased Védrines, had commenced training for a 20,000 kilometres contest from London to Mel-

* For the purpose of conversion, ten litres may be taken as equivalent to two-and-one-fifth gallons.



M. Etienne Poulet's Caudron G-4 biplane, showing twin 80 h.p. Le Rhone rotary engines.



A rear view of M. Poulet's machine.

bourne. He would be accompanied by his comrade and mechanic, Benoît, and, should he win a prize, he would devote the proceeds to a fund to help the orphans of Jules Védrières.

M. Poulet has received no financial support either from the French Government or from the maker of his machine, which has been purchased from his own savings. He is unmarried, 29 years of age, and, interviewed in Paris shortly before his departure, stated that although not a champion, like his beloved comrade, he nonetheless hoped to win renown (*rénomée*), and add lustre to the annals of French aviation.

Of the many interviews, genuine and imaginary, which have been published concerning this chivalrous airman, the most interesting, in the present writer's opinion, are those contributed by Mr. Henry J. Smith (special correspondent in Paris to the *New York Globe* and *Chicago Daily News*), and by Mademoiselle Louise Faure-Favier, in *L'Oeuvre*.

Needless to add, the flight to Australia has received as much publicity at the hands of French, British and American journalists as of their fellow-scribes in the Antipodes.

Mr. Henry J. Smith, who heads his story: "Poulet to Fly to Australia—Pays Own Way," describes the interview in the following breezy style, to which one offers due homage.

PARIS, France, September 30.

A tall young man in a careless civilian suit of blue sat in the cluttered workroom at the Caudron Airdrome, sneezed and admitted that he had a cold. "I caught it in one of those confounded automobiles," he grumbled. "I shouldn't ride in them. I was collecting maps." The maps lay in confusion on the table. They were maps of every country, desert, and stretch of sea between France and Australia. He was going there. This youth of lazy blue eyes and careless sweep of blond hair was Etienne Poulet, who starts on Wednesday or Thursday on the longest airplane flight recorded, from Paris to Adelaide.

"Thursday at the latest," he said rising. "Let's see how the machines are getting on." We went through a yard filled with titanic airships and into the factory structure where a Caudron G-4 was getting its finishing touches. Poulet's mechanic, Benoist, was there peering into the complexity. He will be Poulet's only companion. They are great friends. "Benoist has been everywhere except Russia," said Poulet introducing him. Benoist's acknowledgment was a flash of white teeth. Poulet glowered at the efforts of the

workmen. "If she is not ready by Thursday," he began, but finished with a sneeze.

"Perhaps your cold will prevent your starting," was suggested. Poulet smiled. "The air will cure it, and besides I am not going for my health. You have heard—" All Paris had heard, for the Poulet adventures are unique in motive. He is going with typically Latin romanticism and with a supreme gesture of disdain for the officialdom that would not finance him unless he rejoined the army. This air hero was demobilised two months ago, but declined to re-enlist in order to obtain a subsidy for the trip to Australia. He has taken from his private fortune every centime of the 60,000 francs (\$12,000) the voyage will cost, relying on exhibitions in various cities to reimburse him. What he takes above the 60,000 francs will go to the widow and children of his comrade, Jules Védrières, who was killed last April while flying to Rome. Poulet expects to make a fortune for the little family. "There are four children, the oldest eleven years. I am very fond of them," he remarked.

But he preferred to talk of motors rather than emotions. He pointed to the shining engines with affection. "They are of the Rhone type and air cooled. What happened to the Goliath because of the great heat cannot happen to my Caudron, yet there will be heat. Java, Sumatra, the Mesopotamian deserts—" he sneezed. "The machine is not a very fast one. I shall not care to go fast except over the worst places. As for the sea the longest stretch is from Timor to Palmerston (Darwin), 835 kilometres (502 miles). The total distance is 20,500 kilometres (12,300 miles). I shall make it in a month.

"You could fly to America more easily perhaps," was suggested.

"Too much water," objected Poulet. "Benoist, wasn't there a story of some one posting a prize of \$1,000,000 for a flight around the world? Yes, we have read about it. But why do it, I do not fly for money, nor what you say, 'spectacle'."

Returning to the maps he traced the course of his route with a delicate finger pointing to Paris, Geneva, Rome, Constantinople, Bagdad, Bombay, Calcutta, Rangoon, Bangkok, Singapore, Batavia, Samarang, Koepang, Palmerston, Brisbane, Sydney, Melbourne, and Adelaide. He was tracing a month's heat, cold, peril and perhaps hunger endured for the sake of his comrade's children more than personal glory. "You return by airplane also?" was my final question. Poulet's answer was the French equivalent of "Not on your life."

* * * *

In presenting the woman's point of view, as expounded by the French lady-journalist, the present recorder has endeavoured to preserve the literal sense of the original. It might be added that no responsibility is accepted herein for Mlle. Faure-Favier's geographical data:—

To-morrow (she writes) Etienne Poulet starts off on his flight to Melbourne. Melbourne! Far distant Australia! The Indian

Ocean! The Antipodes! Take a map of the world, and let your finger travel round it as far as Melbourne. *Eh, bien!* Poulet will make a tour of this globe, above the blue seas and the continents of all colours. Twenty-five thousand *kilomètres, madame!* And then the return journey. And that in a little machine with no more accommodation than the interior of a taxi-cab!

I have seen this twin-engined aeroplane. It is painted the colour of a sunbeam (*rayon de soleil*). It is there that Poulet will take his place in front, and his mechanic at the rear.

Etienne Poulet is a tall, handsome youth, with fair hair and blue eyes. Broad-shouldered, obstinate of profile, an air of indifference, a mouth which smiles, despite its sinuous lines, and which recalls the mouths of Roman sculptors. And this air of proud energy mingled with modesty, conveys the impression of breeding, of nobility, softened by the big blue, dreamy eyes of the man from the North. (Poulet is a native of Lomgne.)

His mechanic, Benoît, is the former mechanic of the unfortunate Gilbert. Thirty years old (like Poulet), dark, serious, even grave, he *thee-thou's* his pilot with familiarity.

Both stretched out their hands to me with the grace of frank comrades. For me they unfolded their maps—thirty yards of maps! 25,000 *kilomètres*, which, in the skies, will be unrolled slowly, so slowly! I know nothing more impressive, more fascinating, than the study of these airmen's maps. When one leans across a table and examines them it all appears so charmingly simple. You go straight from Paris to Rome by following this red line. Twelve hours' flight. Then another dash: Rome to Salonika. Once again: Salonika to Constantinople. Stage by stage, one reaches Bagdad, and, crossing the Persian Gulf—a locality of great danger—one lands at Bombay. One lands on the racecourse. Thus do I learn that there is a racecourse at Bombay, as at Maisons-Lafitte. Next it is the beautiful Ceylon, island of voluptuousness! One does not descend in Ceylon. And one crosses the line. Will the navigators of the air receive their "baptism of the line," as do the navigators of the sea? From now on, no maps except sea maps. How grey they are, these maps of the sea! Here are islands; it is the Indian Archipelago. But what are there in these islands; virgin forests or suitable landing grounds?

"We shall see," replies Poulet, with a smile. "Look," he adds, "here it is written: *tall trees*, and here: *altitude, 40 mètres*. Is it the altitude of the trees?"

He smiles again at me. It is then that I notice his expression of youth and goodness. It is indeed a very generous spirit which shines out of his clear eyes. The whole of the material profit of this perilous flight is to go to the widow and orphans of the unfortunate Védrières.

"I was Védrières' friend," he tells me. "Védrières had planned to make this flight. Death prevented him. I replace him. *Voilà tout!*"

From map to map, across orange-coloured

Java, with big brown blots denoting volcanoes, we arrive at Melbourne.

"If we arrive," said Poulet to me, "I believe that the French Government will repay a portion of my expenses. I shall require ten thousand *lires* of petrol and three thousand *lires* of oil; and perhaps I may win the big Australian aviation prize; perhaps!"

Benoît's eyes glisten: "It would be for Védrières' children; they need it badly."

At these words of noble charity I said *au revoir* to the two heroes of to-morrow.

* * * *

M. Poulet's departure from Paris and daily progress is reported in the section of this article dealing (on page 590) with the actual contest between the six competing teams.

A photograph and technical description of the engines used by M. Poulet on this flight are given below:—



M. Etienne Poulet.

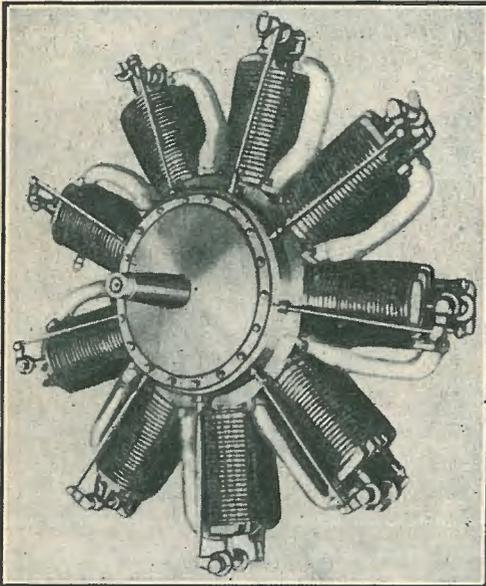
THE 80 h.p. LE RHONE ENGINE.

A Technical Description.

The Le Rhone radial revolving cylinder engine (two of which are installed in M. Poulet's Caudron G-4) has two valves (one for intake and one for exhaust) in each cylinder. By an ingenious rocker arm and tappet rod arrangement it is possible to operate both valves with a single push rod. Inlet pipes communicate with the crank-case at one end and direct the fresh gas to the inlet valve cage at the other. The crank-case, cylindrical in

form, has nine bosses provided with threaded openings into which the cylinders are screwed.

The two main peculiarities of the Le Rhone engine are the method of valve actuation by two large cams, and the distinctive crank-shaft and connecting rod big-end construction. The connecting rods are provided with "feet," or shoes, on the end which fit into grooves lined with bearing metal, the latter being machined into crank discs revolving on ball bearings and held together so that the connecting rod big ends are sandwiched between them by clamping screws. There are three grooves machined in each crank disc, and in each pair of grooves run three connecting rod big ends. Three of the rods which work in the groove nearest the crank-pin are provided with short shoes. The short shoes are used on the rods employed in cylinders 1, 4, and 7. The set of connecting rods that work in the central grooves are provided with medium-length shoes and actuate the pistons in cylinders 3, 6, and 9. The three rods that work in the outside grooves have still longer shoes, and are employed in cylinders 2, 5, and 8.



Le Rhone 80 h.p. Rotary Engine.

M. Poulet's Caudron biplane is fitted with two of these engines.

A carburettor of peculiar construction, and of very simple type, is employed in the Le Rhone engine. It is attached to the threaded end of the hollow crank-shaft by a right and left coupling. The fuel is pumped to the spray nozzle, its aperture controlled by a fuel regulating needle having a long taper which is lifted out of the jet opening when the air regulating slide is moved. The amount of fuel supplied to the carburettor is controlled by a special needle valve fitting which combines a filter screen. In regulating the speed

of the Le Rhone engine, there are two possible means of controlling the mixture: one by altering the position of the air-regulating slide, which also works the metering needle in the jet, and the other by controlling the amount of fuel supplied to the spray nozzle through the special fitting provided for that purpose.

The crank is fixed, while the cylinders can turn about the crank-shaft centre and the piston turns around the crank-pin; because of the eccentricity of the centres of rotation the piston will reciprocate in the cylinders. The explosion pressure resolves itself into the force exerted along the line of the connecting rod. An odd number of cylinders acting on one crank-pin is desirable to secure equally spaced explosions.

The magneto is driven by a gear having 36 teeth attached to crank-case which meshes with 16-tooth pinion on armature. The magneto turns at 2.25 times crank-case speed. Two cams, one for inlet, one for exhaust, are mounted on a carrying member and act on nine rocker arms which are capable of giving a push-and-pull motion to the valve actuating rocker-operating rods. A gear driven by the crank-case meshes with a larger member having internal teeth carried by the cam carrier. Each cam has five profiles and is mounted in staggered relation to the other. These give the nine fulcrumed levers the proper motion to open the inlet and exhaust valves at the proper time. The cams are driven at $\frac{45}{60}$ or $\frac{3}{4}$ of the motor speed.

The weight of the Le Rhone engine may be estimated in ratio of three pounds per horsepower. Thus each of M. Poulet's 80 h.p. engines weighs slightly over 2cwt.

Author's Note.—On the day of Captain Ross Smith's arrival in Darwin (December 10), M. Poulet was held up at Moulmein (Lower Burma), having broken a piston-rod. It should be added that even had he succeeded in reaching Australia ahead of other competitors he would have been ineligible for the Commonwealth Government prize of £10,000.

M. Poulet has now definitely abandoned the flight and will return to France by steamer.

TEAM No. 2

CAPTAIN G. C. MATTHEWS, A.F.C., and SERGEANT T. D. KAY
(Sopwith-"Wallaby").

The machine entered by The Sopwith Aviation Company, Ltd., of Kingston-on-Thames, and flown by Captain G. C. Matthews and Sergeant T. D. Kay, of the Australian Flying Corps, is a two-seater tractor biplane, fitted with a single Rolls-Royce *Eagle* (Mark viii.) engine of 360 h.p., the latest and largest type of motor designed by this firm.

In its issue dated October 22 (the day after Captain Matthews' departure from Hounslow) *The Aeroplane* (London) printed the following details of the machine, these being supplementary to a description published in the October issue of *Sea, Land and Air* :—

The Sopwith-*Wallaby* has been designed primarily to attempt the Australian flight. In general lay-out it resembles the Sopwith-*Atlantic*, but it embodies many improvements and modifications, which suggested themselves as a result of the first attempt at direct flight across the Atlantic.

The main petrol tanks are carried in rear of the engine, and extend aft to a point directly under the trailing edges of the main planes. A gravity petrol tank and water tank are carried in the centre section. The gravity tank is fitted with a flowmeter, which indicates the consumption of petrol per hour.

The pilot's and navigator's cockpit is fitted with Triplex side-windows and a floor-window in front of the pilot, who sits in front. Normally, the seats allow the crew to sit in the usual position with their heads just clear of the cockpit, but provision is made by means of which the cockpit may be converted into an enclosed cabin.

The seats are fitted with clips which allow them both to drop about a foot, and sliding doors are pulled across the openings. Four of the side windows are made to open, and a pipe running from the front radiator supplies fresh air to the crew.

Dual control is fitted throughout, and the pilot has two rudder-bars, one above the other, for the two seat positions. A tail-plane operating gear is fitted, the control wheel being situated on the left side in a position which is convenient to both pilot and navigator. The cockpit arrangements have been beautifully worked out and are fitted with every convenience for the crew.

The pilot has a system of pull-out tables for charts, etc., together with slots and receptacles to take parallel rulers and instruments. The circular opening for the pilot's head is fitted with an aluminium beading which is graduated off into degrees for use in conjunction with a sextant. In rear of the navigator are cupboards and lockers for carrying foodstuffs and any other odds and ends necessary for the journey.

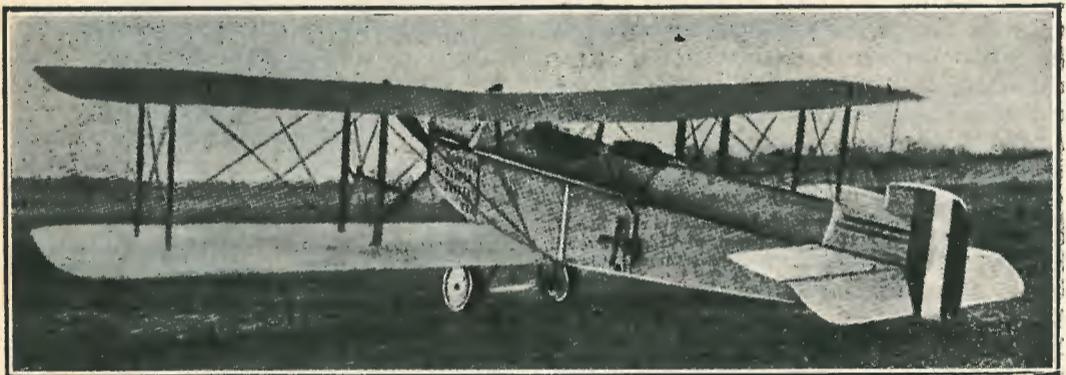
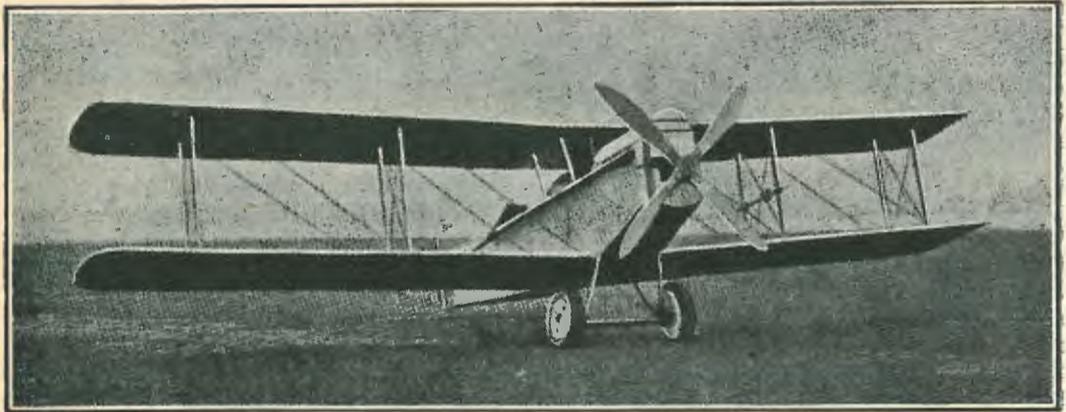
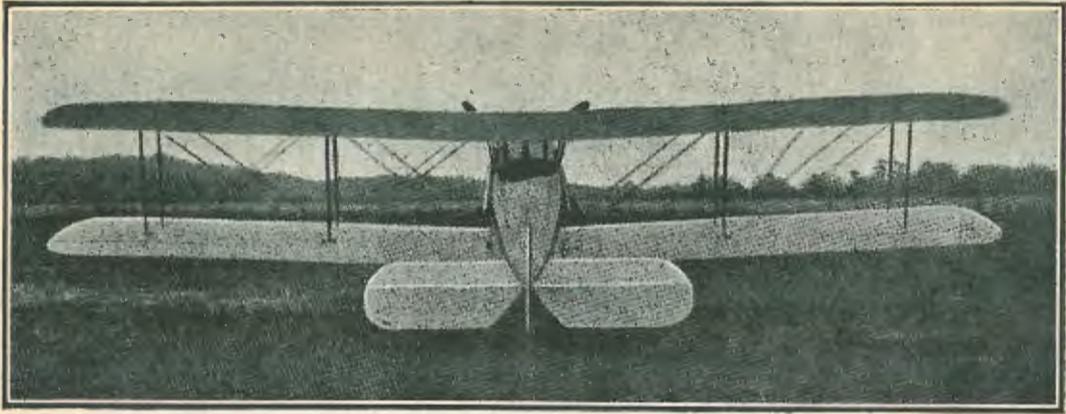
The fuselage fairing tapers down to the small rectangular fin carried above the tail-plane, to which is hinged a balanced rudder.

The main planes of 46ft. 6in. span are staggered forward three inches, and have three sets of struts on either side of the fuselage. Unbalanced ailerons are fitted to all four planes. Length, 31ft. 6in. Gap, 6ft.

The undercarriage is an ordinary steel-tube Vee-type affair, and carries two large size Palmer Aero wheels suspended in the usual Sopwith manner, that is, on a divided axle which is hinged in the centre to the cross-tubes at the apices of the Vees, and slung on shock absorbers in the usual manner.

The whole machine is a very clean job and is finished off in the typical Sopwith style, which strikes one not only as being thorough, but carefully thought out and well finished.

The machine handles very well in the air, and the fact that it has a ratio of useful load to total weight of 46.5 per cent. shows that it possesses the efficiency that one might connect with the names "Sopwith-Rolls-Royce."



Captain G. C. Matthews' Sopwith-Rolls-Royce "Wallaby" biplane.

The windmill projecting through the port side of the *fuselage* (in the bottom illustration) drives the generator for the wireless set; when not in use this may be swung inboard. Being driven by a windmill the generator can be worked when the engine is cut out, as during a glide.

From other sources one learns that the Wallaby has a loaded weight of 5,200lbs.; empty, 2,780lbs.; a petrol capacity of 330 gallons, while the oil tank contains 24 gallons and the water reservoir 17 gallons. She has a maximum speed of 121 m.p.h., cruising speed (at 15,000 ft.) of 107 m.p.h. on 15 gallons of petrol, and minimum

speed of 48 m.p.h. The exhaust is carried well aft with the object of reducing noise.

The *Wallaby* was officially entered for the flight on September 16, and should have been ready to leave on October 14. Departure, however, was postponed for a week pending slight readjustment to machine and the provision of spare propellers, which are carried by all competitors.

In a cabled report of tests carried out on October 16, the *Wallaby* is credited with having attained the extraordinary speed of *170 m.p.h. at a height of 6,000 feet, the fuel consumption on that occasion being 13 gallons per hour, or 2 gallons below the estimate, thus increasing the flying range to 1600 miles. During these tests Captain Matthews was accompanied by Mr. Harry G. Hawker, who subsequently stated that the *Wallaby* was an even better machine than the Sopwith-*Atlantic* (in which his own recent Transatlantic attempt was made), and that Captain Matthews' water-cooled engine would enable him to overhaul the French competitor, M. Poulet.

The *Wallaby* bears the international identification sign G.-E.A.K.S.

Prior to commencing the flight Captain Matthews expressed himself satisfied that nobody could have a better machine, and that the initial cost of preparations made on his behalf by the Sopwith Company was not less than £8000. The money prize offered by the Commonwealth Government would be but a secondary consideration.

MATTHEWS AND KAY.

Captain George Campbell Matthews, A.F.C., is a native of South Australia and enlisted on September 25, 1914, with the 9th Australian Light Horse. After serving with this regiment on Gallipoli he returned to Egypt and transferred first into the Camel Corps and, a few months later, into the Australian Flying Corps, training under Lieutenant-Colonel W. Oswald Watt, O.B.E.

In January, 1917, having won his wings in Egypt, Captain Matthews (then Lieutenant) embarked for England, his final training being completed at Grantham, Lincolnshire.

On September 21, 1917, he piloted one of the fifteen *D.H.-5* biplanes which made a simultaneous flight from Harlaxton to

France, where he gained his captaincy a month later (October 21.) He then returned to England as Wing-Examining Officer and was subsequently loaned as Instructor to the Experimental and Navigation Section of the Royal Air Force, his special qualification for this appointment being the possession of an extra master's certificate and pre-war service as navigating officer with Howard Smith, Limited.

Captain Matthews took a 14-day course at No. 1 Gosport School of Special Flying and, after two days, was passed out in Category I.A. His age is 36.

Experience gained in the Navigation School has enabled him to equip his *Wallaby* biplane with the most modern navigation devices.

Of noteworthy coincidence is the fact that Captain Matthews commenced the flight from England to Australia on the second anniversary of his promotion to the rank of captain.

Captain Ross Smith, as is noted elsewhere, celebrated the second anniversary of his promotion to captaincy by catching M. Poulet at Akyab (Burma).

Sergeant Thomas D. Kay is a son of the late Mr. and Mrs. T. Kay, of Spring Mount, near Creswick, Victoria. It is to his sister, Mrs. L. Whatmore, of Doveton Street, Ballarat, that thanks are due for the accompanying portrait of Sergeant Kay, who accompanies Captain Matthews as mechanic, assistant pilot and assistant navigator.

In civil life an engineering expert, he was for twelve years employed at Ballarat by Ronaldson Brothers and Tippit. He joined the Central Flying School at Point Cook (Victoria) as air mechanic, sailing for England with No. 3 Squadron, Australian Flying Corps, on October 20, 1916.

After the Armistice he entered the Rolls-Royce aero engine factory in England, and obtained his pilot's certificate.

Both Captain Matthews and Sergeant Kay are members of the Larkin-Sopwith Aviation Company of Australasia, Ltd., of Melbourne and Sydney.

THE START.

At 8.30 a.m. on Tuesday, October 21, Captain Matthews and Sergeant Kay, both wearing Australian military uniform, arrived at Hounslow Aerodrome, where they found mechanics engaged in tuning

* Probably a misprint for "107."



Captain G. C. Matthews, A.F.C.



Sergeant T. D. Kay.

up the machine, the engine of which was running in perfect condition.

The starting-board bore the notice:—

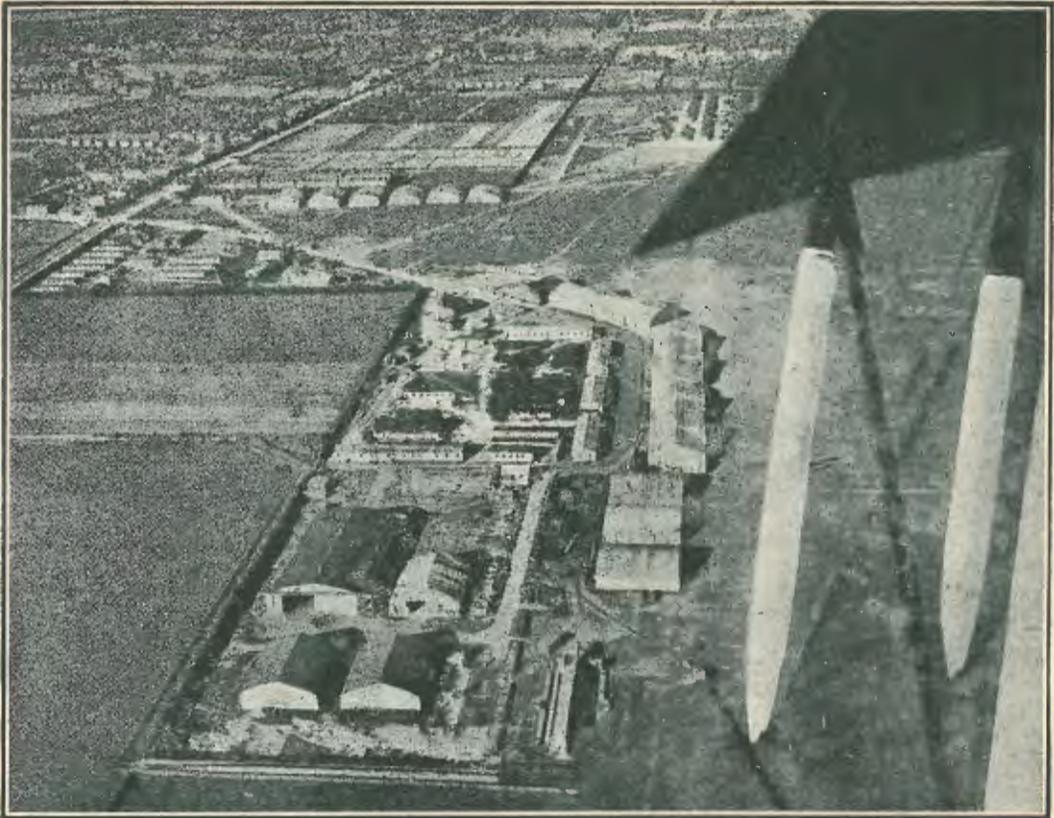
MACHINE: *SOPWITH.*
 DESTINATION: *AUSTRALIA.*
 TIME: *WHEN FOG CLEARS.*

A number of Australian and British officers had assembled to witness the first Australian machine start on its aerial journey across the world, and among them were officials of the Royal Aero Club and a few civilians, including Mr. H. C. Macfie, first president of the New South Wales Section of the Australian Aero Club. The lastnamed, in a letter since received by steamer mail, stated that he had entrusted Captain Matthews with a

written message of greeting from himself for aerial delivery to the present writer.

“I have just returned from seeing Matthews away,” wrote Mr. Macfie. “He had a good start and we are all agreed that he will get there—barring bad breakdowns, within a month, easily.”

Captain Matthews was entrusted with a letter from His Majesty King Edward to His Excellency Sir Ronald Munro Ferguson, Governor-General of the Commonwealth, while farewell messages of encouragement to the departing airmen were received from His Royal Highness Prince Albert, Major-General Sir F. H. Sykes (Controller of Civil Aviation), and the Under-Secretary of State for Air, Major-General the Hon. J. E. B. Seely.



The Starting Point.

An aerial photograph of the aerodrome at Hounslow, near London, from which the flight to Australia was commenced by Captain G. C. Matthews (*Sopwith-Wallaby*), Captain R. M. Smith (*Vickers-Wimy*), Lieutenant R. M. Douglas (*Alliance-Endeavour*), Captain G. H. Wilkins (*Blackburn-Kangaroo*), and Captain C. E. Howell (*Martinsyde-A.I.*).

During the war the Hounslow aerodrome was used as a training centre for the Royal Air Force, as mobilisation depot for squadrons proceeding overseas, and as headquarters for machines of the R.A.F. general staff. It is now one of the three official "entry" aerodromes for machines landing in Great Britain from other countries, a customs officer being permanently stationed here for their examination. Accommodation for 86 machines is provided, and the number of passengers carried from this aerodrome is about 500 weekly.

The official start was made at 11.44 a.m., the *Wallaby* circling for 25 minutes above the aerodrome before heading for the Channel. Mr. Harry G. Hawker, who had reached Hounslow in a Sopwith triplane shortly after 11.30 a.m., accompanied the competitors on the first few miles of their journey.

So great was the interest aroused in Great Britain that the *Westminster Gazette*, abandoning its habitual reserve, announced Captain Matthews' departure in headlines extending the entire width of its front page, as seen in the illustration overleaf.

Photographs of the Rolls-Royce Eagle

viii. with which the *Wallaby* is fitted appear on page 571.

In a message cabled to the Australian Press Association on the eve of the flight, Captain Matthews was reported as having planned to fly direct from London to Cologne. Subsequent reports agree that after crossing the English Channel he was forced down by dense fog and landed at Marquise, between Boulogne and Calais, approximately 100 miles from the starting point.

Resuming the flight two days later he reached Cologne at 2.2 p.m. and remained until November 2. Of this eleven-day delay no official explanation has been

given, but, cabling from London on October 31, a representative of a Melbourne daily newspaper stated that Captain Matthews, in landing at Cologne, had seriously damaged his machine, slightly injuring Sergeant Kay, who would be unlikely to proceed to Australia. On the same day a Sydney newspaper published the rumour that Captain Matthews had encountered mechanical trouble and was receiving assistance at Cologne from the 3rd Wing of the Royal Air Force.

Some while later he was reported 85 miles south, at Gonzenheim, near Mayence, and appears to have been delayed here from November 2 until November 17. Next at Dagsburg (Alsace Lorraine) 100 miles south of Mayence, where the *Wallaby*, in excellent condition, was snowbound for a further 12 days, the ground being covered to a depth of nearly two feet.

Captain Matthews is subsequently reported as having reached Vienna on November 29.

On October 25, after the arrival in Cologne, the following message was cabled by the Commonwealth Prime Minister in Melbourne to the High Commissioner in London for transmission to Captain Matthews:—

"Wish you and Sergeant Kay every success in your great adventure. Every one of your fellow citizens hopes that an Australian aviator may be the first to fly from England to Australia and so achieve what will be easily a world's record in aerial navigation. Want you to take no unnecessary risks, to plug on day after day doing your best, but do nothing foolhardy. *If you cannot make Australia in 30 days, never mind.* The main thing is that an Australian should get here first. If you do that you need not worry. Good luck."

To which Major-General Sykes replied from London as follows:—

"Your congratulatory message to Captain Matthews received. It is being transmitted to catch him *en route*. All Britishers re-echo your sentiments. Successful completion of flight would add important new link in chain of Empire."

Remembering that Captain Matthews' backers had expended £8,000 on preparations for the attempt to win the £10,000 prize offered by the Commonwealth Government, which had fixed a time limit of 30 days for the completion of the flight, one is somewhat perplexed by Mr. Hughes' exhortation to "never mind if you cannot make Australia in 30 days."



Mr. T. O. M. Sopwith, C.B.E.

Chairman of the Sopwith Aviation and Engineering Co., Ltd., Kingston-on-Thames, designers and builders of the Sopwith *Wallaby*, flown by Captain G. C. Matthews, A.F.C.
[Photo—*Flight*.]



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TUESDAY, OCTOBER 21, 1919

ONE PENNY

FINAL EDITION

THE
WESTMINSTER
GAZETTE



THE FLIGHT TO AUSTRALIA BEGUN.

OMNES

Announcing Captain Matthews' departure from London.

TEAM No. 3

**CAPTAIN ROSS SMITH, LIEUT. KEITH SMITH, SGT.-MECHANICS
J. M. BENNETT and W. H. SHIERS (Vickers-"Vimy").**

The Vickers-Vimy biplane which was officially entered on October 18, and left London for Australia on November 12, is fitted with twin Rolls-Royce "Eagle" (Mark viii.) engines, giving a total of 720 h.p. with a maximum speed of 110 m.p.h., a cruising speed of 90 m.p.h. (or 70 m.p.h. on one engine), and a landing speed of 45 m.p.h. It has a wing-span of 67ft. 2in. and an overall length of 42ft. 8in. The chord of the planes is 10ft. 6in., with a gap (height between upper and lower planes) of 10ft.

The loaded weight of the machine is approximately 6 tons and the petrol capacity, 500 gallons.

The equipment includes special thermometers and various other scientific instruments designed for the purpose of obtaining data which might facilitate future attempts.

Spare parts are stored in every corner of the machine and lashed to the outer surface of the fuselage, and, except in the case of a total smash, are considered sufficient for all repairs *en route*.

The present machine is similar to that in which the Transatlantic flight was recently accomplished by Captain Sir John Alcock and Captain Sir Arthur Whitten Brown, but has been adapted to a longer effort.

The *Vimy* was constructed at Weybridge-on-Thames in the aircraft workshops of Vickers, Ltd., its propellers being manufactured by the Lang Propeller Co., Ltd., also of Weybridge.

Its Rolls-Royce engines (each of 360 h.p.) are lubricated with Wakefield Castrol "R," and fitted with Claudel-Hobson carburettors.

The *Vimy* is manned by Captain Ross Macpherson Smith, M.C. (bar), D.F.C. (2 bars), A.F.C., No. 1 Squadron, Australian Flying Corps (South Australia).

Lieutenant Keith Macpherson Smith, R.A.F. (South Australia).

Sergeant-Mechanic James Mallett Bennett, M.S.M., A.F.M., No. 1 Squadron, A.F.C. (Victoria).

Sergeant-Mechanic Walter Henry Shiers, A.F.M., No. 1 Squadron, A.F.C. (South Australia).

* * * *

**CAPTAIN ROSS MACPHERSON
SMITH, M.C. (Bar), D.F.C. (2 Bars),
A.F.C.**

Captain Ross Macpherson Smith is a younger son of Mr. Andrew Smith, of Mutooroo Station, *via* Cockburn (near Broken Hill), South Australia, to whom one is indebted for the accompanying portraits of the two brothers, Ross and Keith.

He is 27 years of age and enlisted in the A.I.F. on August 10, 1914.

While in camp at Morphetville, South Australia, he was promoted to sergeant, and embarked for Egypt with the 3rd Australian Light Horse Regiment on October 22, 1914, sailing with the First Expeditionary Force. He took part in the historic landing on Gallipoli (April 25, 1915) where, after 4½ months' service, he gained a sub-lieutenancy.

After further service in Egypt, during which he won his second star, Captain Smith (like his lamented fellow-competitor the late Lieutenant Douglas) transferred into the Machine Gun Company attached to his regiment, and, accompanying it to the Sinai Peninsula, fought in the battle of Romani, in which the Turks were badly routed, during August, 1916.

On October of that year he joined No. 1 Squadron of the Australian Flying Corps, then newly formed in Egypt. Graduating first as observer, in which capacity he rendered valuable service for six or seven months, and later at the Cairo Flying School as pilot, he returned to No. 1 Squadron and was promoted on November 29, 1917, to the rank of captain.

Of Captain Smith's service in the Australian Flying Corps a detailed account would read almost as a fairy tale. Let the story be told in the following extracts from the *London Gazette Supplement*, in which the official announcement of five of the six decorations conferred upon him are published under the respective dates. And

be it noted that, for downright conservatism, the *Supplement* has no equal in any part of the world. Compared with the bald, laconic, phraseology of the former, those ponderous leading articles which some of us have occasionally read in the *London Times* would seem blatant and hysterical.

Here then is Captain Smith's official record:—

MILITARY CROSS.

May 11, 1917.

For conspicuous gallantry and devotion to duty when his pilot descended to the rescue of an officer who had been forced to land. On landing, he held the enemy at bay with his revolver, thus enabling his pilot to rescue the officer and to safely fly away with his machine.

BAR TO MILITARY CROSS.

March 26, 1918.

For conspicuous gallantry and devotion to duty. He was one of two pilots who carried out a remarkable series of photographs in one flight, covering an area of 45 square miles. On a later occasion he successfully bombed an important bridge-head from a low altitude, and his work throughout, as well as photography, has been invaluable and characterised by the most consistent gallantry.

DISTINGUISHED FLYING CROSS.

February 8, 1919.

During the month of June, 1918, these officers (Captain Smith and Lieutenant A. Kirk, D.F.C.) accounted for two enemy machines, and they have been conspicuous for gallantry and initiative in attacking ground targets, frequently at low altitudes. The keenness and fine example set by these officers cannot be over-estimated.

BAR TO DISTINGUISHED FLYING CROSS.

February 8, 1919.

During the operations prior to October, 1918, he took part in numerous engagements involving flights of 150 to 200 miles, and succeeded in doing extensive damage to the enemy's hangars, railways, etc. Captain Smith displayed most consistent gallantry with marked ability in all his work, whether bombing by night or day, or in personal encounters in the air. Whilst operating with the Sheriffian forces, he destroyed one enemy machine and brought down two others out of control in the desert.

