

judgment more than on either time or colour.

To arrest fermentation at the crucial moment, the drying machine is employed, subjecting the leaf to an intense heat, for which purpose it is spread on trays and carefully turned and mixed by hand during the process. When it leaves the machine the leaf is dry and crisp and ready for sorting and sifting.

In this final process quantities of light, fluffy matter rise in clouds and settle on every part of the room. From this orange-coloured fluff is derived the familiar name of Oranke Pekoe. The friction has detached it from the leaf, and it plays quite an important part in teas of good appearance. Other than this the fluff is not, however, of much account, but is saleable in bulk to Calcutta chemists for the manufacture of caffeine.

By large buyers uniform teas are the most favoured, and for this reason tea is usually only sorted twice. There are five classes of Indian species, and of these

Broken Orange Pekoe and Orange Pekoe head the list. The former is derived from the terminal and embryo buds, blended with some of the finest leaf which has broken off in manufacture; the latter from terminal bud and finest leaf. The cheapest tea consists of powdered fragments, or "fannings," which, though often of good flavour, is awkward to manage in the tea-pot, and, consequently, not very popular. All teas are sold on the merits of the samples drawn from them.

The best teas are packed on the day of manufacture, or as soon after as possible. Just before being packed they receive a final "firing" to eliminate the last trace of moisture. Packing machines hold the chest in a clamp and subject it to rapid vibration while the leaf is shovelled in.

The tea is now ready for shipment to the wholesale markets of Europe, America, and, incidentally Australia, and next month its progress will be further traced through the processes of grading, testing, wholesaling and retailing; and finally, into the tea-cup of the Australian consumer.



At the request of the Prime Minister a highly successful demonstration of the Wireless Telephone was conducted on October 13, at the Federal Parliament House, by Mr. E. T. Fisk, M. Inst. R.E.

The nature of these demonstrations, which were given before a large assembly of Australia's leading politicians, will form the subject of an exclusive illustrated article which Mr. Fisk has promised to contribute to the Christmas issue of *Sea, Land and Air*.

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## ECUADOR

BY

HAROLD H. JOHNSON

[This article is the thirteenth of a series relating to the countries signatory to the Covenant of the League of Nations. Those already dealt with under this heading are:—(1) America, (2) British Empire, (3) Belgium, (4) Bolivia, (4a) Brazil, (5) Canada, (6) Australia, (7) New Zealand, (8) South Africa, (9) India, (10) China, (11) Cuba, (12) Czecho-Slovakia. The present article will be followed by one giving a historical sketch of France.—Ed.]

Ecuador, so named because it is traversed by the Equator, is the smallest republic of South America, and is wedged between Colombia, on the north, and Peru, on the south, with an approximate area, including the Galapagos Islands in the Pacific, of 116,000 square miles.

The exact boundaries of Ecuador eastward of the Andes were for many years the subject of dispute with the two neighbouring republics. The Colombia boundary was settled in 1917, but that of Peru still remains under discussion. Ecuador is divided by the Andes into three zones—the coastal strip, the Andean region, and the plains of the Amazon tributaries.

Of the Andean volcanoes the most imposing group is located in Ecuador; these include Chimborazo (21,420 feet) its broad, round summit towering like the dome of the Andes, and Cotopaxi (19,613 feet), the loftiest active volcano in the world, capped by a dazzling cone of silvery white that knows no change except from the action of its own volcanic fires. History records much suffering to the inhabitants of Ecuador as the result of earthquakes.

East of the Andes are the River Napo, 800 miles long, and others, all flowing into the Marañon, a tributary of the Amazon, which rises in the Andes and flows 4,000 miles to the Atlantic Ocean.

Although lying in the equatorial belt, its climate is diversified by the varied character of the country. In Quito, the capital, situated at an altitude of 9,402 feet, and only 15 miles south of the Line, the annual mean temperature approximates 56° and the highest and lowest monthly mean, 59° and 55° respectively. Quito is the loftiest city in the world, yet a considerably greater altitude is enjoyed by residents of the towns fringing Lake Titicaca, which is 12,645 feet above sea level, and situated between two ranges of the Andes on the Bolivia-Peru border.

