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FOR THE SAFETY OF THE PUBLIC
A PLEA FOR COMMON-SENSE LEGISLATION

Several private aviation companies have been registered in Australia during the present year.

When granting registration the Commonwealth Treasurer stipulated that these companies shall, in time of necessity, hand over their entire personnel and equipment to the Department of Defence for co-operation with the proposed Military and Naval Air Force.

Despite elaborate Press propaganda covering a period of twelve months; despite the appointment of selection committees to consider the qualifications of returned members of the Australian Flying Corps; and despite the repeated announcement that an appropriation exceeding £300,000 had been allocated for that purpose, it now becomes abundantly clear that we are not to have a Naval or Military Air Force—at any rate, not during the present financial year.

For its "Third Arm of Defence" Australia is to depend entirely on the efforts of Private Enterprise.

The success or failure of Private Enterprise during the next few months will depend, in turn, upon the degree of safety with which civilian passengers are carried. Finally, the safety of the public will depend upon the efficiency with which its air traffic is controlled.

In Australia no air traffic laws exist.

One may break a neck without breaking an Act.

International regulations cannot be enforced until such time as each of the six States agrees to Federal control—in other words, to the joint adoption of precautionary measures.

Meanwhile there can be no adequate protection for the aerial passenger. Without some sort of safeguard the latter cannot be expected to venture aloft; and without passengers every commercial aviation company must inevitably be forced out of business. When that happens there will be no "Third Arm" for Australia to fall back upon.

These facts should be weighed carefully

with the forceful remarks made by Lieutenant-Colonel Oswald Watt, O.B.E., on the subject of Air Traffic Legislation. His expert opinions are set out in our report of a recent meeting of The Australian Aero Club—the present issue of this journal having been delayed to permit its inclusion.

The matter is one of immediate urgency, for, lulled into a sense of false security, a number of aviation companies have already concluded the first part of their programme.

On October 13 a consignment of *Sopwith* aeroplanes will be landed at Port Melbourne by the *Palermo*; a few days later a shipment of *Avro* machines, to the value of £30,000, will reach Sydney in the *Barambah*. Mr. H. C. Macfie, chairman of Aerial Company Limited, left Sydney several weeks ago and is now in London, completing his plans. On October 8, Major Lee Murray, chief engineer to Aerial Transport Limited, having completed his surveys and secured his landing cites, sailed for America and England in the *Sonoma*. Mr. Reginald Lloyd, managing director of Aerial Services Limited, expects to follow at an early date.

In addition to the above, we are advised of three big British syndicates and one American, ready to operate in Australasia on a large scale, while, in Sydney, Flight-Lieutenant Pickles talks quite confidently of establishing an export business of locally-constructed aeroplanes.

Private Enterprise is putting its money and brain into civil aviation and it is unquestionably the duty of the Commonwealth Government to protect not only the interests of these pioneers, but also the human lives with which the latter will soon be entrusted.

While politicians argue at cross-purposes and grope blindly in the dark, Colonel Watt shows us a simple way out of the labyrinth. Let the Government follow it.

No subsidy is asked for; but commonsense legislation is our inalienable right.

THE LEAGUE OF NATIONS

No. 2.—THE BRITISH EMPIRE

Especially Written for "Sea, Land and Air"

By HAROLD H. JOHNSON

[This article is the second of a series dealing with the countries which have signed the covenant of the League of Nations. The next country on thelist, Belgium, will be similarly dealt with in our November issue.—Ed.]

Our Empire, with its Colonies, Dependencies, Protectorates and Spheres of Influence, was, at the outbreak of war, the largest Kingdom in the world—a fact of which we should all feel justly proud. Its total area exceeds 12,000,000 square miles and its estimated population 400,000,000 souls. Apart from England, Ireland, Scotland and Wales, the Kingdom embraces the following possessions:

Europe—Gibraltar, Malta.

Asia—India, Ceylon, Straits Settlements, Hong Kong, Aden, Labuan.

Africa—Egypt, Sudan, Nigeria, Rhodesia, Cape Colony, Natal, Zululand, Basutoland, Transvaal, Gambia, Orange River Colony, St. Helena, Gold Coast, Lagos, Sierra Leone, Mauritius, Ascension Island, Seychelles, British East Africa, British Somaliland and Walfisch Bay.

America—Canada, Newfoundland, Labrador, Bermudas, Bahamas, Barbadoes, Jamaica, Turks Islands, Trinidad, Tobago, Leeward Islands, Windward Islands, Honduras, British Guiana, Falkland Islands, South Georgia.

Australasia—Australia, Tasmania, New Zealand, Fiji, Rotumah Islands, British Papua.

With such a wealth of material available, the writer recognises that within the limits of a magazine article one can do little more than reflect on a few points of interest.

Brutus, far to the West in the ocean wide.
Beyond the realm of Gaul, a land there lies.
Sea-girt it lies, where giants dwelt of old.
Now void it fits thy people; thither bend
Thy course; there shalt thou find a lasting seat.
There to thy sons another Troy shall rise
And kings be born of thee, whose dreaded might,
Shall awe the world, and conquer nations bold.

—*DIANA'S DREAM.*

Founded by the Romans in A.D. 47, our Capital is not only the greatest city in the world to-day, but, in wealth and population, the greatest the world has ever seen. It covers an area of 692 square miles, and has a population of nearly 8,000,000. Its elementary schools exceed 1,000 in number and accommodate 800,000 children; before the war the mean rateable value of the City was £56,000,000.

The genius of our nation has been political rather than theological. Oliver Cromwell said: "In things of the mind, we look for no compulson but that of light and reason." Thus it is not surprising to find the British Constitution characterised by the dependence of the Cabinet upon Parliament—the collective responsibility of the Cabinet—and instead of, as in olden times, the Sovereign ruling through his Ministers, the Ministers rule by means of the Sovereign. The Revolution of 1688 made Parliament a permanent organ in the machinery of Government and rendered possible the development of the modern system.

We have attained our present eminence by our respect for Law and Order, which has done so much in maintaining our national greatness.

In political life we have produced many great leaders. Right throughout

the nation's history appear the names of men whose energies have thrown the whole weight of the Kingdom's power into the scale against the forces opposing our national development—a fact which should have warned any other nation that when our national ideal was endangered, either directly or indirectly, we could make but one answer.

In our domestic affairs political leaders have left many blots. It is, of course, very difficult at this time to judge the temper of the nation when such events as the execution of Sir Walter Raleigh—whose genius introduced tobacco and potatoes to us—and many similar acts were permitted. A narrow-minded bigotry existed without the prudence we look for in our leaders to-day, but the passing of time has enabled us to see with a clearer perception the path along which the nation must walk, and our history has shown in later years fewer records of the exercise of might instead of right.

Our domestic history, unfortunately, literally reeks with bitterness, which was caused primarily by the injudicious acts of the nation's rulers in earlier times.

One result of the war was the bringing together of Britons from all parts of the world to share a common danger and, in mutual sacrifice and suffering, to realise the vast extent of the Briton's heritage. Heavy indeed is our debt to the early navigators who laid the foundations of our Kingdom overseas and equipped expeditions in spite of unreasonable opposition in so many cases.

From the time of Drake's voyage to the West Indies in 1585 down to the expedition of the late Captain Scott to the Antarctic during recent years our nation has been steadily growing. With national development the nation's shipping necessarily expanded until, at the outbreak of war, the bulk of the carrying trade and the majority of the large merchant vessels in the world were British built and owned and were manned by men regardless of personal comfort or safety who, by by their unselfishness and courage, set an example to the whole nation. Our supremacy in this direction is seriously challenged by America, and it ought to be some satisfaction to realise that the nation competing in the race for shipping supremacy is composed so largely of those of our own flesh and blood who have grown into a mighty nation—mother and daughter—one each side of the Western Ocean.

It was necessary, however, if national development were not to be retarded that men of courage and wisdom should follow in the seamen's footsteps and secure to the nation the full results of the navigators' daring. Our history contains a generous number of names of valiant men who so excellently have upheld the best traditions of our race in all parts of the world, and to one and all navigators, rulers, explorers and travellers I make due obeisance.

The history of our literature is the story of what great men and women thought and wrote down in good prose and beautiful poetry in the English language. In England it begins about the year 670, and is still going on, nor does it appear to have lost any of its creative force.

Every Briton has good reason to be proud of the work done by our forefathers in prose and poetry. Everyone who can write a good book or a good song can say "I belong to a noble company, which has been delighting and teaching the world for more than one thousand years," and it is a fact in which those who write and read our literature ought to feel a noble pride.

Literature, to be at all worthy of its name, must teach, and a heavy responsibility rests upon the author to educate his or her readers in the right direction. Turning for a moment from our own literature, we realise the tremendous moral force which the writings of Treitschke and Nietzsche brought into operation in the hearts and minds of the German people. The former was for many years prior to his death in Berlin in 1896 Professor of History in Berlin; for him the teaching of history evidently had little, if any value. The latter, who was a Professor in Classical Philology in his youth, became insane and remained so until his death. A tremendous responsibility rests upon both these men for the pernicious doctrines they preached. Our own literature has certainly been free from any similar writer.

The first great writer, Chaucer, has in his "Canterbury Tales" left us the best example of English story telling that we possess. Wyclif, who translated the New Testament, did away with its Latinisms and made it the popular language of religious thought and feeling. Caxton, who acquired fame as the first British printer, enriched our literature by his translations, changed the rude old English of some writers by the power of his printing press, and established a standard which Tyndale's writing fixed more firmly and Elizabethan writers kept in its purity.

In the time of Elizabeth frequent translations were made from the classical writers and theological reform stirred men to another kind of literary work. The Bible also became common property, and Foxe's "Book of Martyrs," by its simple style and popular charm, made all who heard it or read it, feel what is meant by Literature.