SECOND BAR TO DISTINGUISHED FLYING CROSS.

February 8, 1919.

On October 19, 1918, this officer, with Lieutenant Ashley Vernon McCann as observer, engaged and drove down an enemy two-seater. As it appeared to land intact, he descended at a low altitude and, with machine-gun fire, forced the occupants to abandon the machine; he then landed alongside it and, whilst his observer covered the enemy officers, he set light to their machine and completely destroyed it. To have

effected a landing in an unknown country, many miles in the rear of the enemy's defence troops, demanded courage and skill of a very high order.

In addition to the above, a letter received a few days ago from the airman's father, states that Captain Ross Smith has been decorated with the Air Force Cross, the official *Gazette* announcing this award not having yet reached Australia.

In his experience of aeronautical conditions in the East, Captain Smith is singularly fortunate. To him falls the distinction of having piloted the first aeroplane from Cairo to Calcutta, and, by a strange coincidence, this particular flight from Egypt was commenced on the anniversary of his appointment to the rank of captain.

As the details of the Cairo-Calcutta flight have not hitherto been fully published in Australia the following record may be of interest:—

Carrying as passengers, Major-General W. G. H. Salmond, C.B., D.S.O. (Chief Officer commanding the Royal Air Force in the Middle East), Brigadier-General A. E. Borton, D.S.O., A.F.C., R.A.F. (who subsequently made the survey from Calcutta to Timor in connection with the flight from England to Australia), and two mechanics, Captain Ross Smith left the Handley-Page aerodrome at Heliopolis (Cairo) on November 29, 1918, at 7.40 a.m. and arrived at Damascus 5¼ hours later. On the following morning, he left Damascus at 7.40 and, in a single flight, covered the 495 miles to Bagdad in 6 hours 53 minutes. The journey was continued, *viâ* Bushire, Bandar-Abbas and Tehabar, to Karachi, and thence, in a non-stop flight of 485 miles, to Nasirabad, in 6 hours 35 minutes. The entire journey from Cairo to Calcutta occupied 36 hours' actual flying time, the total distance of the route flown being 2,548 miles. On the Damascus-Bagdad section, food and water supplies for seven days were carried, and General Salmond bore a letter signed by Sherif Feisul, son of the King of Hedjaz, directing the Arabs to tender any assistance required.

Captain Smith's Cairo-Calcutta flight, over country hitherto unsurveyed, has proved of the utmost value in the present contest. It is reasonably certain that landing stations were mapped out at each



Captain Ross Macpherson Smith. M.C. (Bar), D.F.C. (2 Bars), A.F.C.
Winner of the Trans-Planet Air Race.

point of descent on the experimental flight, and the official route now being flown from England to Calcutta includes most of the stations visited during the pioneer journey.

In closing this biographical note, one is struck by yet another singular coincidence surrounding the 29th of November. Not only did Captain Ross Smith receive his third star on that date in the year 1917, and leave Cairo on the Calcutta flight on the same day in 1918, but on November 29 of the present year, having flown from London to the terminal point in India, he left Calcutta for Burma and caught the French competitor, M. Poulet, at Akyab, from which point he assumed the lead in the race to Australia.

LIEUTENANT KEITH MACPHERSON SMITH, R.A.F.

Lieutenant Keith Macpherson Smith is Captain Ross Macpherson Smith's senior by two years, being now 29 years old.

After several fruitless attempts to en-



Lieutenant Keith Macpherson Smith, R.A.F.

list in the A.I.F. he finally sailed for England at his own expense and, in 1917, was accepted by the Royal Air Force.

He passed through No. 1 Gosport School of Special Flying and was appointed instructor.



Sergeant-Mechanic J. M. Bennett.

SERGEANT-MECHANIC JAMES MALETT BENNETT, M.S.M., A.F.M.

Twenty-four years of age, Sergeant James Mallett Bennett, M.S.M., A.F.M., is the son of Mr. and Mrs. James Thomas Bennett, of "Argyle," 21 Punt Road, St. Kilda, Victoria, and by civil occupation is a motor mechanic.

He enlisted in the A.I.F. in Melbourne on July 14, 1915, and embarked in the *Orsova* on March 16 of the following year, as Corporal-Mechanic in "C" Flight, No. 1 Squadron, Australian Flying Corps.

Disembarking in Egypt, he served in the Sinai and Palestine campaigns and subsequently (with Sergeant-Mechanic W. H. Shiers) accompanied Captain Ross Smith and General Borton on their survey from Calcutta to Koepang (Timor).

Sergeant Bennett then transferred into the Royal Air Force, served on the North-West Frontier of India and in the recent short-lived Afghan campaign, returning in September, 1919, to England, where he rejoined Captain Ross Smith.

For conspicuous services, Sergeant Bennett was awarded the Meritorious Service Medal and the Air Force Medal.



Sergeant-Mechanic W. H. Shiers.

**SERGEANT-MECHANIC WALTER
HENRY SHIERS, A.F.M.**

Sergeant-Mechanic Walter Henry Shiers, A.F.M., the third South Australian member of the *Vimy* team, is 27 years old, and enlisted on Easter Monday, 1915.

He served with the Light Horse in Egypt and Palestine, transferring in 1916 into No. 1 Squadron, A.F.C. He remained with Captain Ross Smith throughout the subsequent operations, accompanying him on the Cairo-Calcutta flight, and later—after a brief rest in India—on the recent Calcutta-Koepang survey.

In August (1919) returning to India after the latter journey, Sergeant Shiers received notification of having been awarded the A.F.M. for service in Palestine, a distinction shared by his comrade, Sergeant Bennett.

An electrical engineer by civil occupation, Sergeant Shiers during the two years prior to his enlistment, carried on business at Leeton and Narandera (N.S.W.), in which latter town his fiancée, Miss Helena Alford, awaits the happy sequel to the *Vimy's* gigantic effort.

THE START.

For some weeks prior to the departure from England, Captain Smith took up his

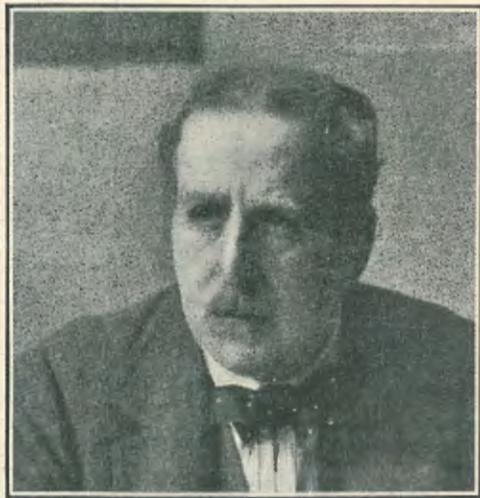
abode at Weybridge-on-Thames, and practically lived beside his machine.

Final tests were concluded at Hounslow on November 11, by Captain Sir John Alcock, whose recent Transatlantic flight had been made in a sister *Vimy*.

On the following morning, Wednesday, November 12, the *Vimy* team set out from Hounslow Aerodrome at 8.55, farewelled by officials of the Royal Aero Club and representatives of Vickers Ltd.

Messages were received from Prince Albert, General Sykes and General Seely, and in a small bag of "personal" mail Captain Smith was handed a copy of the London *Times* of that date, for aerial delivery in Melbourne to His Excellency the Governor General, Sir Ronald Munro Ferguson.

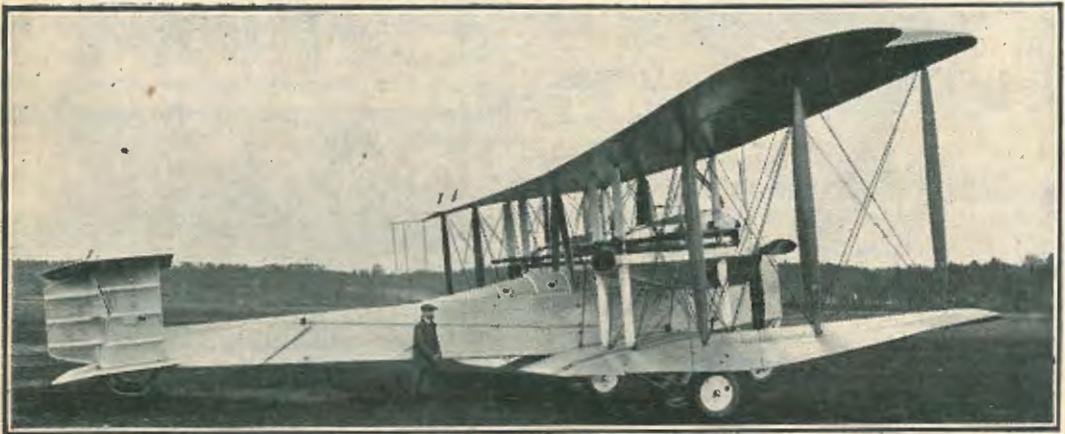
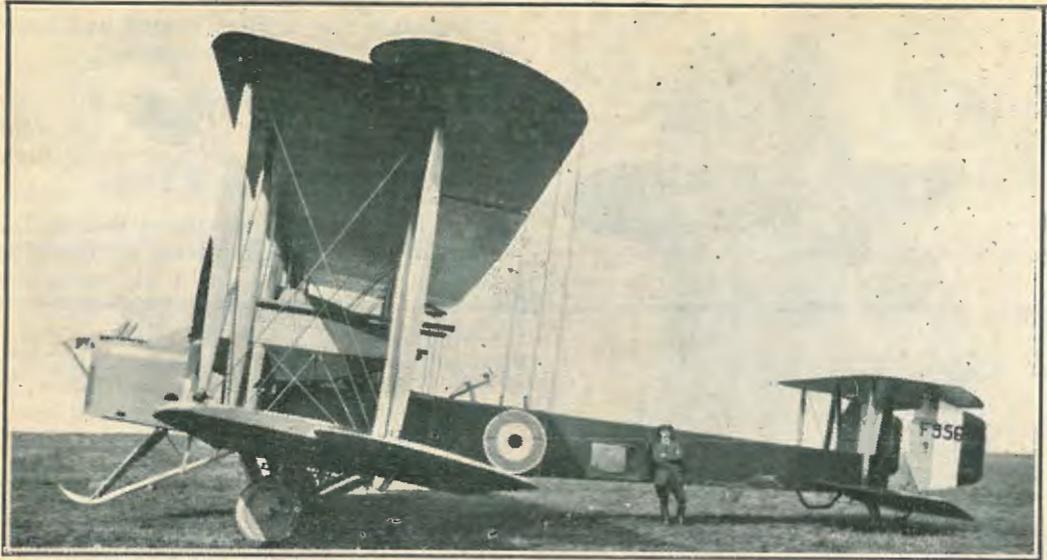
Lieutenant Keith Smith, who carries a cinematograph apparatus, "snapped" the spectators; chocks were withdrawn; the *Vimy*, rising to 2000 feet, thrice encircled the snow-covered aerodrome, and headed south in pursuit of Captain Matthews' *Wallaby*.



Mr. Claude Johnson.

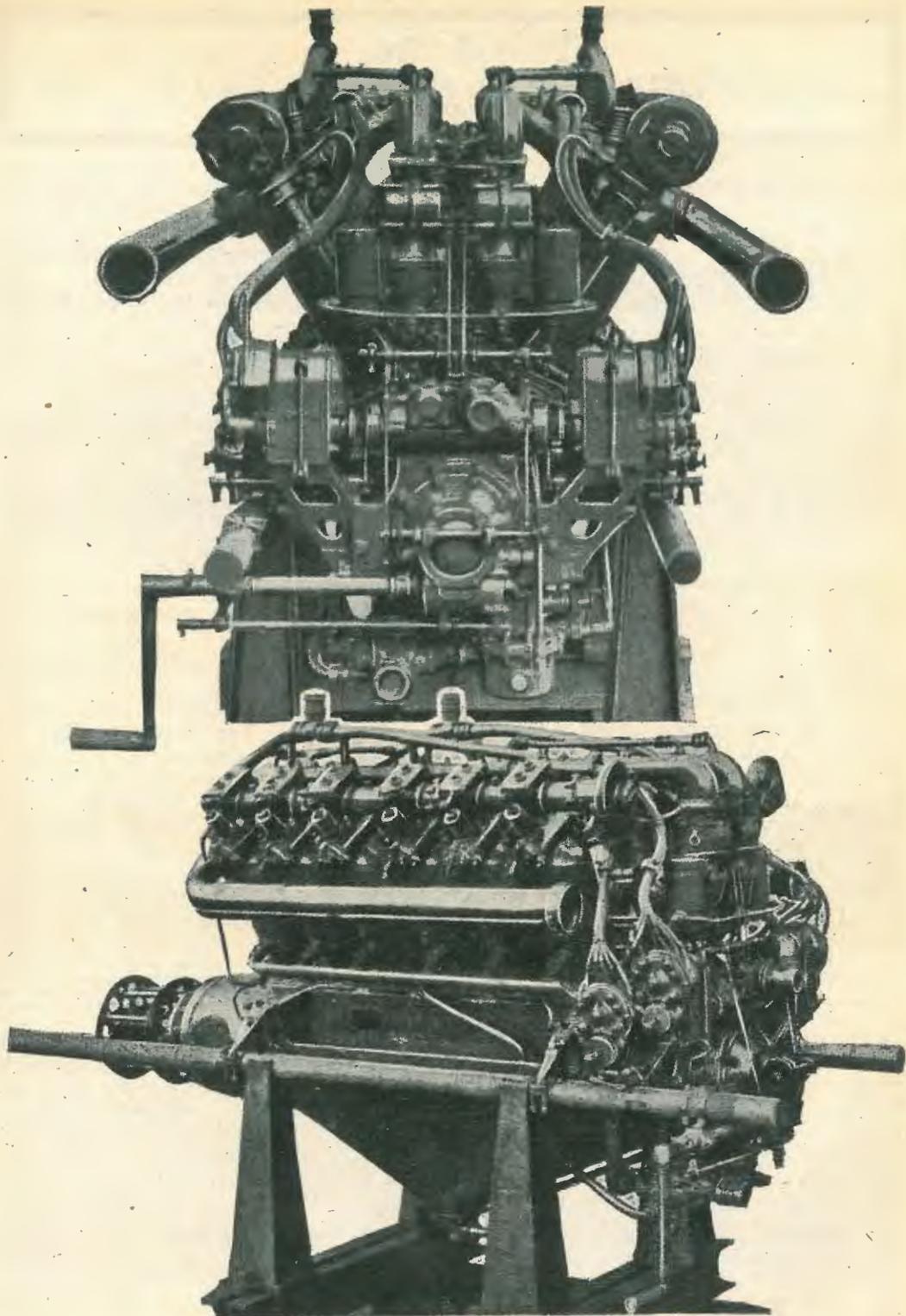
Managing Director of Rolls-Royce Ltd., makers of the aero engines with which four Australian teams are flying to Australia. Mr. Claude Johnson was the first honorary secretary of the Royal Aero Club of Great Britain, which was founded in November, 1901.

[Photo—*Flight*.]



Two Views of the Vickers-Rolls-Royce-"Vimy" Biplane.

In this machine Captain Ross Smith left London at 8.55 a.m. on Wednesday, November 11, and landed at Darwin at 3.50 p.m. on Wednesday, December 10. His actual flying time was 135 hours, and the distance flown—according to the British Air Ministry's calculations—eleven thousand two hundred and ninety-four miles. The Air Ministry's figures will probably be found more reliable than those printed in the diary of the race (page 590), the latter having been compiled from scale maps of doubtful accuracy. The official distances, point-to-point, should be accepted in preference, *viz.*:—London-Lyons 603, St. Rafael (or Fréjus) 844, Pisa (St. Giuliano) 1050, Rome (Fort Baraca) 1225, Naples (Capo di Chino) 1340, Brindisi (or Taranto) 1562, Kantara 2933, Damascus 3259, Abu Kemal 3527, Bagdad 3742, Basra 4047, Bushire 4253, Bandar-Abbas 4660, Tchabar 4933, Karachi 5401, Nasirabad 5375, Delhi 6093, Allahabad 6443, Calcutta (Fort William) 6895, Akyab 7342, Rangoon 7688, Singapore 9011, Bandoeng 9549, Soerabaia 9987, Bima 10,419, Koe-pang 10,776, Darwin (Fannie Bay) 11,294.



The Rolls-Royce "Eagle" (Mark viii.) 360 h.p. Engine.

Top: Dead front view. Bottom: Side view.

Twin engines of this type are installed in Captain Ross Smith's *Vickers-Vimy*, in Captain G. C. Matthews' *Sopwith-Wallaby* (single engine).

TEAM No. 4

THE LATE LIEUTENANTS R. M. DOUGLAS and J. S. L. ROSS (Alliance-"Endeavour").

The fourth starter in the flight to Australia was the Alliance Aeroplane Company's *Endeavour*, manned by Lieutenant Roger M. Douglas, M.C., D.C.M., as pilot, and Lieutenant J. S. Leslie Ross, as navigator, wireless operator and assistant pilot.

This machine left Hounslow Aerodrome 26 hours and 38 minutes behind the Ross Smith party, which had taken-off from the same ground at 8.55 on the previous morning (November 12), and which was then crossing the Gulf of Genoa on its second stage from Lyons to Pisa. Of the other competitors, Poulet was at Karachi, and Matthews in Maysence.

Originally designed for the Transatlantic flight, the Alliance biplane is adapted to long stages and is admittedly one of the first-grade British machines, having a greater speed and wider flying range than Captain Ross Smith's *Vimy*.

The Alliance *Seabird* (a sister machine to the ill-fated *Endeavour*), made a non-stop flight from London to Madrid on July 31, 1919, her pilot on that occasion being Captain W. R. Curtis, R.A.F., and her observer, Mr. J. A. Peters, who had designed the *Seabird* and (later) the *Endeavour*, and of whom more anon. Fitted with a single 450 h.p. Napier-"Lion" engine, the *Seabird* left the Alliance Company's aerodrome at Acton (near London) at 7.30 a.m. and, crossing the Channel between Brighton and Le Hayre, flew over Rochelle and San Sebastian at an altitude of 13,000 feet, and reached Madrid at 3.10 p.m., landing 18 minutes later at Cuetro Vientos Aerodrome. The *Seabird* had been designed and entered for the Transatlantic flight, and was to have been flown in that contest by Captain Curtis and Mr. Peters.

The machine which the Alliance Company had entered for the flight to Australia was equipped with an engine identical in every detail with that flown to Madrid, and carried 515 gallons of petrol, giving it a flying range of 3000 miles at

a speed of 100 m.p.h. The petrol tank of the *Endeavour* occupied the whole of the space between the propeller and the airmen's cabin, which was situated well back in the body, and was fitted with adjustable windows and leather chairs. The machine was 37 feet 6 inches in length, with a wing-span of 53 feet. A heavy load of directional wireless coils encircled the struts.

Lieutenant Ross' seat was in front of the instrument-board, while Lieutenant Douglas manipulated the controls from a specially constructed revolving chair immediately behind his companion.

Dual controls were installed, and the remainder of the cabin space was filled by small cupboards containing provisions and emergency equipment, among which were included a supply of quinine, aspirin, chewing gum, thirst quenchers, Thermos flasks, noise reducers, fire-extinguishers, cablegram forms, an adjustable chart-board, air-suits, two revolvers (one of which had been captured by Lieutenant Douglas from a German officer in France), and five days' rations, calculated according to calories. As a further precaution the airmen were instructed to keep two days' emergency rations attached to their air-suits in the event of a scramble from their burning machine after a possible crash.

Apparently nothing had been left to chance and, if cable messages are to be believed, Lieutenant Douglas made the following statement on October 30: "Only a mishap, such as is sometimes unavoidable with the best machine and organisation, will prevent us landing in Australia. After all, it is pioneering, with the usual pioneering difficulties, but we are splendidly backed and have left nothing to chance."

These remarks were made on the day on which Lieutenant Douglas christened the machine *Endeavour*, as a tribute to Captain Cook, who first discovered Australia from the sea—an achievement which it was hoped to emulate from the air.

The *Endeavour* was fitted with a specially designed undercarriage, having springs of great strength, and calculated to withstand unusual strain.

While testing his wireless instruments

perfectly during preliminary trial flights, the final preparations being concluded at Acton on October 30, when, in accordance with regulations governing the contest, officials of the Royal Aero Club of the



The ill-fated Alliance-Napier-"Endeavour."

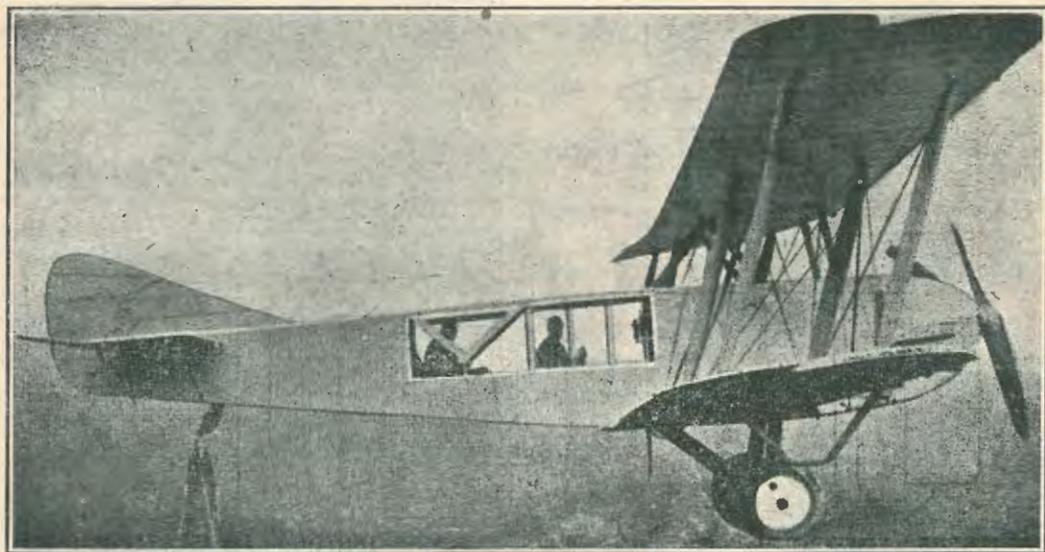
In front of the machine are some of the men and women who assisted in its construction.

prior to the final flight, Lieutenant Ross picked up messages from the American Naval Station on the Panama Canal (probably Darien).

The machine is said to have behaved

United Kingdom affixed distinctive marks and seals to the newly christened biplane.

A cable despatched on that date stated that: "The aviators then had their last



Another View of the Alliance-"Endeavour."

Showing how both pilot (Lieutenant R. Douglas) and navigator (Lieutenant J. S. L. Ross) were accommodated in the cabin.

trial spin and declared everything satisfactory; packed their food supplies, gave a final overhaul to their instruments and went early to bed, hoping that their next resting place would be Pisa." They would leave Acton at dawn on October 31, the message continued, stopping for a few moments at Hounslow, the official starting place, and then heading in a bee-line for Italy.

A later message announced that "bleak and misty weather, with fogs in the Channel," compelled them to postpone their departure on the pre-arranged date.

From October 31 until their official start on November 13, no news of Lieutenant Douglas or Lieutenant Ross was received in Australia—but on November 17, four days after the tragedy, Mr. J. A. Peters, designer of the machine, in a sworn statement at the inquest, testified that on October 30, during the preliminary flight at Acton, there was a slight crash, necessitating the replacing of a plane and portion of the *chassis*. It may reasonably be assumed that it was this "slight crash" which delayed their departure for nearly a fortnight, although the issue is somewhat obscured by a subsequent message stating that the crash in question occurred on *November 9*, when Lieutenant Douglas, landing in a strong wind, tipped up the tail of his machine and wrecked the undercarriage, at the same time sustaining an injury to his hand.

Of the two airmen who manned the ill-fated machine, the following personal records are as complete as the present writer has been able to ascertain from their friends and bereaved relatives.

LIEUTENANT ROGER M. DOUGLAS,
M.C., D.C.M.

Twenty-five years of age, Lieutenant Roger M. Douglas was a Queenslander, his parents now residing at Flinders Street, West Townsville, in that State.

A keen all-round athlete, he achieved distinction chiefly as a pugilist, winning many contests in Townsville and Charters Towers, and holding the lightweight and welterweight championships of Queensland.

By civil occupation a linotype operator on a North Queensland journal, he was a gunner in the Garrison Artillery (Commonwealth Military Forces), and on the outbreak of war joined the New Guinea Expedition, in which he served on Thursday Island.

Returning to Brisbane early in 1915, he at once enlisted in the A.I.F., and embarked for Gallipoli with the 26th Battalion (7th Brigade).

In Egypt, at the close of the Dardanelles campaign, and with the formation of individual machine-gun companies



The Late Lieutenant R. M. Douglas, M.C., D.C.M., pilot of the Alliance "Endeavour."

attached to each Brigade, he joined No. 7 Company, and, in April, 1916, with the rank of sergeant, accompanied this unit to France.

Service at Pozières, in August of that year, won him the Distinguished Conduct Medal and a sub-lieutenancy. In November, 1917, at Polygon Wood, he was awarded the Military Cross and promoted to Lieutenant.

Early in 1918 Lieutenant Douglas applied for a transfer into the Australian Flying Corps, and after training at Reading (Berkshire) during the months of March and April, graduated on May 5, 1918, and was posted to No. 6 (Training) Squadron at Minchinhampton, Gloucestershire. Here, until the cessation of hostilities, he remained as officer in charge of the Sopwith-Pup "Flight," and as general instructor on the Avro and SE5.

With him at Reading, and later at Minchinhampton, was his friend Lieutenant E. A. Astridge, of Bexley, New South Wales, to whom the writer is indebted for the accompanying photographs.

Lieutenant Astridge states that it was his brother-airman's expressed intention to engage in civil aviation on his return to Australia. This officer left England in May, 1919, and at that time Lieutenant Douglas had no "matrimonial tendencies." His engagement to Miss Mabel Woolley, whose evidence at the recent inquiry has given rise to so much comment, must, according to Lieutenant Astridge, have taken place during the last six months.

LIEUTENANT JAMES STUART
LESLIE ROSS.

Lieutenant James Stuart Leslie Ross was born at Moruya, on the South Coast of New South Wales, on October 20, 1895. His parents, Mr. John Leslie Ross and Mrs. Elizabeth Jane Ross, came to Australia many years ago from Cromarty, Scotland, and reside at "The Gonyah," Campbell Street, Moruya, where Mr. Ross Senior, who is now in ill health, carries on business as builder and contractor. Here,

too, reside the younger son, Robert, and the daughter, Jean.

Lieutenant Ross attended the Moruya Public School from 1901 until 1909, when he entered the Commonwealth Post and Telegraph Department, Moruya, as telegraph messenger.

From his home-town he passed, in turn, to the postal departments at Gundagai and Goulburn, qualifying in the latter town for promotion to telegraphist at head office (G.P.O. Sydney). After five years and ten months in the postal service, Lieutenant Ross (at the age of twenty) joined the Pacific Cable Board on August 16, 1915, as Morse operator at the Sydney Station. In February of the following year he was officially complimented for valuable work performed while temporarily loaned to the Brisbane station during interruption of the Norfolk Island-Auckland cable.

On March 1, 1916, he qualified as cable operator, from which position he resigned early in July and enlisted in the A.I.F. As a result of correspondence between the Pacific Cable Board and the District Commandant, Victoria Barracks, his military papers were cancelled and marked "Services Required in Australia." His resignation, however, was finally accepted on July 31, 1916, and on August 14 he went into camp at the Engineers' Depot, Moore Park, Sydney, for wireless training. Four weeks later he sailed for England as wireless operator with reinforcements to No. 2 Squadron, Australian Flying Corps.

At the end of 1916 he was sent to Oxford and here received his pilot's certificate, his commission as sub-lieutenant being granted on October 10, 1917.

During the ensuing three months he ferried aeroplanes across the English Channel to Australian squadrons in France.

On January 20, 1918, he was promoted to lieutenant and posted to No. 2 Squadron, Australian Flying Corps, then stationed at Beauvais, between Paris and Amiens.

In August, 1918, while flying a SE5 (fighting scout) over Douai, Lieutenant Ross engaged in a "dog-fight" (5 Australian machines against 11 German) and was wounded in the thigh. Although weakened by loss of blood he succeeded in flying his machine back to the aero-



The Late Lieutenant J. S. Leslie Ross.

Assistant pilot, navigator and wireless operator of the *Alliance-Endeavour*.

drome, where he made a safe landing. (Casualty published in official list dated October 8, 1918.) After treatment in hospital he was invalided to England, and did not rejoin his squadron.

Lieutenant Ross had over 500 hours' flying to his credit, and, preparatory to contesting the flight to Australia, passed through a special course of aerial navigation at Andover, Hants (as did Lieutenant Douglas).

On November 6, 1919, exactly one week prior to the commencement of the ill-fated flight, Lieutenant Ross' mother wrote a letter to the airman's bosom pal, Mr. H. L. McIsaacs, of North Sydney, formerly a fellow-telegraphist, at Sydney G.P.O.

Mr. McIsaacs, who visited the present writer shortly after the tragedy, produced the letter in question, and one feels that no apology is necessary for publishing the following extract therefrom:—

" . . . Dad and I are immensely proud of the boy. He was always a credit, and as good as could be. All the same we would rather he had left this business alone; it's too dangerous and uncertain, and, coming after the long strain of the war, is very hard on us.

"Still we wouldn't think of trying to prevent him taking it on. It's a glorious thing to be young and fit and have such a spirit—don't you think so?"

THE DISASTER.

After numerous delays and postponements, a start was made from Hounslow Aerodrome at 11.33 a.m. on Thursday, November 13, at an altitude of 1200 feet, as shown by Lieutenant Douglas' log-book, which was recovered after the tragedy. A few minutes later the aeroplane was seen over Surbiton, six miles from the starting point, emerging from the clouds at a low altitude, which eye-witnesses (whose evidence, by the way, appears to have been based largely on conjecture) described as "five hundred or a thousand feet."

Commenting on the disaster, the London Times, whose aeronautical correspondent is admittedly one of the leading authorities in Great Britain, said: "The cause of the machine's fall is unknown, and probably never will be known." The Times report continues: "Something serious happened at Surbiton. The machine steadily lost speed and the working of the engine became intermittent. The airmen

seemed to be seeking a place to land. Suddenly the machine nose-dived, felling a large apple tree. Lieutenant Ross was thrown through the cabin roof and was found seven yards from the machine, dead. Lieutenant Douglas was extricated from the débris, but died shortly afterwards, without regaining consciousness. Stores of food, petrol tins and spare parts were strewn round the shapeless wreckage of the machine."

It is not the purpose of this article to touch on the many distressing scenes which followed the catastrophe. Lieutenant Douglas' fiancée, Miss Mabel Woolley, would, not unnaturally, conceive a spirit of bitterness against the machine itself and against everybody concerned with its construction, and, in the circumstances, her comments during the progress of the inquest may be accepted as those of one distracted with grief at the sudden tragic loss of her affianced husband. Suffice it that the jury returned a verdict of accidental death, no blame being attached to the Alliance Company, designers and builders of the aeroplane, or to the makers of the engines, Messrs. D. Napier & Sons, Ltd.

The generally accepted theory is that of the designer, Mr. J. A. Peters, i.e., that the machine came out of the cloud in a spin, with the engine shut off, and that the pilot (Lieutenant Douglas) put her nose down in order to straighten out, but had insufficient altitude in which to right himself.

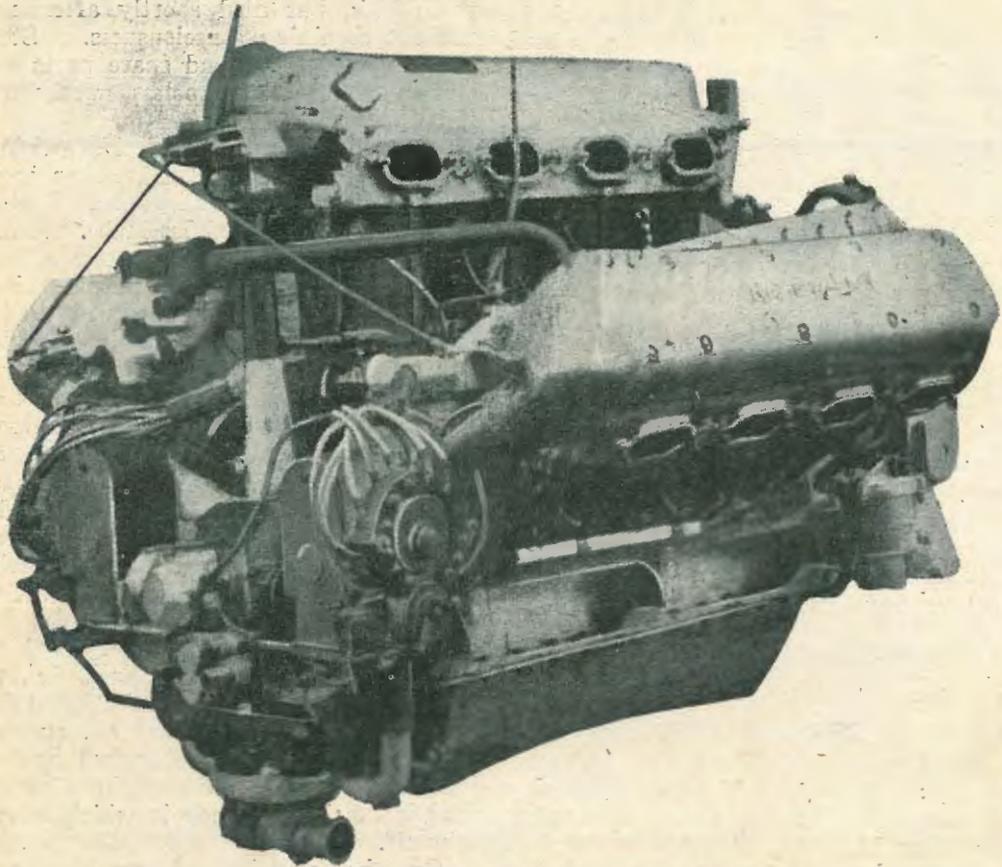
On the question of overloading, it should be noted that the *Endeavour* weighed slightly more than two tons and was lighter by some 400 pounds than the machine in which Mr. Peters had attained a height of 13,000 feet on his London-Madrid flight.

An examination of the wreckage and stripping of the engines showed no mechanical defect.

In considering the effect of cold or snow (which has been publicly offered by two prominent Sydney airmen as a probable cause of engine failure) attention is directed to the accompanying description of the 450 h.p. Napier "Lion" engine, with which the wrecked machine was fitted. In this technical description, which appeared some months ago in a British aeronautical journal of high repute, it is stated that

special attention had been given to the heating of the carburettors, the water jackets being carried down and round the throttles themselves to prevent them from freezing at high altitude.

At Brookwood Cemetery, on November 17, a large party attended the funeral of these two gallant young pioneers. A.I.F. Headquarters was represented by Colonel Durrant, who led a party of Australian



Lieutenant Douglas' Engine.

The Napier-"Lion" 450 h.p. 12-cylinder.

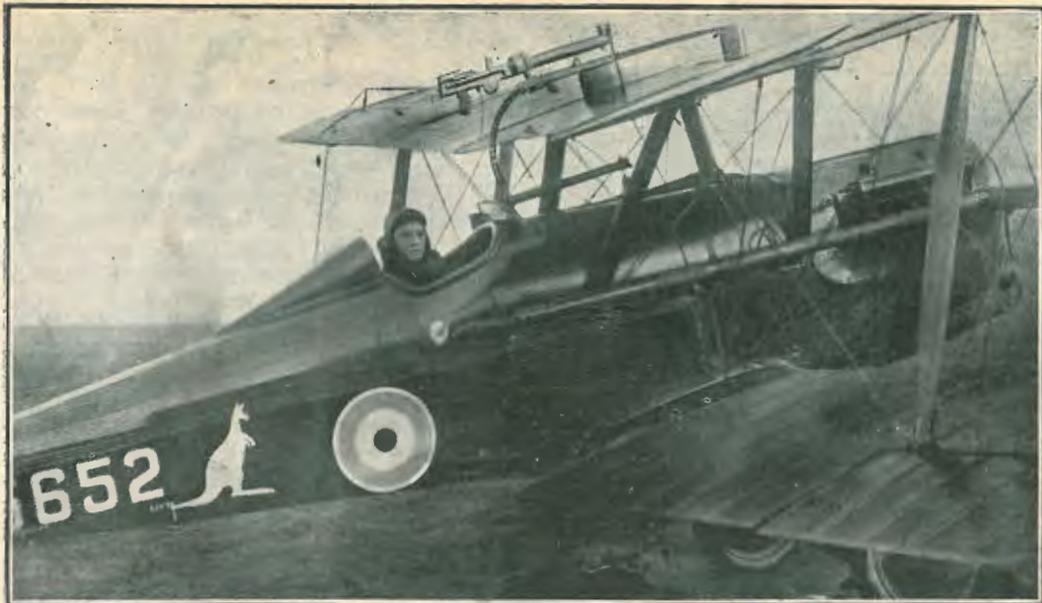
Three-quarter rear view, showing all valve-gear-drives, magnetos, pumps beneath and starter controls above.

An engine of this type was installed in the Alliance- *Endeavour* flown by Lieutenants Douglas and Ross. On being stripped, after the wreck of the machine, no mechanical defect was found in the engine.

The twelve cylinders (5½ in. bore) are arranged in three banks so that three pistons are connected to each crank-pin of the four-throw crank-shaft, the centre pistons having a master connecting rod with links for the side ones. The crank-shaft is carried in roller bearings. Made from steel forgings, the cylinders are fitted with steel jackets, while the head is of aluminium and carries the camshafts, which act directly on the valve heads. There are two inlet and two exhaust valves to each cylinder.

The carburettors are arranged low down at one end of the engine, and are fitted with separate intake pipes, with a view to eliminating any possibility of the machine catching fire owing to engine trouble. Should there be a backfire in one cylinder the other two blocks will keep the engine running and suck in the flames.