The flora and fauna are as varied as the climate. The cocoa tree, Peruvian balsam, vanilla plant, and rubber tree flourish in abundance, and valuable cabinet woods are found extensively in the forests. Rich in fauna, the mammalia of Ecuador include the jaguar, puma, ounce, ocelot, deer, tapir and peccary. Among the reptiles are the boa-constrictor and alligator. The former sometimes attains a length of 30 feet, with proportionate girth, and, at the risk of pedantry, I would remind the reader that it is non-poisonous and kills its prey by crushing—hence the name. In contradistinction, the cobra of India—perhaps the most venomous of the viper family—does not exceed four to five feet in length.

Cocoa, the staple product of the country, is largely cultivated in the Manabi district. The rubber industry is widely extended, some plantations containing over a million rubber trees. Sheep farming is fairly extensive in the lowlands. Sugar-bananas, cotton, tobacco, and vegetable ivory are also grown.

Little mining has been carried on, although Ecuador is known to be rich in iron, lead, coal and quicksilver.

The chief manufacturing industry is the making of Panama hats, mostly in Monticristo, Jipijapa, and Cuenca; other manufactures are practically negligible.

The only important port for foreign trade is Guayaquil. From Duran, opposite Guayaquil, to Quito, the distance is 280 miles, and the connecting railway reaches an altitude of 10,000 feet. This line has opened up the richer portions of Ecuador which are now in a flourishing condition.

In 1915, the estimated population was 2,000,000—omitting the tribes of Indians who inhabit the Amazonian territory. The people are pure Indians, and negro half-breeds, with a comparatively small number of pure Europeans.

ency, and it is considered, for a large machine at any rate, that the other advantages fully compensate for this loss. In

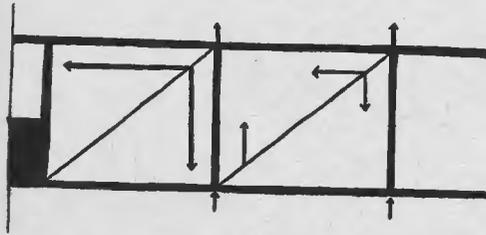


Fig 4

the case of the biplane the lift is transferred to the centre by means of the interplane struts and wires. These are set at much better angles, therefore the compressions in the spars are not nearly so large. The loads also increase gradually towards the centre so the outer bays can be lightened.

At this point a comparison of figures may be interesting. Let us consider a 10,000 lb. machine. Taking the loading as 10 lbs. to the square foot it will be necessary to have 1,000 square feet of wing area, *i.e.*, for a monoplane allowing a 10 to 1 Aspect Ratio a hundred foot span and a ten foot chord, or with a 6 to 1 Aspect Ratio an eighty foot span and thirteen foot chord approximately. Taking the same weight for a biplane and allowing only 90 per cent. efficiency we should need approximately 1,100 square feet of wing

area, *i.e.*, 550 for each wing. With an Aspect Ratio of 10 to 1 this allows about a seventy-five foot span and seven and a half foot chord, or with an Aspect Ratio of 6 to 1 a sixty foot span and nine and a half foot chord. These figures compare very favourably with those for the monoplane in spite of the 10 per cent. increase in wing area to compensate for the loss of lift due to the superimposed planes. In addition to the advantages in structural design the smaller machines are easier to control and save space in housing and launching, both serious considerations.

Triplanes have similar advantages, though since two of the planes give only 80 per cent. efficiency, the total efficiency of the wing area is reduced to 87 per cent. A certain number of small machines have been built on this principle, but they were not sufficiently successful to warrant their adoption in the place of biplanes. Triplane flying-boats, however, have proved the value of this type, as owing to the great weight of the hull a large lifting area is necessary to support the machines. Triplane design is also now being used for the larger types of machine.