Spenser's "Faerie Queene" made him the first poet of the day. Alongside the spiritual allegory in this book is the historical one in which Queen Elizabeth is "Gloriana," and Mary of Scotland is "Duessa," and Leicester and, at times, Sidney, are Prince Arthur, and Raleigh is "Timias."

Shakespeare in twenty-eight years made the drama represent the whole of human life. He used 15,000 words in his vocabulary. His works are well known, but we can only guess with regard to his life and character. We cannot find out what he was from his sonnets or plays, or lay our hands on anything and say for certain that it was spoken out of his own personality.

The present writer feels proud that he can quite justly include two famous men with the same patronymic: "Ben" Jonson (1573-1637), who wrote the drama "Every man in his Humour," and Dr. Samuel Johnson (1709-84) whose * Dictionary is so well known. Bacon's "Advancement of Learning" gave an impulse to research, and awoke scientific inquiry in England. The Royal Society for the advancement of science was constituted in the reign of Charles II.

John Milton was, excepting Shakespeare, by far the greatest in the world of English literature. His "Paradise Lost" was followed by "Paradise Regained." In old age he was quite blind and had fallen on evil days, but his imaginative power was unimpaired until the last.

Another famous author, John Bunyan, left us "The Pilgrim's Progress." Nothing of its kind has equalled it, and its vivid descriptions have given pleasure to men and women of all classes.

Dryden's work is satirical, and Pope, the critic, is credited with writing the most brilliant occasional poem in our language—"The Rape of the Lock."

Swift was a keen political partisan, so excellently revealed in "Gulliver's Travels." Defoe's "Robinson Crusoe" lives and charms from day to day.

David Hume's "History of England" is, I suppose, by its clearness of narrative, our first literary history. Edward Gibbon, who wrote that famous book "Decline and Fall of the Roman Empire," was an Englishman. Adam Smith's "Wealth of Nations" created the science of Political Economy, and Hallam's "Constitutional History of England" opened a new vein of history in the best way. Of the English writers, the last I shall quote is William Wordsworth who, by his close penetration into the realities and simplicities of human life, can claim our reverence.

Scotland has produced some writers of exceptional ability. Barbour's poem "The Bruce," represents the whole of the struggle for Scottish freedom—against the English—which closed at Bannockburn. Dunbar, the composer of the poem "The Thistle and the Rose," was a writer whose work was as varied in its range as it was original. There are a number of other Scottish poets who are all remembered by Dunbar in his "Lament for the Makars."

Robert Burns, who was himself poor, sang of the poor, but the rattling fun of "Tam O'Shanter" is united to an ideal of human character which is peculiarly English. He revealed the Scottish love of nature, not for the love of nature alone, but as a background of human love.

Those who have been quoted, and many others, have all helped to make us a nation who for more than thirteen hundred years have been lovers of literature. The best way to lighten man's load is to

* First edition published in 1755.

enlighten his mind, and in our literature we have a lance with which to tilt at ignorance.

Equally inspiring has been the genius of the leaders of our industrial life. A manifestation of the national spirit has been the insuperable aversion of our manufacturers to be outclassed in any branch of industrial activity, and the application of mechanical and scientific inventions, although at times the cause of much industrial unrest, has steadily progressed.

The rights of subject races have always been closely observed. The great lesson learned from the trial of Warren Hastings was that Asiatics (or any other race) have rights, and that conquerors have obligations. The failure of those in authority at Westminster to recognise the rights of the American Colonists led to the latter electing to declare their independence, and I think that the most astonishing national event in the late war was the way the descendants of those same Colonists came across the water to uphold the ideals of right and justice which were denied their forefathers.

Britain's interest in other lands is the result of her sons' adventurous spirit. First a visit, then a settlement for trading, with a natural development of interest, and ultimately, in so many cases, the land's incorporation in the Kingdom. Other nations have begun in the same way, but none have succeeded as our own Empire, and the reason of such phenomenal success should be sought. The great asset of the Briton is his positive spirit. He takes little account of odds, but has a firm belief in his own destiny. The nation did not falter when the Spanish Armada, in the time of Elizabeth, threatened its very existence; neither did it falter in the time of Napoleon when he had the whole of Europe under his feet and was determined to subdue us. Nor did the nation falter in the late war, which has unfortunately resulted in such an awful loss to its young manhood.

Britons have always sought to use Cromwell's phrase, "light and reason," and in so doing have equipped themselves —unconsciously perhaps—for their great responsibilities. Their toleration of the religious beliefs of those whom she governs is in itself a remarkable thing. It probably has had more to do with the cohesion of the Empire than any other policy. A subject nation that is governed well without its religious belief being called to account has no definite grievance against the conqueror. What a contrast this is to the policy of the once mighty Spanish Empire! It seems to have been a definite cause of distrust, dissatisfaction and then revolution throughout the world's history when the conquering nation has placed wholesale conversion to the conqueror's belief as the fundamental act of Government. Missions of all denominations are allowed everywhere within the scope of British Influence; but missionaries, while they are protected by Government, are not allowed any voice in the government of the country in which they reside. This limitation is perhaps distasteful to some denominations, but history surely teaches how unwise religious interference has been. This is not a reflection upon some of the world's great statesmen, Lanfranc, Wolsey, Richelieu, Mazarin and others. There is an essential distinction, however, between the priest as statesman clothed with power and responsibility, and priestly influence in statecraft—influence without responsibility.

There is an old saying that in time of stress Britain has always produced the right man to take charge and steer the ship of State through the storm. This appears to be generally true, although it must not be forgotten that good leaders are ineffectual without the wholehearted support of the nation.

Before and since the Battle of Trafalgar, the nation has lived up to Nelson's ideal that "England expects every man to do his duty." The same positive spirit has enabled her sons to administer with wisdom the lands which she controls and on which the sun never sets, and which in consequence require a special study in every case; but the inherent spirit of the Briton has carried him over all difficulties and enabled him to show his ability to rule.

It was not uncommon in olden times for nations to appoint viceroys to administer distant possessions—Velasquez in Cuba, Cortez in Mexico, Pizarro in Peru, Alva in the Netherlands, and

others; but they did not preserve to the Crown that loyalty which we look for as the result of our own administrators' work. In the case of India the rulers were The East India Company; from a small beginning in 1613, when the Company was first able to get a footing in India, until 1858 (245 years) when as a result of the Mutiny, the Crown assumed the sovereignty and functions of Government. The British South African Chartered Company successfully controls the affairs of Rhodesia to-day, but history does not show that other nations' representatives could consistently rule with the same success—either under or free of Governmental control—as we have done.

The existence of our Empire depends primarily upon her maintaining control of the seas; and our real history opens with the period in which Britons learned to make the sea their power. This period may be taken to begin in 1485, when maritime adventure became a distinct feature of British life. Henry VIII. saw the importance of encouraging commerce and maintaining a Navy, two factors on which, as Captain Mahon has pointed out, the sea power of a country depends.

The influence of sea power on history has been so deeply impressed on our minds by recent events that we now fully realise why the Navy is the Senior Service.

Our control of the seas was, until recently, a situation which was peaceably accepted as part of the world's domestic policy, and was not challenged because our Navy has never been used for the oppression of weaker nations (except the American Colonists); on the contrary, other nations with a less high ideal were held in check by the moral force of its might. Napoleon's mathematical mind defined the moral as against the physical as three is to one, and on this assumption probably our Navy's usefulness in a war was calculated to result in the same ratio.

When hostilities commenced the physical force of the Navy—as we all anticipated—was quite equal to its moral force, and "life mooches on" with the British Navy still supreme on the seven seas of the world.

Our standing army in times of peace has only been numerically strong enough to police the Empire. We have been free from the oppression of conscription, which, however, was unavoidable, but cheerfully accepted it when the nation realised the magnitude of the late struggle.

In thinking of great men who have led our Navy and Army in times of danger what a number of names arise and float across our mental vision! What we owe them cannot be expressed in words. A stroll through Westminster Abbey, where so many great men are buried, is itself an education and an inspiration.

Great Britain is always "Home" to the Britisher, no matter in what part of the globe he happens to be. The financial centre of the nation is very properly in the heart of London, and from the Bank of England there radiates to the very remotest corner of the Empire the influence of "The Old Lady of Threadneedle Street." A remarkable manifestation of the practical side of our nature was the successful grappling with the financial problems of the war both on our own behalf and on behalf of our Allies. It was amazing to read of the gigantic sums that the Chancellor of the Exchequer from time to time asked for, and more amazing still the way the sums were found.

I think we all looked on the value of the British sovereign as unalterable as the ancient laws of the Medes and Persians, but its exchange value has unfortunately depreciated.

Notwithstanding the success of our arms, we have still before us the financial problem, a solution of which will have to be found. The problem is complicated by its inseparable interest in the industrial condition of Great Britain. I regard as premature the Americans' claim that New York and not London is the financial centre of the universe, but, bearing in mind the practical nature of our competitors, it is clear that it will require great courage and determination on our part to seek out and proclaim the true way to maintain our national greatness in this matter.

After attaining pre-eminence in so many directions it blunts the edge of a Britisher's vanity to read in our daily papers of the deep-rooted unrest in the United Kingdom and of the efforts considered necessary to remedy the unsatisfactory industrial conditions.

Has our Empire been built up utterly regardless of the welfare of the workers whose physical condition (as revealed by the number certified as unfit for war service) was appalling? Have the conditions of life been such that physical well-being was impossible to the people? If so, it is not surprising that the masses are protesting against a continuance of the old order of things. Their demonstrations of enmity are alarming and measures of promptitude and energy are necessary, because timidity on the part of the rulers of the nation will result in national disgrace. Great events do not spring from small causes, although they may have a trivial beginning. Unionism, from small and insensible beginnings, has acquired continued strength through ambition in the few and fanaticism in the many.

During the war the workers received such increased pay that they evidently feel it ought to continue—which, of course, is impossible, unless utter national ruin is to be faced—and although during the transition stage manifestations of dissatisfaction were bound to appear, the causes of unrest seem to be much more deeply rooted.