Special attention has been given to lubrication, which is entirely automatic, and designed with a view to preventing over-lubrication when the machine is dived or climbed steeply for a long time.

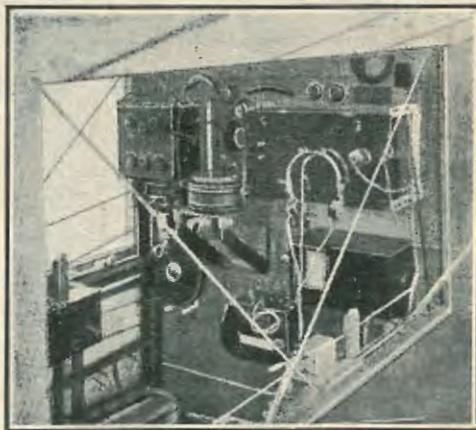


Lieutenant R. M. Douglas at Minchinhampton, England.

The machine is one of the *S.E.-5's* on which he was instructing in No. 6 Squadron, Australian Flying Corps.



A snapshot of the late Lieutenant Douglas in an "Avro" biplane. Seated on the machine is his friend, Lieutenant E. A. Astridge, also of No. 6 Squadron, A.F.C.



Lieutenant Ross' Instruments.

Instrument board and wireless apparatus in the cabin of the *Alliance-Endeavour*. These are the instruments which the late Lieutenant J. S. L. Ross had hoped to operate during the flight to Australia, and on which he had picked up messages from Darien Naval Station (Panama).

In the upper portion of the photograph, on either side of the chronometer, are the transmitting and receiving instruments, with head-telephone hanging from the latter.

The disc at bottom left hand corner is the aerial winding drum, and below it, to the right, are batteries supplying energy to the transmitting and receiving instruments.

A wind-driven high-tension generator is fitted outside the cabin.

officers acting as pall bearers. Three volleys were fired over the graveside, and an Australian bugler sounded the Last Post.

At an impressive service conducted by Chaplain-Colonel Maitland and Chaplain-Captain Heath, the Air Ministry was represented by Major W. R. Bernard, who—as has been noted in the opening portion of this article—had attended the first meeting of the Technical Committee of the Royal Aero Club, and had assisted in framing the original regulations governing the flight; the Controller of Civil Aviation—General Sir F. H. Sykes—was represented by Lieut.-Colonel R. D. Waterhouse.

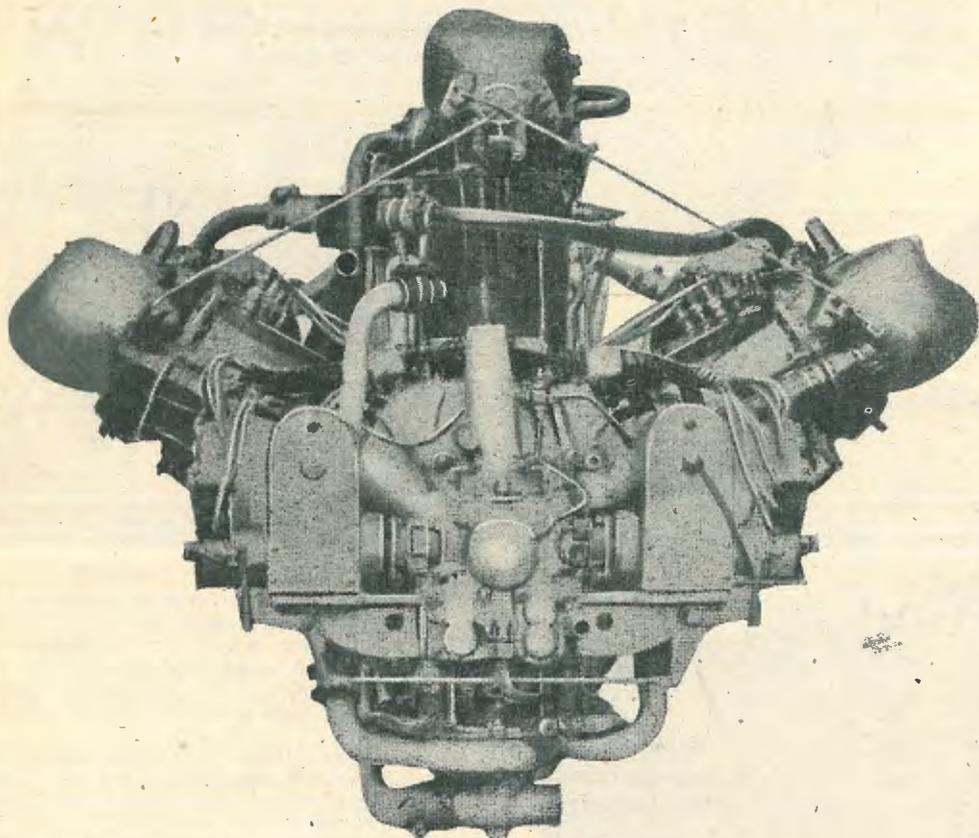
Among the many wreaths were those of A.I.F. Headquarters, the Aerodrome staff at Hounslow, brother officers in the Aus-

tralian Flying Corps, Major-General Sir F. H. Sykes and the Hon. Andrew Fisher.

In his native town, at the Methodist Church, Moruya, on Sunday, November 23, a final tribute was paid to the late Lieutenant Ross. The memorial service, conducted under the auspices of the Methodist and Presbyterian congregations, was largely attended.

Mr. and Mrs. Ross have received expressions of sympathy from all parts of the world. The Alliance Company cabled as follows:—

“The directors, staff and workpeople of Alliance Company offer you their deepest sympathy in your great bereavement. All who came in contact with Lieutenant Ross had greatest admiration for his fine qualities and grieve with you in your sad loss.”



A rear view of the Napier-“Lion” engine.

Note (on left-hand side of centre group) the equaliser and mixture distributor and connections to the other groups, for use with the starting gear.

Members of the Pacific Cable Board telegraphed:—

"Please accept our deepest sympathy in your great loss. We are proud to have had the privilege of associating with Lieutenant Ross and to have enjoyed the friendship of a brave soldier and a gentleman."

Telegrams to the parents of Lieutenant Douglas and Lieutenant Ross were received from the Australian Aero Club, while similar messages were cabled by the Royal Aero Club of the United Kingdom and the manufacturers of competing aeroplanes.

Prior to their departure from Hounslow the following farewell messages had been received by the airmen:—

From Lieutenant-General Sir John Monash, G.C.M.G., K.C.B., V.D., Director of Demobilisation, A.I.F.:—

I send my warmest wishes for the success of your flight to Australia."

From Hon. Andrew Fisher, High Commissioner for Australia:—

"May your courage and endurance be rewarded by a successful flight and a safe landing in Australia."

General Sir W. R. Birdwood, G.C.M.G., K.C.B., K.C.S.I., C.I.E., D.S.O., Aide de Camp to His Majesty the King, and General Officer Commanding the Australian Imperial Force:—

"I need hardly say how very sincerely and heartily I wish you all possible success. You know all the difficulties and dangers of the route, but you are no more daunted by these than your brother officers were by the perils of war. Go on boys, win over the forces of air and space. It is such men who have made the British Empire. Good luck. I hope to see you in Australia and congratulate you on the success won by real brave men."

Similar messages were received from Prince Albert, Major-General the Hon. J. E. B. Seely (Vice-President of the Air Council), and the Agent General for South Australia, Mr. Lucas.

LIGHTS ON THE LINE

By Lieutenant W. J. Warneford (late A.F.C.).

[In France, at the close of each day, lights and rockets were fired from British and Australian aerodromes as a guide to homing airmen.]

No evening shadows ever fall
 Without a thought of signals bright;
 To valiant knights of air they called,
 They pierced the falling gloom of night.
 They flared in green and red and white,
 To guide the airmen back to home;
 They climbed the zenith of their height,
 Then fell exhausted to the 'drome.
 To straggler, scout, and dusk patrol,
 "It's safe, land here," they seemed to
 say.
 And some came back, but, sad!—not all.
 Still they fly on in endless day.

Dedicated to the Memory of Two Gallant Airmen.

TEAM No. 5

THE INTERSTATE QUARTETTE—CAPTAIN WILKINS, LIEUTENANTS RENDLE, WILLIAMS and POTTS (Blackburn-“Kangaroo”).

One of the earliest entrants for the contest, the Blackburn-*Kangaroo* was ready to start for Australia as long ago as the second week in June; departure, however, was prevented by the Commonwealth military authorities in London, on instructions from the Prime Minister. Mr. Hughes (after consultation with General Salmond, General Groves—Deputy Chief of the Air Staff—and Colonel Williams, Australian Liaison Officer) declared that preparations for the flight were not yet sufficiently advanced and advised postponement until receipt of General Borton's survey report on the Calcutta-Koepang route. Despite the indignant outcry which greeted Mr. Hughes' decision, one is strongly inclined to commend it, and any financial loss which might otherwise have been sustained as the result of their demobilisation was made good by the Commonwealth during the five months' delay which ensued.

The Blackburn-*Kangaroo* twin-engined tractor biplane was originally designed as a fighting bomber, carrying eight-260lb. “eggs,” and a crew of three. Although essentially a land-going machine, it was in considerable use—during the concluding months of the war—for coast patrol work, in which it acquitted itself with distinct credit, as may be judged from the official admission that the *Kangaroo* accounted for at least three German submarines off the East Coast of Great Britain.

The *'Roo* was built by the Blackburn Aeroplane and Motor Co., Ltd., of Leeds and Hull, one of the oldest aircraft concerns in the world, the managing director, Mr. Robert Blackburn, having commenced his experiments early in 1908. In general lay-out and size it somewhat resembles the Handley-Page biplane, but has a wing-span of 75 feet (as against the former's 90 feet), with a gap of 9 feet. The engines are twin Rolls-Royce “Falcon” (Mark iii.), each developing 275 h.p. (giving 2000 r.p.m.), a maximum speed of 107 m.p.h., a cruising speed of 86 m.p.h. at 10,000ft., and 98 m.p.h. at 6500

ft. The loaded weight is 8017lbs.—empty 5284lbs.

A machine similar to that now flying to Australia gained notoriety in connection with the recent Aircraft Exhibition at Amsterdam. It left the Blackburn Aerodrome at Leeds (north of England) on August 8, and reached Brussels at 8.30 p.m. Having been duly inspected by King Albert of Belgium, the *Kangaroo* resumed its flight to Amsterdam and landed in the Dutch capital 95 minutes later.

In the present *Kangaroo* team four Australian States are represented: South Australia by the commander and navigator of the flight, Captain G. H. Wilkins, M.C. (of Burra); Victoria by the assistant pilot, Lieutenant D. R. Williams (of Wodonga); New South Wales by the mechanic, Lieutenant G. H. M. St. Clair Potts (of Sydney), and



Captain G. H. Wilkins, M.C. (Bar).

(From a photograph taken in Sydney prior to embarkation with the Australian Flying Corps.)

Queensland by the pilot and assistant navigator, Lieutenant V. Rendle (of Brisbane).

CAPTAIN G. H. WILKINS, M.C.

Captain George Herbert Wilkins, M.C., is journalist, scientist and explorer. He was correspondent with the Turkish Army in the last Balkan war, second in command of Stefansson's Arctic Expedition, and has recently been appointed chief of the scientific staff of Dr. Cope's forthcoming expedition to the Antarctic. In France as official photographer to the A.I.F. (and later in charge of the Australian War Records Section) he was awarded the Military Cross (with bar) for acts of cool daring under close enemy fire at Ypres and on the Hindenburg Line.

LIEUTENANT V. RENDLE, R.A.F.

Lieutenant Valdemar ("Val") Rendle is the only son of the late Dr. Richard Rendle, of Brisbane, and of Mrs. Rendle, Swann Road, Taringa, Brisbane.

From his early school days he had always been keenly interested in aeronautics and was a member of the Glider Club and the "Courier" Aeroplane Club in Brisbane. On the outbreak of war he offered his services to the Austra-

lian Flying Corps, but was rejected on account of his youth, his age at that time being 17.

In December, 1915, with seven other young Queenslanders, he sailed for England and was accepted in the Royal Flying Corps. Commencing as air mechanic he worked his way up to a first-class pilot, gaining his wings very quickly.

For some months he was Acting Flight Commander, and received his second star in March, 1917.

A letter received by the present writer from Miss Ella Rendle states that "Val was always keen on flying to Australia and has never relaxed his efforts to realise this ambition." Another of Lieutenant Rendle's sisters accompanied him to England and has made several flights with him.

His experiences cover a very wide field, including those of mechanic in an aircraft factory, testing pilot and piloting the official aerial mail from London to Paris.

He was recently married in England.

LIEUTENANT D. R. WILLIAMS.

Lieutenant Reginald ("Reg.") Williams was born at Wodonga, Victoria, 23 years ago.

He went to New South Wales in 1907 with his brother (Percy H. Williams, also



Lieutenant "Val" Rendle, R.A.F.
Pilot of the *Kangaroo*.



Lieutenant D. R. Williams.
Assistant pilot of the *Kangaroo*.

of the A.F.C.), and established a garage at Orange, where both enlisted. In 1915 Lieutenant Williams applied for admission to the Central Flying School, Point Cook, but was refused for the reason that he had not held a commission in the Citizen Forces. In 1916, on the formation of the New South Wales school at Richmond, he was among the earliest applicants to be accepted as a cadet. His pilot's certificate was granted after seven hours' flying, and he was appointed instructor in succession to Captain Andrew Lang (who recently attained the altitude record). Until Easter of 1917, he remained as instructor under Lieutenant (now Captain) W. J. Stutt. He continued his applications for admission to Point Cook, but it was not until June of that year, after a special recommendation from the N.S.W. Government, that he was accepted in the A.F.C., and immediately embarked for England, where he was attached to No. 6 (Training) Squadron at Tern Hill, Shrewsbury. Lieutenant Williams had almost completed his training on *Sopwith-Camels*, when he developed ear trouble, due to high flying. An operation was performed and on discharge from hospital he was marked "Fit for low-flying machines only." He was then transferred to No. 7 (Training) Squadron at Leighterton, where he completed his training on *R.E.8's*. He was then detailed to the "ferry service," flying new machines to France, and continued at this work until the signing of the Armistice.

He then joined his friend Lieutenant Potts, at the Grahame White works.

LIEUTENANT G. H. M. St. C. POTTS.

Lieutenant Garnsey ("Gar.") H. M. St. Clair Potts, is the second son of the Principal of Hawkesbury Agricultural College, New South Wales, and was educated at King's School, Parramatta, and Sydney Technical College. On the outbreak of war he was training as an engineer in the Australian Electric Lighting Company's works. He joined the first squad of trainees (with Lieutenant D. R. Williams) at the State School of Aviation, Richmond, where he obtained his pilot's certificate. He then passed into the Central Flying School at Point Cook, Victoria, and was granted a commission in the Australian Flying Corps, on January 11, 1917.

In May, 1917, he was sent from England

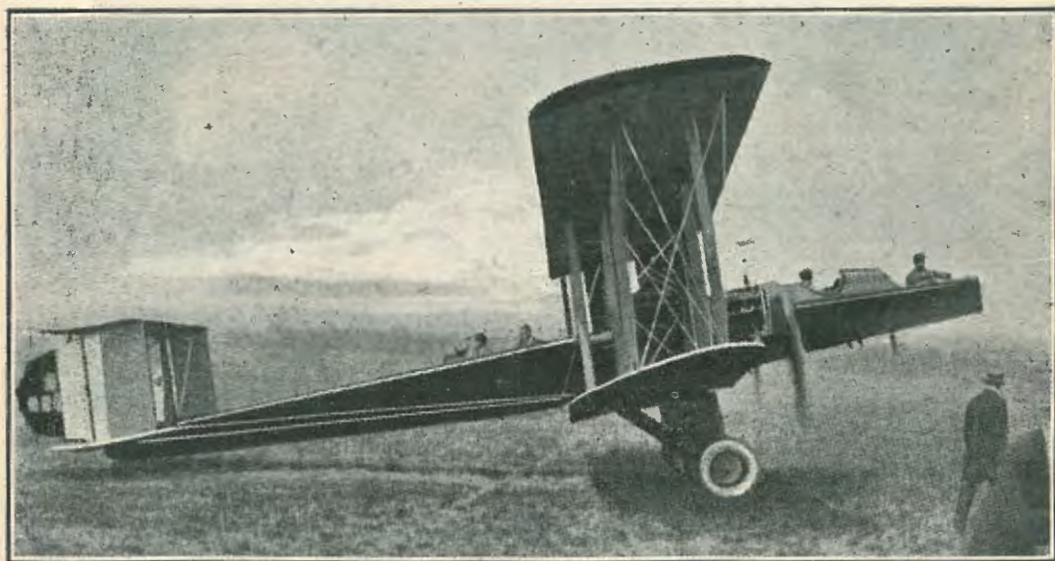
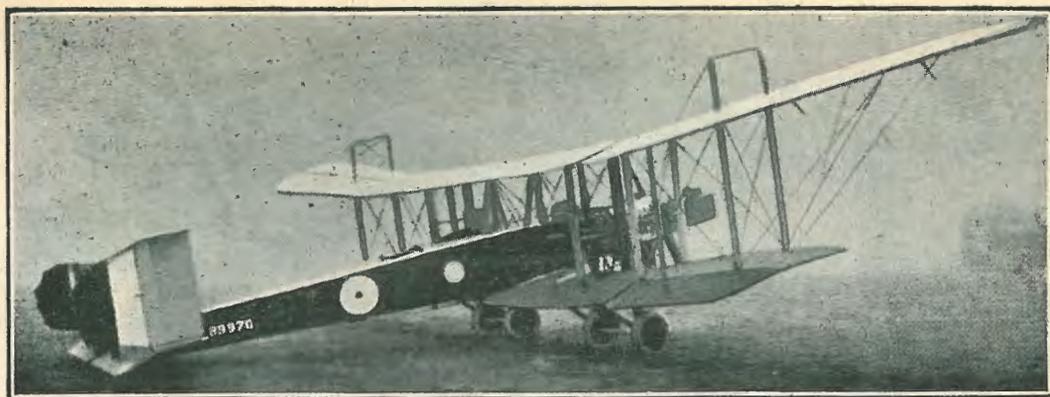


Lieutenant G. H. M. St. Clair Potts.
The *Kangaroo's* mechanic.

to No. 3 Squadron, A.F.C., then stationed at Villers Bocage, France, his flight commander being Lieutenant Nigel B. Love, who is now associated with the Australian Aircraft and Engineering Company, Sydney. A week later Lieutenant Potts was transferred, as gunnery officer, to No. 7 Squadron, Leighterton, England, where he remained until April, 1919. He then joined the Grahame White Aviation Company at Hendon and studied general construction of aircraft until the commencement of the present flight to Australia.

* * * * *

Captain Wilkins is reported to have said that the accumulation of valuable scientific data and the removal of some of the difficulties of future flights to Australia is far more attractive to him than the cash prize of £10,000, and his equipment includes wet and dry bulb thermometers, an aneroid barometer, a position finding device of his own design and numerous instruments for recording atmospheric and meteorological variations of which half-hourly *minutæ* will be recorded in a special log, compiled in accordance with the recommendations of the Air Force Research Committee. A cinematograph apparatus is carried, and the interstate quartette is armed with rifles.



Two Views of the Blackburn-"Kangaroo."

This is the biplane in which Captain G. H. Wilkins, M.C., accompanied by Lieutenants V. Rendle, G. H. M. St. C. Potts and D. R. Williams, left Hounslow Aerodrome, London, on November 18. The upper photograph shows wireless aerials, but, with a view to economising weight, Captain Wilkins subsequently decided to dispense with this equipment.

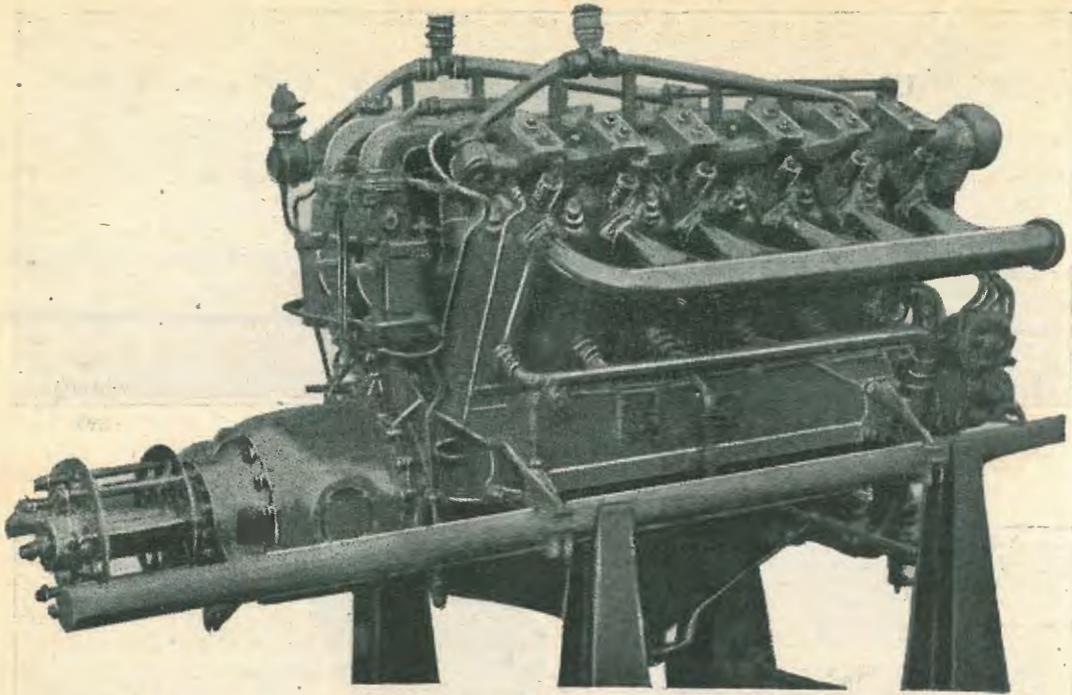
THE START.

On November 18, having been flown from the Blackburn Aerodrome at Hull (in 2½ hours) by one of the company's pilots, the *Kangaroo* was taken over by Captain Wilkins at Hounslow and put through its final tests. The machine is drab-coloured, and in huge letters on the centre of its fuselage it carries the inscription "ENGLAND TO AUSTRALIA."

Three days later, on Friday, November 21,

farewelled by Prince Albert, the Rt. Hon. W. S. Churchill, General Sykes and General Birdwood, and carrying letters for the Governor-General, the Viceroy of India and Senator Pearce, the *Kangaroo* (with Lieutenant Rendle at the joy-stick) took off within 30 yards, rose to 2500 feet, twice encircled the Hounslow Aerodrome and headed for the Channel.

A cabled description of the start adds that Rendle's bride and sister took their



Engine flown by Captain Wilkins and Captain Howell.
The Rolls-Royce "Falcon" (Mark iii.) 275 h.p.—12-cylinder.

places in the machine before taxiing to the centre of the 'drome, and that the designers and constructors sent down a silver plaque inscribed "Good luck, *Kangaroo!*" which was affixed just prior to taking the air.

The latest available information concerning the Interstate Quartette was published in the London *Times* of December 9—two days prior to Captain Ross Smith's arrival in Darwin—and is reprinted from the Sydney *Sun* :—

"Captain Wilkins left Suda Bay (Crete) on December 8 for Egypt, but the oil-pipe of the port engine of his Blackburn-*Kangaroo* 'plane broke 40 miles out, compelling him to return to Suda Bay. He is endeavouring to secure another engine."

An unconfirmed rumour states that in returning to Suda Bay the *Kangaroo* made a faulty landing and overturned.



Mr. Robert Blackburn, F.R.Ae.S., C.E., M.I.C.E.

Managing Director of the Blackburn Aeroplane and Motor Co., Ltd., Leeds and Hull; manufacturers of the Blackburn-*Kangaroo* biplane which carries Captain G. H. Wilkins, M.C., and crew.

[Photo—*Flight*.]

TEAM No. 6

CAPTAIN HOWELL AND MECHANIC FRASER (Martinsyde A.I.).

The sixth and last competitor in the flight is the Martinsyde A.I. biplane, manned by Captain Cedric Ernest Howell D.S.O., D.F.C., M.C., R.A.F., of South Australia, and Air-Mechanic George Henry Fraser, of Victoria.

The machine is fitted with a single 275 h.p. Rolls-Royce "Falcon" engine, similar to those installed in Captain Wilkins' Blackburn-Kangaroo.

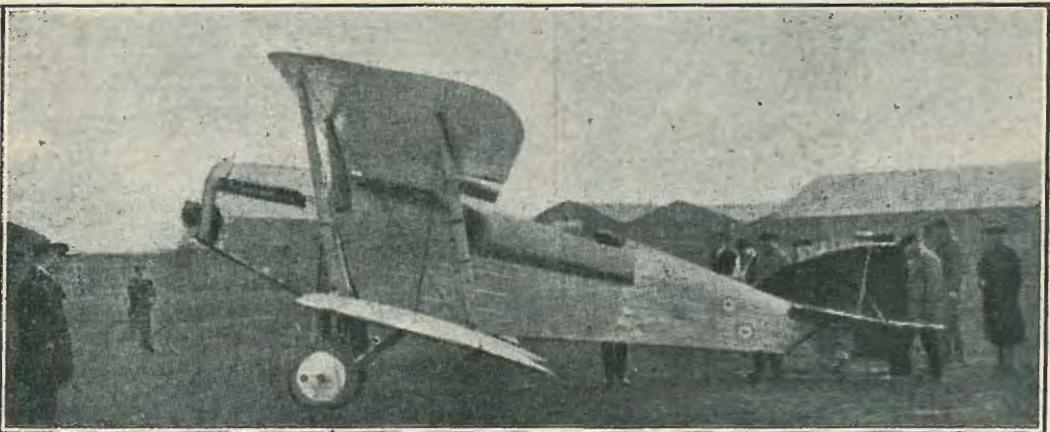
It has a wing span of 43ft. 4in., an overall length of 27ft. 5½in., a gap of 5ft. 6in., petrol capacity of 160 gallons, and its loaded weight is about 5000lbs.

Captain Howell's machine is practic-

ally identical in every respect with that entered by Mr. Raynham (Mr. H. G. Hawker's rival for the Transatlantic flight), which, as may be recalled, made an inauspicious start in endeavouring to overtake the Australian.

A similar machine, fitted with the same type of engine, left Hendon Aerodrome, London, on April 8, at 3.20 p.m. and, travelling *via* Dijon, landed at Buc Aerodrome, Paris (a distance of 215 miles), 75 minutes after its departure from London, an average speed of 172 m.p.h.—or over 2½ miles per minute—being maintained.

Captain Howell was born in Adelaide,



Two views of the Martinsyde-Rolls-Royce-"A.I." biplane on which Captain Howell left London or December 4.

and was educated at the Church of England Grammar School, Melbourne.

Being under age at the outbreak of war, his offer of enlistment in the A.I.F. was rejected by the military authorities, despite the fact that he already held a commission in the Citizen Forces. This, however, he resigned and enlisted as a private, embarking with the 16th reinforcements of the 14th Battalion.

After service in Egypt he sailed for France with the 46th Battalion and fought as a sniper in the first battle of the Somme.

In 1917 he was selected for service with the Royal Air Force, passing first through



Captain C. E. Howell, D.S.O., M.C., D.F.C.,
R.A.F., Pilot of the Martinsyde-"A.I."
From a photograph taken in England while
qualifying for his wings.

the training squadron at Durham and later to No. 17 Training School at Port Meadow, Oxford, where the type of machine then in use was the *R.E.8*. His first solo flight was made on July 24, 1917, his instructor being Captain Geoffrey F. Hughes, M.C., A.F.C., whose record was published in the November issue of *Sea, Land and Air*.

Captain Hughes states that on that date he gave Captain (then Lieutenant) Howell 30 minutes' "dual" in the morning, and one hour in the afternoon. Captain Howell's "solo" was exceedingly good—well above the average. "He was," says Captain Hughes, "a very good chap—exceedingly promising, and possessing tremendous self-confidence."

From Oxford, Captain Howell was sent to Yatesbury, where he completed his training on *D.H.-5's*.

He subsequently served in Italy, where all his distinctions were won, also mentions in despatches. The machine flown by him during the Italian campaign was the *Sopwith-Camel*.

Captain Howell is credited with having brought down thirty enemy aeroplanes, one of which is preserved by the British Air Ministry.

The *London Gazette Supplement* of September 21, 1918, states that on a recent occasion, Captain Howell, leaving his patrol of three machines, attacked nine enemy aeroplanes, destroying six and driving one down out of control, he, himself, accounting for two of these. On a former occasion, he destroyed three enemy machines in one flight. He is a fine flight officer, skilful and determined."

His M.C. was gazetted on September 16, 1918, and D.F.C. on September 21 of the same year.

A later issue of the *Supplement*, dated October 29, 1918, contains the following announcement of the award of Captain Howell's D.S.O. :—

Lieut. (T. Capt.) Cedric Ernest Howell, M.C., D.F.C.—This officer recently attacked, in company with one other machine, an enemy formation of 15 aeroplanes, and succeeded in destroying four of them and bringing one down out of control. Two days afterwards he destroyed another enemy machine, which fell in our lines, and on the following day he led three machines against 16 enemy scouts, destroying two of them. Capt. Howell is a very gallant and determined fighter, who takes no account of the enemy's superior numbers in his battles.

Captain Howell is accompanied by Second Air-Mechanic George Henry Fraser, a native of Coburg, Victoria, and a brother of Mr. William Fraser, of Messrs. Fraser and Willsford, 822 George Street, Sydney. This firm represents the Australian interests of the Sunbeam Motor Car Co., Ltd., of Wolverhampton, manufacturers of the Sunbeam-Coatalen engines, with which the mammoth airship *R.-34*, recently made its double journey across the Atlantic.

Captain Howell's mechanic, who is 40 years of age, and enlisted early in 1917, sailed for England with reinforcements to the A.F.C. in August of that year. After service with No. 1 Bombing Squadron, he took a post-armistice course of aerial navigation at Andover, and was subsequently employed with Martinsyde Limited, manufacturers of the machine now being flown, and at the Rolls-Royce aero engine factory. After having previously written to his brother in Sydney as to the likelihood of his accompanying Captain Howell on the flight to Australia, he cabled definitely on September 15, announcing the completion of arrangements. He stated that the Martinsyde *A.1.* had been tested at Brooklands both as a land plane and a

seaplane, that they were perfectly satisfied with its behaviour, and that at 120 m.p.h. it was as "steady as a rock." They expected to make 8 miles per gallon, giving a flying range of approximately 1200 miles.

On arrival at Calcutta the Martinsyde is to be converted into a seaplane by substitution of floats which have been sent on in advance.

THE START.

On Thursday, December 4, Captain Howell and Mr. Fraser made an unceremonious start at Hounslow Aerodrome at 9.45 a.m. Immediately on the arrival of the Royal Aero Club officials, the Martinsyde was wheeled out of its hangar, the airmen took their seats and, after hasty farewells, started the engine, shouting: "Ta-ta boys, we're off!"

Messages were received from Prince Albert, Mr. Winston Churchill and General Sykes.

Captain Howell carries despatches to Australia, the addressees including the Commonwealth Prime Minister, Mr. W. M. Hughes.

Captain Howell, emulating the example of Lieutenant Rendle, of the *Kangaroo* team, was married whilst in Great Britain, his wife preceding him to Australia in the *Orsova*, which Captain Howell hopes to overhaul at Naples and salute by circling over the vessel.

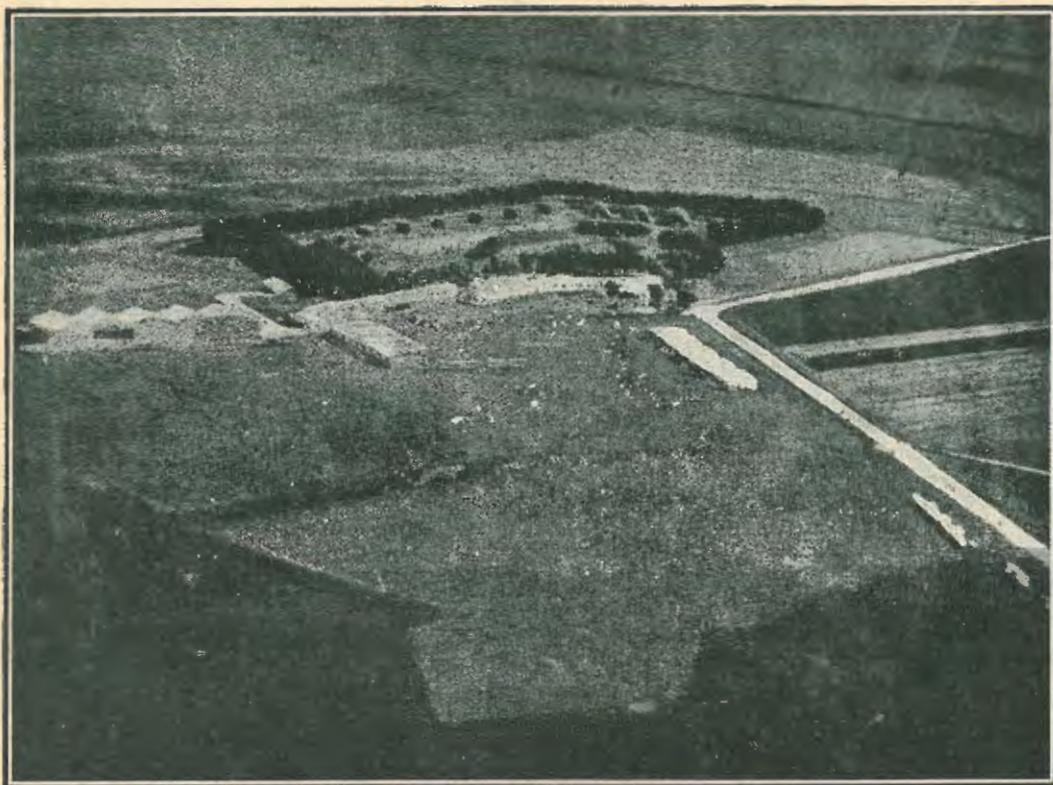


Air-Mechanic G. H. Fraser.



"Martinsyde, Limited."

Mr. Martin (right) and Mr. Handasyde (left), of "Martinsyde" Ltd., Woking, England. Manufacturers and designers of Captain Howell's biplane.



Centocelle Aerodrome, Rome.

M. Poulet landed here from Genoa on October 18, and remained three days, departing on October 20 for Naples. Captain Ross Smith descended at the same aerodrome (from Pisa) on November 15, and left next morning for Taranto. Captain G. H. Wilkins, following the same route, descended here from Pisa on November 30, leaving on December 1 for Taranto. Although as yet there is no advice to this effect, it is probable that Captain Howell, who left London on December 4, and landed at Taranto on December 8, descended *en route* at the aerodrome depicted above.

THE AIR RACE ACROSS THE PLANET

CONTINUOUS REPORT OF THE SIX-TEAM CONTEST
SHOWING DAILY POSITION FROM START TO FINISH.

The six separate teams contesting the £10,000 prize set out for Australia on different days, no two machines following identical routes. To bring each competitor into focus with the other five the following consecutive diary is presented, commencing its record of the contest with the date of M.

Poulet's departure from Paris and bringing him into touch with Captain Ross Smith's party (or *vice-versâ*) a month later.

By this method of procedure the Trans-Planet Air Race opens on October 12, and concludes with the safe arrival of the

Vickers-Vimy team at Fannie Bay, Darwin, on Wednesday, December 10.

Meanwhile one may trace the progress of the several competitors from the time of leaving their aerodromes, at Hounslow and Villa Coublay, up to final day of the contest.

(Note, the figures in parenthesis show approximate daily and total mileage flown. For British Air Ministry's official estimate of distances see page 570. See also route map on pages 596-597.)

POULET GETS AWAY.

Uniting the disconnected cable messages already received, it will be seen that M. Etienne Poulet left the Caudron Aerodrome at Villa Coublay, on the outskirts of Paris at 8.15 on the morning of *Sunday October 12, 1919*. After he had covered some 30 miles a dense fog compelled him to return. In the afternoon a second attempt was made, but on this occasion engine trouble led to a further postponement.

On *Monday, October 13*, a third ascent was commenced, but, yet again, heavy fog compelled him to return to the aerodrome. Those of us who have spent a winter in Paris will appreciate the airman's reluctance to venture aloft in an October fog.

On *Tuesday October 14*, the atmosphere having cleared, Monsieur Poulet started off in real earnest, the fourth attempt being made at 6.57 a.m.

Following the *Paris-Lyon-Méditerranée* railway (generally known as the P.L.M.) and, passing Lyons, he flew over the village of St. Rambert d'Albon and dropped a wreath inscribed "*A mon ami Védrières.*" He then appears to have headed due south (still following the P.L.M.), probably as far as Aix, and thence due east, over flat country, to Fréjus (70 miles). The alternative route from St. Rambert (where he dropped his wreath) to Fréjus (where he made his first descent) lies *S.S.E.* across the Alps, and it may be assumed that these lofty ranges would be avoided, even though *Geneva* (Switzerland) was cabled as part of the itinerary. This, however,

would most probably be intended as *Genoa* (Italy).

The first day's flight averaged a speed of 57 m.p.h. over a distance of 430 miles, and was completed at 2 p.m.

Fréjus where the last evening in M. Poulet's native France was spent, is a small town of some 4,000 inhabitants, and is situated on the Cannes Road, which follows the Mediterranean coast as far as Nice. Famous chiefly for early Roman associations, a ghost of its bygone importance still flutters itself before the tourist in the form of enormous walls, enclosing an area five times as large as the present town. The harbour was founded by Cæsar and enlarged by Augustus, who sent to Fréjus the galleys captured from Antony in the battle of Actium (B.C. 1). Fréjus was the birthplace of Agricola, the Roman general; Cornelius Gallus, the poet; and of Gérard Desargues, the famous scientist (1593).