The future will probably see single-seater monoplanes taking the place of the motor bicycle, biplanes carrying any number of passengers from two to a hundred and triplanes, and, perhaps, even multiplanes carrying hundreds of passengers and doing the work of express trains and ocean liners.

Next month methods of design and detail structure will be dealt with.

### AERONOTES FOR AERONAUTS

Captain H. J. Whittingham, Acting Hon. General Secretary of the Australian Aero Club, returned to Melbourne on October 18, after a month's absence in Sydney and Brisbane.

Captain G. C. Matthews, A.F.C., of Trans-Planet Air Race fame, left Sydney on October 15 for Wagga, where he will open a tour of lantern lectures on Commercial Aviation.

Captain G. H. Wilkins, M.C., also of Trans-Planet fame, left Sydney on October 14 for New Zealand, *en route* to South America, where he will join Dr. Cope's Antarctic Expedition.

Captain Sir Ross Smith, K.B.E., who has been spending several weeks in Sydney, left on October 13 for Adelaide, where he will join the R.M.S. *Ormonde* as a passenger to England.

Registration, under the title "Northern Territory Aerial Services Limited," has now been granted to the Company organised by Lieutenants Hudson Fysh, D.F.C., and P. J. McGinness, D.F.C., D.C.M., referred to in our last issue. The new company has a nominal capital of £100,000, half of which will be called up immediately. The headquarters will be at Winton (North Queensland).

Aerial Company Limited ("A.C.L."), whose registered headquarters are at 14 Martin Place, Sydney, have recently opened a second office at 5a Moore Street, City (ground floor), under the management of Mr. N. P. H. Neal—one of the original founders of the Company. Here sea-plane flights may be booked.

Mr. Neal states that an "extremely important announcement" concerning the Company's future plans will shortly be made.

## EDITORIAL ANNOUNCEMENT

### "Sea, Land and Air" to cost 1s.

SINCE 1918, the cost of paper has advanced approximately 200 per cent.; the cost of printing, linotyping, binding, and kindred processes has risen in proportion; two successive awards by The Master Process Engravers of New South Wales have seriously affected the cost of illustrations, while postage on copies to subscribers and to the Trade has doubled.

For nearly three years we have borne the rising cost of production, refraining from "passing it on," and have added sixteen pages to the monthly copy without even calling attention to the fact. At last, however, further industrial awards have forced us into line with other Australian publishers and, commencing with the Christmas issue (to be published on December 1), the retail price of "Sea, Land and Air" will be One Shilling.

Prepaid subscriptions will continue at the old rate—nine shillings—until expired. This advantage applies equally in the case of new subscriptions received not later than November 30, 1920, whereafter the cost will be twelve shillings per annum—post free.

Readers desiring to avail themselves of this intimation should make early remittance to the Circulation Manager.

*Edward J. Hart*

Managing Editor, "Sea, Land and Air."

Sydney, October 15, 1920.



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tical and relevant note, upon which I should like to finish this paper, is that the commercial aeroplane, as now for the first time designed, is already tending to outstrip the use we are making of it. What I mean is that, unless we develop very speedily and improve the land organisation of our "airways," and unless we provide the system which will permit machines to fly at night as well as day, we shall be failing to make a suitable commercial use of the improved craft which will be designed and built. Already, for example, as an "air express" to take the bigger motors forthcoming, designers have plans for machines carrying 20 and 30 passengers. If regular commercial loads are to be forthcoming for such machines, and if services are to be supported and maintained all over Europe, it will certainly mean that aerial transport companies, which have shown enterprise far in advance of any assistance promised or received, must have the really willing and cordial support not only of Governments, but also of the general public.