The whole nation was stirred to the very depths of its soul during the late war—a fight for an ideal of liberty. Has the world to go through another struggle between the forces of law and order, science and culture on the one hand and, on the other, those of disorder and license and the degrading tendencies of democracy as we see it to-day? We wish democracy to march hand in hand with liberty and progress, but present-day democracy wishes to drag everybody down to a common level, and that the lowest. It desires law to restrain the rich, but will not obey the law itself. Democracy seems to desire a loud voice in the control of the wealth it has helped to create, but its triumph is apparently to be one of lawlessness.

In England they are only now introducing a Bill to give reforms in hours of labour and in wages, such as Australia has enjoyed for years, while the suggested control of mines has been tried here and found wanting. Man has to be clothed, shod, given a decent home with all necessary appurtenances. We candidly confess that it is much easier to state a problem than to find a solution, but the nation is called upon to earnestly seek an answer because in this matter there is no neutrality. Government ownership and co-operation have both been tried in this country and given us examples of failure, because human nature is so diverse. One man has the capacity and the will to work, another has neither or only one of these, and from such thoughts there necessarily arises the belief that a greater exchange of ideas between employers and employees on matters of business is essential, but of course the bargain must be a fair one.

A greater exchange of ideas is necessary because you cannot force any rules of life upon a nation. Constantine the Great allowed christianity unfettered development in the Roman Empire during his day, because he saw the nation demanded it, but a successor, Julian, attempted to reverse this and consequently has come down in history as Julian the Apostate. Bismarck, after attaining such an eminent position as he held after the Franco-Prussian war, miserably failed in his domestic policy. Napoleon was wiser in so far as his own nation was concerned, although religion troubled him very little, but he fell when by his actions he showed contempt for the domestic liberty of conquered nations.

The signatories to the League of Nations covenant have undertaken to secure just and humane treatment for the working classes and it will be better, I think, if this can be obtained by interchange of ideas between the classes than by legislation, by this means you may instil into the minds of servants as well as masters a clear perception of their duty to "owe no man anything."

Not what we have, but how we use;
Not what we see, but what we choose.
These are the things which mar or bless
The sum of human happiness.

COLOUR MUSIC

Especially Written for "Sea, Land and Air"

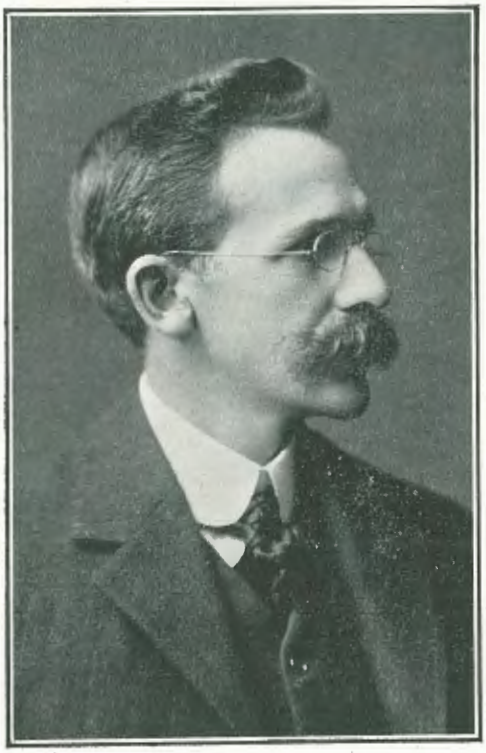
By MISS KAE McDOWELL

The theory that a connection existed between sound, colour and form has been handed down from the early days of the world's history. References to it may be found in the literature of the Ancients; a monk in the Middle Ages wrote a book about it, and occultists have dealt lengthily with it ever since. There are many descriptions by clairvoyants of the colour effects produced by the playing of beautiful music. They also tell us of the music of the Spheres.

A little dressmaker in Melbourne, whose work-room window looked across the light area into the room of a music teacher, tells how one day, while gazing idly into that other room, she seemed to see coloured lights flashing up round the instrument, in response to chords played upon it.

A Sydney woman listening to a Schubert quartette saw waves of irridescent colour ascending from the instruments. The colours in this case were mostly blues and purples—those almost indescribable tones of dusk and twilight. They seemed, she said, to take indefinite, luminous shapes.

That every musical note, every sound in the universe, has its responding colour has long been tacitly accepted by a large number of people, but it was not until



Mr. A. B. Hector.

Mr. Roi de Mestre.

comparatively lately that investigations in that vast untravelled sea called electricity decided conclusively that the vibrations caused by sound produced responsive colours; that a perfect wireless system, in fact, existed between them.

Much interest is growing in the matter, but as yet there is little literature connected with it, and the man in the street, naturally suspicious, is inclined to treat it as part of the charlatan's box of tricks.

A society is being formed in Sydney for colour research.

Local men who have been actively investigating two separate branches of the subject for some time, are Mr. A. B. Hector (general manager of Burroughs, Wellcome & Co.) and Mr. Roi de Mestre, who belongs to what is called the New School of painting. Mr. Hector is occupied with the scientific side of the question; Mr. de Mestre with the aesthetic. Interviews with these two scientists supply us with much interesting information.

Mr. Hector's views on certain aspects of the subject would be considered hetrodox by many scientists. He has the spirit of the pioneer, and what pioneer ever even wished to follow the beaten paths? In this article an effort has been made to keep closely in touch with his theories. The ground traversed is so new, however, that it would at times be hardly possible to avoid slight misconception. It is only fair to Mr. Hector to say so.

"My invention," he says, "will be most readily comprehended by the following hypothesis":—

"It was claimed by Faraday that all matter was more or less magnetic, and more recently Sir J. J. Thomson claimed that all matter was more or less radio-active. In this connection it appeared to me that this was setting forth the same idea in different terms, inasmuch as the difference between radium and, say, magnetic iron, is that the former disintegrates intra-atomically comparatively rapidly, the latter very slowly.

"In respect to the transmission of light, Newton stated that light consisted of corpuscles propelled at a very great rate of speed, while Young and Fresnel combated the corpuscular theory by propounding the undulatory theory, that light progressed as ethereal waves. In this connection it appeared to me that here again both scientists were correct, only viewing the same thing from different aspects; that is, that the corpuscles emitted by incandescent bodies proceed in waves.

"If it is postulated that a magnetic body or a radio-active body is practically interchangeable, then magnetism and radio-activity will be practically the same thing, only varying in speed of the emission of their respective emanations. This may be shown practically in the following manner:—

"If a piece of soft iron is rotated within the poles of a horseshoe magnet, induced magnetism is set up. This magnetism can be made to flow along a suitable conductor such as copper wire, and the faster the soft iron or armature is revolved, the faster will the induced magnetism be produced. When this induced magnetism is flowing along a conducting wire which is broken at different positions, and varying resistance are interposed, sound, heat, light, cathode-rays, and X-rays will be produced. It is also found that magnetism, electricity, sound, heat, light, cathode-rays, and X-rays all obey the same laws, such as resonance, reflection, refraction, diffraction, polarisation, absorption, and inverse squares. It has been frequently stated that sound differs from light in so far as light will pass through a vacuum, but sound will not. This is only a partial statement of facts, as if the vacuum is perfect, neither sound, heat, light nor any other electrical phenomena will be transmitted therethrough.

"From the above I deduce that if sound and light are but varying manifestations of the same thing, they should both obey the same laws of harmony."

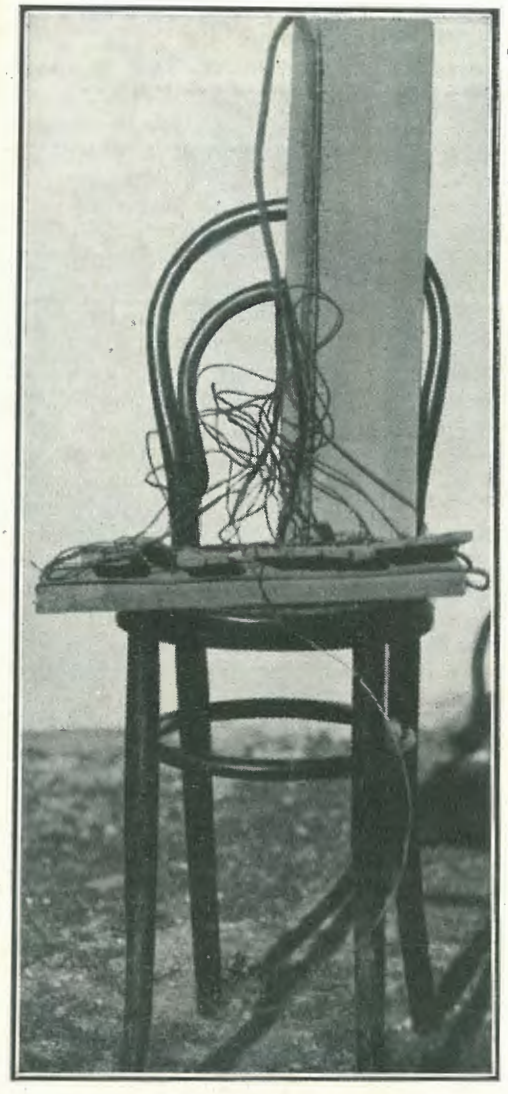
In a recently translated book entitled "The Mechanism of Life," by the well-known French scientist Leduc, Mr. Hector's contentions are supported to a remarkable degree.

This book came into Mr. Hector's hands but a few months ago, years after his patent was lodged.

It will be remembered (says Leduc) that Newton considered light to be produced by projectile-like particles emanating from a centre, and proceeding in straight lines in all directions. This emission theory of light was

abandoned in favour of Huygens' undulatory theory.