It was while passing the afternoon in this historic old-world hamlet that M. Poulet cabled the following request to the newspapers of Australia:—

"I left Paris to-day and arrived at Fréjus. Request that preparations be made to supply me with 400 litres (88 gallons) petrol and 120 litres (26 gallons) castor-oil at undermentioned points: Palmerston (Darwin), Burketown, Townsville, Rockhampton, Brisbane, Newcastle, Sydney, Eden. Shall need your help, and will cable at each landing station. Greetings.—POULET."

On its receipt in Melbourne, the above message was conveyed to the Federal Treasurer, Hon. W. A. Watt, and referred to the Department of Defence, by whom it was stated that the necessary supplies would be made available.

Further reports of M. Poulet's progress are for, the most part, extremely disjointed, and often contradictory.

Reconstructing the route, from information thus available, one arrives at the following itinerary, which, it should be stated, cannot be officially verified until we have the complete account from M. Poulet's own lips. That he will eventually reach the land of the Southern Cross is, doubtless, the sincere wish of every man and woman who recognises the sporting nature of his attempt.

POULET (2nd day): Left FREJUS with the intention of flying to Rome. Encountering low clouds and strong winds which severely buffeted his machine, he descended a few miles beyond GENOA and remained there until the following morning. (100-530.)

Thursday, October 16.

POULET (3rd day): Crossed the Apennines and, flying S.E. over Pisa, landed at Centocelle Aerodrome, ROME, at 10.15 a.m. (270-800.)

Friday, October 17.

POULET (4th day): Left ROME at 6.30 a.m., presumably with the object of landing at Salonika, but after a flight of 161 miles a heavy snowstorm compelled him to descend at NAPLES at 10.30 a.m. (161-961.)

Saturday, October 18.

POULET (5th day): Attempted to leave Naples but was driven back by violent storm.

Sunday, October 19.

POULET (6th day): Made second attempt to start for Salonika, but was again forced back by continued bad weather.

Monday, October 20.

POULET (7th day): Left NAPLES; flew across Southern Italy, crossed Italian coastline at Brindisi and over the Straits of Otranto to the coast of Albania. Heavy rains, accompanied by sleet and snow, forced him to land at the Taviago Aerodrome near VALONA. (Albania is a Turkish province, peopled by descendants of the Illyrians, with an admixture of Slav and Greek. It may be described as a country of vendettas and climatic extremes. Poulet, arriving during an exceptionally bad season, was delayed here for eight days.) (280-1241)

Tuesday, October 21.

POULET (8th day): Weatherbound at VALONA.

MATTHEWS, flying *Sopwith-Wallaby*, left Hounslow Aerodrome at 11.44 a.m., crossed the English Channel and was driven down by fog at MARQUISE, midway between Boulogne and Calais. (85.)

Wednesday, October 22.

POULET (9th day): Weatherbound at VALONA.

MATTHEWS (2nd day): Weatherbound at MARQUISE.

Thursday, October 23.

POULET (10th day): Weatherbound at VALONA.

MATTHEWS (3rd day): Left MARQUISE, crossed the Franco-German border and landed at 2.2 p.m. in COLOGNE. (215-300.)

Friday, October 24, to Tuesday, October 28.

POULET (11th to 15th day): Weatherbound at VALONA.

MATTHEWS (4th to 8th day): Delayed at COLOGNE.

Wednesday, October 29.

POULET (16th day): Left VALONA, flew east across Turkey and landed at

SALONIKA (province of Macedonia). (180-1421.)

MATTHEWS (9th day): Delayed at COLOGNE.

Thursday, October 30.

POULET (17th day): Left SALONIKA and, continuing his eastward flight across Turkey, landed at CONSTANTINOPLE at 5 p.m., and despatched the following message

"Terrible journey after leaving Paris. Crossed Apennines in snow. Carried by gale into Albania. Made our way to Constantinople in torrential rain at an altitude of 100 mètres (328 feet). (130-1551.)

MATTHEWS (10th day): Delayed at COLOGNE.

Friday, October 31.

POULET (18th day): Delayed at CONSTANTINOPLE.

MATTHEWS (11th day): Delayed at COLOGNE.

Saturday, November 1.

POULET (19th day): Left CONSTANTINOPLE, crossed the Sea of Marmora, and heading south-west, flew over the plains of Asia Minor. (His landing place is not recorded, no information on this point having yet been received in Australia.)

MATTHEWS (12th day): Delayed at COLOGNE.

Sunday, November 2.

POULET (20th day): Continued his flight across Asia Minor and landed at KONIA, an oasis in the Salt Desert. (280-1831.)

MATTHEWS (13th day): Left COLOGNE and landed at GONZENHEIM, near Mayence, 85 miles south-east of Cologne. (385.)

Monday, November 3.

POULET (21st day): Left KONIA, flew across the Salt Desert, traversed the Taurus Mountains (10,000ft. to 12,000ft.), and landed at ADANA. This town lies some 30 miles east of the Mediterranean, and had been included in Poulet's original list of petrol stations, but for reasons not yet explained, no petrol was available. (175-2006.)

MATTHEWS (14th day): Delayed at GONZENHEIM.

Tuesday, November 4.

POULET (22nd day): Left ADANA, crossed the Cilician Plains, the Jihan River and the Gulf of Iskenderum, landing at ALEPPO (Northern Syria), where he replenished his petrol tanks. (180-2186.)

MATTHEWS (15th day): Delayed at GONZENHEIM.

Wednesday, November 5.

POULET (23rd day): Left ALEPPO. Following the Euphrates across the desert of Mesopotamia, he crossed the Persian frontier and reached BAGDAD at midday. (380-2566.)

MATTHEWS (16th day): At GONZENHEIM.

Thursday, November 6.

POULET (24th day): Left BAGDAD, and flying south-east landed about noon at BUSHIRE, on the Persian Gulf (445-3011.)

MATTHEWS (17th day): At GONZENHEIM.

Friday, November 7.

POULET (25th day): Left BUSHIRE and followed the Persian Gulf to BANDAR-ABBAS. (360-3371.)

MATTHEWS (18th day): At GONZENHEIM.

Saturday, November 8.

POULET (26th day): At BANDAR-ABBAS.

MATTHEWS (19th day): At GONZENHEIM.

Sunday, November 9.

POULET (27th day): Left BANDAR-ABBAS and flew along the coast of the Gulf of Oman to within 30 miles of the Indian frontier, landing at TCHABAR. (290-3661.)

MATTHEWS (20th day): At GONZENHEIM.

Monday, November 10.

POULET (28th day): Left TCHABAR at dawn, crossed the Indian frontier into the province of Baluchistan. Engine trouble developing, he was compelled to descend at 6 a.m. in the Indus Valley at PUSSNI (on the Gulf of Oman). During their enforced delay Poulet and his mechanic, Benoît, were attacked by hostile natives whom they dispersed with revolver fire. (65-3726.)

MATTHEWS (21st day): At GONZENHEIM.

Tuesday, November 11.

POULET (29th day): At PUSSNI, effecting repairs.

MATTHEWS (22nd day): At GONZENHEIM.

Wednesday, November 12.

POULET (30th day): Left PUSSNI and arrived at KARACHI (mouth of the Indus) at 3.30 p.m., where he spent a week overhauling his machine and installing new engines which had been sent down from Lahore. On opening up his original Le Rhone engines they were found to be in almost perfect condition, despite 90 hours' wear and tear on the flight from Paris. Departure from Karachi was further delayed by the non-arrival of maps, Poulet having decided to alter his route and fly north-east to Delhi instead of south to Bombay as originally planned. Meanwhile his mechanic, Benoît, was stricken with malarial fever. (100-3326.)

MATTHEWS (23rd day): At GONZENHEIM.

ROSS SMITH, in his Vickers-Vimy biplane, left Hounslow, LONDON, at 8.55 a.m., crossed the French coast near Boulogne, and landed at LYONS at 3.45 p.m. He had completed 450 miles at an average speed of 85 m.p.h. His engines were giving 1650 revolutions per minute. The machine on reaching Lyons was coated with ice and the instruments frozen. (450.)

Thursday, November 13.

POULET (31st day): At KARACHI.

MATTHEWS (24th day): At GONZENHEIM.

SMITH (2nd day): Left LYONS at 10 a.m. He flew along the Rivièra, crossed the Gulf of Genoa between San Remo and Spezia, and landed at PISA (56 miles south-east of Genoa), at 2.40 p.m., after what he de-

scribed at a delightful trip with sunshine all the way.

DOUGLAS and **ROSS**, in their Alliance-*En-deavour* biplane, left Hounslow at 11.33 a.m. and a few minutes later crashed, with fatal results, at Surbiton, six miles from their starting point.

Friday, November 14.

POULET (32nd day): At KARACHI.

MATTHEWS (25th day): At GONZENHEIM.

SMITH (3rd day): At PISA. As the result of heavy rain the aerodrome was under two inches of water, in which the *Vimy* was bogged.

Saturday, November 15.

POULET (33rd day): At KARACHI.

MATTHEWS (26th day): At GONZENHEIM.

SMITH (4th day): Left PISA at 8 a.m. and landed at ROME at 3 p.m. (165-915.)

Sunday, November 16.

POULET (34th day): At KARACHI.

MATTHEWS (27th day): At GONZENHEIM.

SMITH (5th day): Left ROME at 9 a.m., flew over Capua and Naples, then east over Vesuvius, reaching TARANTO at 11.45 a.m. Italian mechanics devoted remainder of day to overhauling the machine. (270-1185.)

Monday, November 17.

POULET (35th day): At KARACHI.

MATTHEWS (28th day): At GONZENHEIM.

SMITH (6th day): Left TARANTO at 8 a.m. in heavy rain and flying at an altitude of 800 feet. Crossing the Ionian Sea he followed the west coast of Greece and landed at SUDA BAY, on the north coast of Crete, at 3.45 p.m., having covered 480 miles in 7½ hours. In a message describing the flight, Captain Smith said "we nearly hit a small island"; this would appear to be Cerigotto, a tiny island off the extreme north-west coast of Crete and directly in the line of flight taken by the *Vimy*. An aerodrome had been prepared at Suda Bay, where the airmen were rendered every assistance. (480-1665.)

Tuesday, November 18.

POULET (36th day): Left KARACHI at 8.15 a.m. He crossed the Indus, flew over Hyderabad into the province of Rajputana, landing at NASIRABAD at 4 p.m. On arrival it was found that the oil distributor had been damaged and that the tank was in a leaky condition. (420-4246.)

MATTHEWS (29th day): At GONZENHEIM.

SMITH (7th day): Left SUDA BAY at 8 a.m. in bad weather. He traversed the island of Crete and crossed the Mediterranean in 2½ hours, reaching the north coast of Africa above the Gulf of Sollum (west of Alexandria), and thence east, across the Libyan Desert, to CAIRO, landing at 3.30 p.m., after a magnificent non-stop flight of 660 miles in 7½ hours (an average speed of 88 m.p.h.), thus establishing beyond all further contention the practicability of interstate aerial services for Australia. In Melbourne on this date the Prime Minister cabled a message of congratulation to Captain Smith. The message was couched in terms almost identi-

cal with that sent a few weeks earlier to Captain Matthews and repeated the exhortation: "If you cannot make Australia in thirty days, never mind." (660-2325.)

Wednesday, November 19.

POULET (37th day): At NASIRABAD, repairing damaged tank.

MATTHEWS (30th day): At GONZENHEIM.

SMITH (8th day): Left CAIRO at dawn, crossed the Suez Canal at Kantara, then over the battlefield of Romani (where he had fought in 1916 with the Machine Gunners), and along the coast to Gaza (yet another battlefield beneath which many gallant Australians lie eternally at rest). By way of Er Rumleh, Haifa and the Jordan Valley he crossed the Sea of Gallilee and landed at DAMASCUS, bringing with him the first rain which had fallen in this historic city since March. (480-2725.)

Thursday, November 20.

POULET (38th day): At NASIRABAD, still engaged on repairs.

MATTHEWS (31st day): Left GONZENHEIM and landed at DAGSBURG in Alsace-Lorraine (100 miles south-west of starting point). (485.)

SMITH (9th day): Left DAMASCUS at day-break and crossed the Arabian Desert above Tadmur and Abu Kemal, reaching the Euphrates which he followed to RAMADIEH, where he landed in a heavy gale, which developed to such intensity that the 10th Lancers were called out to hold the machine throughout the night. (375-3100.)

Friday, November 21.

POULET (39th day): At NASIRABAD.

MATTHEWS (32nd day): Snowbound at DAGSBURG.

SMITH (10th day): Left RAMADIEH at 1.15 p.m., crossed the southern portion of Mesopotamia by way of Kut, flew over the Garden of Eden and Bagdad (where Poulet had descended sixteen days earlier), and following the Persian Gulf, landed at BASRA at 4.40 p.m. He had covered 350 miles in 3 hours 25 minutes and stated that this was the first fine flying day they had had since leaving London. (350-3650.)

WILKINS, in his Blackburn-Kangaroo biplane, left LONDON (Hounslow) at 10.38 a.m., crossed the English Channel and landed at ROMILLY, 62 miles east of Paris. (240.)

Saturday, November 22.

POULET (40th day): At NASIRABAD, repairing damaged tank.

MATTHEWS (33rd day): At DAGSBURG, held up by snowstorm.

SMITH (11th day): At BASRA, overhauling machine and making adjustments.

WILKINS (2nd day): At ROMILLY, adjusting extra petrol filter.

Sunday, November 23.

POULET (41st day): At NASIRABAD.

MATTHEWS (34th day): At DAGSBURG.

SMITH (12th day): Left BASRA at 6.30 a.m., flew over Bushire (where Poulet had landed 17 days ahead of him), along the Persian Gulf, passing, en route, several emergency landing grounds which had

been prepared by the Royal Air Force, and landed at BANDAR-ABBAS (now 16 days behind Poulet) at 2.20 p.m. Here he was welcomed by the British Consul and the local Persian Governor. (360-4010.)

WILKINS (3rd day): At ROMILLY.

Monday, November 24.

POULET (42nd day): Left NASIRABAD at 11.20 a.m. and landed at DELHI at 3.20 p.m. Here he was accorded an enthusiastic reception, being welcomed by Brigadier-General N. D. K. MacEwan, C.M.G., D.S.O., commanding the Royal Air Force in India, who had sent up a pilot in a two-seater to direct the course by means of Verey lights. At Delhi, Poulet took on 100 gallons of petrol and 10 gallons of oil. He and Benoît dined that evening as guests of the Air Board. (225-4501.)

MATTHEWS (35th day): At DAGSBURG.

SMITH (13th day): Left BANDAR-ABBAS at dawn and by avoiding Tchabar and Pussni where Poulet had been compelled to descend, made a non-stop flight of 690 miles, and landed at KARACHI at 5.40 p.m.—now only 12 days behind his rival. (690-4700.)

WILKINS (4th day): At ROMILLY.

Tuesday, November 25.

POULET (43rd day): Left DELHI at dawn. On being informed of Smith's safe arrival at Karachi, he replied: "I wish him *bon voyage*." Flying over Muttra, Agra and Gwalior, he landed at ALLAHABAD at 2.10 p.m. (340-4841.)

MATTHEWS (36th day): At DAGSBURG.

SMITH (14th day): Left KARACHI at 7.40 a.m. and dispensing with Poulet's intermediate station at Nasirabad, made a brilliant non-stop flight of 675 miles to DELHI, where he landed at 4.30 p.m., and was in turn welcomed by General MacEwan and enjoyed the hospitality which had been extended to Poulet on the previous evening. One may well imagine the excitement among the quarter-of-a-million residents of Delhi at the departure of one Trans-Planet aeroplane in the morning and the arrival of a second in the afternoon of the same day. (675-5375.)

WILKINS (5th day): Left ROMILLY at 9.40 a.m. and, encountering bad weather, landed at LYONS. (240-450.)

Wednesday, November 26.

POULET (44th day): Left ALLAHABAD at 7 a.m., and flying over Benares landed at CALCUTTA at 4.40 p.m., thus completing his flight across the Indian Empire. (450-4891.)

MATTHEWS (37th day): At DAGSBURG.

SMITH (15th day): Resting at DELHI. With engines of 720 horse-power, and Poulet battling gamely along on engines of 160 h.p., the Australian could well afford a brief spell at Delhi. It was not his first aerial visit to this city, nor his first reception by General MacEwan (having previously flown there in a Handley-Page): there would be reminiscences to exchange with brother-officers of the Royal Air Force; the two mechanics would be glad to stretch their legs in a stroll round the

picturesque streets; moreover, had not Mr. Hughes particularly impressed upon him the necessity of avoiding undue haste or worry!

WILKINS (6th day): At LYONS.

Tuesday, November 27.

POULET (45th day): At CALCUTTA, cleaning and overhauling engines.

MATTHEWS (38th day): At DAGSBURG.

SMITH (16th day): Left DELHI at 10.30 a.m. At Muttra, a few miles from Delhi, he descended to repair a defective oil-gauge, resuming his flight 90 minutes later. Passing the Taj Mahal at Agra and flying over Cawnpore, he landed at ALLAHABAD at 5 p.m. (340-5715.)

WILKINS (7th day): At LYONS.

Friday, November 28.

POULET (46th day): Left CALCUTTA, crossed the mouths of the Ganges and the coast of Burma and landed at AKYAB. (340-5231.)

MATTHEWS (39th day): At DAGSBURG.

SMITH (17th day): Left ALLAHABAD at 8.30 a.m., made a short exhibition flight above the city and, assisted by a following wind, landed on the racecourse at CALCUTTA at 2.10 p.m., a few yards from the tent in which General Younghusband, commander of the fort, and other prominent residents awaited his arrival. A huge bonfire had been kindled to indicate wind direction. (450-6165.)

WILKINS (8th day): Left LYONS, and following the route flown by Poulet, landed at ST. RAFAEL, a suburb of Fréjus, at 4 p.m. According to a cabled report Lieut. Rendle stated that while at St. Rafael some person deliberately short-circuited one of the *Kangaroo's* magnetos. (200-650.)

Saturday, November 29.

POULET (47th day): At AKYAB.

MATTHEWS (40th day): At DAGSBURG.

SMITH (18th day): Left CALCUTTA at 8.30 a.m. On his departure he was farewelled by Lord Ronaldshay and entrusted with the first aerial mail from India to Australia. Smith's mail-bag is said to contain Christmas greetings to Mr. Webster, Postmaster-General of the Commonwealth, and one would give much to be present at the delivery. Crossing the Ganges to Chitragong and thence south along the coast of Burma, he landed at AKYAB at 1 p.m. Poulet was here, too, but no reference has been made to any meeting between the rival airmen. (340-6505.)

WILKINS (9th day): Left ST. RAFAEL at 9.30 a.m. and landed at PISA, where Smith's machine had been bogged a fortnight previously. (180-830.)

Sunday, November 30.

POULET (48th day): Left AKYAB, landed at RANGOON 12.50 p.m. (320-5541.)

MATTHEWS (41st day): At DAGSBURG.

SMITH (19th day): Left AKYAB at 7.30 a.m. and, flying along the Irrawaddy at 3000

feet, reached the railway which he followed as far as RANGOON, landing here at 11.50 a.m.—an hour ahead of his rival, who had commenced the flight from Paris a month before Smith left France. According to cabled reports, the excitement at Rangoon was intense, both airmen being welcomed on arrival by the Lieutenant-Governor (by whom they were subsequently entertained) and General Fowler (whom one may perhaps be pardoned for confusing with Colonel I. G. V. Fowler, A.F.C., of the Royal Air Force). They were presented also to Sir Reginald and Lady Craddock, who offered congratulations on their safe arrival. Captain Smith cables that Burmese residents to the number of 40,000, viewed the arrival. They referred to the aeroplanes as "flying gharries," and against their demonstrative curiosity both machines were protected by a cordon of native troops. (320-6825.)

WILKINS (10th day): Left PISA and, flying against a strong wind, landed at ROME. (165-995.)



Rangoon.

Where Ross Smith assumed the lead.

Monday, December 1.

POULET (49th day): Left RANGOON at 7.25 a.m. (25 minutes behind Smith), and flew towards the border of Siam. Encountering a heavy mist and fearing to lose his way while crossing the Gulf of Martaban, he returned to RANGOON at 2 p.m.

MATTHEWS (42nd day): At DAGSBURG.

SMITH (20th day): Left RANGOON at 7 a.m., crossed the Gulf of Martaban and the western border of Siam. After leaving Moulmein (on the Burma-Siamese frontier) a heavy storm drove the *Vimy* out of its course and delayed the journey. A landing was made at 1 p.m. at BANGKOK (capital of Siam), where assistance was given by the Siamese Aviation Corps. (360-7185.)

WILKINS (11th day): Left ROME for Taranto.

Tuesday, December 2.

POULET (50th day): At RANGOON. In his second attempt to leave for Bangkok the tyres of his landing wheels punctured.

MATTHEWS (43rd day): Left DAGSBURG and landed at VIENNA. (460-945.)

SMITH (21st day): Left BANGKOK at 7 a.m., escorted during the first 50 miles by four Siamese machines. Flying due south he landed at 1 p.m. at SINGORA, in the extreme south-east of Siam. The flight was made in monsoonal rains, described by Captain Smith as the worst flying conditions he had ever experienced. The aerodrome was wet and stumpy, and while taxiing along it one of the *Vimy's* tail-skids struck an obstacle and snapped. The airmen were entertained by Prince Yugala and local officials, while supplies of petrol were ordered by telegram from the Asiatic Petroleum Co., at Penang (Straits Settlements). (400-7585.)

WILKINS (12th day):

Wednesday, December 3.

POULET (51st day): At RANGOON.

MATTHEWS (44th day): At VIENNA.

SMITH (22nd day): Delayed at SINGORA by torrential rain. The *Vimy* crew worked all day repairing the damaged tail-skid, while convicts were detailed to remove the stumps which had endangered the visiting airmen. Supplies of petrol from Penang reached the aerodrome during the evening.

Settlements) at 5 p.m., after a wet journey at low altitudes, mostly 500 feet. This was Smith's 27th birthday and the airmen were warmly welcomed by a large crowd of spectators. Singapore is the control station arranged by the Royal Aero Club. The route thence to Darwin now becomes a sort of No-Man's-Land, so far as the Royal Aero Club is concerned. (410-7995.)

WILKINS (14th day): At TARANTO.

HOWELL, flying a Martinsyde *AI* biplane, left LONDON (Hounslow) at 9.45 a.m.

Friday, December 5.

POULET (53rd day): at RANGOON.

MATTHEWS (46th day): At VIENNA.

SMITH (24th day): At SINGAPORE, preparing for final stage of flight. Discarded all superfluous kit and spares.

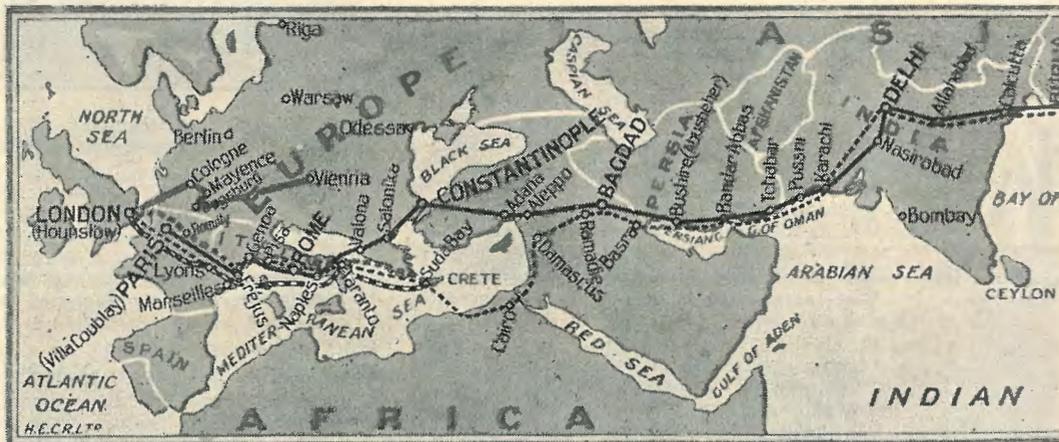
WILKINS (15th day): Left TARANTO, landed at SUDA BAY. (480-1745.)

HOWELL (2nd day):

Saturday, December 6.

POULET (54th day): At RANGOON.

MATTHEWS (47th day): At VIENNA.



Actual route flown by each competing team.

WILKINS (13th day): Landed at TARANTO. (270-1265.)

Thursday, December 4.

POULET (52nd day): At RANGOON.

MATTHEWS 45th day): At VIENNA.

SMITH (23rd day): Left SINGORA at 10 a.m., and flying south across the Malay Peninsula, landed at SINGAPORE (Straits

SMITH (25th day): Left SINGAPORE at 7 a.m., circled over the city, flew south along the coast of Sumatra, over dense jungle and above The Thousand Islands to Tangerang—thence followed railway past Batavia, and landed at KALIDJATI (Bandung) at 4 p.m. Welcomed by Governor-General of Java and flying officers. The *Vimy* team were presented with laurel leaves. (360-8365.)

WILKINS (16th day): At SUDA BAY.

and the *Kangaroo* returned to SUDA BAY on the starboard engine.

HOWELL (3rd day):

HOWELL (5th day): Landed at TARANTO. (1185.)

Sunday, December 7.

Tuesday, December 9.

POULET (55th day): At RANGOON.

POULET (57th day): Left MOULMEIN 9 a.m. Fogbound over Siamese Mountains and returned to Moulmein, having broken one of his propeller-blades.

MATTHEWS (48th day): At VIENNA.

MATTHEWS (50th day): At VIENNA.

SMITH (26th day): Left KALIDJATI at 7.30 a.m. Arrived at SOERABAIA at noon. 360-8725.)

SMITH (28th day): Landed ATAMBOEWA TIMOR 3.30 p.m. (460-9225.)

WILKINS (17th day): At SUDA BAY.

WILKINS (19th day):

HOWELL (4th day):

Monday, December 8.

POULET (56th day): Left RANGOON at 8 a.m. Again crossed Gulf of Martaban and landed at MOULMEIN at 10 a.m. (100-5641.)

HOWELL (6th day): Left TARANTO for SUDA BAY.

Wednesday, December 10.

MATTHEWS (49th day): At VIENNA.

POULET (58th day): At MOULMEIN.

SMITH (27th day): Left SOERABAIA at 11.55 a.m. (In taking-off at 9 a.m. along a native-built bamboo "way" one of the *Vimy's* landing wheels became entangled in a splinter of bamboo diverting her course onto swampy ground in which the machine sank above the axle and remained thus for 2½ hours despite efforts of 200 coolies.)

MATTHEWS (51st day): At VIENNA.

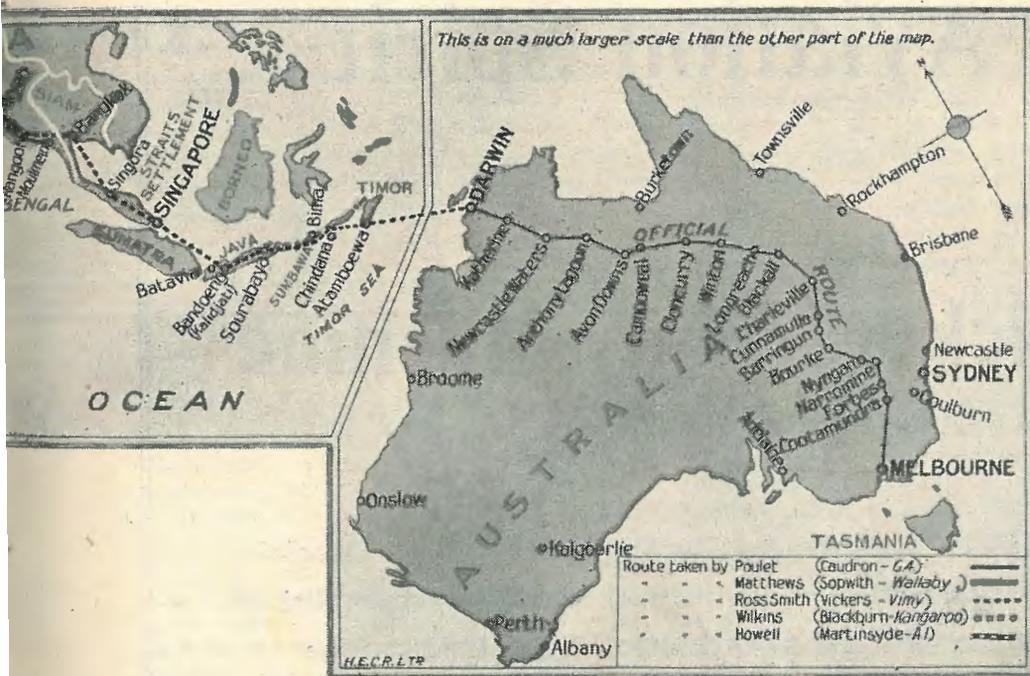
SMITH (29th day): Left ATAMBOEWA 3.20 a.m. Flew over Gulf of Carpentaria and crossed Australian coast line at 3.20 p.m.

LANDED AT DARWIN, AUSTRALIA, 3.50 p.m. (300-9885.)

WILKINS (18th day): Left SUDA BAY for Egypt. After covering 40 miles the main return oil pipe of the port engine broke

WILKINS (20th day):

HOWELL (7th day):



England=Australia Flight

Captain Ross Smith

used

“SHELL”
Aviation Spirit

in his

Vickers=Vimy Machine

“SHELL” was also used by Captain Sir John Alcock in the Vickers-Vimy machine with which he accomplished his successful Trans-Atlantic Flight in June last

FROM ASIA TO AUSTRALIA

PERILS OF THE ARCHIPELAGO — DESCRIPTION OF THE ROUTE.

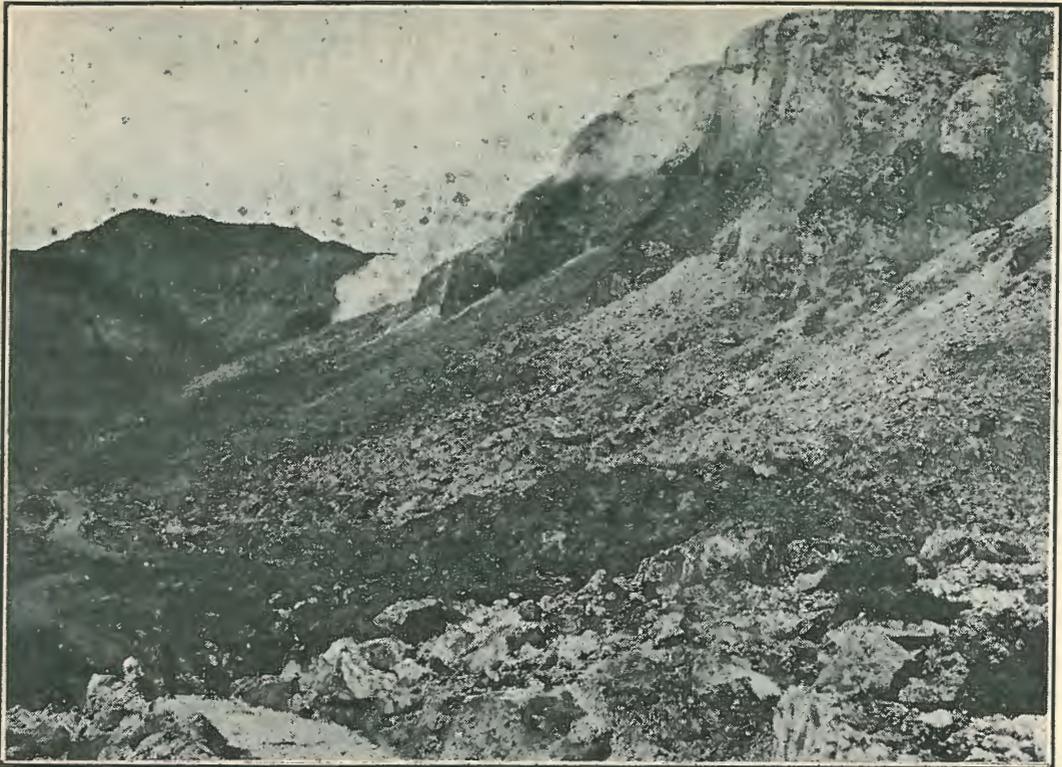
By HARRY B. MANDERSON.

[This timely article by Mr. H. B. Manderson is the first to be published in any magazine or newspaper in which the physical character of the obstacles to be faced by the prize flight competitors are described from firsthand knowledge of the route. As a member of Lloyd's Aerial Survey Party despatched by Aerial Services, Ltd., to chart the aerial route between Sydney and Port Said (Egypt), Mr. Manderson crossed the Australian continent from Sydney to Darwin overland and continued the preliminary survey through Malaysia to the Asiatic mainland. He has the unique distinction of being the first aerial investigator to attempt and accomplish this tremendous journey in the interests of commercial aviation. It should be understood that Mr. Manderson's article was received some weeks prior to the successful conclusion of Captain Ross Smith's flight.—Ed.]

The spectacular and speculative aspects of the across-the-world flight will be most strongly in evidence in that section of the route known as the Malay Archipelago. It is this mammoth causeway of islands stretching between Australia and the Asiatic mainland on which the faith of the exponents of the England-Australia aerial service is mainly founded and which renders this competitive flight at all practicable to an aeroplane. A large size map of the archipelago (such for instance as is issued by the Dutch Packet Company) discloses a continuous series of large and small islands looping the tropical ocean from Singapore to Timor in a hop-step-and-jump juxtaposition. This island congeries constitutes the keystone of the Australian Imperial air scheme.

On paper, at any rate, it looks good. It is good—indeed we could hardly hope for anything better, except, perhaps, that Timor were a mite closer to Australia—provided there are prepared landing places at regular intervals. It must be remembered, however, that Imperial supervision of the competition route ceases at Singapore, and that thereafter to Darwin the aviators will have to rely on such arrangements as have been made by the Dutch. There is every reason to hope that the Dutch authorities of recent weeks have fulfilled their earlier promises to the British Air Ministry to facilitate the competition in every way along their stretch of island territory. This could best be done by clearing one or two landing stations between the excell-

ent official flying field at Bandoeng, near Batavia (Java), and Koepang at the western end of Dutch Timor. In the absence of definite information as to whether or not the Dutch have made landing stations available, it is of interest to note in recent cable messages some mention of the probability of the planes being fitted with floats whilst traversing the archipelago. Provided the technical difficulties attaching to the conversion of the machines into flying boats can be satisfactorily overcome—with due regard, of course, for the re-conversion back to land use at Darwin for the Trans-Australian journey—this would be by far the best solution of the problem. Competent opinion already favours the flying boat as the unit of commercial aerial transportation in this island region. Ability to use the numerous and admirably adapted island waters as landing grounds would materially lessen the anxiety of the aviators in this penultimate stage of their long aerial hike. The islands abound with semi-enclosed harbours of a size and surroundings which render them naturally ideal for over-water flying. With one or two exceptions landing and take-off can be accomplished in waters of lakelike smoothness. Where more exposed conditions exist, the magnificent visibility of these regions should enable the aerial navigators to take their choice of a landing on either side of the chain, according to the influence of the prevailing wind. The comparatively "skinny" characteristics of most of the islands would render this choice by no means difficult. Taken by and large, the sea



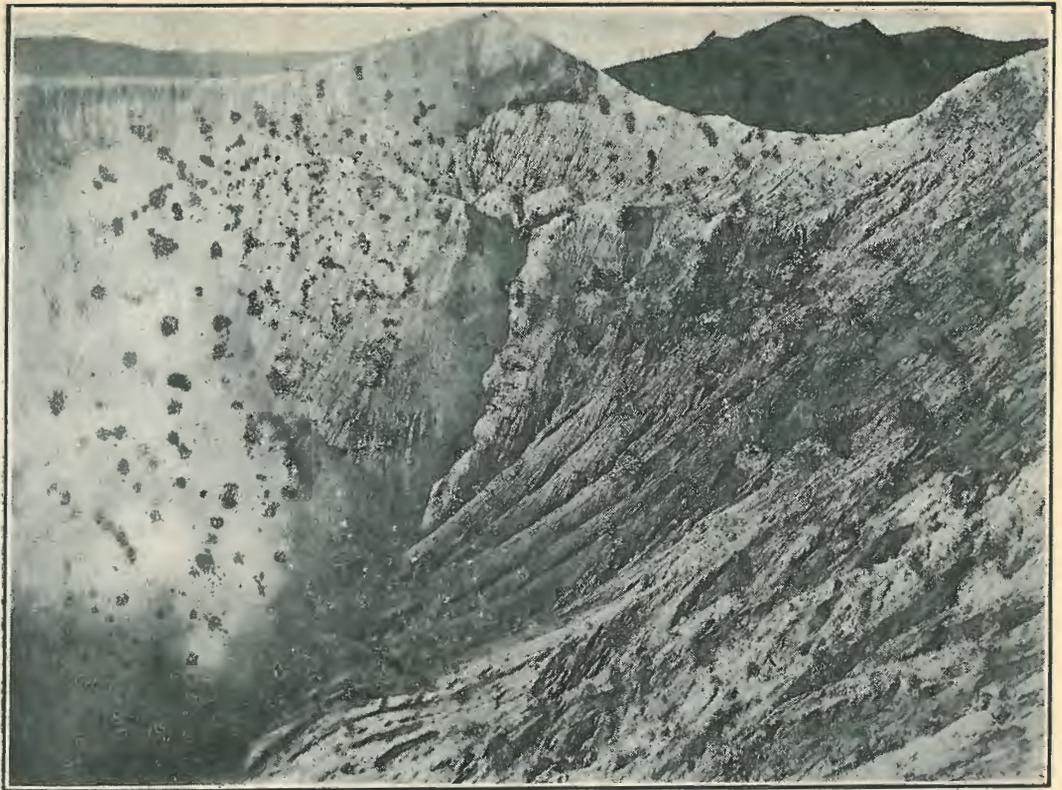
On the Official Route from England to Australia.