Even when Governments have provided the ground organisation of air routes, and mail-matter has been put into the air in bulk as a matter of routine, it will still remain for the public to clinch the bargain, and ensure the success of our airways by sending express goods by air and also by travelling by air themselves whenever their journey is urgent. What I mean to say is that any form of Government aid is more or less a temporary and artificial process. Sooner or later, and the result need not be long delayed once the business world really grasps the advantage of 100 miles an hour transport, our international airway systems should find themselves on a perfectly sound commercial basis, well able to look after themselves. But that result can never be attained, even assuming the encouragement of Governments, unless the general community, and particularly the great business firms in the big European cities, learn without hesitation to use the air whenever the time-factor becomes important.

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Revised to October 7, 1920.

Ship.	Operator.	Ship.	Operator.
<i>Apolda</i> .....	J. W. McKay	<i>Macedon</i> .....	N. W. Marshall
<i>Arahura</i> .....	W. C. Brown	<i>Makarra</i> .....	A. D. R. Davis
<i>Araluen</i> .....	H. H. Black	<i>Macumba</i> .....	F. L. Dawes
<i>Aramac</i> .....	N. H. Brown	<i>Maheno</i> .....	G. Hugman
<i>Arawatta</i> .....	N. W. G. Scott	<i>Makambo</i> .....	V. M. Brooker
<i>Atua</i> .....	G. Poole	<i>Makura</i> .....	{ E. A. Hunter (s) M. Webb-Watts (j)
<i>Australbrook</i> .....	J. F. McGinley	<i>Malayan</i> .....	H. F. Giles
<i>Australcrag</i> .....	V. E. Stanley	<i>Manuka</i> .....	J. A. Heavey
<i>Australford</i> .....	T. W. Bearup	<i>Maori</i> .....	J. Elmore
<i>Australglen</i> .....	W. H. Richardson	<i>Marama</i> .....	{ J. H. Bennett (s) F. Ouvrier (j)
<i>Australmead</i> .....	G. Pow	<i>Mararoa</i> .....	—
<i>Australmount</i> .....	A. R. Catford	<i>Marsina</i> .....	E. A. Burbury
<i>Australpeak</i> .....	R. H. Alexander	<i>Mataram</i> .....	C. Williamson
<i>Australplain</i> .....	A. Stuart	<i>Maunganui</i> .....	—
<i>Australpool</i> .....	E. J. Glaisher	<i>Melusia</i> .....	S. F. Stafford
<i>Australport</i> .....	J. H. Pullan	<i>Minderoo</i> .....	M. A. Prudence
<i>Australrange</i> .....	V. P. Nevins	<i>Mindini</i> .....	R. S. Taylor
<i>Bakara</i> .....	C. W. Donne	<i>Moana</i> .....	J. F. Hutton
<i>Baldina</i> .....	—	<i>Moeraki</i> .....	A. Cuthill
<i>Barambah</i> .....	M. L. Robertson	<i>Mokoia</i> .....	T. H. McWilliams
<i>Bingera</i> .....	J. H. Hawkins	<i>Monowai</i> .....	G. Donnelly
<i>Bombala</i> .....	I. B. Gibson	<i>Montoro</i> .....	S. R. Dixon
<i>Boonah</i> .....	F. A. Cook	<i>Morinda</i> .....	F. C. Davies
<i>Booral</i> .....	R. Jordan	<i>Navua</i> .....	D. C. Lane
<i>Boorara</i> .....	T. Alexander	<i>Ngakuta</i> .....	H. Bargrove
<i>Bulla</i> .....	A. W. Watt	<i>Niagara</i> .....	{ H. A. de Dassel (s) D. W. Higgins
<i>Bundarra</i> .....	J. B. Ponsonby	<i>Ooma</i> .....	A. E. Sheppherd
<i>Calulu</i> .....	F. Exon	<i>Oonah</i> .....	F. G. Forrest
<i>Canberra</i> .....	T. Bannister	<i>Paloona</i> .....	R. P. Ginders
<i>Carina</i> .....	W. Hall	<i>Paratiah</i> .....	K. L. Simpson
<i>Changsha</i> .....	B. Boni	<i>Pateena</i> .....	C. F. S. Taylor
<i>Charon</i> .....	J. E. Cleary	<i>Rakanoa</i> .....	V. M. S. Simpson
<i>Coocoe</i> .....	P. D. Hodges	<i>Riverina</i> .....	G. Illingworth
<i>Cooma</i> .....	J. A. Guy	<i>Rotomahana</i> .....	A. S. Smith
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<i>Dilga</i> .....	T. V. Tressler	<i>South Africa</i> .....	E. J. Giles
<i>Dimboola</i> .....	—	<i>St. Albans</i> .....	H. W. Barnfield
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<i>Dromana</i> .....	F. Stevens	<i>Tahiti</i> .....	{ E. M. Bain (s) W. S. Ringrose (j)
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<i>Dundula</i> .....	J. A. Cooper	<i>Talawa</i> .....	D. Hairs
<i>Eastern</i> .....	C. H. A. Kidman	<i>Talune</i> .....	H. F. Harman
<i>Eurelia</i> .....	—	<i>Tarawera</i> .....	A. W. Hooper
<i>Eudunda</i> .....	—	<i>Tofua</i> .....	{ L. R. Dickson (s) E. N. Williams (j)
<i>Gilgai</i> .....	D. H. George	<i>Toromeo</i> .....	M. Sedgers
<i>Hwah Ping</i> .....	F. A. Hunter	<i>Ulmaroa</i> .....	H. Tuson
<i>Kaipoti</i> .....	E. A. Miller	<i>Victoria</i> .....	C. H. Griffiths
<i>Kaitangata</i> .....	R. W. Barnes	<i>Wahine</i> .....	W. A. Hawkins
<i>Kaituna</i> .....	F. E. Duggan	<i>Waihora</i> .....	H. Bashford
<i>Kaiwarra</i> .....	L. H. Jones	<i>Waihemo</i> .....	G. Maxwell
<i>Kanovna</i> .....	W. J. Washbourne	<i>Waikawa</i> .....	N. Leeder
<i>Karoola</i> .....	R. R. Pilmore	<i>Waimarino</i> .....	A. S. Dening
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<i>Katoa</i> .....	K. L. Freeman	<i>Wattemata</i> .....	H. F. Hartley
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<i>Kurov</i> .....	F. N. Davidson		
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(Continued on page 554.)