It was said that the phenomena of interference and diffraction could not be explained by the theory of emission, while the undulatory theory gave a simple explanation. The scientific mind was unable to conceive the idea of emission, and periodicity as taking part in the same phenomenon. The savants and



Mr. Hector's First "Colour Organ."
[Photograph Copyright *Sea, Land and Air.*]

thinkers who have meditated on this question have always considered the theory of emission and that of periodicity as incompatible. Nevertheless we are here in presence of a phenomenon in which emission and periodicity exist simultaneously. The molecules emanating from one drop are diffused in straight radiating lines, and yet produce periodic precipitates which are subject to interference and diffraction like the undulations of Huygens.

The phenomena associated with the pressure of light, the discovery of the cathode rays and the radiations of radium, together with the introduction of the electron theory of electricity, all seem to have brought again into greater prominence Newton's original conception of the emissionary nature of light.

Some of the phenomena of radiation can be explained only by the emission theory, and others by the undulatory theory of light. All these difficulties would be solved if we admitted the hypothesis that radiating bodies project electrons, which produce in the other project electrons, which produce in the ether gelatine films.

"Here," says Mr. Hector, "we come to the undoubted relationship between sound and colour. *Do, re, mi, fa, so, la, te, do*,—in other words *c, d, e, f, g, a, b, c*, says the musical octave. Red, orange, yellow, green, blue, indigo, violet, red, says the colour spectrum."

Music requires sound to express the emotions; colour requires sight. Mr. Hector's contention is that by harnessing the two in harmony the effect becomes infinitely more intense.

After certain experiments he decided that red must be associated with the lower vibrations (bass notes) of the piano; green with the middle notes, and violet with the high. Upon this foundation he based his colour keyboard. Electricity in coloured shades he made his light medium; the effect, of course, being obtained only in a darkened room.

At first Mr. Hector used only a six candle-power light to each note, then he increased it to twenty-five candle-power. Now he uses 300 c.p. to each note, or an aggregate of 18,000 for the entire piano keyboard. In one phase of colour music produced at the Panama Exposition, fifty-five million candle-power per unit was employed—totalling for the whole instrument, a power of two thousand six hundred and forty million candles.

A demonstration of colour music is both interesting and beautiful. In presenting the results of his investigations Mr. Hector has spared neither money nor trouble. The little theatre he has built on to his beautiful home, overlooking the Lane Cove River, is of red brick, with a stage at one end. Here, in an artistic setting of rocks, pampas grass and statues, the coloured lights are cunningly

concealed. At the back a white curtain falls from ceiling to floor.

Not being a musician Mr. Hector uses an Angelus for his piano.

The effect of colour music is remarkable. At first one is overcome with wonder at it, then every sensation but that of the beauty of it fades. One's sensibilities seem to be reduced to those of hearing and sight. Imagine yourself in a darkened room waiting for the soft notes of Mendelssohn's Spring Song to imprint themselves upon the stillness. Then, as the music starts, the responsive colours immediately flash and glow, and bathe the soft folds of the white curtain in varying blending colours. All the delicate shades of the spring season are shown, green shoots, hues of flowers, almond blossom, primrose, crocus, daffodil, together with the emotions the composer intended to portray.

The meanings attributed to the primary colours are—red, anger and passion; yellow, intellect; blue, devotion; green, sympathy; indigo, aspiration; violet, spirituality.

In Chopin's Funeral March the effect of the colour was very fine—as though a portion of the Aurora had been captured from the Southern sky and made to glow in ever-changing harmony at man's caprice. The blues, greens and amber shades! The blending of them in the long folds of the curtain! The delicate gleams of yellow sunshine—the sinister reds and purples!

The strong chords of Rachmaninoff's *Prélude* produced wonderful waves of colour.

The Angelus was then moved away and a pianist played one of Brahm's waltzes, which was full of colour and emotion. An inferior performer played the same thing and the effect was quite insipid—the colours scarcely glowing from his touch.

Though Mr. Hector has accomplished so much—more, it is believed, than any other investigator—he feels that he has but touched the fringe of the subject.

"When I started," he said, "we had to carry all the electricity in cells from the Town. It was a great boon to us when the City supplies reached Gore Hill and we could be connected direct."

A question here and there sets him dreaming a-new, and propounding new theories. He has in his mind some far more ambitious scheme. Perhaps the mystery of form will be enlisted to complete the magic and harmonic trio—Sound, Colour, Shape.

Already an instrument has been invented by Margaret Watts Hughes, showing the forms which sound vibrations trace in sand or powder on a rubber surface. The instrument is called the Eidophone, and it is like a large meerschaum pipe with an elastic disc stretched evenly across the bowl. When a sustained note is directed into the mouthpiece of this pipe the vibrations form a pattern. If the powder is coloured beautiful traceries appear—like stars, or the foliage of plants, or like those wonderful patterns traced by the frost on the window-pane.

In Mr. Hector's experiments it will be noticed that he has kept almost exclusively to the practical relation lying between music and colour. Mr. de Mestre, the other investigator interviewed, has worked out his scheme in the direction of organising colour-harmony through the *theoretical elements* of music.

Down one of Sydney's narrow lanes we find his studio. He is a man of the purely artist type; temperament is writ large all over him—in his restless movements, and in the unaffected earnestness and conviction in his manner.

For some time, he says, he was torn between the two arts—painting and music. Finally the former gained a somewhat reluctant triumph. Colour, he was convinced, was his medium of expression. A conviction of the close relations existing between the two was, however, growing within him and he felt that sound and colour should be combined in order to make expression complete. This idea took such a strong hold of him that he set about looking for some means of bringing it down to a practical basis. He evolved a colour key-board exactly like the note key-board of the piano, except that its tones and semitones were tones and semitones of colour. His theory, like Mr. Hector's, was that the seven notes of the octave corresponded to the seven primary colours of the spectrum—the

semitones being expressed by the blending of colours. The first question which arose was upon what note should he start his octave and how should he discover its responsive colour?

It was intuition practically that placed his finger on the middle *c* of the piano and paired it with yellow, the central note of the colour octave. Further study convinced him that he was right for the reason that the "two most important notes in the musical scale, the 4th and 5th degrees, were represented by degrees of colour complementary to the key-note."

Fixing the key-note as yellow then, the spectrum band developed into a scale of progression, thus—yellow, green, blue, indigo, violet, red, orange and yellow again. All that remained then was to insert a tone of colour between the 1st and 2nd degree, the 2nd and 3rd, the 4th and 5th, 5th and 6th, 6th and 7th degrees, and the chromatic colour scale was complete. He merely repeated his octaves to correspond with the 88 notes of the piano keyboard—gradually deepening for the bass and lightening them for the treble.

The system of our major and minor scales, as applied to the theory of music, was then transferred to the colour keyboard. The correct relation of the colours to the warmth and coolness respectively of the major and minor keys follows in direct response.

A pretty incident proved the accuracy of the scale. De Mestre and a friend went to the sea-side for a holiday. The friend, by the way, was no painter, but, for the success of the experiment to be tried it was not necessary that he should be. Taking some paints and a small stretch of canvas he went out to sketch a little scene, using merely the natural broad sweeps of colour of the objects before him, and not their forms, as his medium. The little sketch, which may be seen at Mr. de Mestre's studio, shows the blue of the sky, the deeper blue of the sea, green sward on a jutting headland, a reddish line for a road and notes of various colours in the immediate foreground.

The Stage of Mr. Hector's private theatre. The central instrument is his latest model of the Colour Organ.

[Photograph Copyright *Sea, Land and Air.*]

When they reached home they set the little scene to its corresponding notes in music, using the aid of their colour scale. Imagine with what bated breath they spelled it out! And imagine with what swimming emotion they discovered that the playing of the notes produced a little melody! It was like the sudden opening of a door into a brilliantly-lit room.

A few weeks ago Mr. de Mestre and Mr. R. S. Wakelin, a well-known exponent of modern colour harmony, gave an initial exhibition of paintings at the Australian Arts Club Rooms in Penzance Chambers, Sydney. An idea of the interest which is growing in the matter may be formed by the fact that, although little has so far been written on the subject and it has received no notoriety through the Press, more than seven hundred people viewed it.

The pictures covered a wide range of subjects and the charm of the colouring gave them a kind of magnetic attractiveness. Certainly their names have a quaint sound to the irrelevant layman—"A Syncromy in Yellow Green Minor," for instance, or "The Bridge—an Arrangement in Yellow Major resolving into Red Minor."

When the subject becomes better known, however, these names will appear no more strange in relation to colour than those of many of the best known musical compositions, such as a Fugue in B Minor by Bach, or a Symphony by some other composer.

The differences between a picture painted in the major key, and one done in the minor is interesting. "The minor key," says Mr. de Mestre, "always produces a greyer and less progressive colour-scheme than the major. The next subject to occupy my attention will be to construct several other sets of scales similar to those I have already, but producing a different tone quality which I hope to use in colour orchestration. By colour orchestration I mean combination of tone quality, colour, harmony and rhythm."

The application of this kind of colour organisation to interior decoration opens a big field for the colourist of the immediate future. Its relation to commerce opens an even bigger one. It is already predicted that the qualifications of the publicity man of the future will include a knowledge of the potent influence of colours.

OUR SUBMARINES.

SOME LTTLE-KNOWN PARTS.

Especially Written for "Sea, Land and Air" by E. J. HILL

There are certain aspects of a submarine which are usually passed over by those who write about these undersea craft, though really these ignored trifles are the most fascinating features on board.

A few days ago I was in *J.3*, lying off Garden Island, and was shown many interesting points which even the searcher after technical—let alone popular—details might quite easily miss.

The "sub" was being stripped preparatory to going into dock, and was hardly in a condition in which the wardroom would invite guests on board for tea and talk, being mostly covered in oil and grease, and with a large part of her interior lying spread out on deck.