The main track at Garoet, Java.

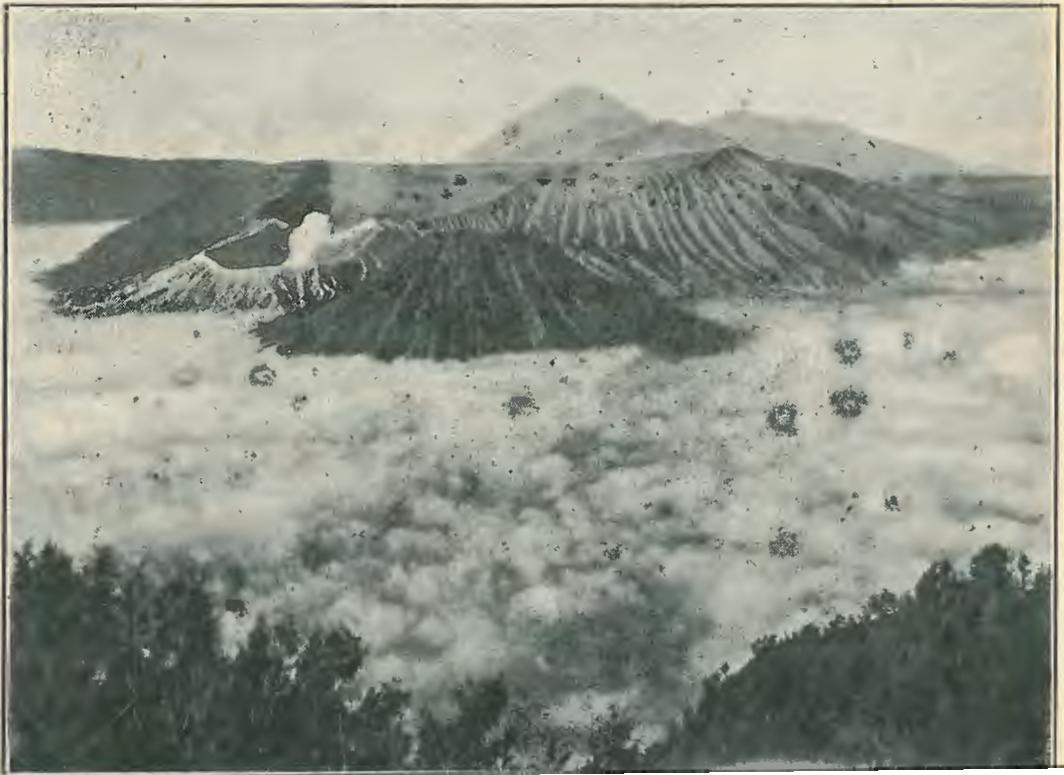


A Red Hot Lake in East Java.

[Photo—O. Kurkdjian, Soerabaya.]



A Crater Wall in Java.

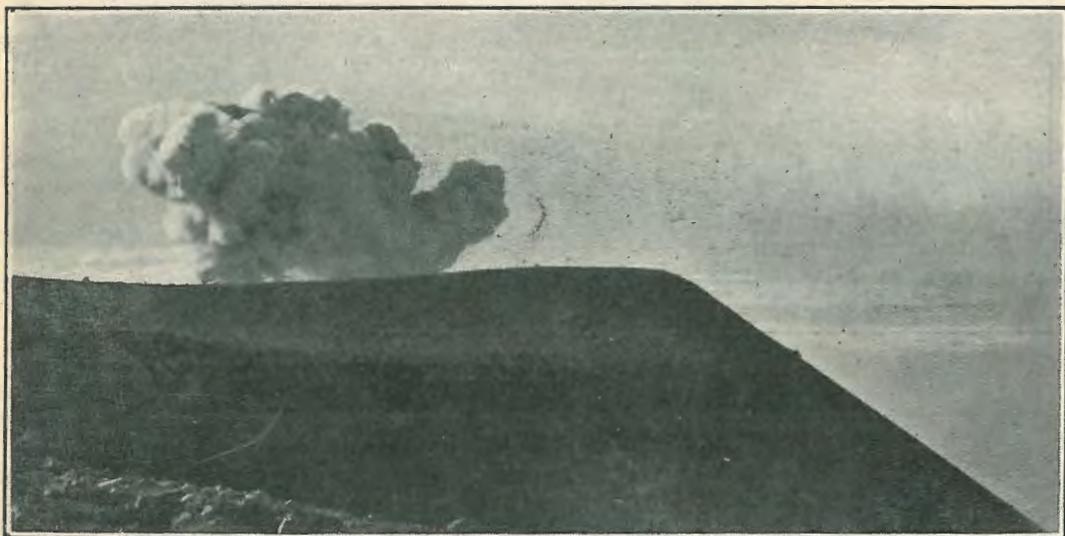


route along the archipelago is decidedly the more attractive from the point of view of safety, comfort and ultimate attainment of the goal.

Perhaps the most prominent factor in favour of the use of waterplanes in the island section of the route is the fact that on leaving Timor some 300 miles of ocean have to be crossed to Darwin. And even before reaching Timor there is a hundred-mile water stretch from Flores down to Koepang. I am convinced from personal observation that it would have been much better for the route to have run the whole length of Flores to the door of Dilly, capital of Portuguese

ated at Babao, about 16 miles from the port and close to Koepang Bay. When I saw it in September it was covered with fairly thick timber, which would take three or four months to remove—according to the "tropical" estimate of the Dutch officials. I heard later that a boatload of natives had been brought down from Macassar to clear the site—the work to be supervised by a Dutch flying officer.

At Bandoeng, in Java, there are ample facilities for the competitors. Being situated inland, however, this flourishing town would be useless to aviators using seaplanes. The latter would find Tandjong



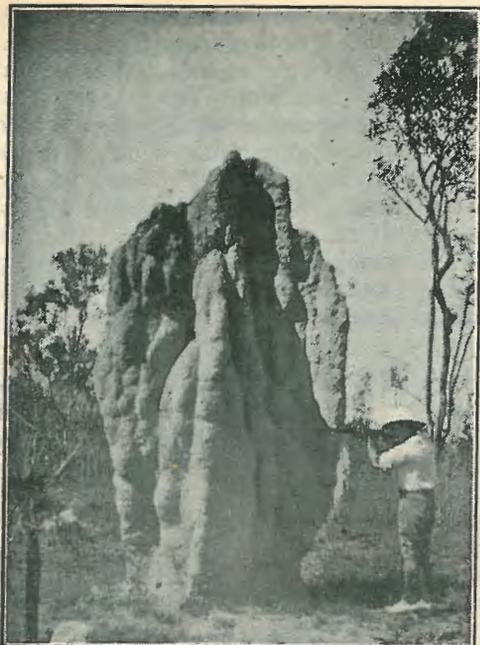
In the event of a forced landing—? Volcanic country around Smeroe, Java.

[Photo—Kurkdjian, Soerabaya.]

Timor, whence the aviators could have followed the Portuguese coast to the eastern extremity of the island which would make a splendid jumping-off place for the last leg of the ocean journey to Darwin. The deviation down to Koepang instead of proceeding on the direct route along Portuguese Timor is probably in the nature of a *quid pro quo* for official facilities along the major portion of the route is wholly Dutch. Lloyds' commercial aerial survey in Timor has provided for linking up both the Portuguese and Dutch halves of this rich island to the main England-Australia highway.

The landing station, which at last news was being prepared at Koepang, is situ-

Priok, the port of Batavia, quite suitable. Samarang, further along the north coast of Java, offers few advantages for landing for either class of machine. The port is of the open roadstead variety, and apart from the racecourse, which is none too suitable, a shore landing ground is not available without considerable preparation. Sourabaya, the commercial capital of Java and the Dutch East Indies generally, could accommodate both land and water machines with a little care on the part of the pilots in making the specified stations. The outer harbour is a centre of world traffic, with ocean-going steamers arriving and departing with all the attendant fuss on



A Monster Anthill (Northern Territory).

the part of official and other minor craft. To land and protect a plane from damage, even for a short day in Sourabaya harbour, would require the exercise of great caution and unremitting watchfulness on the part of the aerial crew. There are one or two places within easy reach of the city, where temporary alighting grounds are available, but unless Dutch officials have definitely designated these for the use of competitors it would be better to give them a miss.

On the whole it is more than likely that men like Captains Ross Smith and Matthews who are acquainted with the topographical and hydrographical peculiarities of the archipelago will make as few landings as possible in this section of the route. Certain is it that with seaplanes they will stand a far better chance of success than with land machines, even though the latter have a straightout flying capacity of 1000 miles or more. So far as the islands are concerned these long straightout flights are going to represent nine-tenths of the battle. The other tenth—subsidiary landing grounds—will not count until the necessity for them arises—and then they count with a vengeance! Here, then, is the main gamble of the second

half of the route. After their long journey to Singapore are the machines going to stand up during the remainder of the contest in such a way as to enable their crews to sweep across the long stretch of unlandable islands down to Koepang? Or, on the other hand, with due regard to the possibility of forced landings during this latter inter-island stage, would not a plane equipped with floats stand a better chance of success by being prepared to cope with the one-tenth emergency chance when it arises, by relying on a dependable water route against a land course? In a more leisurely flight conducted under the same conditions of partial unpreparedness, the choice would be obvious, namely, the water. It must be remembered, however, that a keen spirit of rivalry exists among the contestants, and in the event of a more or less neck-and-neck contest developing by the time the islands are reached, it is more likely they will be unwilling to sacrifice valuable time in converting their machines to water use, but will prefer to take a sporting chance of success on a non-stop long-distance effort. This, of course, is the more hazardous plan, but as nothing succeeds like success, the pilots who adopt this method will doubtless weigh the consequences of failure—and worse!—against the glorious delights of possible achievement. If they win through they will be heroes; if they don't two hemispheres will want to know why in the name of common sense they didn't do the trip in comparative safety by short sea jumps, or why proper land stations were not prepared? 'Twas ever thus!

In a word, therefore, between Bandoeng (Java) and Koepang (Dutch Timor), assuming that no prepared landing places have been laid down by the Dutch, land planes will either succeed—or they won't. A forced landing in any of the intensely cultivated plateaux or mountain basins of Java spells "bog" for an aeroplane. A like contingency among the volcano-crowned, sierra-edged mountains, both for men and machine. Everyone who has regard for the future of aviation as an instrument in commercial transportation, will regret that the lines of this competition were not laid down with a keener regard to the development

of an Imperial air route. It goes without saying that a competition conducted along a chain of regularly distanced landing stations—each, say, 300 or 400 miles apart, with subsidiary landing conveniences at lesser intervals—would have brought more real benefit to the cause of commercial flying than the somewhat haphazard schedule of the present prize flight will achieve. At the same time credit must be given to the Australian Government for its desire to foster and forward the rapidly developing industry of aeronautics, even though one cannot always agree, from the standpoint of commercial aviation, with the methods it



Anthills chiefly occur in hard, "ridgy" ground. By their presence a landing place which would otherwise be suitable, becomes a menace to even the most careful airman.

employs. Some little time must yet elapse before the commercial aerial route to England is fully charted and prepared. This important work is being prosecuted in practical fashion, and when completed—early next year, it is hoped—will lend a powerful impetus to aviation throughout the Eastern hemisphere. Meantime, sportsmen on either side of the equator, will wish the competitors in the Commonwealth £10,000 prize flight the best of luck in tackling a big job with plucky Australian spirit and undaunted enterprise—unperturbed by the fact that their own Government has no say respecting the preparation of the route (or lack of it) until they reach Australian soil.

A final word regarding the Trans-Australian section of the journey. Officially, the competition ends at Darwin, where seaplanes will find a beautiful harbour

for safe and protected landing. The gaol paddock fronting Fanny Bay should afford other machines adequate temporary landing facilities. Ten miles out of Darwin there are several plains which could be used at a pinch—provided the weather is fine. By the time the machines reach Australia, however, the Northern Territory wet season will have set in—and black soil holds all moving objects (man, beast and aeroplane) in a cementlike embrace.

The best flying months along the archipelago are from April to November. This more or less applies to Northern Australia as well. December brings the *début* of the storm clouds, while January and February find the Northern Territory a waterlogged wilderness. It is fervently to be hoped, therefore, that the earlier part of December at least will see the aviators in sight of home. The jour-



Semi-civilised natives of the Northern Territory point out the "road" during Lloyd's Aerial Survey from Sydney to Darwin. The author of this article is seen seated on the motor cycle.

ney from Darwin to the railhead at Katherine River (Emungalen), some 200 miles, should offer no obstacles. The township itself is riddled with limestone outcrops, but on the lower side of the river, near the telegraph station, or in the vicinity of the site chosen for commercial aerial landing purposes by Lloyds' surveyors, a little clearing of the light timber will provide a suitable site for the competition flight. Thence to Newcastle Waters Cattle Station, the overland telegraph line will serve as a guide over timbered, unlandable country,

though at the station itself, with the exercise of proper caution, a safe landing can be effected in the horse-paddock, or one or two other home paddocks. The intermediate country between Newcastle Waters and Anthony's Lagoon (150 miles) must likewise be covered in a single flight. For the most part this consists of a huge plain, intersected and paralleled by hard timbered ridges. Here and there the ridges are bared of scrub, and while the surface of the gravel is ideally smooth and hard, the open spaces are not numerous or large enough to be relied upon with any degree of certainty in the emergency of a forced landing. Moreover, giant anthills are an ever-present menace in these ridges. The plains consist of soft, ashy downs, heavily tussocked and riddled over their entire surface with huge holes, any one of which would wreck the sturdiest aeroplane. But once they reach Anthony's Lagoon competitors may, with decent luck over the "civilised" stages of the journey, consider themselves as being practically "home and dried." They will have no difficulty in choosing a good, dry land-

ing at Anthony's, and they can rely on receiving the heartiest of welcomes from the lone policeman isolated there in his tin shanty in the heart of the Never-Never. From Anthony's a defined road points the way to Brunette Cattle Station (60 miles), where there is a splendid machine shop, and so down past Alexandria and Avon Downs Stations (where the aviators will probably see the first white woman since leaving Katherine) to the "fierce" little border township of Camooweal (where the main street is wide enough to accommodate a fleet of 'planes), and then across the dip of the Barclay Tableland into Cloneurry. Touching the heads of the other lateral railways in Queensland at Longreach and Charleville, competitors will be able to land in, on the whole, excellent flying country. The balance of the route should not offer any serious obstacles to men who have successfully traversed the tremendously more difficult archipelago and Northern Territory stages of the long journey. For this reason it is a pity that they are not routed to call in at Sydney on their way to Melbourne.

PREPARING TO RECEIVE THE TRANS-PLANET FLYERS THE AIR ROUTE FROM PORT DARWIN TO MELBOURNE

Official Report by Major R. Brown (Department of Defence).

The aerial route from Darwin to Melbourne has now been thoroughly inspected and reported upon by flying officers sent from the C.G.S. Department.

For the purpose of survey it was divided into two portions, *viz.*, Darwin to Longreach, and Longreach to Cootamundra, Lieutenants McGinness and Fysh traversing the former portion and Major Brown and Lieutenant McComb the latter.

As the portion Cootamundra to Melbourne has been flown over several times, also reported upon, it was not necessary to make a fresh survey.

Generally speaking, the country is exceptionally good for flying, and in the majority of cases suitable landing

grounds for all types of machines are already available and need no further preparation.

Only a very small outlay would be necessary to make this route an ideal one; as in most cases the local authorities at the different towns are quite willing to clear and improve the selected grounds at their own expense.

Many fields selected—and this especially applies to Queensland—would not be suitable in wet weather, and it is not recommended that any machines attempt to use this route during rainy seasons until the surfaces of the respective grounds have been properly prepared.

The following is a description in detail of the route to be taken:—

Complete reports of the first portion,

i.e., Darwin to Longreach, have not yet reached the Department of Defence, hence it is not possible to give much information other than distances, etc., of this part of the route.

At Darwin a good ground will be ready, and machines will be met by an officer, and all information, maps, etc., also petrol and oil, will be supplied to carry them on to Longreach (940 miles).

Port Darwin to Katherine River (170 miles). The railway will be followed to Katherine River, where a landing ground is being prepared, and here machines can fill up their tanks so that the next sub-depot at Avon Downs will be within easy distance in case of strong head winds.

Continuing from Katherine River to Newcastle Waters (220 miles), to Anthony Lagoon Waters (140 miles), to Avon Downs Station (200 miles): at each of these places it is anticipated that machines can land if necessary, and at Avon Downs sufficient petrol and oil can be drawn if required to carry them on to Cloncurry, *via* Camooweal (210 miles). This portion of the route, *i.e.*, Darwin to Cloncurry, will be the most difficult, as the country is practically uninhabited, and in the event of a forced landing a machine might remain undiscovered for a considerable length of time, more especially if the occupants happened to be injured.

Another difficulty might present itself on account of the lack of prominent objects such as railways, rivers, etc., for in unfavourable weather, with low clouds and poor visibility, should a pilot get off his course considerable time might be lost in determining his exact position, owing to the similarity in appearance of the whole country.

On reaching Cloncurry the remainder of the route should present no difficulties.

Here the machines will be met by an officer who will supply full information of the route, maps, etc., also abundant supplies of petrol, oil and water will be at hand.

It will be noted that the route now passes over all the termini of the Queensland railways running west from the coast, the advantages thus obtained needing no further explanation.

From Cloncurry to Longreach, *via* Winton (300 miles), the country is, from

all reports, excellent (Winton is known as the "City of the Plains").

From now on full particulars can be given of the country and landing grounds.

The officers surveying this portion made complete arrangements with the local authorities at each place, and in addition left typed instructions with a responsible person—usually the Mayor, a Councillor, or Shire Clerk.

Leaving Longreach, the country is patchy to Blackall (100 miles), but a successful forced landing could be made, especially on the northern side of the route towards Barcardine.

At Blackall excellent landing grounds exist, and the country is very good, especially out towards Tambo, where vast plains extend for miles upon miles.

From Blackall to Charleville (145 miles), it is ideal until 9 miles from the latter place, which is surrounded with thick timber. Here the townspeople will in time clear a ground nearer the town.

At Charleville an officer will meet the machines and supply maps, etc., also petrol and oil.

From Charleville to Cunnamulla (125 miles) the country is heavily timbered as far as Claverton Station, but open breaks on which a machine could make a forced landing occur at Wallall, Yanna and Quilberry.

From Claverton to Cunnamulla the country again opens out, and no difficulty would be experienced in case of engine failure.

This ideal condition exists all the way to Barrigun (65 miles) to the border of Queensland and New South Wales, where an excellent ground was selected.

For about 16 miles after leaving Barrigun the country is still good, but from there on to Bourke (75 miles) it is very bad and no possible landing ground could be seen.

At Bourke an excellent ground has been cleared at the town's expense, everyone being exceptionally keen to assist in all matters "aerial."

For 20 miles after leaving Bourke the country is very open, but then is heavily timbered to Nyngan (125 miles). At Nyngan a huge field is available and will be ideal in every way.

Arrival of Aeroplane.

The BELLMAN will announce the date and hour as near as possible of the arrival of the

AEROPLANE FROM MELBOURNE

en route to Port Darwin, at the Landing Ground at the back of the Racecourse close to the Rifle Range.

It is also proposed to ring the FIRE BELL one hour prior to the arrival.

As many of the public as possible are requested to be present at the landing to afford a welcome to the first Aviator to arrive at Longreach.

Owners of Motor Cars are cordially requested to place their Cars at the disposal of the public for the purpose of conveying women and children to the grounds



F MILLS, Shire Clerk.

Local Enthusiasm.

Reduced facsimile of handbill distributed among residents of Longreach, Central Queensland prior to the arrival of Captain Wrigley, D.F.C., on the aerial survey from Melbourne to Darwin.

[By courtesy of Mr. H. B. Manderson.]

Continuing to Narromine (75 miles) very bad country again occurs until within a few miles of the town.

An officer will be present here with maps, etc., and arrangements have been made for supply of petrol and oil.

From Narromine to Forbes (85 miles) suitable open spaces occur as far as Tomingley, but thence through Peak Hill and Parkes it becomes impossible, and no suitable ground could be discovered.

A good field can be used at Forbes, and thence on to Cootamundra (85 miles) the country is excellent as far as Stockinbingal, 14 miles out.

Cootamundra is surrounded by hills and rough country, but possesses a fine field large enough for any type of machine.

Leaving Cootamundra through Albury, Benalla, Seymour to Melbourne (280 miles) the country is excellent, except in short stretches, notably at Glenrowan, Broadford and Donnybrook.

A special map is being prepared showing the nature of the country from information collected by pilots who have been employed on various duties in the different States.

It is intended to send a machine over this route from Melbourne to Cloncurry, and if possible to Port Darwin, so that information which it was impossible to obtain by ground survey will be collected and made available.

LANDING PLACES AND DISTANCES.

	Miles.	Miles from Darwin.	
Port Darwin	0	0	Depot
to Katherine River ..	170	170	Sub-Depot
to Newcastle Waters ..	220	390	
to Anthony Lagoon Waters ..	140	530	
to Avon Down Station ..	200	780	Sub-Depot
to Camooweal	45	775	
to Cloncurry	165	940	Depot
to Winton	200	1140	
to Longreach	100	1240	
to Blackall	100	1340	
to Charleville	145	1485	Depot
to Cunnamulla	125	1610	
to Barrington	65	1675	
to Bourke	75	1750	
to Nyngan	125	1875	
to Narromine	75	1950	Depot
to Forbes	85	2035	
to Cootamundra	85	2120	
to Melbourne	280	2400	

CIVIL AVIATION IN TASMANIA

AERIAL DELIVERY OF NEWSPAPERS

By **RUSSELL O. ATKINSON** (Late A.F.C.).

(Tasmanian Correspondent to SEA, LAND AND AIR.)
(All Rights Reserved)

The flight made by Lieutenant A. Long, A.F.C., from Hobart to Launceston, *via* Deloraine, delivering newspapers on October 27, was no mean achievement, and was an event hitherto unaccomplished in the Commonwealth. But not only on that score was it unique in the annals of aviation in Australia, but the length of time the machine remained in the air perhaps constitutes a record. From the time the machine took the air until it made its first landing a period of three hours and ten minutes elapsed, which, if not a record for Australia, is at least a very notable performance, taking into account also that in addition to the weight of pilot and navigator the 'plane carried a load of newspapers weighing approximately 110 pounds.

The newspaper thus aerially delivered was the Hobart *Mercury*, special copies of which were printed by the proprietors, Messrs. Davies Bros., Ltd., under whose engagement the enterprise was undertaken.

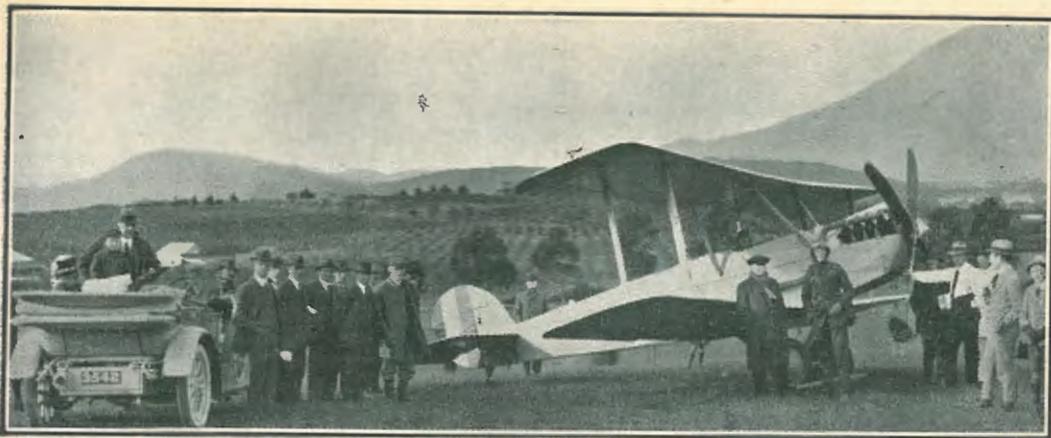
As a demonstration of the possibilities attending the use of aeroplanes for commercial purposes the flight was an undoubted success, arousing intense interest and enthusiasm amongst the people of Tasmania from one end of the island to the other. As an advertisement, not only from the point of view of the newspaper concerned, but even more so from the aspect of commercial flying generally, the trip was truly auspicious, for so successful was the enterprise that many of the most sceptical amongst the business men were totally convinced that commercial flying is not all moonshine or a crazy dream, never to effectually materialise, but that it is at least a probability, and that great developments may be expected in that sphere in the near future.

Lieut. Long's machine was built by Messrs. Boulton and Paul, Ltd., of



Lieutenant A. Long (right), and Captain E. Cummings, D.F.C., at Hobart.

Norwich, England. It has a span of 27ft. 6in., is 24ft. 6in. long, and has a gap of 5ft. The ailerons are hinged to a special false spar, after the German practice, while the chord of the wings is 5ft. The fuselage is well streamlined, and the propeller is of four blades. The engine, purchased by the owner from the Air Board, is of the R.A.F. type, and attains 119 h.p. at 1,890 revs., with a normal speed of 900 revs. per minute. The machine can travel comfortably at 194 miles per hour, and can dive with safety



Delivering Newspapers by Air.

Lieutenant A. Long and Hon. C. E. Davies, proprietor of the "Mercury" (Hobart), at Elphin prior to commencement of flight to Launceston, Tasmania, October 27, 1919. The B.P. biplane is laden with copies of the "Mercury" for aerial distribution.

[Photo, J. W. Beattie, Hobart.]

at 250 k.p.h. She has a landing speed of 50 m.p.h., and is fitted with dual controls. Her total weight is something less than 30 cwt.

Interviewed on behalf of *Sea, Land and Air*, Lieutenant Long and Mr. D. K. McKenzie made little of their exploit, but at the same time gave much information concerning their flight. They also kindly made available the somewhat diverting log compiled by Mr. McKenzie during the trip. The photographs which accompany this article are from the same source.

A *résumé* of the log is given below. It shows that the aviators attained all their objectives, although at one time they were apparently hopelessly lost in a low-lying cloud-bank, and eventually found themselves many miles out of their course.

October 27, 1919.

6.30 a.m.—Loaded machine with newspapers and wheeled bus out on to 'drome.

6.50—Chocks removed in presence of Hon. C. E. and Mrs. Davies, and took off like a bird. Steered for Hobart, where large numbers of people assembled in streets to see us despite early hour. Did a few stunts and made for Government House to deliver first aero newspaper to His Excellency. Spiral put on over Government House and special copy launched into the air. Unfortunately it got caught in the slipstream of the propeller and wedged on to tail plane, where it remained until we landed at Deloraine.

6.55—Turned nose north in direction of Pontville.

7.5—Passing over Claremont. Lady and gentleman stand beneath a porch in night

attire, thinking we cannot see them. From scattered houses about people are waving to us, and I am returning salutes with log sheet. Pontville appears now, set in huge expanse of timber from this side. We are at 1,500 feet, doing 80 miles per hour on 1,500 revs. Over Pontville now we see people running about scantily dressed. There is no sheet or flag to direct our shot, but here goes the first bundle. People can be seen rushing them. We have veered north-east to take in Bagdad, and have head wind right in our faces. Air very bumpy and the old bus is rocking up and down and over like an American ragtime singer. Round she goes in a split-tail. The people like it evidently; they are cheering and waving towels. We have come down in a swoop from 2,000 feet to 1,000 feet. Doing 75 m.p.h. in teeth of wind, on 1,600 revs. Kempton in sight now, and the large crowd plainly shows the spot for our shot.

7.30—Down to 60 m.p.h. now, propeller doing 1,500 revs.

7.42—We are over Jericho; people running out to welcome us. That finishes the load on my chest; I can breathe a bit now. Oatlands plainly in view; must be hundreds of people in the reserve with a sheet down and visible at this distance. Clouds ahead—low too.

7.49—Over Oatlands. Steep spiral from 3000 feet down to 1000. Can plainly hear the cheering; everybody waving. Papers are over. When they struck the ground the package burst, and contents flew in all directions like a bomb bursting. Doing 80 m.p.h. now by the altimeter, which I don't think is registering properly. Long's is not working at all. We are entering scud clouds now. Visibility "no bon," wind bad, and bumps hard and often.

7.54.—Doing 80 miles and in thicker clouds; getting worse as we go. Long asks "How's the game?" Have just written on the Tunbridge parcel in large letters, "très bon." Appears to amuse him. No horizon in view fore

or aft, and clouds getting thicker. Compass showing our course to be north-north-west. That ought to get us to Ross anyway.

8 a.m.—Afraid we are completely lost. We are above a low-lying bank of clouds. Altimetre shows 3000 feet, speed 80 m.p.h. Have a feeling the compass is wonkey. The clouds are like banks of wadding. Sun shining brightly up here; slip stream through the cylinders is baking my face, and the oil is greasing me up.

8.5.—Still lost. No sign of clouds ending, course still north-north-west. Long is going down to see what is below. A drop of 1000 feet, through dark, swirling, wet, smoky clouds. Just missed a tree—a matter of inches. Clouds are right down on the ground, evidently, and the terrain below is not up to much. Up through the clouds again to 3000 feet.

8.10.—We are over them, but they appear to be endless. Still lost and have been so for nearly half an hour. Must be 30 or 40 miles nearer somewhere anyhow. Making for a break in the clouds on our right, doing 90 m.p.h. at 1700 revs. Why, there's Maria Island, and we are nearly over it—can see the waves on the shore. Right on the East Coast, and compass still registering nor'-nor'-west. What a rotten compass we have got! Getting out of the clouds and going up the coast near Freycinet, we bear inland. There are miles and miles of trees below us, not a house or piece of clear land in sight. If anything goes wrong here we will be looping somewhere else in a very short time. But the engine is going perfectly—not a falter.

8.30.—And we still do not know quite where we are. There's a big town, anyway.

8.55.—A swoop shows us that the railway station is labelled Ross.

8.58.—Petrol and oil are getting low. We have been in the air over two hours, and the bumps accompany us with diabolical pertinacity. Long is enjoying himself immensely, and roaring out something I cannot hear owing to the wind and our speed of 80 m.p.h. Switch off and down in a dive. Long shouts that he cannot see for the oil on his "windows." I have just taken them from him and am cleaning them with a good silk handkerchief. Oil flying everywhere.

9.1.—We are over Campbell Town; the B.P. standing up to it beautifully, and not missing a revolution. Huge crowd of cheering people in the streets below. My arm getting stiff from waving. The Campbell Town bundle dropped and we have a straight line on Longford. Neglected to state that we tried to drop the Turnbridge parcel at Ross, but the slipstream got it, and stuck it beside His Excellency's on the stabilising fin. Long said something then that I did not hear.

Plenty of open country now; if petrol given out can put the bus down anywhere without our becoming the basis of negotiations for a vault.

9.30.—Flying straight on Westbury. The papers are gone and with them my log—by accident. That ends its career. It is a thousand to one that I will never see it again. (The log, by the way, was picked up almost immediately and sent by express to Hobart.)

9.37.—We see Deloraine—country very beautiful. Now we are stunting over a town, and a large crowd has gathered. We are to land here—must fasten my safety belt.



Lieutenant Long, with the first two ladies to fly in Tasmania—Mrs. Palfreyman (right), Miss Elsie Nairn (left).

Cameras by the score are focussed on us. At last we are out and have inspected the petrol and oil supplies. It was a very near thing. Another ten minutes in that cloud would have been serious.

Have just despatched north-west coast papers by motor car for Ulverstone to catch the train we missed through our voyage to Maria Island. Have asked a motorist going through to Westbury to look for my log, but have not much hope. The Warden has called us over for an official welcome.

11.30.—Up and off to Launceston. Can see Launceston now that we are at 4000 feet. The wind is slightly behind us, and we are licking the pace out at 95 miles per hour on 1650 revs. Covering extensive cultivation areas criss-crossed with tracks.

11.49.—We are over Launceston. Can see right down to the mouth of the Tamar, though visibility is not good. People rushing into the streets; crowds forming at all corners. Ap-

parently the news of the Maria Island stunt has spread, and they are surprised to know that we are alive. Do a couple of loops, a half roll, then a gentle spiral, and an A1 landing.

* * * *

At Launceston the aerial *voyageurs* were lavishly entertained, and, carrying letters of greeting and congratulations to the proprietors of the *Mercury* and public officials, set out for Hobart early in the afternoon, arriving without incident at about 5.15 p.m.

Lieutenant Long is doing a big "joy-riding" business, and has taken up a number of ladies. He has several schemes in view, and it is considered quite possible that when conditions are more favourable he may venture on a pioneer flight across Bass Straits to Melbourne.

CIVIL AVIATION IN WEST AUSTRALIA

A VISIT TO THE GOLDFIELDS

During the month of October Major Brearley, at intervals of passenger carrying, flew from Perth to Kalgoorlie. He gave two exhibitions at Kalgoorlie and one at Boulder, from the respective race-courses.

It was certainly a novelty for the fields, and a large crowd paid entrance money, even though all the evolutions could easily be seen to advantage outside the course.

The major was accorded an enthusiastic reception on the 'fields, and on Thursday, October 23, was received in the Council rooms by the Mayor of Boulder and other prominent goldfielders.

In the course of his speech, Alderman Beston assured Major Brearley that Boulder citizens were pleased to welcome him in their midst . . . The exhibitions were really magnificent, and there was little doubt that the confidence of the public had been gained.

Major Brearley, in responding, said that he was certain flying had come to stay, and West Australia offered particular encouragement to airmen because of the unique climatic advantages.

A company was now in course of formation in Perth and he (the speaker) would probably become the chief pilot and

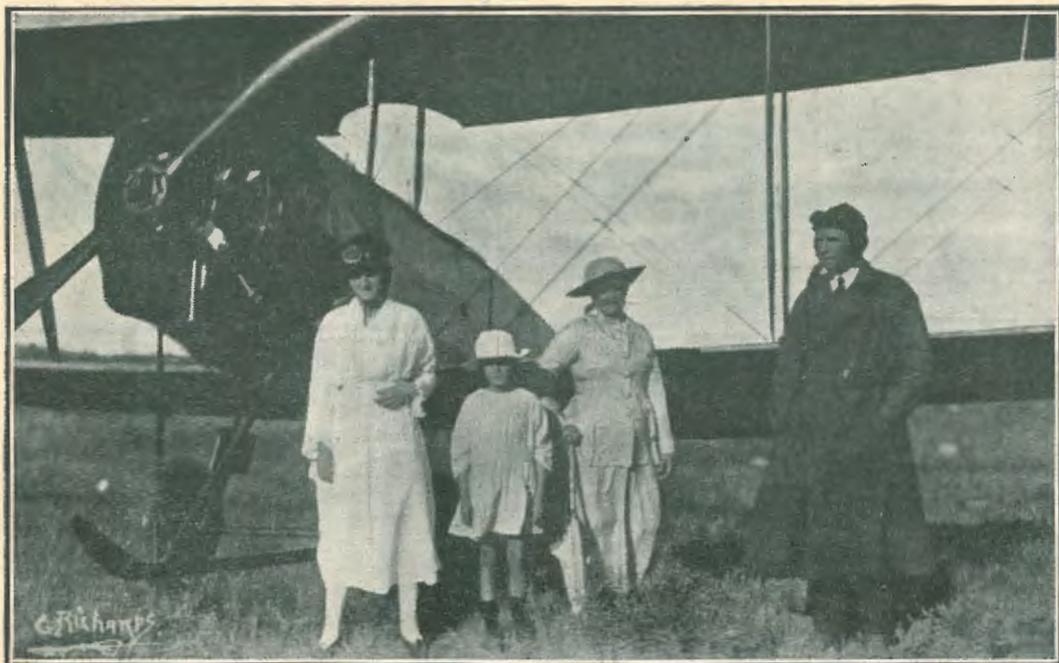
technical manager. He had been offered survey work by the Government, which was now realising that aerial photography would save them large sums of money. It may be thought that £5 was dear for a flight, but one had to recover the cost of the machines, and passengers were paying for this experience. Ten gallons of petrol would keep him in the air for an hour. He had hopes that in the future the cost of a flight would be reduced to one shilling per mile. Each flight was about 10 miles; climbing most of the time at 55 m.p.h., and flying level at 80 m.p.h. The greatest height on the 'fields was 3,500 feet.

During Major Brearley's nine days' stay at Kalgoorlie, 80 passengers were carried, some making double-flights.

Special trams conveyed the large crowd of enthusiasts to the course.

The major took off and landed in each instance on the straight of the racecourse, which is barely double the width of the 'plane.

Both *Avros* are now fitted up to accommodate two passengers in the rear seat, the price for the double-passenger trip being £7 10s. for ten minutes, and single flight £5.



The First Lady to Fly the Westralian Goldfields.

Miss Betty Gregson (with cap and goggles), and her pilot, Major N. Brearley, D.S.O., M.C., A.F.C. (ex-R.A.F.).

CIVIL AVIATION IN SOUTH AUSTRALIA

Civil aviation is booming in South Australia. The first commercial venture, the Harry J. Butler & Kauper Aviation Company, Adelaide, was launched a few days ago, and has already carried 62 passengers. The new company has purchased a Bristol monoplane and an *Avro* type biplane, both of which are fitted with single 110 h.p. Le Rhone engines.

Mr W. H. Langham, Mayor of Unley, was the first civilian passenger and was followed by a number of Adelaide's leading citizens and citizenesses, the latter being in the majority.

The waiting list of intending passengers is assuming big dimensions, and if local enthusiasm may be accepted as a criterion, the future success of civil aviation in South Australia is fully assured. A striking contrast was presented by a 70-year-old gentleman, Mr. T. J. Richards, and a schoolgirl of seven years. Mr. Richards on returning to *terra firma* insisted that his wife (his senior) must make a flight "at all costs," while the little girl, a daughter of Mr. H. R. Thorpe, informed us that "flying is a lovely sensation," and it was with great difficulty

that she was coaxed away from the machine. Her flight was made whilst seated on the knee of Sergeant Kitto, late of the Australian Flying Corps.