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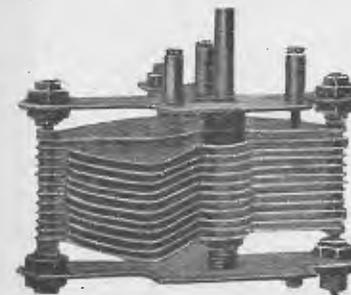
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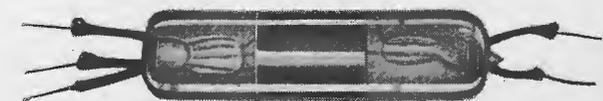
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(Continued from page 552.)

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**WIRELESS CALL LETTERS.**

The following additions are notified:—

Call Signal.	Ship.
CGV .. .. .	Wyola
VXO .. .. .	Melbourne
VXR .. .. .	Flying boat, Curtiss Eagle (owners, Aerial Co., Ltd., Sydney).

**WIRELESS INSTITUTE OF AUSTRALIA.**

**South Australian Division.**

At a monthly meeting held in Adelaide on October 6 (Mr. Hambly Clark presiding), it was decided to communicate with the authorities regarding the issue of valve licences to incompetent persons; the Institute asking for information as to whether the standard test of 12 words per minute is still to be enforced, particularly in view of the fact that certain of its members had thereby been prevented from applying for valve licences.

It was further decided to form a library for the use of South Australian members and to stock it with current literature dealing with Wireless Telegraphy and kindred subjects. The annual subscription to library members was fixed at 3s., revenue thus derived to be expended in keeping the library up to date.