My guide, who was an enthusiast as far as the engines were concerned, took me down aft. Our way below led through a man-hole that an ordinary civic father, "in fair round body with good capon lined," could never have negotiated. As my guide explained: "Go slowly and surely. It's no good getting hot and losing your block going down or coming up. The hotter you get the more skin you lose. A man must keep cool on a 'tank,' for you may have to shin up to gun's crew quarters or down to the engine room at a second's notice, and if you flurry, well—you may get someone's boot on your head or your hands, or you might jam in a tight place, and every place on a 'tank' is a tight one."

With this word of warning we crawled down a steel funnel and emerged into a tiny chamber which, I was informed, was an engineers' mess. Two miniature tables were offered as the proof that twelve men ate and slept and spent their hours off there, and close by there was an electric galley on which the meals for the whole crew, barring officers, were daily cooked. The officers have a galley of their own, for'ard of the ward room, operated by their own special steward, chef or batman (or whoever cooks for them), when not engaged in other duties.

Close to the crew's galley was the "Rubbishy Jack," a huge steel receptacle into which all refuse is placed when the "tank" is under water. Compressed air is forced into the "Jack," driving its entire contents into the ocean outside. The compressed air, which is used for many purposes on board, is stored in groups of metal bottles, scattered all over the ship, very similar in shape to oxygen cylinders, yet considerably larger. One use to which the compressed air is put is to blow the tanks clear of water, thus enabling the submarine to rise to the surface.

A couple of steel wheels chained and padlocked together were brought to my notice. "If," said my guide, "we dived to the bottom and then found that for some reason or other we couldn't rise when we wanted to after exhausting all the usual methods, such as blowing tanks, etc., the turning of these wheels release portions of a false keel on the bottom of the boat, thus reducing her weight. This is only resorted to as a last resource and, thank God, I've never had to see 'em used yet, and, what's more, I don't want to."

Everywhere one went down below one noticed what appeared to be Gargantuan French horns protruding from ceiling or side of each compartment. This Verbrugghen nightmare turned out to be not as fantastic as one's sober senses would imagine, for in reality they are Klaxon horns, through which the captain of the boat can, by pressing a button and setting them going, notify everyone below decks that he is going to "splash dive," and thus intimate that everyone must jump to diving stations, in the same manner that the ringing of the gongs on a destroyer notifies her crew that they must go to Action Stations and not wait on the order of their going.

Passing for'ard through the engine room with its intricate maze of machinery, within a few inches of which the engine room staff have their bunks, one passed into the control room, quite a light and airy compartment compared with those that lay aft. On either side was a torpedo tube, and in the centre was the eye of the ship when submerged—the periscope. It seemed strange that here, many feet below the level of the water, one could grip the two handles and, after applying an eye to the lens, turn the periscope and see the whole of Sydney's sky line and the ships lying at anchor, or the ferries passing to and fro' on their lawful occasions.

Close to the periscope was a disc with three pointers on its face, known as the "Is-Was." It was explained that the officer firing torpedoes could tell by means of the pointers on the disc what the exact position of his was when the tin-fish was liberated and what the boat's exact position was after the shot, thus giving him the vessel's course.

On the other side of the control room was what appeared to be a big black kettle-drum. Musical instruments (with the exception of the Klaxon horns) do not form part of a submarine's equipment, and this apparent kettle-drum turned out to be the electric compass in its swinging case.

From the control room one passed into the ward room. On the right hand, or starboard side, were the officers' bunks, brass-railed and looking most comfy, while on the port side was the mess table and a lounge. All this is arranged in a space so congested that a man lying in his bunk could reach anything off the table, or even if he wanted to, take a hand of cards with those seated on the far side of the table. Under the bunks were lockers such as one sees in the cabins of officers in destroyers and bigger ships, but the wardroom of a "tank" is the best example of a *multum in parvo* I have ever come across.

"They're very comfortable in here," said my guide, "nice and roomy, isn't it? Almost big enough for one couple to waltz three steps in if they were careful and didn't take big ones." And compared with the perilous path through the engine room between throbbing engines and shaking bunks, as it must be at sea, the ward room did indeed seem roomy.

For'ard again and we stepped into the fore torpedo chamber with its four tubes and its gleaming and deadly tin-fish lying at rest, but nonetheless looking devilish in their very passiveness. Above the locked doors of the tubes was the vessel's motto engraved on brass: *Nil Nisi Nisu*, a liberal translation of which is, "Get up or stay under."

Returning to the control room we climbed up past the signalman's locker with its pigeon-holed bits of bunting to the conning tower with, in front of us on the superstructure, the gun. One is often asked when a submarine dives doesn't the gun get full of water? It does, but at the same time it is so thickly coated with grease, inside and out, that salt water will not affect it, and further, unless a "splash dive" takes place the gun is plugged at the muzzle before the boat submerges.

One last little matter was brought to my notice. It was an insignificant wheel valve just inside a man-hole in the superstructure on deck, but the lives of every soul on board the boat might have to depend upon it and upon the metal tube leading away from it into the living quarters of the vessel. Should a submarine dive and, for some reason, refuse to come to the surface again when required, it becomes necessary to send a diver down to her—that is providing, of course, her unpleasant predicament has been discovered in time. The diver's first duty is to find the man-hole, raise the cover and attach one end of the metal tube to liquid food supply with which he is provided, turn on the wheel valve and thus give the imprisoned officers and crew something to go on with, and at the same time let them know that help is at hand. The whole idea is really a sort of forlorn hope, because by the time the crew of a "tank" had consumed all the provisions on board the chances are that the air would have been consumed and they would be beyond human aid, but to these men who go down into the sea in ships every chance must be given that the ingenuity of man can invent to insure that they return to the light and the air again after they have done their business in great waters.

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.HS.

PART IV.—UNDER STEAM.

It was in 1881 that the management of the Aberdeen Line decided to employ steam, it having taken some time to convince the cautious Scotchmen that herein lay the future success of their Line. Steam had been gradually making its way, and with the opening of the Suez Canal the sailing ship (for passengers and the lighter class of cargo) was being worked off.

The first steamer to carry the White Star was not to be built at Aberdeen, for with the launching of the iron sailing ship *Orontes,* Walter Hood & Co. had done their work as builders, and George Thompson & Co.—who for some time controlled the latter—went to Glasgow to have her built. The *Aberdeen,* as she was named, came from the yard of Robert Napier & Sons, of Govan, on the Clyde, and was the 381st ship turned out by that firm, who have built hundreds of others since. She was what was termed an iron screw barquentine, that is, as she was built in the days when steamers carried sail, she had fore and aft sails on her main and mizzen masts, and square sails on the foremast, and so as to keep up the connection still more with the sailing ship, she had a clipper bow. She was 3659 tons burthen, and 362 feet long—quite an infant compared with the firm's later vessels.

Launched on December 21, 1881, she arrived at Sydney on her first voyage on May 20, 1882. Her commander was Captain Matheson, who had previously had the celebrated clipper *Thermopylæ.* His chief officer, Alexander Simpson, had been an apprentice on the wooden ship *Queen of Nations,* belonging to the same owners as the new steamer, and in which he was later to become second officer.

The *Aberdeen* established a reputation for regularity, her time to Melbourne being 43 or 44 days, and on one occasion, when a day over, the London underwriters cabled out to ask for information.

On March 1, 1884 (still under Captain Matheson), she dropped down to Gravesend to commence her fifth voyage, but her departure was delayed by a very serious accident which caused the death of the captain, the second officer, and the pilot. While about to weigh the anchor Captain Matheson ordered the removal, from the bridge, of a box of blue lights and rockets. While this was being done the second officer, Mr. Hillson, noticed that the contents were on fire. Captain Matheson hastened to give a hand to get the box overboard, but before this could be accomplished the contents exploded, wrecking the bridge, deckhouse and charthouse.

The pilot, who was to have taken the *Aberdeen* to sea, was blown up and fell on deck, dead. The captain and the second officer, who had just joined the vessel from the sailing ship, *Thermopylæ,* were instantly killed, suffering terrible mutilation. This, of course, delayed the steamer's departure; temporary deckhouse and charthouse had to be built, and officers obtained to replace those killed. Mr. J. Barclay, the chief officer, obtained the command, Mr. Charles Taylor was appointed chief officer, Mr. William Seward, second; Mr. Richard Drew and Mr. H. Goldsmith, third and fourth officers, retained their positions.

The vessel left London on March 6 and, calling first at Melbourne, reached Sydney April 28. Two voyages were made every year, the Medical Superintendent with the 543 immigrants she brought in April, 1885, being Dr. F. Antill Pockley; in April, 1886, she had 672 immigrants under the care of Dr. J. A. Beattie, both of whom later became leading men in their profession.

Captain Barclay retained command of the *Aberdeen* until the beginning of 1888, and, after his eighth voyage, was succeeded by Captain Charles Taylor, who had been her chief officer in 1884, but had since had the sailing ships *Aviemore* and *Centurion.*

Captain Taylor, who brought the *Aberdeen* to Sydney on April 17, 1888, is well known in shipping circles in this port at the present time, and the shipping report mentioned that he was late of the barque *Centurion.*

Whilst she was still in Sydney cable advices stated that the Aberdeen sailing ship *Smyrna* had become a total wreck off the Needles—Isle of Wight—and that her commander, Captain Taylor, formerly of the *Centurion*—with 11 others of the crew—was drowned. Captain Taylor, who at that time, was in Sydney Harbour on the s.s. *Aberdeen,* had the satisfaction of contradicting the report.

With the arrival of the mail it was ascertained that the unfortunate victim was Captain *Thomas* Taylor, the confusion of names being explained by the fact that he, too, had commanded the *Centurion* before she was taken over by Captain Charles Taylor.

In writing of these master mariners of the period, when the transition from sails to steam was making rapid progress, one cannot but marvel at the ease with which these seamen adapted themselves to the change of conditions, a change which in course of time has produced quite a different type of man—or, it may be said, two types, for officers of the mercantile marine recognise that this is so—those of the "liners" and of the "tramps." *The Nautical Magazine* opened its columns to a discussion of the subject, but neither type is as was he of the sailer.