Mr. W. G. T. Goodman manager of the Adelaide Tramways, has been quick to recognise the commercial possibilities of the aeroplane and arranged for Captain Butler to give an aerial demonstration at Henley Beach. On that occasion the tramways carried some 30,000 visitors to the popular seaside resort, where the local airman concluded a brilliant repertoire with a spinning nose dive from 10,000 ft.—the longest yet attempted in the Southern Hemisphere.

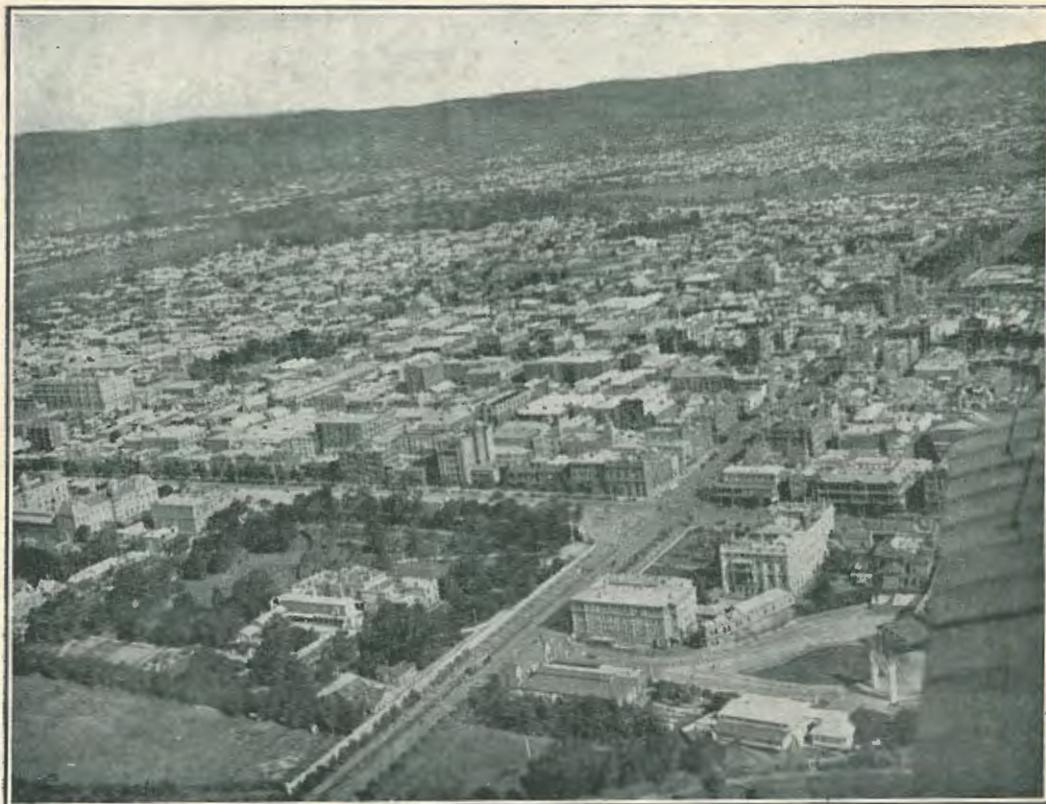
He then flew to Gawler, where the Returned Soldiers' Sports were in progress and, for the benefit of their funds, gave a further exhibition which included 46 loops, 38 rolls, several half-rolls and another nose-dive.

On November 18, Captain Butler gave an exhibition over Adelaide in his new two-seater.

Special attention has been given to aerial photographic work, this department being conducted by Mr. B. C. Sanders, a former photographer with the Australian Flying

Corps. Aerial photographs of city and suburbs are in great demand by residents and the popular form of post-card is one depicting the owner's house as seen from aloft.

Similar photographs have been prepared for local firms of estate agents and are submitted to prospective purchasers of land recently opened up for building purposes.



Civil Aviation in South Australia.
An Aerial View of the City of Adelaide.

CIVIL AVIATION IN NEW SOUTH WALES

The first aerial delivery of goods was accomplished by Aerial Company Ltd. (Sydney) on November 5, when orders received as late as 11 a.m. on that date were packed by David Jones Ltd., and delivered at Goulburn (140 miles) by 3.45 p.m.

During the same afternoon, order forms were dropped over Goulburn and collected on the following morning.

On return to the Sydney aerodrome next afternoon—after a flight occupying 2 hours 25 minutes—the airmen were met by a representative of David Jones Ltd., who took delivery of the orders, despatching the goods to Goulburn by afternoon train.

Despite unfavourable winds, the machine (a *D.H.-6* biplane, piloted by Lieut. S. K. Lavers, and carrying as observer Lieut. N. P. H. Neal) adhered to the pre-arranged time-table on both days. The airmen state that although the passage was very bumpy no serious difficulty was experienced.

* * * *

Congratulations are due to The Per-driau Rubber Co., Ltd., on being the first firm in Australia to purchase aircraft for commercial purposes, this distinct advance in the right direction being made with the arrival in Sydney a few days ago of *R.M.S. Osterley*, carrying two biplanes ordered



The First Aerial Goods Service.

A representative of David Jones, Ltd., meets the *D.H.-6* at Sydney Aerodrome on its return from Goulburn, and collects the orders sent by air from residents of that city.

from England for use of this enterprising firm's commercial travellers.

The machines are of the *B.E.-2E* type, and will be piloted by three of Messrs. Perdriau's own representatives who have recently returned from service with the Australian Flying Corps.

These ex-officers are Captain N. L. Petchler, Lieutenant E. Montgomery and Lieutenant J. H. Butler, and they hope to assist the company in the dual object of piloting salesmen to remote country districts and developing civil aviation from the national standpoint.



"Our Harbour."

Photographed during a flight from Sydney to "deliver the goods" in Goulburn.



Another Harbour view as seen from above Sydney Central Railway Station.



Civil Aviation in New South Wales—One of the Perdriau Rubber Company's B.E.2.E's.

CIVIL AVIATION IN VICTORIA.

AERIAL TRANSPORT, LTD.

Records of some interesting flights in Victoria are supplied by Mr. Sidney L. Officer, manager of Aeroflights Company (Hamilton).

The company was formed in August last and purchased one of the *D.H.-6* biplanes offered by the Department of Defence. The partners in the new concern are (as previously announced) Captains E. J. Jones, M.C., D.F.C.; R. M. McKenzie, M.C., and S. Brearley, D.F.C., the last-named being a brother to Major Norman Brearley, pioneer of civil aviation in Westralia.

Passengers carried by Aeroflights Co., are of all ages, the extremes being a child of 8 and a gentleman of 74.

On August 9 a flight was made from Melbourne to Hamilton; on September 20 the 80-mile journey from that town to Horsham was flown in 90 minutes; Captain Jones, carrying Mr. Officer, flew from Talbot to Horsham (34 miles) in 23 minutes. The company's best performance, to date, was a flight by Captains Jones and McKenzie from Natimuk to Horsham (15 miles) in 9 minutes.

Aeroflights Company is performing valuable missionary work by educating residents of the western district of Victoria in the advantages of quick transport and communication.

* * * *

A flying tour of 3000 miles was completed on October 28 by Lieutenant W. H. Treloar and 1st-class Air Mechanic H. F. Lord, in a *D.H.-6* biplane recently purchased as a joy-riding proposition.

The tour opened on August 11 at Essendon (near Melbourne) which was also the terminal point. Passenger flights were made at Echuca, Deniliquin, Hay, Wagga, and numerous other towns; the star passenger being the Bishop of Riverina, Rev. Dr. Anderson. The 90 h.p. "Rap" engine gave no trouble, and 400 landings were made with no greater casualty than that sustained when a small boy at Wagga walked along one of the wings and put his foot through the fabric. During a flight from Collendina to Corowa, a distance of 14 miles was covered in 6 minutes.

The sum of forty guineas was paid by Mr. D. McClure for a return flight from Albury to Henty, which was made in 75 minutes.

The first shareholders' meeting of Aerial Transport Ltd., was held at the company's head office, Equitable Building, Melbourne, on October 23, when a report was read showing progress of preliminary work carried out. This includes (1) The completion of surveys of the direct air routes from Melbourne to Adelaide, Sydney, Hobart and Hamilton; the selection of aerodromes and the preparation of complete plans and photographic records. (2) Investigations regarding local manufacture of aircraft, and the recommendation that machines be manufactured in Australia after importing the first shipment. (3) Negotiations with Commonwealth Department of Home and Territories for the supply of meteorological information. (4) Negotiations for securing local agencies and manufacturing rights (under royalties) of one (or more) of the leading aircraft companies in Great Britain.

The chairman, Mr. W. T. Appleton, announced that Sir John Taverner, the company's representative in London, was investigating certain offers received in the latter connection. Captain H. J. Whittingham (assistant engineer to Aerial Transport Ltd.), was in London dealing with the technical side, and Major Lee Murray, chief engineer, had sailed for England on October 8.

As indicated in the company's prospectus, an ultimate working capital of £500,000 would be required, and it was proposed that a new company be formed with a capital of £700,000, divided into 500,000 non-cumulative 8 per cent. preference shares of £1, and 200,000 of £1. Of these ordinary shares 50,000 would be allotted to the underwriters of the preference shares, 50,000 to the successful applicants for the preference shares, and the remaining 100,000 amongst holders of the vendor company. The allotment of the 100,000 shares would be subject to the approval of the shareholders.

The following directors were re-elected to office:—Mr. William Thomas Appleton (chairman), Sir E. Owen Cox, K.B.E., Mr. Wilfred Blacket, K.C., Mr. Hector Sleeman, Major Lee Murray (ex-R.A.F.).

COMMERCIAL AVIATION IN GREAT BRITAIN*

By H. E. BROADSMITH, F.R.Ae.S., A.M.I.E.

[Mr. Broadsmith, prior to his visit to Australia, occupied the position of chief engineer to A. V. Roe and Co., Ltd., England, manufacturers of the *Avro* aeroplane and seaplane. He is now associated with the Australian Aircraft and Engineering Co., Sydney.—Ed.]

Unfortunately there is little information to be given which can be considered useful from a commercial point of view.

Very little communication was done, and none of it furnished useful data.

The bulk of the flying done was passenger-carrying or "joy-riding." At least seventy-five per cent. of the "joy-riding" was done with *Avros*. Messrs. A. V. Roe & Co., ran two companies, dealing with the North and South respectively.

The North conducted flying at Blackpool, Southport, Morecambe, Isle of Man, Windermere, Rhyl, Liverpool and Manchester.

The South dealt with Hounslow, Brighton, Eastbourne, Bournemouth, Southampton, Paignton, Isle of Wight. The South was a separate company in which flying officers had an opportunity of investing money.

The town where the business was most brisk was Blackpool. This was the first town dealt with by the Northern section. Generally speaking, the business was enormously successful. Great crowds were attracted, and there was no lack of passengers. It was impossible to take them up fast enough, and a queue of over 200 persons waiting for their flight was quite a common sight.

During the holiday weeks of Whitsuntide and August, the passengers averaged 1000 per week. The machines used were standard *504K Avros*, converted into three-seaters, and using 110 h.p. Le Rhone engines. Later, *504K* machines were converted to five-seaters and fitted with 150 h.p. Bentley Rotary engines.

The charges were £1 1s. per flight lasting eight to ten minutes, charges of £2 2s. and £3 3s. being made for "stunt" flights.

Ten thousand passengers were taken

during a period from the second week in May to the second week in August. Up to the time of my leaving England at the beginning of September about 12,000 passengers had been taken, without a single accident. There had been only one forced landing owing to the H.T. lead to the engine dropping off, but no one was hurt.

Avros proved the most suitable machines for this work and were used by several smaller firms, and also by such firms as Messrs. Vickers Ltd., and Handley Page.

The crowds attracted on a special exhibition day at Southport were the greatest since the visit of King Edward VII. to that town. Nearly fifty per cent. of the passengers carried were women.

A large number of the passengers were of a good age, some being over 70 years old.

The public gained great confidence, and later turned up for flights in almost any weather, and when winds of 40 to 45 m.p.h. were blowing.

Most passengers wanted "stunts." One woman had 15 stunt flights in one week.

A notable feature (and one which should inspire confidence) was the way in which the insurance companies reduced their premiums. A couple of years ago I tried to get covered for flying risk, but the insurance companies quoted me 25 guineas per cent. Just before I left England I was quoted £2 10s. per cent., and my ordinary assurance policy for £1000 will cover me for £500 in the event of death from aerial pursuits, without extra premium.

A. V. Roe & Co., employed, up to August, twenty-seven flying officers as pilots and forty-seven ex-Air Force mechanics. This staff was increasing. Many applications were made for instruction. One Australian officer who learned to fly at the Hounslow school had 4½ hours' dual instruction and, on his second solo flight, looped, rolled and spun the machine.

* A lecture delivered before The Australian Aero Club (New South Wales Section), Sydney, on November 11, 1919.

COST OF JOY-RIDING.

Since the season had not ended when I left England, it is impossible to give final figures. Taking the twelve weeks, May to August, when 10,000 passengers were carried, the cost of wages of pilots, mechanics, clerical staff, etc., petrol and oil, repairs and upkeep averaged £6 7s. per hour. The flying hours per machine averaged 21 per week, and average flights were 4 per hour. With three-seaters, this gives a taking of £8 8s. per hour.

The five-seaters were the most profitable, since the cost averaged about £7 4s. per hour, and at four flights per hour (16 persons) the takings were £16 16s. The cost of flights in the five-seaters was reduced later to 12s. 6d., and even then, it was a better paying proposition than the three-seater.

The above figures, however, do not include overhead charges, such as administration at Manchester works, flying between aerodromes, cost of aerodromes, advertising, depreciation of machines and so on. Also these figures were taken during the best period of the year as regards both weather and holiday crowds. I do not wish to imply that the joy-riding business will not pay. It *will* pay, handsomely—if properly worked.

The initial arrangements and advertising cost a lot, and the demand for flights was so great that there was not time to work up an efficient organisation. Probably it will be a much better proposition next year.

The weather in England, however, is always against any regular service being held. Also rotary engines—being immediately available—were used, and these have a high cost of running and a big repair bill. A suitable stationary engine would have put on a different complexion. Second-hand machines were purchased from the Aircraft Disposal Board to start this service, and they required a considerable amount of money spent on them before they would be licensed by the Air Ministry. It would have been more profitable to have used new machines, and this was done in regard to later services. The charge per flight was also rather low. An

extra charge per flight would have made a considerable difference. I am sure the passengers who paid a guinea would not have jibbed at another nine or ten shillings.

As regards communication, no regular service was run which would furnish data as regards cost. A regular daily service was conducted between Manchester and Blackpool, the charge being £5 5s. single and £9 9s. return. A number of passengers were taken, but not sufficient to justify the expense of running the service. The service was maintained, however, to demonstrate the fact that a regular service could be run, and up to the time of my leaving, it had been kept up from May until September without fail every day except Sundays. The flight was often made in high winds, and wet weather, and on one occasion when a gale was blowing and the wind was over 60 m.p.h.

Newspapers were taken from Windermere to Douglas (Isle of Man) by seaplane, for a couple of weeks, and the service was flown to the minute each day without fail.

Several flights from London to the north were made with passengers, and on one or two occasions holiday-makers were taken from inland towns to the seaside when there was a strike of railway employees.

Generally, communication services were unsatisfactory, since one could not be sure of a regular traffic of passengers or goods.

It may be said that, beyond the service which was made by the "Aircro" people between London and Paris during the time of the Peace Conference, and which was assured of either passengers or mails for a period, no communication service was flown which would furnish useful data as to the actual cost of such a service—which is the data required in Australia.

In this country, with its more settled weather, and wide distances between towns and railways, an aerial service should easily be assured of sufficient traffic—passengers or goods, or both—to prove a well-paying commercial proposition.

A TRANSCONTINENTAL FLIGHT

DARWIN TO HAY ABOARD THE M.A. 2

Especially Written for "Sea, Land and Air" by TED COLLES

[Viewed in the light of recent events, although written almost a year ago, Mr. Colles' story will be admitted to contain more prophetic truth than fiction.]

Night at Port Darwin. The hour is unusual for passenger traffic on the Transcontinental Air Service, for night travel practically ceased when the old slow railway systems were superseded by machines which could cover big distances in as many days as formerly occupied months. Nevertheless, there are people willing to miss a night's sleep at home in order to save seven hours on their journey to the other side of the continent.

To-night, because, owing to weather conditions over Southern Russia, the Indian mail has missed connection with the ordinary day service across Australia, several passengers will travel by the Auxiliary Night Mail Service, rather than wait till next morning for one of the larger, yet slower, passenger machines.

Having urgent business down South, one or two local passengers are availing themselves of this service; we—it must be confessed—are actuated mainly by curiosity concerning night travel, and at the invitation of our friend the senior pilot.

The aero station is built on a clearing a few miles from the fast growing Northern town. Heavenwards a vertical searchlight rises in an intermittent, dazzling shaft of white, and, by the reflection of its spasmodic flashes, the plain beyond the hangars looms up tremblingly out of the tropical night.

To the South-east, four successive pencils of light rise from a chain of emergency landing grounds. Far beyond the invisible horizon, a faint, luminous pulsation against the star-powdered sky above Pine Creek marks the location of a second aero station similar to that from which we are about to commence our flight.

The fitful tower of light beside us suddenly dies out but, before darkness can supervene, a flood of softer illumination is projected over the centre of the aero station.

The tall doors of the nearest hangar slide noiselessly apart, revealing a great glistening torpedo-like nose emerging on to the aerodrome.

Presently it moves eerily forward, escorted by a party of mechanics who, by comparison, appear mere pigmies. Slowly the whole length of the great shimmering body comes into view, its folded wings suggestive of a drowsy giant dragon-fly being urged into the unwelcome glare of a noonday sun; this is *Mail Auxiliary Number Two*—or *M.A. 2*, as she is known in the Service.

She halts just inside the ground enclosure, and from the shadows of the surrounding office-buildings men appear hauling out into the light a trolley load of mail bags. They proceed to store them in the containers under the belly of the aerial monster, from which the pilot will eventually drop them, by moving a lever over the various non-stop stations on our journey south. Other men are winching out the spreading wings into flying position; and some, under the supervision of the second pilot, have commenced staying them rigidly to the great underbody. While these preparations are in progress we make a leisurely inspection of the remarkable craft in which we are about to begin our transcontinental flight.

With her great wings—or planes—of fine metal, spread over a span of two hundred feet, like a big awning over the heads of the attendant mechanics, *M.A. 2* now appears thoroughly awake. Smaller than her sisters of the daily passenger service, and even a second-class type in the postal service, she yet conveys the impression of highly specialised ability, while the darkened space between her planes seems to hint at mysterious reserves of hidden energy.

Beneath these wings the huge polished body tails away nearly two hundred feet to the two big up-standing rudders at the rear. Up for'ard her lower bulk is

pierced by a row of lights from the long passenger-cabin within, and the extreme front tapers off to a gently rounded nose. On top, half way between the nose and the planes further back, a small bay-fronted structure projects from the sloping back, or upper surface of the body. Its front window commands a good view of the ground ahead and on either side, and obviously qualifies it as the pilot's cabin. Behind it, a few portholes in the still rising hull reveal another room, with railed passages on either side leading out to the engines, mounted between the planes. This, evidently is the mechanics', or engine-room, and in addition two engines mounted between the planes on either side, there is one immediately below the centre of the top plane and above the body; five in all.

While we have been noting these details mechanics have appeared along the railed passages and, with the aid of portable electric lights, are now carefully examining the engines. The junior pilot strolls across from the offices, walks beneath the great body of the aeroplane, climbs into the passenger cabin, hoists himself up through the ceiling into the pilot room aloft, seats himself at the window, and busies himself with the control mechanism.

A bell rings; our friend the senior pilot and a group of passengers arrive on the aerodrome and, assisted by an attendant, mount the steps into the cabin.

A noise like the panting of giants, and gradually merging into a low, tense, continuous humming, disturbs the silence of the night; the great low-hanging propellers in front of the planes have accelerated their action from a leisurely threshing of the air to blurred wheels of dazzling motion. The uproar is altogether different from the sound of escaping steam, yet somehow recalls occasions when I have stood on Spencer Street Station, Melbourne, dazed by the prolonged screaming of the big express engine, in its impatience to commence the journey to Sydney.

The mails are now stowed aboard. Suddenly four bright red lights appear on the outer edges of the planes overhead. They correspond to the port lights of a ship, and we know that four green lights have similarly appeared on the other side of the great body.

Simultaneously, several brilliant white lights have flashed out along the front, or leading edges, of the planes and a strong single shaft of mobile light shoots forth from the tapering nose in front. The station master, in shirt-sleeves, stands puffing at a cigar and exchanging a final word with the pilot. Suddenly the latter turns to us and signals us aboard.

We move towards the steps and now find ourselves in a cosily-fitted apartment, very like the long, two-seated corridor cars of our railway days. It is, of course, smaller, *M.A.2* being primarily a mail-carrier and having but limited passenger accommodation. Yet it is roomier than the railway coach because there are only eight comfortable-looking collapsible cane seats, placed at generous intervals along either side of the cabin, thus providing seating and sleeping accommodation for sixteen passengers.

Our apartment is designed for lightness and comfort; a luminous band of mica encircles the walls of the cabin and reveals an electric radiator. The whole place, in fact, is very comfortable and attractive, confirming the general opinion that aerial night travelling is reserved for those who can afford to "do the thing in decent style."

Our fellow passengers are now all seated, with their luggage distributed on the ample floor-space surrounding their respective seats. The droning of the engines has attained a high pitch, and the moment of departure is near.

The bell, which has remained audible throughout, suddenly ceases. The pilot appears and the trap-door below closes after him. He climbs up into the cabin overhead, and presently the *whir-r-r* of machinery increases in depth and rhythm. At the same time there is a faint continuous straining and jolting, coupled with tremors of motion through the cabin.

At first we cannot decide whether we are moving or not; then the floor beneath our feet seems to tilt slightly upwards; a glimpse down through the port holes shows the lights of the aero-station slipping past fully two hundred and fifty feet below. A sudden increase of the weight pressure of one's back against the seat; the creaking of the light fittings of the cabin, and the continuous tremor of strain as our craft battles upward, leave no further doubt in the matter.

These indications are punctuated at intervals by slight bumps and forward pitchings on the part of the machine, to the obvious embarrassment of one or two passengers.

"That's the remnants of yesterday's weather," remarks an Indian passenger to a sunburned young mine manager seated on his left. The latter is obviously new to aerial travelling, and looks about him uneasily.

"We ought to be out of it in a few minutes," adds the first speaker.

Hardly are the words spoken when the stars, framed through our front windows, seem to be climbing higher into the heavens as the nose of our machine drops a few degrees.

"Thank goodness!" exclaims the young lady passenger—who for some moments past has been clinging to her burly father's arm—as the machine begins to travel forward quite smoothly.

But her relief is short-lived. The noise of the engines has decreased, but the cabin heels over alarmingly to one side, to the discomfort of the novices among us. We grip our seats; *M.A.2* is taking a short turn, and we experience the sensation of falling down on one side. The novice is naturally thrilled, because his sense of gravitation and direction at first seemed strangely lost in the new element in which we are moving. But the realisation of distance between us and the earth becomes even painfully keener as the ship heels still further over, and the next moment the lights of the aero station stare up squarely at the passengers through the porthole. Suddenly they vanish and our aerial vessel rights herself and takes a straight, level course. Then a pretty, dazzling, green flare drifts slowly down through the darkness outside; the pilot has signalled "all's well" to the aero station officials below, and we are about to go straight ahead. The engines tune up to a steady song of higher speed; the lights of Darwin drop rapidly behind as we whizz forward on an even keel, and proceed to follow the linked line of thin, white columns which indicate our southern route over and beyond the dark distant horizon.

* * * *

For a while silence reigns among the passengers. Some have already yielded

to the somnolent influence of aerial night travel; a few of the less experienced are soulfully and wonderingly regarding the shadowy scenery below which drifts by, grey and phantom-like, with uncanny slowness. The only sounds are the noise of the madly whirling propellers outside, the persistent, soothing drone of the high-strung engines, and an occasional sweet treble note from some bracing wire touched by the fingers of the wind—all combining in one harmonious, ethereal choir; while the stars outside creep lazily past the windows on either side.

Suddenly, the inner silence is broken by the voice of the lady passenger: a sun-browned, golden haired girl, who is accompanied by her father—a big, hale, middle-aged man of the Australian out-town type. "I wonder what speed we're doing?" she speculatively remarks, to no one in particular. A young man, wearing the Distinguished Flying Cross ribbon of 1918, and who is travelling with an elderly white haired gentleman, volunteers: "at a very ordinary aerial speed of one hundred and forty-three miles an hour."

"One hundred and forty-three!" she echoes incredulously, "it's really difficult to believe we're travelling so fast"—taking a glance through the porthole—"I expected to see flying scenery, and all that sort of thing; but it's less exciting than a fifty-mile-an-hour railway journey! Nothing seems to be moving!"

"If we were whizzing along close to the ground you'd realise our speed right enough," smiles the young man; "but at our present height and distance, we get no sense of motion; that explains why airmen are always calling for speed and more speed. The higher they go the slower they seem to be moving over the earth; 'steady' flying becomes monotonous and they look for new sensations."

"Oh!" replies the girl thoughtfully; "and at what height are we travelling now?"

She experiences a thrill of satisfaction at the careless reply: "About ten thousand feet—a little under two miles."

Meanwhile we have passed three of the thin, vertical shafts of light which mark our course, and passengers are reassured by the knowledge that at the foot of each is a landing ground to which we could

glide in perfect safety even if our engine-trouble amounted to entire stoppage. Towards the one now ahead we seem to be travelling direct as though about to dash right through its beam, while still further ahead is one of the larger kind with the intermittent light that indicates a station. The first one suddenly begins to grow shorter, wider and more dazzlingly white as we draw nearer and seemingly higher over it. On, on it comes, now rushing towards us at such a rate that it seems only to have just started really moving nearer. On, on, on—and next moment the air about us becomes a quivering, white deluge of glory.

In a flash it is gone, and we are again whizzing through comparative blackness.

For this diversion the young lady laughingly expresses her gratitude to the pilot, and it seems that the absurd inclination to sleep is also dispelled from some of the other passengers. Conversation, which is no more difficult than in a railway compartment, now makes headway, and we begin to take some interest in our fellow passengers.

The man from India, who had earlier proffered information about yesterday's weather, seems loquaciously inclined, and exchanges remarks with a white-haired gentleman and the D.F.C. airman accompanying him. These two have come right through from England and, in the last stage of the voyage—from India—the loquacious passenger has made their acquaintance; naturally they assume the position of aerial veterans.

The wiry looking young mine manager is silently, yet keenly, interested in every phase of the novel situation and now sits gazing expectantly towards the alternately disappearing light ahead which marks one of the localities in the Northern Territory well known to him. But a little elderly gentleman in the second front seat does not appear at all happy; his eyes have hardly moved from the temperature gauge over the front window since we left Darwin. Something in his appearance suggests that he had just stepped off the liner that had this afternoon tied up off Darwin; and whether his silence is due to nervousness of his new experience, or to some family or business trouble that has compelled him to take this fast but unaccustomed journey down south, we can only surmise.

One or two others reveal their newness to aerial journeying by an excitable interest in what little there is to be seen from the portholes.

Of the more experienced, the white-haired gentleman is telling a few of the Australian passengers how he and his younger companion left England five days ago, and would have arrived at Darwin earlier but for bad weather on the last stages of the journey. In reply to a question from the mine manager he proceeds to unfold an interesting tale of flying continents and changing colour-schemes, culminating in heavy travelling through *khamseen* weather over Palestine. Referring to some heavy rains through which they have passed, he explains how this circumstance had forced them to climb through a few thousand feet of thick cloud to find better travelling above. "Not only did it delay us," he adds in conclusion, "but having then to travel mile after mile over a drab white desert of cloud without a glimpse of ocean or warm land beneath, became deuced monotonous."

As the discussion continues the ex-airman confirms the story of his elder companion, but now the former's head begins to hang wearily and soon he is fast asleep. To him flying is no novelty; he learned quite a lot about it in the European war of 1914-1918.

Meanwhile the young mine manager and the father of the lady passenger have become acquainted. Both are men whose names are well known over the land of wide spaces, and they are pleased at last to meet each other in person. The elder man tells that on the previous day, in order to catch *M.A.2* for this journey, he had flown in a friend's "slow" private machine from his new cattle station on the MacArthur River to Darwin in three hours. He mentions having previously made two trips on this route to his agents in Adelaide and Melbourne, and adds that the saving in time alone made the journey profitable on each occasion.

The mine manager confides that the bag at his feet contains some unusual specimens from his syndicate's prospector in Arnheim's Land, and that the aerial service is now enabling him, after two days' hard travelling, to reach Melbourne sufficiently ahead of a rival crowd's expert to secure valuable leases

and certain options over good adjoining country.

"If I'm not all out in my calculations," he adds, with a chuckle, "Bradley's party should reach the Roper in just about forty hours' time. Then all the cables in the world won't help them; they *must* miss the bus!"

Someone draws attention to the aero-station light, now drawing nearer.

"Pine Creek," remarks the squatter to his now excited and interested daughter; "but we won't pick up anything here. The Indian delay gave 'em time to be sent up to Darwin to us, by rail."

Ahead, we see a glitter on the dark shadowy earth below, which might or might not indicate the presence of water, but, still further ahead, the great, soft, intermittent beam of light allows of no doubt about the aero-station.

Somewhere overhead an instrument begins to *click-clicker*. The signals are immediately answered by a flickering light some distance from the base of the big column of white ahead. In staccato jerks the two conduct a conversation regarding mails to be dropped or taken on, identity of passengers on board, and so on, until overhead the voice of one of our pilots addresses the man from the MacArthur River.

"A message here for you, Mr. Allan, wireless across half an hour ago. Come up and I'll interpret for you."

The squatter mounts the steps and disappears into the pilot's cabin above. Presently we hear his voice: "Many thanks, Mac," then he turns and, resuming his seat beside his daughter, both become engrossed in conversation.

The D.F.C. man opens his eyes and sits up abruptly: "Hello! are we dropping a bit?" he asks, instinctively. Apparently we are, for the searchlight seems to be losing width and extending higher into the heavens as we approach it at a lower altitude. Now, with the increasing speed of its approach, it seems to be growing proportionately larger as well. Without any check in its progress it grows magically larger each second. Then suddenly the whole thing vanishes, and in its place a patch of illuminated ground, fringed with tiny buildings, appears and rises rapidly towards us.

Down, down, we go, its size and velocity madly increasing. Four red lights mark

its centre, but, just as we seem doomed to hit the earth, the expansion in size ceases, and next moment we are skimming at a low level over its nearest buildings.

There comes a flush of red on either side—followed by a flash of white—then up we madly sweep into darkness again, on our way to the higher levels.

"Did that seem fast enough for you?" asks the young ex-aviator, turning to the delighted and astonished young lady-passenger.

"Lovely!" she exclaims, with a gasp of excitement; "that was much, *much* faster!"

The young man smiles: "Well, as a matter of fact, Miss Allen, it was much, much slower; our speed was reduced considerably to drop those mails. But being nearer the ground everything seemed to travel past more quickly, in the same way that the telegraph posts and the nearer trees seen from a railway car window seem to be dropping back faster than those in the distance."

"Well—well, it *felt* much faster anyhow," rejoins the young lady conclusively.

After travelling some distance it occurs to me that, as privileged passengers, and friends of the pilot, we might now avail ourselves of his invitation to inspect some of the inner workings of *M.A. 2*.

Our appearance at the opening to the pilot's cabin elicits a cheery command to enter and take a seat behind him. From my level on the top steps I can see almost as well.

On a ledge immediately beneath the front window of the cabin is a row of five luminous dials; the pointers vibrating slightly as they tell exactly what is happening back with the engines. The two outer dials show full speed, the inner pair indicate an easier speed, while the centre one stands idle, awaiting the call for extra power for climbing or for travelling against an adverse wind.

Above the latter, but not infringing on the glass, is a slightly curved tube with a bubble, lying in a horizontal position; this is the inclinometer, and the position of the bubble indicates whether we are travelling on an even keel or not. Just above it is a watch, and, immediately below it, the air speed indicator. On either side are the altimeter, which indi-

cates the height, by the action of air pressure on a small enclosed vacuum tank; and the barograph which, with a small needle, similarly records the rate of ascent. On the extreme right and left are the petrol gauge, oil gauge, and other instruments, mostly operated back in the engine room by mechanics. Below and immediately before the pilot are a brass disc with a pointer like that seen on a ship's bridge, by which he communicates with the engine room, and a combination compass and map-holder.

The latter is contained in an illuminated box. Across the glass face are two fine crossed wires, beneath which a strip of map slowly passes. The country we are actually passing over is always located on the map directly beneath the intersection of the wires. If she wanders to left or right of that position, *M.A. 2* must be correspondingly straying from the route which she should be following.

There are one or two smaller dials on the ledge in front of the pilot, but as far as the actual motion-control of the great machine is concerned the mechanism is simplicity itself. This consists of the steering gear, operated by a lever connected with two air motors (as employed in sea vessels) which a simple touch sets spinning in the required direction while the big twin rudders answer simultaneously; also the "joy-stick."

The slightest inclination of this powerfully-gearred lever to left or right, forward or back, gives the entire mass of *M.A. 2*'s great bulk a severe list to either side, or alters her direction of flight downwards or upwards as required. And that's about all. Compared with the amount of machinery contained in the cabin of a steam engine much less than a quarter of her size, the mechanism of *M.A. 2*'s control is a matter of amazing simplicity.

Taking a last glimpse at the compass, we turn to the window, and think, perhaps, to identify the scenery. But that is a different matter by night to what it is by day. By daylight the pilot familiar with his route scarcely troubles to look at the compass at all, for the whole route with its hundreds of landmarks is actually down there before his eyes. But should the land be hidden below mists or clouds, or by the darkness of night, the air-skipper is metaphorically, as much "at sea" as his brother of the oceans.

Thus is the world below on this night; a murky grey mass, singularly lacking in detail, for we are passing over comparatively level country. An occasional ghostly light patch, rising from its darker surroundings, indicates some small hill or elevation which catches the faint light of the myriad stars and the high-swung moon above the distant horizon, while deeper black masses mark the low-lying lands and depressions. Yet the pilot assures us that hills and contours often show more clearly by night than by day on account of the greater contrast of the moonlit peaks against the black shadowed valleys. Our pilot explains that the general and more diffused brightness of daylight renders these differences and outlines much less distinctive.

Far ahead through the gloom a faint glint of light or some reflection catches the eye. We are told that about thirty miles away is a river over which we should be flying in another fifteen minutes or so, and to the left of it lie the once almost inaccessible mineral fields of Arnheim's Land.

Soon we pass another motionless column of light, and now only one more stands between us and the bigger flickering mass further ahead. After a while, judging it best to leave the pilot to his work, we descend into the cabin and resume our seats.

* * * *

All doubt as to the presence of a waterway ahead soon vanishes before the appearance of a chain of glittering points that hint at the course of a river. At the same time the big glare looms rapidly nearer and appears to have grown taller. Once again the alternating flashes of light fade from view, to be replaced by a wider and softer area of ground light.

The latter rushes up towards us, while, again, a glow of red becomes visible in the midst of the greater white mass.

With miraculous ease and accuracy we swoop down into them. Once more a glow of colour sweeps past us—while a glimpse of steel girders and a suggestion of two small human figures mounted high upon them flashes by us, and momentarily a stretch of cable supporting some dark object appears almost in our path.

A slight jar, a clank of metal, then up, up we sweep again, with a few hundred pounds of mail matter on board that

we were not carrying before. A glittering green star drifts down through the darkness, telling the officials below that we have successfully grappled and taken mail aboard as well as having delivered some.

Next moment the lights of the Roper River Aero Station are dropping rapidly behind, and the silvery course of the river of that name grows finer and more thread-like, until it fades away altogether in diminishing pinpoints of reflected light; and presently a faint, light patch of rising ground to the south of its course, marks our last view of the tropical portion of Northern Australia.

* * * *

Within the next few hours we pass over the newly revived sheep country about Daly Waters; then along the beautiful moon-paled crests of the Ashburton Ranges, and the fringe of the now famous cattle country which extends between the Anthony Lagoon, Camooweal and the Murchison Hills.

But it seems that the break in the monotony of the scenery has come too late for most of our fellow passengers; for the soothing, harmonious drone of aerial travel has overcome their waking senses, and one by one they have converted their collapsible seats into comfortable lounges and are now fast asleep. The comparatively rugged scenery, much less the frequent pencils of light from the emergency landing grounds that dot our route, can no longer interest them; the latter, in fact, had become almost tiring to the eyes and were rather to be avoided.

While we are passing over particular grey, dreary landscape, some change in our direction or height, and a realisation in our drowsy senses that the signal light is flashing, awakens us to something of interest being in the wind.

We notice the big man from the MacArthur River just emerging from the pilot's cabin, and then crossing over to the now wide-awake D.F.C. man, who, through the front window, is peering out into the night.

The girl with the gold-dusted hair and the deep-brown eyes arises from her lounge and asks what it is that interests them. The young man replies that another machine has appeared travelling almost

in the same direction as *M.A.2*, whereupon she too hurries across and asks for further details.

"See those lights—right ahead of my finger?" asks the airman extending his arm in front of her.

"Yes—but are you sure they're not stars?"

"Not they," comes the confident reply; "look carefully now—a little to the left of those four big stars—you will see a couple of points of light moving ever so slowly—that's the aeroplane."

By this time others have become interested too. While all are trying to locate its position amidst the innumerable stars, the keen-eared young man, who has been listening intently, announces that at this moment wireless signals are passing between the two machines, and will presently be revealed by the operator up behind the pilot's cabin.