Messrs. C. E. Ames, H. L. Austin, and W. Magain were elected as library committee, with Mr. R. M. Dunstone as librarian.

Members are requested to note that the Division will meet at 1 Currie Street, Adelaide, at 8 p.m., on the first Wednesday of each month, and that meetings are open to all interested.

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**ISLANDS OF THE PACIFIC**

**TAHITI: A PLAYGROUND OF NATURE**

BY  
PAUL GOODING

TAHITI lies far from the feverish activities of modern industrial life. It is more than 1,000 miles below the Equator, in longitude about 150 degrees west; 3,000 miles from Australia, 3,600 miles from San Francisco, 4,500 miles from the Panama Canal, 6,000 miles from Asia. By old trade routes—*via* the Suez Canal and Australia—it is nearly as far from New York as all these distances combined, but the Panama Canal reduces this to 6,500 nautical miles, thus effecting a saving of 10,000 miles.

Ever since its discovery by Wallis in 1767, the Otaheite of early exploration days—or King George the Third's Island, as this navigator called it—has been famed as an isolated jewel remarkable in contour, rich in verdure, blest with a pleasant, healthful climate, and inhabited by friendly people of handsome physique. The impressions of Wallis are those of Bourgainville and Cook and their conceptions are, in the main, those of the average visitor of to-day.

Tahiti is an extraordinary work of creation—a jagged, fertile cinder from volcanic pits, perhaps, or a verdant fragment of a sunken continent. It is indeed a steeped gem of wondrous green within a teeming coral ring.

This captivating heart of Polynesia presents abundant evidence that in its adornment Nature was in a liberal mood. Here the eye is delighted by a leafy luxuriance stretching from palm-fringed beach to loftiest mountain crest; by the brilliant colours of land and sea; by the high physical standards of the natives, both men and women.

Here the ear is soothed by the wash of an inner sea; by the flow of gentle streams or of boisterous mountain torrents. Here the tired or distressed mind is composed and renewed by lasting quietude, and by the knowledge that madly competitive centres are far away.

Overshadowing all are the mountains. In every colossal pile there is distinctiveness. Here a mighty slab rises high above

a valley; there a peak with a triangular summit shoots thousands of feet upward; beyond, lofty columns, hundreds of feet in thickness, stand in solitary grandeur; another turn and a shaft cuts the sky with an edge like an enormous knife—an edge to which tree, shrub, fern, and vine cling tenaciously.

As its indulgent climate might well suggest, Tahiti is an amiable country. Along all its shores one sees smiling, care-free faces, bright, liquid eyes expressing contentment and inviting confidence, and generous hands outstretched in welcome. Everywhere one hears musical voices carrying notes of kindness and sympathy; daily the visitor is gladdened by the gracious "*Haere mai!*" or the social "*Iorana!*"

Tahiti is not an abode of savages. It still has primitive life, but of barbarism it has none. There life and porperty are safe; compulsory education quickens the mind of the youthful; and the Church, the vernacular religious Press, and contact with the Caucasian, broaden, in a limited way, the intellect of the adult.

I first saw the smiling Kingdom of Pomare in a timorous dawn soon to be emboldened by the streamers of a mountain-hidden sun. In waters placid and clear my steamer lay at anchor. Behind it long lines of milk-white surf lashed against coral barriers.

To right and left strangely shaped mountains pierced the sky, and in their dense wooded depths flitted fantastic outline of crag, peak, and precipice. On a coral-strewn shore tall palms flapped a lazy welcome. In the distance rose the green spires of *La Diadème*. Between them and the jutting reef, Papeete, drowsy capital and metropolis of Tahiti and its far-flung dependencies, gently rose and fell in a mirroring sea.

As we anchored inside the reef, the sun was on the point of surmounting its lofty obstruction. Shafts of gold shot over the island. Suddenly sunbeams bathed mountain summit and valley floor. The great