During the *Aberdeen's* 25 years' service under the White Star flag she had various commanders in addition to those mentioned, among them being Captain A. T. Wills and Captain Robb; the former had left the service, and come into prominence ten years ago when the barque *Inverna* collided with the Newcastle tug-boat *Advance.* The latter sank, all hands with the exception of the mate, Mr. A. T. Wills, being lost. The mate, almost miraculously, drifted 40 miles, hanging on to a grating and was washed ashore after being 12 hours (all night) in the water.

Among Captain Wills' eventful experiences one recalls his homeward voyage (Sydney to London) in command of the Aberdeen ship *Strathdon,* in 1892, when the ship, for two days, was surrounded with icebergs, some of them 1000 feet high.

To navigate her in the circumstances required considerable skill and nerve, and so masterful was Captain Wills' handling of the situation that the crew, when being paid off in London, presented him with an address—among seamen a distinctly unique way of showing their appreciation of "the old man."

But steamers, like other things, have their day, which in the case of the *Aberdeen* expired in 1906, when she was sold to the Turkish Government, together with a second vessel from the same owners—the two realising approximately £32,000.

Three years after the launch of the *Aberdeen,* the second steamer made her appearance; she was of the same build, and had the *Aberdeen's* clipper ship aspect; in fact, the first seven steamers of the fleet bore a strong family likeness, and it was only when the eighth, a purchased ship, was brought into the service that a departure from the old time type was made.

This was the *Australasian,* 3662 tons, and the command was given to Captain Simpson, who made fourteen voyages in her, and who had been master of the sailing ship *Samuel Plimsoll.*

When the *Australasian* made her first appearance in Port Jackson, the Press comment was:—

> All the qualities for which the sailing clippers of Messrs. George Thompson & Son are noted have been embodied in her construction. The graceful lines which render the hulls of those ships so pleasing to the eye have, if anything, been improved upon.

On this voyage she arrived, with 640 immigrants, on August 21, 1884—44 days from Plymouth.

On her second voyage, she arrived in time to take part in the result of Mr. Dalley's offer of troops to the British Government for service in the Soudan, which being accepted caused the *Australasian* and the Orient Company's *Iberia,* to be taken up to transport the troops to Suakin, in the Red Sea. Five hundred infantry and two batteries of field artillery, with 10 guns and 224 horses, were embarked on the two troopships on March 3, 1885.

Captain Simpson remained in the *Australasian* until 1891, when he went to Aberdeen to superintend the building of a steamer which he was to command.

He was succeeded in the command by Captain T. F. Spalding, who had charge of her for some years.

In 1906 she was sold, with the *Aberdeen*, to the Turkish Government.

tain Schleman, who died in England in March, 1915.

The *Damascus*, after 23 year's service, was sold to foreign buyers, the price being about £6,800.

In 1891, when Captain Simpson left the *Australasian*, he went to Aberdeen to superintend the building—in the yard of Hall, Russell & Co.—of a new steamer, the *Thermopylæ*, a steel screw barquentine of

An Early Aberdeen Liner.

The *Iberia* (Aberdeen Line), with the *Australasian* (Orient Line), at Circular Quay, Sydney, embarking N.S.W. Contingent for the Soudan, March, 1885.

When George Thompson's built their two earliest steamers they named the first *Aberdeen*, from the city of their origin, and the second from that part of the world they were built to trade with; after which they systematically and consistently named each new steamer, as it made its entry into its element, after a place or person associated with ancient Greek history, reviving in their third vessel the name of a noted little clipper, *Damascus*, which had preceded her namesake by some thirty years.

This new *Damascus* was one of the early steel vessels, built by Robert Napier & Sons on the Clyde in 1887, and arrived in Sydney on her first voyage under command of Captain A. H. H. Douglas (this being his first voyage as captain), in March, 1885, and having as chief officer Mr. A. T. Willis.

During her career for a time Captain McKilliam had command as also had Cap-

3711 tons, which was launched at the end of 1891. In her was revived the name of the celebrated tea clipper, which at the time was a training ship, under her own name, for the Portuguese Navy at Lisbon. In her Captain Simpson made fifteen voyages and, in 1899, handed her over to Captain William Philip, Jnr., whilst he watched the *Moravian* being built before taking command.

Captain Philip, Jnr., was a son of Captain William Philip who was in command of the sailing ship *Harlaw*, of the Aberdeen line, until 1878, when he stopped ashore for a holiday; fortunately for himself, for she was lost in the China Sea with all hands, and it is usually said that he was lost with her. For some years he commanded the sailing ship *Pericles*, which is still to the fore, with Norwegian colours flying.

Captain Philip, Jnr., arrived with the

Thermopylæ in July, 1899, and sailed again on the return trip in August, leaving Melbourne on the 16th; was reported at Natal on September 8, and on the 11th the *Thermopylæ* was a total loss on Green Point, four miles from Cape Town. This Point is a low, rocky neck of land at the entrance to Table Bay. Fortunately no lives were lost, and the gold aboard, worth £50,000, was saved. The cargo, valued at nearly £100,000, and the ship, which represented £60,000, were, however, total losses.

Aberdeen got no more of George Thompson's steamers to build, and the next one was again from the yard of Robert Napier & Sons, who, in 1894, turned out the *Nineveh* (3808 tons), which made her first trip under command of Captain N. Allen, whose experience was gained in some of the firm's best sailing ships, the *Ethiopian, Patriarch, Thermopylæ,* and *Aristides,* his first command being in 1878. It was the *Nineveh* that took a squadron of New South Wales Lancers to England, leaving Sydney on March 3, 1899, and was bringing them back. On arrival at the Cape of Good Hope it was found that the Boer War had commenced; the Lancers were accordingly landed, thus being the first colonial troops to enter the War.

The even tenor of the *Nineveh's* voyages was on one occasion disturbed by her running ashore near Cronulla during a heavy fog which obscured the coast, and the captain was rather astonished when he found his ship on the sand. Had it been rock she would never have reached Sydney.

On April 25, 1907, this steamer arrived in Sydney Harbour, but her name had been changed to *Aldenham,* and she was flying the flag of the Eastern and Australian Steamship Company. She had been sold in England to the direction of the E. and A.S.S. Co. to replace the *Australian* which had been wrecked in November, 1906, near Port Darwin, and had been named after Lord Aldenham, whose eldest son, the Hon. Alban Gibb, was chairman of the directors. With this transaction Captain Robb retained the command until he handed her over to Messrs. Gibbs, Bright & Company, the Sydney agents for the E. and A.S.S. Co.

Like the *Thermopylæ* the *Nineveh* was a revived name; the original became a timber carrier and in that capacity was abandoned in the Pacific.

Following up the plan that had been adopted of naming the steamships after the old clipper sailing ships, the next vessel was called *Moravian.* The old sailer of that name passed to Sydney owners and was broken up after doing duty as a hulk.

The s.s. *Moravian* was of 4573 tons—the largest the house flag flew over up to this time. Like the former steamers, she was built under the superintendence of Captain Simpson, who took command when she was finished. He was now the commodore of the service, and held command of the *Moravian* for many years, making in all 22 voyages in her. After Captain Simpson left the *Moravian* she was selected by the management as one of the vessels to carry one class of passengers only. The previous system was for saloon and third class, the new arrangement was for the latter, who by it have the run of the ship, instead of being cooped up as they were in the old style. This method has been found to answer well, and is followed by most large shipping companies, as it encourages numbers of people to travel who could not afford to do so if the first saloon fares ruled, and it entirely does away with class distinction. Captain Robb succeeded Captain Simpson in 1908, and Captain W. J. Burge took his place in 1910.

(To be Continued.)

AN INTERVIEW WITH FLIGHT-LIEUTENANT PICKLES

(A.F.R.Ae.S., R.N.A.S.)

Flight-Lieutenant Sydney Pickles, A.F.R.Ae.S. who, to readers of this journal, requires no introduction and who, as widely reported in the Press, recently returned to Sydney, has lost no time in familiarising himself with Australian flying conditions, his first cross-country flight being made on Saturday, September 20, in company with the New South Wales Premier, Hon. W. A. Holman.

It was the writer's privilege to meet Mr. Pickles at lunch on the following Monday and, while the meeting cannot be described as an official interview, we believe that the following views on certain phases of aviation will be read with interest.

The conversation having turned on the subject of the proposed flight from England to Australia, Mr. Pickles was invited to express an opinion as to its practicability.

Said he: "I think that it is well within the range of accomplishment, but of a highly experimental nature and entailing a considerable amount of risk.

"As to whether a regular service between England and Australia is warranted or not, this, to my mind, can only be definitely decided after the first actual flight, because, until that is accomplished no really reliable data and information will be available. In other words, until the entire route has been flown, it will be

Flight-Lieutenant Pickles' First Cross-Country Flight.
Refilling the Petrol Tanks.

quite impossible for anyone to state whether such a service can be maintained.

"I certainly think that, once a proper chain of landing grounds is established, the organising of an aerial service between England and Australia should be a comparatively simple matter."

Speaking of the transatlantic flight, Mr. Pickles expressed considerable enthusiasm concerning the value of directive wireless for aircraft.

"I think," said he, "that all passenger-carrying aeroplanes travelling any distance over the sea and out of sight of land, should be compelled by law to carry a wireless installation in order that stations may know the exact whereabouts of the machine during the entire flight.

"While not in any way wishing to depreciate a magnificent example of British audacity, it seems to me that as the transatlantic flight by the American seaplane *N.C.4* was a more useful pioneer flight than Alcock's. It was a sound proposition, conducted on a properly organised plan, and constant wireless communication was maintained during the entire flight.