"I wonder where they're going?" asks someone—referring to the strange machine.

"Same direction as we," answers the ex-aviator, "to Oodnadatta. She's one of the sub-service's carriers that serve the newly developed latitudes between the once barren Tanami goldfields and Charlotte Waters."

"What sized machine is she?" the same man asks.

"A little bigger than their mail busses, but not as fast," he is told—"and almost as big as this."

Meanwhile, one of the mechanics has come down and entered into conversation with the young man and his elder companion. Presently he leaves us, and soon it is rumoured that the stranger has news concerning the long-overdue Government survey and prospecting party, which was the chief topic of conversation when we left Darwin.

While the discussion is at its liveliest the door from the pilot's cabin opens and the second-in-command descends:

"Here we are—

"*Received by Wireless*," he commences in perfunctory tones:

Postal bus advised us Palmer's party sighted this morning. Smoke signal located at noon. Approx. two-twenty miles S.S.W. of Tanami. Landed supplies and left guard of three over outfit. Remainder on board with us. All well.

"That's the end of the message," he concludes, with a smile; "thought you'd like to know." And he climbs back into his cabin.

A buzz of conversation ensues. The young airman demonstrates that another and smaller machine of the postal service had really first discovered the lost party's location and had later advised the machine outside to that effect. Whereupon, the latter had gone with a load of provisions to their relief, had left three fit members of their party in charge of their outfit, and was now taking the remainder with them to Oodnadatta, where they would receive any medical or material aid which may be required.

The whole story is reconstructed and recounted in detail, until one by one the passengers retire to their seats and subside in slumber.

* * * *

"O-o-oh, look! I'm sure I can see the house-tops and the mine buildings!"

We jump up dazedly—and find that it is early daylight on a sunlit and slightly misty morning. The girl from the MacArthur River is at the window, gazing out excitedly over some town which we have just passed. At the mention of Broken Hill the cabin becomes animated with comments on the dazzling speed of aerial travelling, while certain wakeful passengers endeavour to tell of the more interesting hill and river scenery they began to enjoy when *M.A. 2* reached the vicinity of the Macdonnell Ranges, and of the lakes and waterways they saw between Oodnadatta and Broken Hill.

But a feeling of freshness and satisfaction after a delicious night of aerial slumber leaves no room in the minds of the others for regrets that the most interesting phase of the great journey had only arrived when they were too sleepy to appreciate it.

However, we are not to be cheated of all scenic beauty. For a glittering golden sun is rising over the mist-filmed horizon with an apparent rapidity never seen by earth-dwellers. And below are pearl-grey vapours, streaked and dappled with deep blue shadows out of which a group of small lakes send up shafts of reflected light, like a cluster of jewels beaming from a billow of soft grey. Above and about us, masses of delicate pink-gold, pearl-grey and pale-

blue clouds drift dreamily along through space, their soft shapes and delicate tints changing as the rays of the rising sun affect them at varying angles. A sense of illimitable space and a great, wonderful silence prevail.

South of the tiny lakes a thread of fine, shimmering silver winds away over the misty horizon; and when someone suggests that this is probably the Darling the whole cabin becomes a-buzz with interest. Gradually it looms nearer and larger, and presently we are travelling over a forty-mile stretch of its glittering, winding course in a south-easterly direction. As the mists become thinner we have glimpses of thread-like roads and occasional light specks that suggest the house-tops of human habitation, and we pass over a small, sleepy-looking township, which, according to the man from MacArthur—who has done the trip before—is a place called Pooncaira.

Gradually the river becomes lost over the horizon on our right, and presently we commence to glide over the soft, sage-green flats and slopes and blue-shadowed woods which separate the Darling from the Lachlan.

The latter river is sighted and soon crossed, the far-famed Murrumbidgee appears glittering on the horizon, and, half an hour later, Hay, the town of our destination, comes into view.

Rapidly the streets and house-tops become clearer and visible as we gradually descend, in a wide sweeping half-circle, to our goal—a large enclosure on the outskirts of the town, fringed with sheds and buildings.

Down, down we glide; the skirting road, the buildings, and even a few individual figures and a couple of aeroplanes on the aerodrome coming within normal vision. They rise and expand rapidly beneath us until every object is clearly visible, and it seems that we are about to land on the very tops of the office buildings. Up, up at lightning speed they come; surely the nearest roof must scrape our under-carriage, and those two great machines on the far side of the aerodrome deliberately intend to obstruct the path of our landing.

But no; just when a catastrophe appears inevitable, the building flashes under us just out of reach! Next moment we are taxi-ing along the ground—apparently doomed to scrape wings with one of the

great machines at rest. However, we somehow miss, and a few seconds later *M.A.2* stands on *terra firma*, silent and motionless at last!

Mechanics and officials hurry forward and cluster in the shadow of her great body while, barely thirty yards away, the two passenger machines stand cold and unperturbed by the arrival of their precociously fast but smaller brother.

* * * *

Fifteen minutes later, after a bath and brush-up, we are all seated in the great dining hall of this southern aero-junction; surrounded by a couple of hundred other passengers about to start on, or—like ourselves—continue their aerial journeys further south, or east or west.

Having breakfasted, most of us stretch our legs or sit talking, smoking and whiling away the half-hour which must elapse before we resume our flight.

Presently the shrill ringing of a bell sounds above the clatter of cutlery and conversation, and sends many people filing out to the ground on which the great busses stand awaiting their orders.

The MacArthur River squatter and his

daughter return from a tour of inspection; also the young ex-aviator and his white-haired English companion.

Our exchange of farewells is interrupted by the clatter of a deeper toned gong. With a hurried "good-bye" the mining man sprints away with a business-like glint in his eye, and vanishes in the crowd moving towards the Melbourne "bus."

A minute later we see the last of the man from the MacArthur and his pretty daughter, and the young man and his elderly companion. The two senior gentlemen are leading the way towards the Sydney aero-bus outside, and the young people follow.

Passing out towards the machine which is to take us to Adelaide, we catch a last glimpse of our late speedy, faithful friend *M.A. 2*, far over on the other side of the aerodrome. With feelings of mingled respect and affection we watch her being backed off the ground, through the crowd behind the barriers, into a hangar; there to be thoroughly rested and overhauled before commencing her next night of postal journeying over the vast central spaces of the Australian continent.

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AVIATION LUNCHEON

AIRMEN ENTERTAINED BY THE MILLIONS CLUB.

The first anniversary of Armistice Day (November 11) was celebrated in Sydney by an Aviation Luncheon at Farmers' Restaurant, under the auspices of the Millions' Club of New South Wales, Mr. Arthur Rickard presiding.

Major-General J. G. Legge, C.M.G., C.B., emphasised the necessity of protecting Australia against invasion by air and reminded his hearers that the world is gradually growing smaller. In advocating an Air Service for Australia he had (he said) been dubbed a "wasteful militarist," but vindicated himself by presenting a clear picture of what might happen if we failed to provide one. Readers of this journal will have been sufficiently impressed by General Legge's contribution * "What an Air Service can do for Australia," to render unnecessary a detailed report of his forceful address to members of the Millions' Club.

Mr. Charles Lloyd Jones, managing director of David Jones, Ltd., pointed out that the ten-minute limit imposed upon his remarks was in itself an indication that business men's time was valuable. As a time economiser the aeroplane was a factor of supreme importance in our commercial and industrial life—it was quicker than train, motor, or steamer. The air had been mastered; it was cheap and—there was plenty of it. There was no permanent way to be maintained as in railways; no roads to be kept in repair, as in motor delivery, and without being unduly optimistic he (the speaker) could conjure up visions of our big business houses conducting aerial delivery services from warehouses in the State Capitals to customers in the remote interior of the Commonwealth—conducting them, too, by means of express delivery lorries to their own aerodromes near the city, and thence by their own freight planes to the back country.

We had passed the experimental stage, Mr. Lloyd Jones continued; aerial de-

livery of merchandise was already an accomplished fact. In Chicago, in June of the present year, a firm of clothing manufacturers inaugurated a daily express delivery to dealers in territory adjacent to Chicago. So successful had it proved that the service was now to be extended to a radius of 500 miles. The American company in question had laid out an aerodrome covering 40 acres, and erected a hangar for its two machines. We had, perhaps, not quite reached that stage in Australia, but the novelty of to-day was often the necessity of to-morrow, and he could, in his mind's eye, already see the atmosphere above us thick with buzzing aircraft, their sides embellished with a hundred business slogans familiar to advertisement readers of the present day. He could name at least one of these, but—natural modesty forbade. (*Laughter.*)

Mr. Lloyd Jones concluded his "ten-minute talk" with a list of practical purposes to which aircraft could be put, and instanced, among others: the conveyance of our primary products to city marts; of important sections of mining machinery urgently required to repair a breakdown; locating bush-fires; conveying medical aid where an operation would save the life of a patient too seriously injured to be moved over bad roads to the nearest doctor—often a matter of several days' travel by coach; exploration, survey, charting dangerous rocks, and an air police force for overhauling fugitives and bringing them to justice.

Lieutenant-Colonel W. Oswald Watt, O.B.E., who was introduced by the president as "The Father of Aviation in Australia," briefly traced the birth and growth of the aircraft industry in France and supported General Legge's plea for an Australian Air Service.

The luncheon guests included Captain L. H. Holden, M.C., A.F.C., Captain J. Wright, M.C., A.F.C., Mr. W. E. Hart, Mr. R. Lloyd and Mr. E. J. Hart, honorary secretary of the Australian Aero Club (New South Wales Section).

* *Sea, Land and Air*, November, 1919.

THE AUSTRALIAN AERO CLUB

VICTORIAN SECTION.

A meeting of the above Section was held on November 7, when on the motion of Major-General J. G. Legge, seconded by Colonel W. E. Cass, the proposed rules and regulations of the Club were adopted.

Office-bearers for the ensuing twelve months were elected as under:—

Chairman, Major W. Sheldon; Hon. Secretary, Captain P. Roach Pierson; Committee, Captain H. J. Larkin, D.F.C., Dr. Griffith Taylor, Mr. Hector Sleeman and Mr. A. H. Parker.

General Legge suggested that provision be made for altering the rules from time to time in accordance with the progress of aviation.

The following resolutions were carried:—

Proposed by Captain Larkin, seconded by Dr. Griffith Taylor, that a smoke night be held on November 28, and that the secretary be requested to arrange for a musical programme.

Proposed by Mr. A. H. Parker, seconded by Mr. Sleeman, that Club premises at Aberdeen House, 94 King Street, Melbourne, be leased for a period of six months, with option of renewal, at a rental of £160 per annum as from December 1919.

Moved by Mr. Sleeman, seconded by Captain Larkin, that in view of the additional expense of maintaining Club premises, the annual subscription be increased to three guineas.

Moved by Captain Roach Pierson, seconded by Mr. Sleeman, that in the event of the arrival in Melbourne of any competitor or competitors in the flight from England to Australia, he (or they) be entertained by the Club at a dinner of welcome.

Proposed by Captain Pierson, seconded by Captain Larkin, that messages of condolence be forwarded to the parents of the late Lieutenant R. M. Douglas and Lieutenant J. S. L. Ross.

The Smoke Social above referred to was duly held at the Savoy Hotel. Some

fifty guests were present, including Sir Robert Muirhead Collins, Major-General J. G. Legge, C.B., C.M.G.; Brigadier-General T. A. Blaney, C.B., C.M.G., D.S.O.; Paymaster-Commander A. M. Treacy, Commander J. K. Davis, Mr. W. Blacket, K.C., Mr. W. T. Appleton, Colonel W. E. Cass, C.M.G., and Major W. Sheldon.

The toast of "The King" was proposed by Major W. Sheldon; that of "Fallen Comrades," proposed by Captain P. Roach-Pierson was honoured in silence.

NEW SOUTH WALES SECTION.

A general meeting was held on November 11, in the Lecture Hall of the Royal Society of New South Wales, Sydney, Colonel W. Oswald Watt, O.B.E., presiding.

Major-General Legge detailed the preparations which the Defence Department had undertaken at the Australian end in connection with the flight from England to Australia, the substance of which is printed in another section of this journal.

The sub-committee submitted a comprehensive report on the same subject, together with its suggestions and recommendations.

General Legge stated that the Defence Department had received no information from England regarding the flight; the terminal point would be Darwin, but as far as he knew, nobody had yet been appointed to act as control officer at that station.

"Regarding the control of aviation," continued General Legge, "the Commonwealth Government has asked the State Government to consider the matter. The Commonwealth can legislate on the subject of bringing various 'planes into Australia, and on the subject of people sending mails, but anything which does not come within the constitutional powers of the Commonwealth cannot be under its legislation. Therefore, when it comes to the regulating of traffic, the issuing of certificates, the safety of aeroplanes, and the framing of rules to be observed when

you meet one another in the air—the Commonwealth has no power whatever, and any legislation would be illegal.

"We want legislation to safeguard the public, to stop the lunatic flyer from bringing discredit on his fellows, to make the careless man careful, to prevent rash men going up in machines and killing themselves and killing the public, doing stunts over the city and so on. As the Commonwealth has no power to interfere and the States, apparently, do not seem inclined to do so, I consider that the alternative suggested by Colonel Watt is a very reasonable one. That is all we can do until the State Governments take the matter in hand or give the Commonwealth the power. If the New South Wales Club issues a certificate, that same certificate will be accepted by Sections in all other States. It is a very good idea for the Aero Club to take on the responsibility as a temporary measure. Inspection ought to be done by paid Government officials, but in the meanwhile, I think the Aero Club should offer to inspect aerodromes and machines and certify as to qualifications of pilots. Commercial propositions which are dealing with flying should be able to make use of these certificates and say, 'We have our certificate and we have the authority of the Aero Club'—and this is going to do a good deal. In forming its committee of technical experts, the Club should appoint men of fairly broad experience, because one might say that only certain types of engines should be allowed. A particular type of engine which may be no good on one machine might, perhaps, work excellently on another."

Captain Hughes moved that a sub-committee be appointed to prepare a report recommending the methods which the technical committee would follow in its inspection of aeroplanes. This sub-committee could prepare draft rules which, if approved by the Club, could then be enforced by the technical committee, which would be elected to carry them out. The sub-committee should consist of five or six members and include those commercially interested. Certificates would be issued to pilots of machines of the passenger-carrying type and of the non-passenger-carrying type. The technical committee should consist of any number

of qualified, but not commercially interested, members. After some discussion, it was resolved that a sub-committee consisting of two trade members of the Club and three non-trade members, be appointed to prepare rules in accordance with the above suggestion.

Mr. H. E. Broadsmith, F.R.Ae.S., delivered a lecture on Civil Aviation in Great Britain, which is printed on page 617.

SOUTH AUSTRALIAN SECTION.

A special general meeting of the above was held at the Wool Exchange, Adelaide, on November 19, Mr. Dudley T. Angas presiding.

The honorary secretary, Mr. R. O. C. Matthews, outlined the work of the Club up to that date, and stated its aims and objects.

They had met, he said, to discuss the question of the control of aviation in the Commonwealth, and the best means of co-operation with the other Sections in order to obtain for the Club official recognition by the authorities, and with the object of inducing the Commonwealth Government to legislate for its proper control.

The chairman said that it appeared to him that the only hope of moving the authorities would be to keep worrying them. He urged that the State sections should unite and arrange a definite plan of action.

Mr. Matthews pointed out that New South Wales was the first of the sections to take up this matter, and although the South Australian section was comparatively small in membership, he considered that the matter was of such urgency as to justify calling a special meeting to deal with it.

Bad control was no better than no control, and unless the officers appointed to enforce the regulations were themselves capable and experienced men, nobody would benefit by their appointment. Mr. Matthews added that he was altogether against State Government control, and past experience had shown that they could not have uniform regulations if the framing of these were left to individual States.

Captain H. G. Butler stated that medical examination should be included in the

examination for a pilot's certificate as in those conducted by the British Air Ministry

He was quite prepared, on behalf of his own company, to offer every facility for inspection of plant and aeroplanes by Aero Club officials. "I should like to know," added Captain Butler, "whether the matter of altitude when flying over towns has been gone into. Personally I consider it unnecessary to impose the same limitations in Adelaide as would apply in Melbourne and Sydney. There are wide spaces for landing in all parts of Adelaide, most of them being larger than the average aerodrome. One could make a safe landing over Adelaide at a thousand feet.

The following motion, proposed by Mr. C. Exton and seconded by Mr. L. Parsons, was carried:—

That, the views of this section of the Aero Club be placed before the General Secretary with the request that the Council submit a report dealing with the various clauses of the Air Navigation Act.

QUEENSLAND SECTION.

A general meeting of the Queensland Section of the Australian Aero Club was held in Brisbane on November 5, when the following provisional committee was elected:—

Chairman, Mr. J. J. Knight; Hon. Secretary, Captain H. E. Rydon; Committee, Major J. Macleod, O.B.E., Captain F. R. Smith, D.F.C., Messrs. W. Pyke, A. R. Macdonald, A. F. Hudson and J. G. Williams.

The main purposes of the Club were briefly outlined by the provisional chairman, Mr. J. J. Knight, as follow:—

(1) The formation of a club, to which those interested in flying could look for authoritative advice. (2) The binding together in fellowship of men who had formed ties of friendship with other members of the Air Service. (3) The holding in connection with (2) of an annual reunion.

After some discussion it was decided that a second committee meeting be held on November 13, in the rooms of the Automobile Club of Queensland, and that a general meeting be held on the following day.

TASMANIAN SECTION TO BE FORMED.

With a view to forming an Aero and Automobile Club in Tasmania, a meeting was held in Hobart, on October 24, at the instigation of Mr. T. S. Nettlefold. Those present were Mr. Knight, Mr. L. J. Crozier, Mr. L. F. Piesse and Dr. Butler. Lieut. A. Long and Mr. D. K. McKenzie represented the aero section, while the automobile section was represented by Mr. Nettlefold.

Letters were read from the Royal Automobile Club of Victoria, inviting affiliation, and offering an exchange of privileges.

It was decided that a club be formed, and that it be known as the Automobile and Aero Club of Tasmania. Considerable general discussion took place on the matter of the constitution, and a sub-committee was formed, consisting of Lieut. A. Long and Mr. D. K. McKenzie, to obtain copies of the constitution of the Royal Aero Club and the rules of the Automobile Club, in order that the two might be fused.

The motion to be moved at the forthcoming meeting of the Hobart City Council regarding the acquisition of landing grounds for future aerial traffic was discussed at some length, and the club lent its strong support to the principle of securing landing grounds at the earliest opportunity.

Mr. Nettlefold agreed to act as temporary secretary, and said that motorists were very enthusiastic about the club, and a large number of subscriptions were assured.

This will be the first auto and aero club in the Southern Hemisphere.

Subsequently, at a meeting of the City Council, Alderman Bottrill moved:

"That the Council wait upon the Premier of Tasmania, and urge the Government to acquire sites at Hobart and Launceston to serve as landing places for aeroplanes."

Their thanks, he said, were due to Captain Cummings and Lieutenant Long for the exhibitions they had given to prove the advance that had been made in regard to aerial service, and also to the *Mercury* for the enterprise it had shown in proving the commercial use to which the aeroplane could be put. Landing places

were necessary for the future development of the aeroplane system, and the sooner they were acquired the more economically would the arrangements be carried out.

"We are just at the beginning of great events, and unless preparations are made now we may find it difficult to do so in the future." In these words Alderman Cuthbertson seconded the motion.

Alderman Lamprill said he knew that companies were already inquiring of various owners of properties for sites. Large areas of ground were required. Dr. Bottrill was to be congratulated on having brought the matter forward.

The motion was carried.

The next meeting of the new club was fixed for November 13.

A SYDNEY AERODROME FOR TRANS-PLANET FLYERS.

To the Editor,

Sea, Land and Air,

Dear Sir,—Referring to a suggestion made by the writer the other day, we would like to mention for your information that should any of the machines at present en route to Australia from England decide to land at Sydney, we should be delighted to place our aerodrome at their disposal.

As you know our aerodrome is an extensive one and within easy distance from Sydney, and for this reason would probably prove more convenient than Richmond.

We should be interested to have your views on this matter.

Yours faithfully,

NIGEL B. LOVE,

Director The Australian Aircraft and Engineering Co.

Sydney, December 2, 1919.

ANZAC MEMORIAL APPEAL.

In connection with the above appeal for bursaries, the honorary secretary of the New South Wales Section of the Australian Aero Club has received a cheque for £125, as a bursary in the name of the Australian Flying Corps. The donor, a distinguished airman, desires to remain anonymous.

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"On June 21st—the winning of the Aerial Derby against all comers, at an average speed of 129.3 miles per hour

"On July 31st—the first direct non-stop flight from London to Madrid—a distance of nearly 900 miles in 7½ hours.

"Throughout all these performances 'Castrol R' Oil was used, and never on any occasion did it give the least trouble or anxiety, and it will be realised that the tests have been severe, as the temperature on the altitude record was as low as 39.5; whereas in Spain the opposite conditions had to be met.

"We have no hesitation in definitely instructing all users of Napier Aero Engines that 'Castrol R' Oil is the only Oil they can use, and we shall continue this recommendation so long as its lubricating qualities remain as satisfactory as they are at present, or until it can be proved that any other oil will give equal or better results."

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THE LEAGUE OF NATIONS

BOLIVIA AND BRAZIL

Especially Written for "Sea, Land and Air"

By HAROLD H. JOHNSON

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[These articles are the fourth of a series dealing, in alphabetical order, with the countries which have signed the covenant of the League of Nations. The next country on the list, Canada, will be similarly dealt with in our January issue.—Ed.]

One of the original signatories to the Covenant of the League was Bolivia, the third largest division of South America; larger than either Chile or Peru, but smaller than either Argentine or Brazil. Embracing as it does an area of 703,400 square miles, with an estimated population of 1,815,500 inhabitants, this State is of far greater importance than is at first apparent.

Bolivia, in common with all South American States, is an inland State and a Republic. In a place known as the New World, this new order of things presents a psychological problem of some interest.

The country owes its name to Bolivar, a famous Venezuelan soldier and statesman, who materially helped to achieve the independence of the South American States, Bolivia, Columbia and Venezuela. He was commonly called "the Washington of South America."

Bolivia has no seaboard, and is bordered by Peru, Chile, the Argentine Republic, and Brazil. A small strip of the Pacific coast, which it held until 1884, was lost during this year in the war with Chile; the trade of the country now goes eastward to Buenos Ayres, or westward to the Chilean coast.

The leading exports are silver, copper, bark, rubber, wool, cocoa, coffee and coca-leaves, which yield the drug cocaine.

The history of Bolivia dates from a comparatively recent period. Prior to the Wars of Independence, by which South America freed herself from Spanish rule, Bolivia had been merely a province of Peru, known as Charcas. The great struggle, in so far as it concerned Bolivia, lasted from 1801 to 1825, practically the whole of which time was occupied in

more or less desperate fighting. At length the patriotic party was victorious and, in 1825—ten years after the battle of Waterloo—the province of Charcas was declared a republic and named Bolivia.

The independence of Bolivia did not, however, bring peace in its train. It would be impossible, within a limited space, even to outline the record of rebellion, counter-rebellion, murder, assassination and political intrigue which formed the domestic history of Bolivia during the remainder of the century.

In 1879, jealousy of Chilean advancement and fear of her encroachments on their territory involved Bolivia and Peru in a war with Chile, which ended disastrously for the Allies in 1882. After the war a dispute arose, as is usually the case, over territorial adjustments, and was not finally settled until as recently as 1905.

The Lake of Titicaca, one of the natural wonders of the world, lies between two ranges of the Andes on the borders of Bolivia and Peru, 12,645 feet above sea level. The area of the lake is 3200 square miles, with an average width of 27 miles. Its greatest length is 101 miles, and it is nearly 700 feet deep on the eastern side. It contains numerous islands; the largest, Titicaca, was a sacred place of the Peruvian Incas and contains the ruins of one of the Temples of the Sun. The Peruvians were worshippers of the sun, and attached to the temples were houses of virgins, who were set apart for the service of the Sun God and from whose ranks the brides of the Incas were taken. What desperate valour and sustained endurance is shown in the cause of freedom! The patriots of South America, in their endeavour to shake off

Spanish rule, doubtless experienced the same sufferings as did the Spaniards when traversing the heights of the Andes during their conquest of South America, where the cold is so intense that many lost the nails of their fingers, the fingers themselves, and sometimes their limbs. Others of the Spaniards were blinded by the dazzling waste of snow reflecting the rays of a sun made intolerably brilliant in the thin atmosphere of those elevated regions, and where no living thing was visible, except the great bird of the Andes hovering over the traveller's head in anticipation of a banquet.

The largest town is La Paz, with 50,000 inhabitants, situated to the south of Lake Titicaca and having considerable trade with the settlements on its shores. The towns of Suere and Oruro take their turn with La Paz as the seat of Government.

Potosi, famous for its productive silver mines, is in Bolivia and is connected by rail with Antofagasta, on the coast of Chile.

The signature of Bolivia's representatives to the Covenant of the League of Nations is welcome as illustrating the belief of men of South American republican ideas, as well as the leaders of our own strictly constitutional monarchialism, in the ability of the League to enforce harmony amongst the nations of the earth. History teaches very clearly that long-continued hostility will inflame the passions both of nations and of individuals. The South American republics have had a surfeit of strife, and doubtless hope, under the much criticised League of Nations, to be allowed to work out their own destiny undisturbed by outward aggression.

BRAZIL.

Brazil, the largest republic in South America, was discovered in 1499 by Vicente Yanez Pinzon, a follower of Columbus; but Cabral, a Portuguese captain, was driven upon its coasts in the following year, and it was declared a possession of the Portuguese Crown. The Portuguese did not, however, send an expedition to colonise the country until 1532, when John III. of Portugal granted permission to De Sousa, who landed at Santos in that year.

In 1630, the Dutch, after an initial success in 1624—which was frustrated by the Spaniards and Portuguese in the following year—once more attempted to effect a settlement and, although they secured and maintained a footing, they were unable to extend their power beyond the limits of the coastal settlement, and finally abandoned the country in 1654.

On the invasion of Portugal by Napoleon I., the Prince Regent of that country, afterwards Dom John VI. of Portugal, decided to take refuge in Brazil, where he arrived in 1808.

In retaliation against the French invasion of Portugal, the Brazilians seized the French colony of Guiana in 1809. Its restoration to France, by the Treaty of Vienna in 1815, adjusted the territory of France to the limits of pre-revolutionary times. The exactions of the Portuguese in Europe, and the heavy taxes laid upon the Brazilians, raised revolutionary outbursts which were promptly suppressed. Portugal itself, however, revolted in 1820 and the Portuguese troops in Rio de Janeiro forced Dom John to adopt a representative form of Government.

Prior to this, in 1817, the title of Kingdom was bestowed on Brazil by the Regent, but the Portuguese at home were not satisfied with this and desired to make Brazil once more subservient to the mother country. To enforce the decree large forces were sent to Bahia, but these were obliged to re-embark. The independence of Brazil was proclaimed in 1822, although a republican form of Government was not adopted until 1899. Twenty years later, in 1910, the House of Braganza was replaced by a republic in Portugal also.

In 1826, the Brazilian army was defeated by the Argentine forces and difficulties arose with the United States, France and Great Britain. In 1853, the President of Buenos Ayres again declared war against Brazil, but was defeated and crushed by the help of Argentine rebels. Brazil then entered upon a period of expansion and prosperity. The State now embraces 3,218,160 square miles and has a population of 14,500,000, including many Indians. It is only



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slightly less in area than the whole of Europe.

The war against Paraguay occupied the attention of the country from 1865 until 1870, a conflict which cost Brazil no less than 50 millions sterling and thousands of valuable lives.

The spread of socialistic doctrines ended in a revolution against the royalist form of Government. On November 14, 1889, the Royal palace was surrounded, and on the following morning the King and Royal family were placed aboard a ship and sent to Portugal—treatment rather different to that meted out to Maximilian, King of Mexico, who, in 1867, after a short reign of two years, was arrested by the rebellious Mexicans, condemned to death and shot.

A provisional Government was formed in Brazil in 1889, but, unfortunately, it fell into the hands of political and military adventurers and corruption grew. The naval insurrection in 1893 caused widespread unrest, which lasted for two years. In 1909, a naval revolt broke out and, to show their discontent with the conditions of service, the personnel of the Brazilian Navy—both officers and men—bombarded several of the principal forts. But just as the revolt began to take on a most dangerous complexion it collapsed almost as suddenly as it had originated and a pacific settlement was arrived at.

The harbour of Rio de Janeiro is one of the most unique in the world. Although the entrance to the bay of Rio is only one mile wide, it is deep enough for the largest vessels, and can be easily defended. The city of Rio de Janeiro has a population of 820,500, slightly greater than that of the capital of New South Wales.

Bahia, or San Salvador, the second largest city, is also a seaport, with an estimated population of 200,000. Santos, where De Sousa landed in 1532, is credited with a population of 42,825 inhabitants, although this scribe is not prepared to swear to the odd 25.

Brazil exports principally coffee, sugar, rum, tobacco, cotton and diamonds, and

has the advantage of many seaports. Her immense coast-line has brought home to Brazilians the need for adequate naval protection, and embarking—during quite recent times—on a scheme of naval defence, she now possesses some very fine men-of-war.

Slavery existed in Brazil until 1848, although in 1826 a treaty with Great Britain was concluded for the abolition of the slave trade. During the sixteenth century slave labour formed the universal means of transport, but, with the passing of time, this exercise of might over right has passed away and with it the removal of another blot on civilisation.

The famous river, Amazon, runs right across the northern part of Brazil. This river, which is the largest basin and extent of water of any river in the world, rises among the Andes and flows 4000 miles to the Atlantic. One of its tributaries, the Madeira, is 1800 miles long. The Amazon drains nearly 3,000,000 square miles.

Mention of the Amazon recalls a most extraordinary adventure of the Spaniards from Peru, who, under Gonzala Pizarro, brother of the conqueror of that country, whilst on an expedition, reached a broad expanse of water formed by the Napo, the river of Ecuador and of the great tributaries of the Amazon. Discovering a magnificent cataract they made a rude bridge over to the other side at a narrow spot in the hope of finding a country that would give them sustenance. At length, spent with toil and suffering, Gonzalo resolved to construct a barque large enough to transport the weaker part of his followers and his baggage. The forests furnished him with timber, the shoes of the horses, which had died or been slaughtered for food, were converted into nails, gum, distilled from the trees, took the place of pitch, and the tattered garments of the soldiers supplied a substitute for oakum. At the end of two months a vessel was completed, rudely constructed but strong. Hearing of a rich district, Gonzalo sent the vessel, under the command of Orellana, down the river with a crew of about 50 men. Days and weeks passed

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and the vessel did not return. Being unable to endure the suspense or maintain themselves in their quarters, they reluctantly retraced their steps. But the Spaniards gathered no tidings of Orellana until the return of one man who had left the vessel and returned to the Spanish camp famine-stricken and half naked.

Orellana, borne swiftly down the Napo, reached the point of its confluence with the Amazon in less than three days. It was impossible for him to return as he had come and make headway against the current of the river, so the desperate expedient of sailing down the Amazon and then to Spain was resolved upon, and although it is marvellous that he escaped shipwreck in the perilous and unknown navigation of the river, he safely passed out of the Amazon over the Atlantic to Spain in the vessel, and told the story of his voyage to the Spanish Court. Orellana's adventure in a vessel hastily constructed of green timber by unskilled hands and without a pilot was a splendid enterprise.

The Amazon was the neighbourhood where it was believed that a community of armed women existed, though they have now disappeared. As one historian says, it would be hard to disprove the fact, but still harder, considering the embarrassments in perpetuating such a community, to believe it.

Early in 1808, the Brazilian ports were thrown open to the world. Industry was freed from cramping restrictions, and educational and other beneficent institutions were introduced, largely on the advice of Great Britain, who obtained the largest share of the expanding trade which the new policy encouraged. But though Brazil, like other States in South America, is of immense size and superior in the natural richness of soil and in the physical features which promote commercial activities, its early promise has not been fulfilled. Vastness of territory and the corresponding difficulty of communication, the absence of a homogeneous population, and the comparatively low standard of educational and political training which the State has inherited

from its Latin rulers, have contributed to make it fall behind North America. The circumstances of the States' emancipation have encouraged a spirit of personal ambition which has denied to South American politics that equilibrium so essential to progress. As boys, we were taught that Rome was not built in a day—progress must be slower in some circumstances than in others, but as Brazilian finances were put on a sound basis in 1909, there should be a great future before such a magnificent land, where coconut palms flourish from 600 to 700 years, and whose very geographical position—just across the "Pond" from Europe—is an asset of almost immeasurable value.

The obstacles which have militated against Brazil's development, *i.e.*, vast territory, difficulties of communication, the absence of a homogeneous population and low standard of political and educational training, will disappear with the influx of North American capital and European immigration. There has been a great development of the meat-packing industry in Brazil and many modern plants have been erected by American capital. Both in Europe and the United States the land has become too valuable to allow large tracts to lie idle for grazing purposes and Brazil, with its vast territory and proximity to the United States and Europe, is an ideal country in which to raise cattle for export; the result will be great economical advancement for that State.

The immense quantity of timber in the valley of the Amazon has already attracted the notice of capitalists. The forests are estimated to contain more timber than those of the United States.

The signature of Brazil's representatives to the Covenant of the League of Nations places upon the Government of that country the obligation to raise the standard of living for the poorer classes, and freed, under the ægis of the League, from the aggression of stronger nations, either in Europe or America, Brazil gives promise of being one of the leading countries of the world in the not far distant future.

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THE HISTORY OF THE ABERDEEN LINE

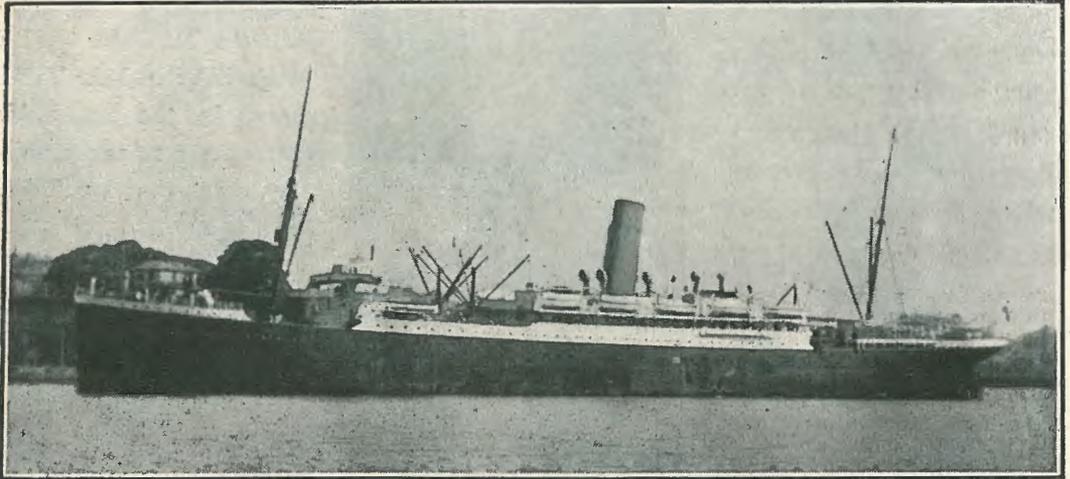
UNDER SAIL AND STEAM

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

PART VI. (CONCLUSION.)

The loss of the *Pericles* in March, 1910, caused the two new steamers, which were being built by Messrs. Harland and Wolff at Belfast, to be pushed on with the utmost speed, and the *Themistocles*, the first to be finished, was launched in the presence of a large number of people interested in shipping, on September 22, 1910.

tons and 516 feet long, was the last word in liners, and was equipped with every modern appliance for the comfort of passengers, and the handling of cargo. Whilst as if anticipating the change of front of the nation whose flag flew over a rival company, three years later she had fitted on the stern deck two 4.7 guns, to be used as stern chasers. The Admiralty had decided that liners on certain indicated



s.s. "Themistocles," 11,400 tons.

Visitors included Mrs. Cornelius Thompson, who performed the christening ceremony; Miss Thompson, Mr. George T. Henderson, manager of the Aberdeen Line, and Mr. Oscar S. Thompson; these may be said to represent the original owners, whilst Lord and Lady Pirrie, Mr. Savill and Mr. McMillan may be considered as some of the new blood, which had done so much to develop the company. Others present were Captain Gambell, the Marine Superintendent, Mr. J. A. Maunell, late engineer of the s.s. *Marathon*, and now superintending engineer, and Captain Robb.

The *Themistocles*, a vessel of 11,400

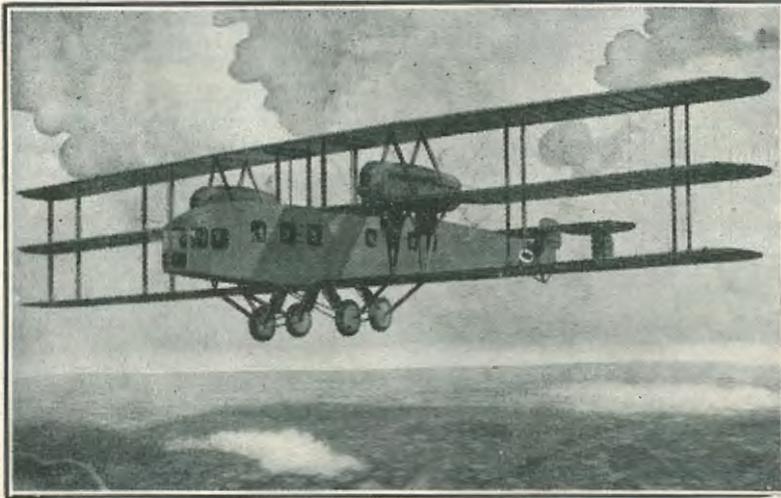
routes should be armed for purposes of defence in case of attack by enemy vessels, and the *Themistocles* in August, 1913, was the first ship to arrive in Australian waters thus provided for safeguarding herself, passengers and crew. Her first voyage to Australia, however, was made in 1911, when she reached Sydney, *viâ* Cape Town and Melbourne, on April 2, taking 45 days to complete the voyage. Her time to Melbourne was 40 days, or only two days longer than the mail steamers which followed the Canal route.

The *Themistocles* came out under command of Captain A. H. H. G. Douglas, R.N.R. This officer was trained in the

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Aberdeen Line, having first gone to sea in 1873 in the sailing ship *Centurion* (the second of that name).

Captain Douglas, on the arrival of the *Themistocles*, made his 54th voyage in command of the Aberdeen Line ships, the *Miltiades* being his command previous to the new liner. His chief officer at this time was Mr. G. A. Elrick, one of the old tea-clipper-record-breaker *Thermopylae* apprentices. Mr. C. K. Williamson was second officer, and Mr. A. Ogilvy third.

Like all other steamers of the great lines, the *Themistocles* has had a strenuous time during the war, her most sensational experience being as recently as in July last. At this time, whilst under the command of Captain W. Jermyn, she left Cape Town on July 3 on the voyage from London to Sydney with troops, and at about midnight in a dense fog she was run into by the *Edderside*, an iron barque of 1348 tons. The collision tore away one side of the barque, which was under the Norwegian flag and loaded with coal, and foundered before her boats could be got out, seven of her crew being lost. The *Themistocles* had a nasty knock and, compelled to return to Cape Town, was delayed there three weeks for repairs. She reached Sydney on August 11, and has only recently left on her return.

The *Demosthenes*, which was building at the same time as the *Themistocles* was successfully launched on February 28, 1911. Of the same tonnage as the latter, 11,400 tons, she is the first steamer in the Australian trade to be fitted with triple-screw turbines. A local newspaper describing her said: "She will not only be the first triple-screw vessel in the Aberdeen Line, but she will be the first vessel engined on the combination principle of reciprocating and turbine machinery to enter the Australian trade."

On her first voyage she arrived in Sydney on October 14, 1911, under the command of Captain A. Robb, an old identity of the Aberdeen Line, who formerly had the s.s. *Nineveh*, and the s.s. *Moravian*. With him as chief officer were Mr. Jermyn (now Captain Jermyn of the *Themistocles*), and, as second officer, Mr. C. Mathieson, a son of the late Captain Mathieson, who was killed by the explosion on the *Aberdeen*, as related in a former issue.

The largest number of passengers ever brought by an Aberdeen ship came by the *Demosthenes* on this voyage, the list including the Australian Coronation Contingent which had gone home by the *Themistocles*. The *Demosthenes* was the first steamer of this line to call at Fremantle, an arrangement made in London by Sir J. Newton Moore, Agent-General for Western Australia, whereby Westralians have the same advantages of communication with the world as do the other States.

Progress begets progress, and it is a question whether the limit to the size and tonnage of steamships has yet been reached; so far as Australia is concerned this at present is controlled by the depth of water at the entrance to the ports and of the waters in the ports themselves. Steamers coming by the Suez Canal were, at one time, kept within the depth of that waterway. When the Canal was opened in 1869 its average depth was 26 feet, but it was soon found that this would not meet the growing trade, and powerful dredges with all the necessary concomitants of barges, lighters, sand pumps, etcetera, had to be provided and kept constantly at work both to widen and deepen this great highway, which is now down to a depth of 36 feet, and vessels for Eastern waters are necessarily limited to that draught.

Some Australian ports have less water than others, and where a chief one has shallow water, the size and tonnage is limited to vessels that can enter that port.

The largest vessel coming regularly to Australia is a Liverpool steamer of 18,000 tons, and while there is no doubt in time that size will be exceeded, yet for the present the Aberdeen Line has been content to build one of 15,000 tons, which made her appearance just as the great war commenced.

The *Euripides*, the vessel in question, was built at Belfast by Harland and Wolff, and is of the same type as the two last described, but 3600 tons larger, with a length of 569 feet and a beam of 67 feet 3 inches; and is therefore 52 feet longer and 5 feet wider than those vessels. Although an immense cargo carrier, special attention was given when building to her passenger accommodation, this, however, has not been tested in the manner intended, as on her first arrival in Sydney in August, 1914, England had just declared war

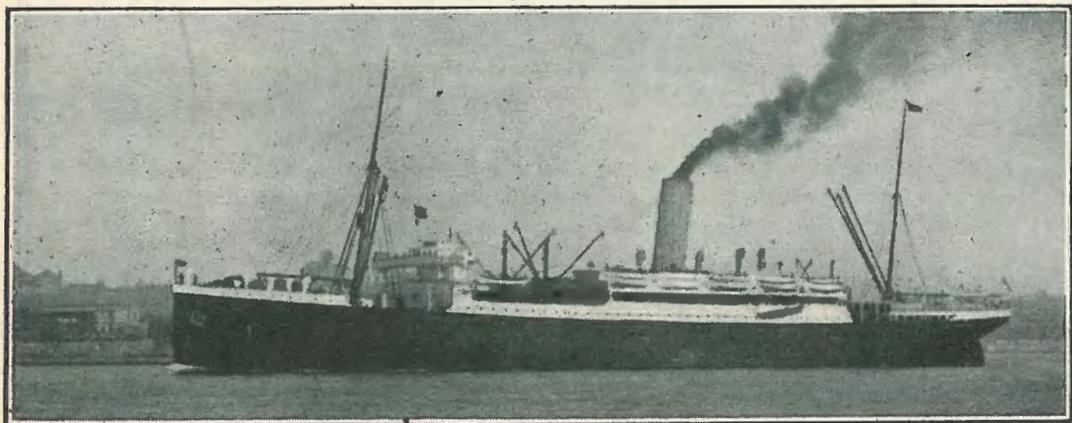
against Germany and the liner was taken up by the Imperial authorities for war services. She has only recently returned to her legitimate duty in her proper garb, having discarded that "camouflage" which she was the first vessel to bring to Sydney in September, 1917.

The *Euripides* was commanded by Captain Douglas, who was now Commodore of the fleet, on her first voyage and until recently, Captain P. J. Collins, formerly of the *Marathon*, taking charge and bringing her out on her present voyage, which she is completing now on her return to London.

The *Euripides* is the last and largest vessel of this celebrated line, which from

rupted service for 74 years. To preserve the continuity of the steam service it has, on two occasions, been necessary to charter vessels, placing the *Norseman* on the line in 1910, and the *Gothic* in 1913.

In comparing ships of the present with ships of the past it is interesting to go back to January 26, 1788, when at sundown of that day the historic "first fleet" was at anchor in Sydney Cove, eleven of these vessels being the first that had ever entered Port Jackson. Their average size was 376 tons, it would therefore take 40 of them to equal the *Euripides*, and the total number of people on the 11 ships (crew, troops and passengers) numbered about 1436, whilst the *Gothic* had 1500 passengers and



s.s. "Demosthenes," 11,400 tons.

the day in January, 1843, when on the 28th of that month the barque *Prince of Wales* (582 tons, commanded by Captain Alexander) was the first vessel to fly the Aberdeen White Star in Australian waters, the flag which has continuously and uninterruptedly been carried into the port of Sydney by sailing ships whose tonnage, first in wood, then in iron, and finally in steel, increased from 582 to 2093 tons. When steam asserted itself these were followed without a break by an ever-developing class of steamers commencing with the *Aberdeen* of 3659 tons, and reaching, but not terminating, with the *Euripides* of 15,000 tons, for, at the present time, a sister ship in building at Belfast (Harland and Wolff).

The Aberdeen Line has a record to be proud of, one which no other can boast of, having conducted a regular and uninter-

rupted service for 74 years. To preserve the continuity of the steam service it has, on two occasions, been necessary to charter vessels, placing the *Norseman* on the line in 1910, and the *Gothic* in 1913.

Those who came by the *Euripides* landed in a great city with a population of about 800,000 people, with well equipped hotels, theatres and picture shows, railways, tramways, steam ferry boats, and all that conduces to the comfort and pleasure of life.

But those "who left their country for their country's good," found nothing of a reciprocating nature; they stepped into a dense forest, inhabited by the emu and the kangaroo, and where lurked the crafty aborigine, who, with spear and waddy, watched their movements and killed twelve of them before they learned how proficient the blackfellow was with his tools of trade.

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There was recently published "a war record" of this line, in which is shown its ability as a troop-carrying shipping company, and the services rendered by each of the five steamers which now comprise the fleet. The total mileage steamed was 948,487, and the troops carried numbered 129,404; these were conveyed over nearly all seas, and they were Australian, Canadian, South African (black and white), Imperial, West Indian and American.

The *Miltiades* steamed 177,484 miles and carried 21,051 troops.

The *Marathon* steamed 184,379 miles and carried 20,804 troops.

The *Themistocles* steamed 222,784 miles and carried 28,137 troops.

The *Demosthenes* steamed 165,533 miles and carried 20,973 troops.

The *Euripides* steamed 208,307 miles and carried 38,439 troops.

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Salamis, 4600 tons, built at Govan, on the Clyde, by Robert Napier & Sons, in 1899, sold 1912 to Andrew Weir & Co.

Miltiades, 8000 tons, built by Alexander Stephens & Sons, Glasgow, 1903.

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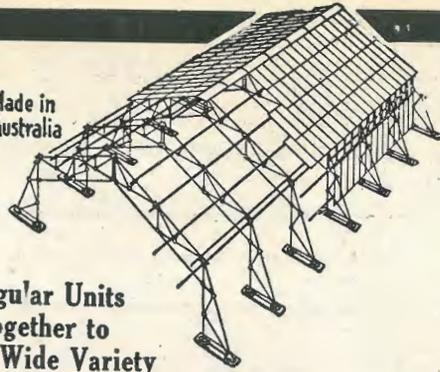
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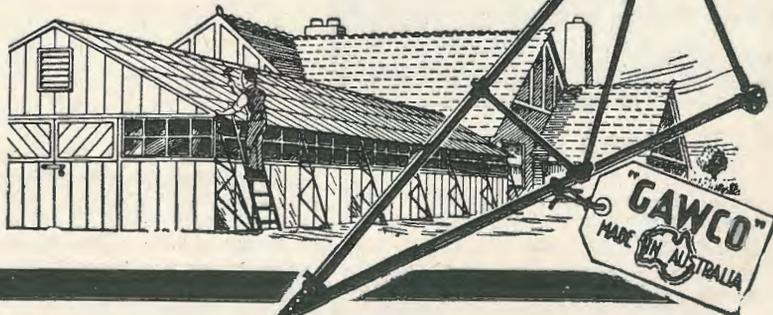
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A TUNING TRANSFORMER FOR LONG WAVES.

Especially Written for "Sea, Land and Air" by **RAYMOND EVANS.**

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This is the age of long waves, and to those experimenters who desire to build an instrument which will be suitable for use on wavelengths lying between 3,000 and 15,000 metres, this article should prove of interest.

Used in conjunction with suitable loading inductances, condensers, valves and a fair sized aerial, it should readily respond to American and European signals, bringing in

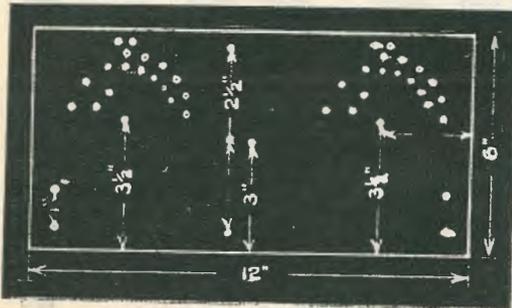


Figure 1.

quite clearly such stations as Honolulu, New York, Darien, San Francisco, Cavite, Guam, Funabashi, Nauen (Germany), and Carnarvon (Wales), and many others equally distant. The majority of long-wave stations use continuous or sustained waves, which would, of course, not be audible in the ordinary crystal receiver

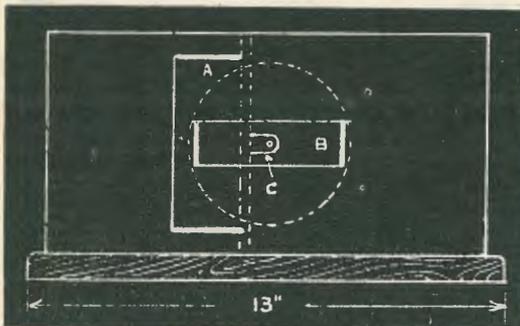


Figure 2.

on account of the fact of there being no break in the wave train with which to give us an audible frequency.

It is, therefore, necessary to break up the wave train to a lower frequency by mechani-

cal means, or to produce a harmonic by the use of the "beat," or "heterodyne" principle.

This latter is by far the most effective and up-to-date, as it gives the experimenter much greater control, and easier amplification, besides the ability to alter the tone of the received signal to his own liking.

Tuners for long waves require such a large value of inductance, that they are usually very cumbersome, but the writer has found, that, by the careful arrangement of windings, with due regard to end-turn losses, etc., quite a compact tuner will result, without loss of efficiency.

This tuner has "layer" or "pile" windings, and end-turn switches in both primary and secondary, while the coupling is varied variometer fashion by means of a knob on the panel.

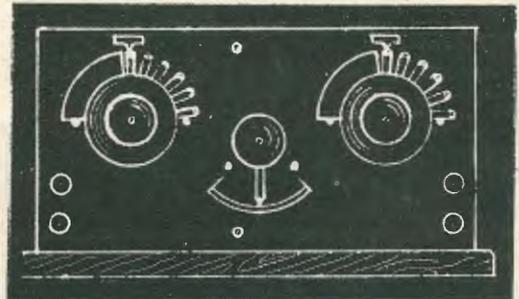


Figure 3.

The front or panel can be cut from sheet ebonite, "erinoid," or "bakelite," about $\frac{1}{16}$ in. in thickness.

The edges must be filed up square and finished with emery cloth, and when complete the panel should measure exactly 12 in. long and 6 in. wide.

Now, mark the three lines which locate the centres of the switches, and the coupling spindle, and working from these, mark the positions for all holes. Make sure that all are correct before drilling, and thus avoid trouble afterwards. The three holes shown just to the left of the centre, are for screwing to the wooden frame which supports the primary coil.

Now centrepunch the positions for all holes, ready for drilling, but before drilling, make a coupling scale similar to that illustrated in the October issue of this journal.

Drill all holes to the correct sizes, and countersink for the three screws which go through into the wooden support at the back of panel.



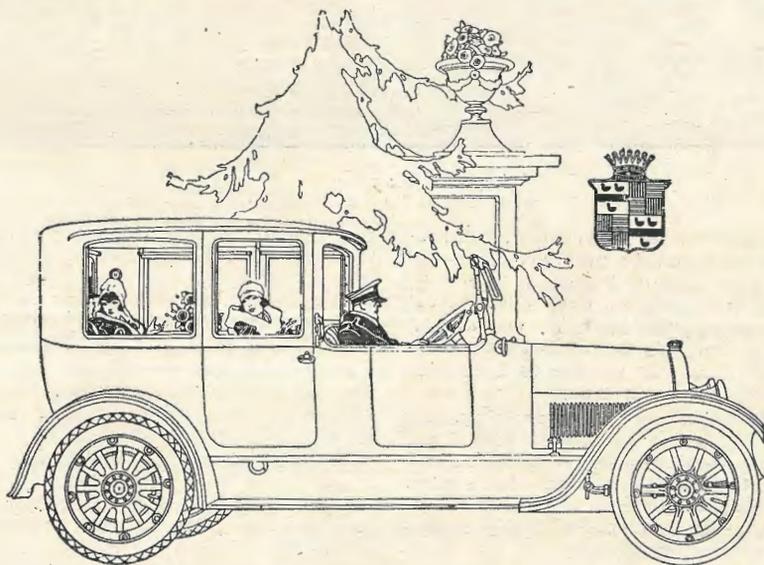
The Scripps-Booth

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The panel can now be polished or grained as desired, or to suit the gear which will be used in conjunction. It might be said here, that if made of "erinoid," it can be made to take a mirror-like surface.

Ebonite can be either polished or grained, while "bakelite" looks best "flat."

The base is made of oak, teak, maple, or other hard, well seasoned timber, and measures 13in. long by 7in. wide and $\frac{3}{4}$ in. in thickness.

The edges look best rounded off. A piece of the same material is also required for the supporting piece for the primary coil, this must measure 6in. x 6in. x $\frac{1}{4}$ in., and a circle $4\frac{1}{4}$ in. in diameter must be cut exactly in its centre.

This can be done in the lathe or with a fret-saw.

These wooden parts can now be polished to the reader's taste, and when complete can be screwed to the front panel in the position shown in Figure 5.

Next, two end turn switches will be required.

This is the most difficult part of the con-

Cut the contact arms from hard, springy brass or phosphor bronze, about 28 or 30 gauge.

Of these, five each will be required like *K* and *L*, and one as *S* for each switch.

The contact arm *S* has both ends turned down, the outer end making contact on the outer row of studs, while the inner end presses on a brass collector ring or washer, as shown.

This contact will be screwed to the disc in the holes provided under No. 1.

A pair of contacts *K-L* and spacing piece, as shown, must be screwed each under Nos. 2, 3, 4, 5 and 6.

The function of the *K-L* contacts is merely to bridge the end of one coil or section, and the beginning of the next. This will be more clearly understood by reference to the scheme of connections shown in Figure 6.

Contact arm *S*, or No. 1, serves as the main switch arm, carrying the current to the terminal.

Use $\frac{1}{8}$ in. Whitworth, round or cheesehead screws $\frac{1}{4}$ in. long for screwing these arms in

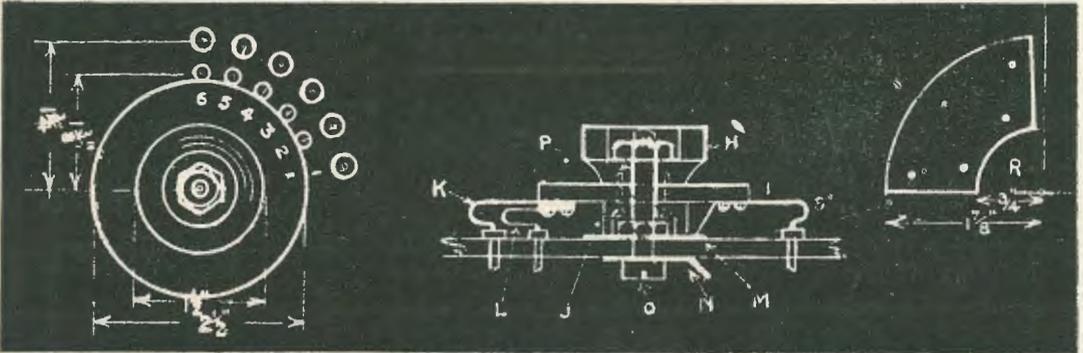


Figure 4.

struction, but the writer has endeavoured to simplify them as much as possible.

By close examination of Figure 4, it will be seen that the insulated portion consists of three parts, namely, the knob *H*, the disc *I*, and the base *J*, but this is not altogether necessary, though care will require to be shown in order to keep all parts true.

When shaped according to the drawing they can be secured together as shown, with three $\frac{1}{8}$ in. Whitworth countersunk screws, and a hole then drilled right through the centre, large enough to take tightly a piece of brass tube whose internal diameter will slip snugly over a $\frac{1}{4}$ in. Whitworth screw.

This is for the purpose of forming a bearing surface, and to take the wear and tear of the spindle.

The disc portion, must now be divided off for the contact arms, care being taken to have the dimensions suit the positions of the contact studs on the panel. There will be twelve holes in each disc.

Drill them from underneath, but not right through, and tap $\frac{1}{8}$ in. Whitworth.

place. The centre spindle *O* of the switch is a brass cheesehead screw $\frac{1}{4}$ in. x 3in., and is screwed through the panel with a copper lug or thimble *N* at the back for connection, then is placed in position the large brass collector ring *M*, and a nut screwed tight.

Now take the ebonite knob and disc, with the contact arms, and place on the spindle and keep in position with a locknut or a springwasher and nut.

Engrave or paint the numbers 1 to 6, as shown, over each contact arm and, after filling in with white oxide or other colouring matter, the moving part of the endturn switch is complete.

The contact studs for these switches can be made from ordinary *B.A.* cheesehead screws with the slotted part filed away as in the preceding article.

Use, say 2 *B.A.* for the outer row and 4 *B.A.* for the inner, and keep all studs of even height.

An ebonite or bakelite plate or fan, *R*, is also required for each switch, and is used to keep the contact arms in position when off the

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studs (see Fig. 3). It would be advisable to thoroughly test these switches before finally connecting windings to the contact studs in order to avoid trouble later.

Consideration must now be given to the windings, which can either be pilewound or in layers.

The writer would suggest the use of layers, which in this case will be just as effective.

The formers for both the primary and the secondary windings can be made from press-pahn or cardboard tube, well shellac-ed and dried.

The primary former measures $4\frac{1}{4}$ in. outside diameter, and 2 in. in length, and the secondary 4 in. outside diameter and $1\frac{1}{4}$ in. in length.

The primary tube *A*, must be glued securely in the opening already cut in the wooden supporting piece. It must be wound with 532 turns of 26-gauge SCC copper wire, in eight

The winding is arranged as under:—

Section.	Layers.	Turns per layer.
1st ..	1 ..	100
2nd ..	1 ..	99
3rd ..	1 ..	98
4th ..	1 ..	97
5th ..	1 ..	96
6th ..	2 ..	95-94
Total 6 ..	7 ..	679

The connections to studs are the same as those for the primary.

Shellac well and allow to dry.

The two leads from the primary coil and switch are to be connected to the left-hand pair of terminals which represent the aerial and earth connection, while the secondary leads are brought to those on the right.

Anchor the secondary tappings to the double

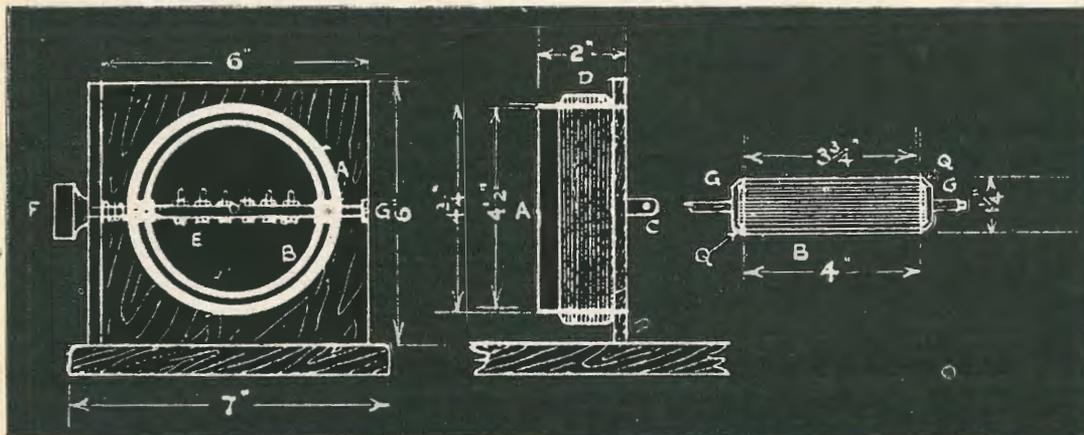


Figure 5.

layers, each to be wound in the same direction.

Bind the last few turns of each layer together with narrow silk ribbon to prevent wire slipping away, and shellac well.

Details of winding are shown under, which connections are clearly indicated in Figure 6, in which the top section represents the first layer:—

Section.	Layers.	Turns per layer.
1st ..	1 ..	70
2nd ..	1 ..	69
3rd ..	1 ..	68
4th ..	1 ..	67
5th ..	2 ..	66-65
6th ..	2 ..	64-63
Total 6 ..	8 ..	532

Wind the secondary coil in the same manner as the primary, but with seven layers of 30-gauge S.S.C. copper wire, and 679 turns in all.

row of screws on the bakelite bar *E* (Fig. 5), and lead on to the studs with light "flux."

The spindle upon which the secondary moves *G*, does not go right through the coil, but is divided into two sections, each section being riveted to a brass yoke or bracket *Q*, which is clamped tightly over the edges of the former as shown.

Two bearing brackets of brass, as *C*, are provided for spindle to work in, also a small spring to take up the play in the spindle and keep in position.

The pointer on the coupling knob is secured to this knob by means of small brass screws, while the knob itself is kept in correct position with relation to the coils, by means of a small set-screw. Two brass pointers must be made, and placed in position, one over the centre of each switch as shown, or, if the reader so desires, an arrow can be engraved or painted in the position the pointer would take.

This serves to indicate the number of sections in circuit as can be seen by the drawing.

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Make six stop pins from $\frac{1}{8}$ in. brass wire and drive into holes in position, as shown in Figure 3.

They should stand about $\frac{1}{2}$ in. above the surface of the panel.

All metal parts with the exception of those making contact must be polished and lacquered or plated.

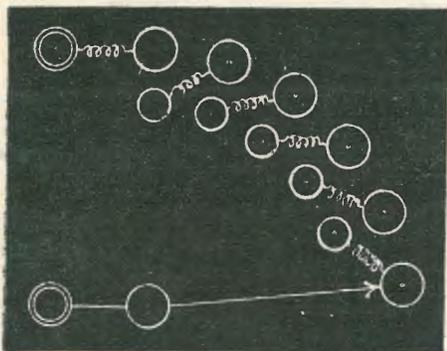


Figure 6.

Should the builder desire to enclose this tuner, it will be seen that this can readily be accomplished.

The same applies to substituting pile wound or honeycomb coils in place of layers. Fine adjustment of this tuner is obtained by means of shunt condensers and loading inductances, which will be made the subject for a future article.

CORRECTION.

Beneath an illustration appearing on page 528 of our November issue, five aeroplanes which took part in Peace Loan flights were erroneously described as Sopwith-Pups. These, of course, were Avro biplanes, as will be seen on referring to the article which accompanied the illustration. We thank the numerous readers and callers who have called our attention to this error, an error which, unfortunately, had escaped our notice until too late for correction in that issue.

SEASON'S GREETINGS

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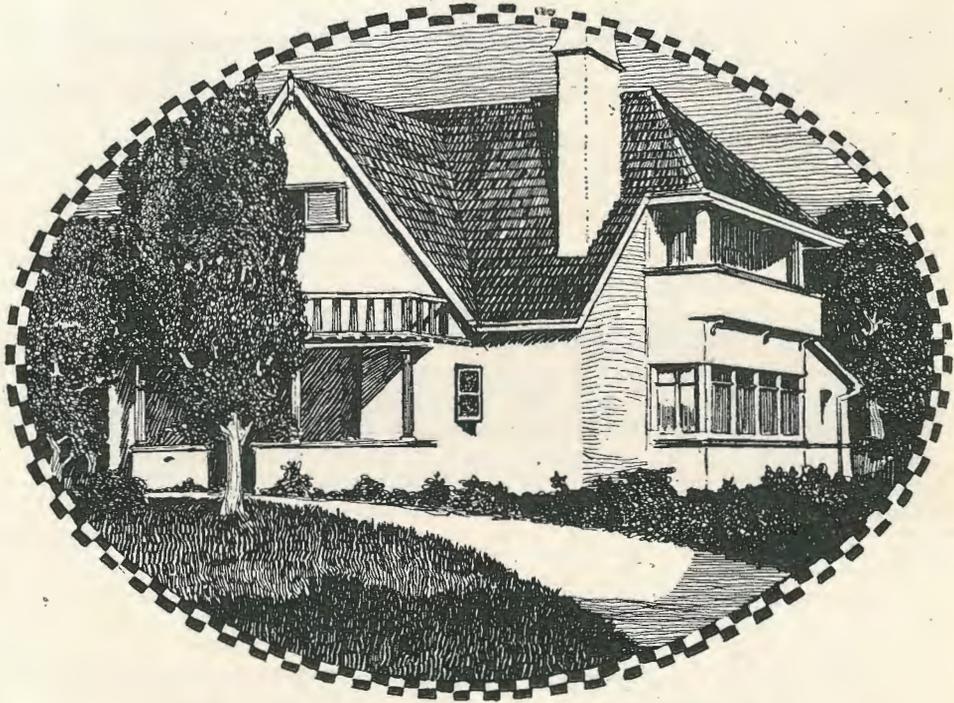
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NEW ZEALAND WIRELESS INSTITUTE

Following the lead set by England, Canada, Australia and America, a society has at last been formed in New Zealand, known as "The New Zealand Wireless Institute."

This Institute has in view the following objects:—

1. To bring into contact all persons interested in the study of electricity, especially as applied to research in radio-telephony.
2. To arrange a meeting place to facilitate study, reading, discussing questions arising from experiments, and the exchange of ideas generally.
3. To appoint members of a deputation to interview the proper authorities in an effort to make arrangements for the granting of experimental licenses to all legitimately interested in the value of wireless research.
4. To distribute written matter on the proceedings of all demonstrative, instructional, and theoretical lectures, given for the practical benefit of country members.
5. To form a library of books, works, and periodicals on wireless, both experimentally and commercially, and to encourage the study thereof.

About two months ago, Messrs. J. L. Mulholland, C. E. Forrest, A. Curlew and J. O. Taylor, formed themselves into an organising committee, with the object of forming the above Institute. Advertisements were inserted in the leading local papers, requesting persons interested in wireless to communicate with Mr. Taylor. The result was very satisfactory, and on October 28, the first general meeting took place. Mr. Mulholland was voted to the chair, and Messrs. Forrest, Mitchell, Taylor, Curlew and Shearer were elected as a committee.

The meeting was addressed by Mr. Mulholland, who pointed out the difficul-

ties encountered in other countries in securing licenses to conduct research work in Wireless Telegraphy and Telephony. He also outlined the vast field which wireless offers to research work, and the invaluable services rendered by the amateur in the great war. The Australian wireless amateurs' success in securing receiving licenses was then spoken of, and the conditions under which they were granted explained.

The secretary, Mr. J. O. Taylor, outlined the work of the organising committee, and explained the objects of the Institute. After a very interesting discussion, the following proposals were carried:—

1. That the minimum age for members be 18. Persons under that age, wishing to join, may do so as student members.
2. That *Sea, Land and Air* be the official journal of the Institute.
3. That the subscription be one guinea for full members, and half-a-guinea for country members and student members.
4. That a deputation, to be appointed by the committee, be formed, to interview the Government authorities, in reference to securing licenses for wireless research.

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SOUTH AUSTRALIAN BRANCH.

A general meeting of the above was held in Adelaide on November 5, Mr. Hambly Clarke presiding.

The special business of the meeting was to consider the adoption of a new constitution which the committee had been instructed to submit. At a previous meeting it was considered that the constitution of the N.S.W. branch as adopted by the organising committee necessitated several changes and additions subsequent upon the new regulations issued by the Commonwealth authorities, and it was decided that a new constitution be constructed and adopted by this branch of the Institute.

Proposed by R. O. C. Matthews and seconded by Mr. Heagney, it was further decided that the previous constitution be rescinded and that the draft constitution as submitted, be adopted as the constitution of the South Australian Branch of the Wireless Institute.

Under the new regulations the following were appointed as office-bearers for the ensuing twelve months:—

President, Mr. Hambly Clarke; Vice-President, Mr. Lee and Mr. T. M. Heagney; Hon. Sec. Mr. C. E. Ames; Hon. Treas., Mr. R. O. C. Matthews; Committee, Messrs.

D. H. Smith, Harrison, R. M. Dunstone, D. G. Malpas, H. C. Coles and Cooke.

Twelve new members were admitted to the membership of the Institute.

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2. { A "Simple Press" at 10 words per minute.
B "Simple Press" at 15 words per minute.
3. { A Simple wireless messages.
B Simple wireless messages (faster).
4. { A More difficult messages with figures.
B Code and cipher words and figures.
5. { A Assorted messages sent at commercial rate.
B Fast messages in foreign languages.
6. { A A long press message "jammed" by another similar message. This and side "B" of this record afford excellent practice in reading through interferences.
B Fast messages "jammed" by a press message.

SERIES 2.

1. { A Identical with the first record in Series 1, except that the signals given are those of the telegraph "Sounder" on land stations in connection with the land lines.
B. "Sounder" signals of Press sent slowly.
2. { A French Press at commercial speed.
B Italian Press at commercial speed.
3. { A Spanish Press at commercial speed.
B Portuguese Press at commercial speed.
4. { A Figures and fractions at commercial speed.
B Press message, with accompanying noises from the ship's bell, whistles, conversation of passengers and deck-hands, etc., for the purpose of affording practice in reading wireless signals through such interruptions. This is a somewhat humorous, but nevertheless highly useful record.
5. { A In this record two ships are heard working together, when a third in the distance cuts in with the "S.O.S." signal. The traffic of the ship in distress is then expeditiously handled, positions are given, and messages sent to say the first two ships are speeding to the rescue.
B This record illustrates the correct method of calling up a coast station, and reproduces an interchange of traffic between a ship and a shore station.
6. { A & B Messages, French and jamming.

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<i>Arawatta</i>	V. Blight		{ J. G. Campion (j)
<i>Arahura</i>	G. Donnelly	<i>Moeraki</i>	S. A. Ludlow
<i>Aramac</i>	R. D. Thompson	<i>Monouai</i>	L. V. B. Sutton
<i>Australbrook</i>	R. E. Haddock	<i>Mokoia</i>	V. M. Simpson
<i>Australcrag</i>	E. S. Earngey	<i>Montoro</i>	N. W. Marshall
<i>Australford</i>	T. W. Bearup	<i>Morialta</i>	L. N. Callaghan
<i>Australglen</i>	J. R. Gilligan	<i>Morinda</i>	F. C. Davies
<i>Australmead</i>	G. Pow	<i>Navua</i>	
<i>Australmount</i>	A. R. Catford	<i>Ngakuta</i>	H. Bargrove
<i>Australpeak</i>	C. H. Kidman	<i>Niagara</i>	{ W. J. Martin (s)
<i>Australplain</i>	S. R. Dixon		{ G. Hugman (j)
<i>Australpool</i>	K. J. Dines	<i>Ooma</i>	{ E. A. Miller (s)
<i>Australport</i>	A. H. Jeremy		{ T. Ward (j)
<i>Australrange</i>	C. Black	<i>Oonah</i>	L. G. Devenport
<i>Atua</i>	G. Ross	<i>Paloona</i>	
<i>Bellata</i>	T. V. Tressler	<i>Paringa</i>	L. S. Lane
<i>Bingera</i>	J. Elmore	<i>Pateena</i>	F. E. Duggan
<i>Bombala</i>	T. Bannister	<i>Rakanoa</i>	W. C. Brown
<i>Bundarra</i>	H. K. Burbury	<i>Riverina</i>	J. F. McGinley
<i>Canberra</i>	E. F. Hayes	<i>Rotomahana</i>	W. E. C. Sawyer
<i>Cethana</i>	K. L. Freeman	<i>Rupara</i>	G. Cook
<i>Challamba</i>	H. W. Barnfield	<i>South Africa</i>	C. Williamson
<i>Changsha</i>	R. H. Alexander	<i>St. Albans</i>	W. H. Harris
<i>Charon</i>	J. E. Cleary	<i>Taiyuan</i>	E. J. Giles
<i>Coolcha</i>	M. A. Prudence	<i>Tahiti</i>	E. M. Bain (s)
<i>Coolgardie</i>	R. S. Taylor	<i>Talune</i>	{ T. H. McWilliams (s)
<i>Cooma</i>	J. H. Hawkins		{ H. M. Arthur (j)
<i>Culburra</i>	A. R. D. Davis	<i>Tarawera</i>	F. A. Hunter
<i>Dimboola</i>	A. F. Vipan	<i>Tofua</i>	{ W. A. Hawkins (s)
<i>Eastern</i>	P. C. Gillon		{ C. F. G. Taylor (j)
<i>Flora</i>	H. F. Harman	<i>Ulimaroa</i>	
<i>Indarra</i>	{ T. A. Jones (s)	<i>Victoria</i>	F. J. C. Hall
	{ C. F. Green (j)	<i>Wahine</i>	A. J. E. Corbett
<i>Kaiapoi</i>	A. E. Sheppherd	<i>Waihora</i>	{ V. M. Brooker (s)
<i>Kaitangata</i>	H. F. Hartley		{ F. L. Dawes (j)
<i>Kaituna</i>	H. Speed	<i>Waikawa</i>	F. L. Scott
<i>Kaiwarra</i>	C. Smith		{ A. Cuthill (s)
<i>Kanowna</i>	W. J. Washbourne	<i>Waimarino</i>	{ L. H. Jones (j)
<i>Karori</i>	S. G. Jones	<i>Waipori</i>	H. E. Young
<i>Karoola</i>	M. Sedgers	<i>Wairuna</i>	{ A. S. Smith (s)
<i>Katoa</i>	B. Boni		{ H. G. Reilly (j)
<i>Katoomba</i>		<i>Waitemata</i>	{ C. F. Griffiths (s)
<i>Kauri</i>	N. G. W. Scott		{ N. H. Brown (j)
<i>Koromiko</i>	F. N. Davidson	<i>Waitomo</i>	A. S. Dening
<i>Kowarra</i>	H. Fullerton	<i>Wanaka</i>	R. R. Robinson
<i>Kurow</i>	{ D. C. Lane (s)	<i>Wandilla</i>	T. Chalmers
	{ C. Hart (j)	<i>Westralia</i>	M. A. H. Ryan
<i>Levuka</i>	S. J. McVeigh	<i>Whangape</i>	{ C. H. Brown (s)
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<i>Maheno</i>	J. A. Heavey		{ E. N. Williams (j)
<i>Makambo</i>	H. L. Miller	<i>Wodonga</i>	J. Welch
<i>Makura</i>	{ D. N. Quinn (s)	<i>Wyandra</i>	R. M. Firminger
	{ E. A. Hunter (j)	<i>Wyreema</i>	H. Tuson
<i>Manuka</i>	L. R. Dickson	<i>Zealandia</i>	
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