"Some people are apt to sneer at the American Government for having taken elaborate precautions to ensure, as far as possible, the safety of their airmen in the pioneer flight across the Atlantic, but to my mind their action, far from being derided, is highly commendable."

On his first cross-country flight in Australia, Mr. Pickles left Richmond at 1.15 p.m. on Saturday, September 20, and flew to Victoria Park, landing on the racecourse at 1.50 p.m. and carrying two passengers, one of whom weighed 15 stone and the other 12 stone. This is the first occasion on which three persons have made a cross-country flight together in Australia.

The machine, originally an *Avro*, has been very considerably reconstructed to Mr. Pickles' own design and is fitted with a 120 h.p. new type *Anzani* stationary engine.

Describing his flight, Mr. Pickles said: "At Victoria Park Racecourse, I took aboard the New South Wales Premier (Hon. W. A. Holman) and gave him a flight over Sydney. Our route from Victoria Park lay over Centennial Park, South Head Lighthouse and across to North Head. At Manly we turned over Ocean Beach, following the Corso to the Pier, then cut straight across the Spit, Mosman, North Sydney, Darling Harbour and turned back towards Circular Quay, passing over the G.P.O. and Hyde Park and landing on the Polo Ground in the centre of Centennial Park about 3.15 p.m. We maintained an altitude of about 2,000 feet and, travelling at approximately 75 m.p.h., the entire journey occupied 35 minutes."

The Premier, on returning to *terra firma*, remarked that he enjoyed his flight immensely and felt entirely confident in the hands of his pilot.

"The visibility while over Sydney was excellent, and although several returned pilots had told me that there was a marked difference in the lifting effect of the air, I have found no noticeable difference from that of flying in England on a summer's day. Personally, I have found the flying conditions in Australia excellent in every sense of the word."

Discussing the future of commercial aviation, Mr. Pickles said, "I believe that Australia has far greater possibilities for the development of aviation than any other country in the world, particularly on long and short-distance flights between towns which are otherwise not easily accessible. Our unrivalled climatic conditions form one of the strongest recommendations in favour of commercial aviation.

"My cross-country flight on Saturday quite convinced me that it is absolutely necessary that all machines be especially designed and constructed to meet Australian requirements.

"During my trip from England in the *Orsova*, I evolved the design of an aeroplane which I think to be the most suitable for general use here and, with the experience since obtained in Sydney, I shall incorporate one or two minor improvements which will render the machine still more suitable for the purpose for which it is designed.

"During the past seven years, I have flown thirty-four different types of aeroplanes, including British, French, American, German, Italian and Roumanian.

This experience has assisted me very materially in evolving a machine of my own design, and I hope to be in a position very shortly to assist aerial transport companies and private owners by supplying them with machines most suited to their particular requirements.

"I am perfectly confident that it is easily practicable to manufacture aeroplanes, seaplanes and flying boats, entirely in Australia; although, of course, for the immediate future, it will be necessary to import the engines and certain small parts.

"Regarding the tariff as affecting aircraft, I am firmly of opinion that the importation of the wooden parts of the structure of aeroplanes should be very heavily taxed, if not entirely prohibited; the woodwork should be entirely carried out in Australia, and thus provide employment for Australians.

"As regards the metal fittings and engines, I still hold the view that the imposition of a moderate duty would encourage their manufacture in Australia in the near future.

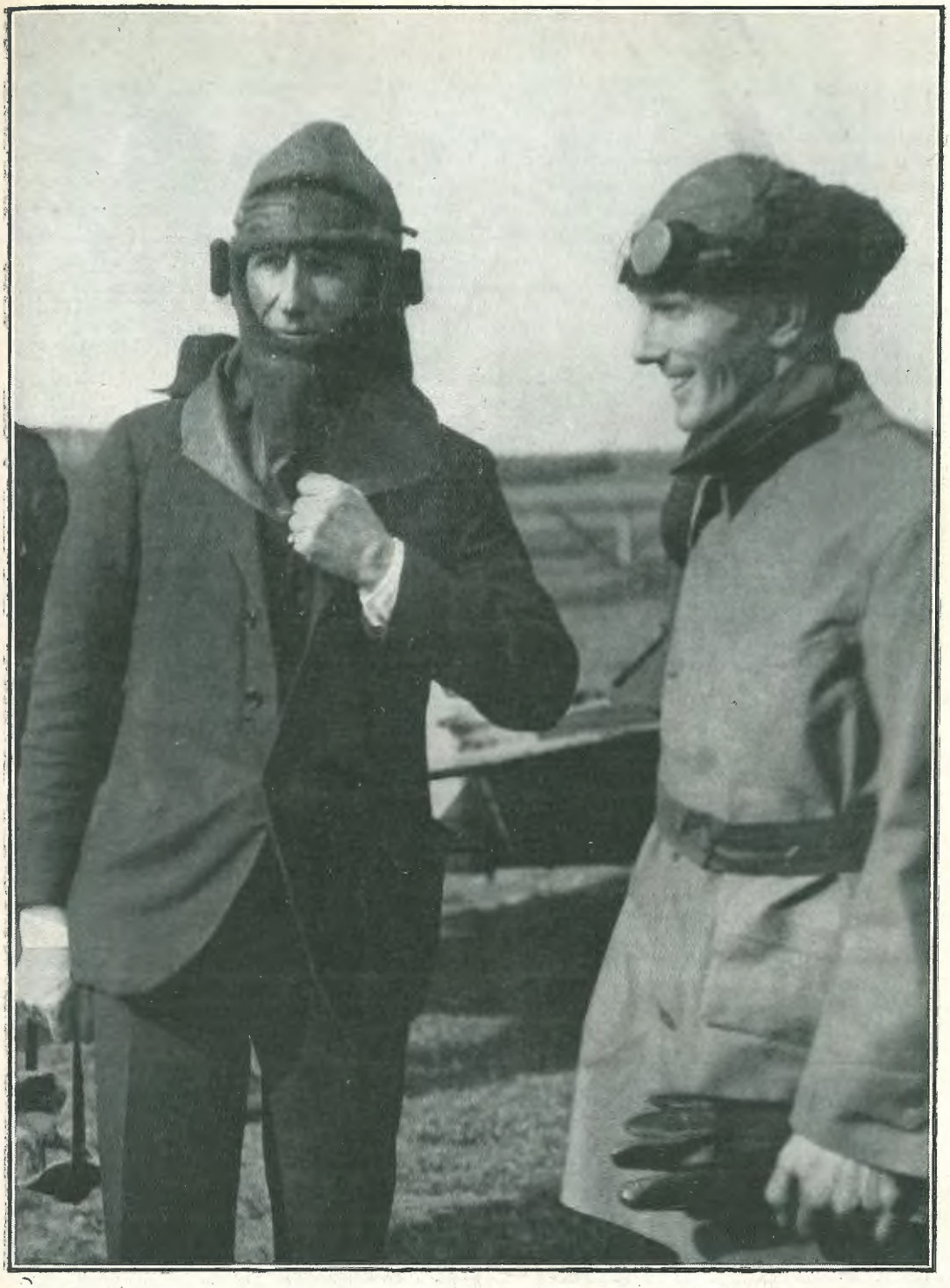
"In the case of aero engines imported in parts for assembly in Australia, I think that these should carry an even more moderate duty as their importation would provide employment for Australian labour.

"If protection in some form is not given to aeroplanes and component parts of machines and engines, the complete

Two Views of the Crowd at Centennial Park.

Going Up!

The Premier of New South Wales (Hon. W. A. Holman), in flying kit, about to soar skyward as a passenger of Flight-Lieutenant Sydney Pickles.



Back on Terra Firma.

Mr. Holman and Flight-Lieutenant Pickles land at Centennial Park, Sydney, September 20, 1919. "Delightful! I enjoyed my trip immensely."

development of the manufacture of aircraft within Australia would probably never take place.

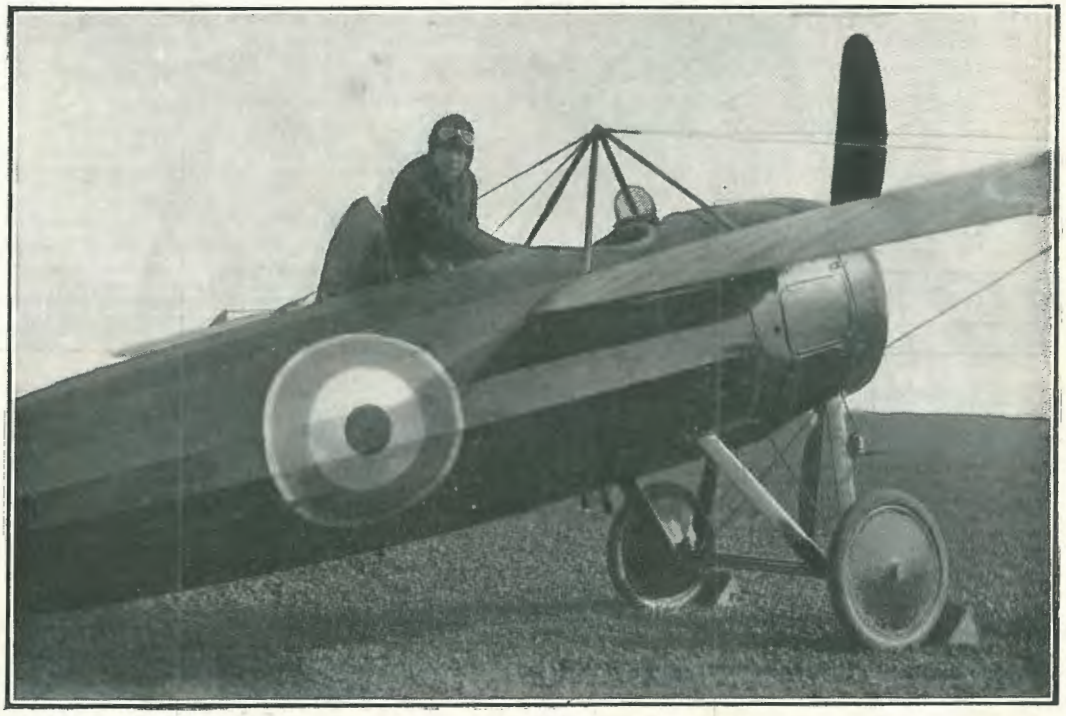
"Henceforth every nation must protect itself in the air, and in time of war none can afford to rely on overseas shipping. The Australian aircraft manufacturer must be assured of adequate tariff protection; we must recognise the importance of fostering an industry so vital to the defence of the Commonwealth.

"We must profit by the lesson of the late war, remembering that in all future wars Allied ships will be requisitioned for the transport of troops, and that the facilities for importing aircraft from overseas will practically disappear.

"In considering the question of imported aircraft it should be remembered also that their bulky nature is in itself a very strong reason why one could not expect big shipments from Europe or America in time of war.

"Judging by the rate of progress in Australia since I left in 1912, I see no reason why the entire aeroplane, including engines, should not be manufactured in Australia in the very near future."

Flight-Lieutenant Sydney Pickles is an Associate of the Royal Aeronautical Society of Great Britain, and holds both the ordinary certificate (No. 263) and superior certificate (No. 8) granted by the Royal Aero Club of the United Kingdom. He also holds the Air Ministry License (No. 9).



CIVIL AVIATION IN SOUTH AUSTRALIA.

Captain H. G. Butler, A.F.C., R.A.F., and the Bristol Monoplane in which he recently flew from Adelaide to his home in Minlaton, on the Yorke Peninsula. Particulars of the flight and a description of the machine were published in the September issue of *Sea, Land and Air.*

CIVIL AVIATION IN WESTERN AUSTRALIA

MAJOR BREARLEY'S PERTH-MOORA FLIGHT

By H. V. NORTON

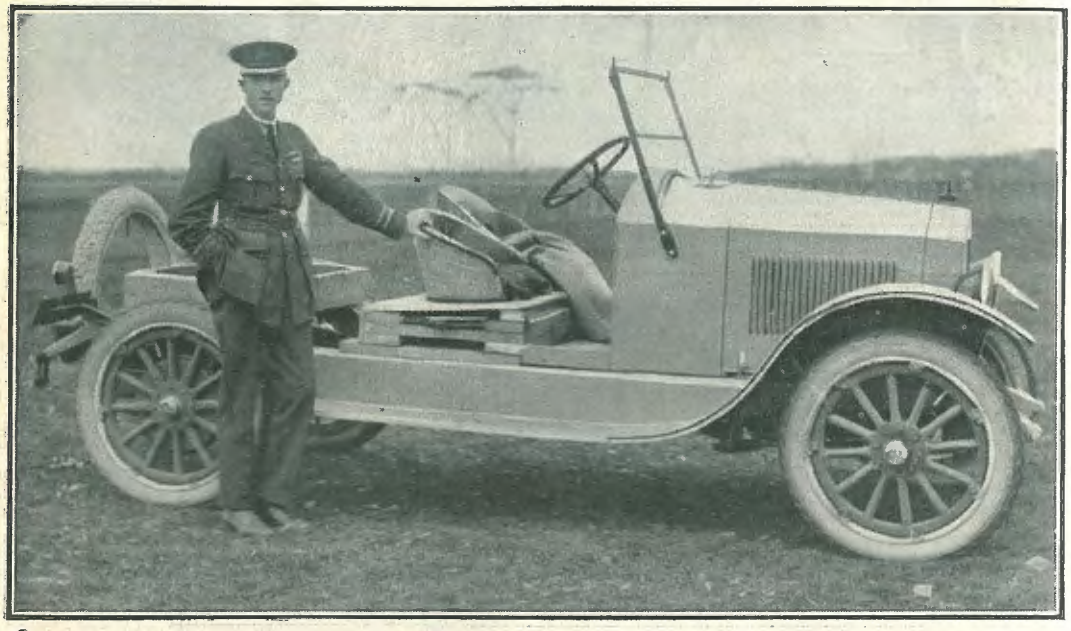
Major Norman Brearley's ten-minute "flips" at £5 a head continue to prove a strong local attraction. His oldest male passenger is Mr. G. P. Paterson, a septuagenarian resident of Pingarra, and the oldest lady, Mrs. H. Seeligson, of Perth, now in her sixties.

The cross-country season opened on September 1, when Major Brearley left Perth on a flight to Moora. The start was made at 10.10 a.m. in rainy and squally weather; the overhanging clouds kept him dangerously low to avoid missing his landmarks.

He covered the first 25 miles in 18 minutes and landed his passenger, Mr. Wilson, at Bullsbrook. From this point the railway line was followed to Muchea and thence to Mooliabeenee. Here he overtook the morning train which had left Perth 3½ hours ahead of him. Mogumber was passed at 11.53 a.m., and less than half an hour later a good landing was made on Mr. J. Robert's estate at Moora. The actual flying time on the 108 miles from Perth was 91 minutes—a halt of 39 minutes having been made at Bullsbrook.

Major Brearley carried from Perth a special edition of the *West Australian*, which were eagerly snapped up. The morning train with the ordinary edition arrived at Moora 1½ hours later, despite its 3½ hours' start.

Four days were spent at Moora and during that period 43 residents were taken joy-riding, some making three and even four flights. On the return flight to Perth, the passenger seat was booked by Mr. Botterill.



Major Norman Brearley, D.S.O., M.C., A.F.C. (late R.A.F.), with his "Essex" car, the body of which is of Westralian manufacture.

At a dance held in honour of the first aerial visitor, Major Brearley addressed the residents of Moora on the many advantages which aviation would bring to Western Australia.

The return journey was made at altitudes ranging from 3,000 to 6,200 feet. Leaving Moora at 11 a.m. on September 5, Mogumber was passed at 11.25 and Gingin at 11.40. At 12.20 Major Brearley was above North Perth, shutting off his engine exactly 80 minutes after leaving Moora, the journey having been covered on an average speed of 81 m.p.h.

At 2,000 feet above Perth Major Brearley distributed a number of copies of the *Moora Herald*—the first country paper in Australia to be carried by aeroplane into the State Capital.

Major Brearley hopes to fly his *Avro* to Geraldton—300 miles north of Perth—at an early date.

At the Perth Oval on September 6, a successful exhibition was given to an audience of some 3,500 West Australians. On this occasion the passenger-seat was occupied by Miss Marjorie Armstrong, the daughter of Perth's leading motorist. Stunts included the "falling leaf," starting at 3,400 feet, four continuous loops, two tail-slides, a couple of rolls, concluding with a spinning nose-dive.

Interviewed on behalf of *Sea, Land and Air* Miss Armstrong, the first lady in Western Australia to participate in aerobatics, described her flight in the following words:

"I have always had a great wish to fly, but when dad came home and told me he had actually arranged for a flight for me, it seemed too good to be true.

"Before we went up, Major Brearley described all the stunts we were to do and told me that he was going to use telephonettes to find out how I felt from time to time.

"I didn't realise we had left the ground, till we did the climbing turn, then we steadily mounted till the houses looked very small. The Major pointed out Perth Oval over which we were to fly and also several other places of interest, including Fremantle, Cottesloe and Rottnest Island.

"It was fairly cold, but not unpleasantly so, and I was surprised to find how steady the motion was

"Before I had any warning we were actually looping the loop. I felt nothing unpleasant, excepting the weight on my head when we were upside-down. I cannot describe the other stunts, they happened so quickly that they were just a series of sensations.

"The only thing I did not like was the sudden dive after the "falling leaf." It was then that Major Brearley asked me how I felt. Only one word was needed, and that was 'rotten'!

"Soon after that, we stalled down; then near the ground he straightened out and before I knew it we had landed. The landing was most gentle and I was really sorry it was all over.

"After the cold rush of air above, the heat and smell of the castor oil made me feel very "off colour" for a few minutes, but I soon lost that and was able to enjoy things. It was the most wonderful experience I have ever had and I wouldn't have missed it for worlds."

Miss Marjorie Armstrong (in fur coat) after her flight with Major Brearley.

THE AUSTRALIAN AERO CLUB

SOUTH AUSTRALIAN SECTION FORMED.

A meeting held in Adelaide on September 4, for the purpose of forming a South Australian Section of The Australian Aero Club, was largely attended by returned members of the A.F.C., R.A.F. and R.N.A.S.

Mr. Dudley T. Angas (R.N.A.S.), presided.

The Honorary Organising Secretary, Mr. R. O. C. Matthews (A.F.C.) outlined the work already done by the Victorian and New South Wales Sections, and explained that the new Section would foster and develop civil aviation in South Australia and arrange flying competitions and exhibitions. These objects had been approved by the Honorary General Secretary in Melbourne, Mr. Hector Sleeman.

Provisional office bearers were elected as under:—

Chairman: Mr. Dudley T. Angas.

Honorary Secretary: Mr. R. O. C. Matthews.

Committee: Messrs. D. F. Day, C. Exton, J. Gordon, H. W. Pope, and L. N. Ward, all late A.F.C.

The following resolutions were carried:

(1) That a South Australian Section of The Australian Aero Club be formed.

(2) That the Constitution (as read) be adopted by this Section and that the Honorary Secretary be instructed to convey this resolution to the General Secretary, with a request for further information as to the authority of State Sections in the control of aerial exhibitions (referred to in Draft Rules, para. 53).

(3) That the official journal of this Section be *Sea, Land and Air.*

(4) That an account be opened at the Commonwealth Bank, in the name of The Australian Aero Club, South Australian Section, this account to be operated jointly by the Honorary Secretary and Chairman.

Lieutenant R. O. C. Matthews, A.F.C.
Honorary Organising Secretary South Australian Section of The Australian Aero Club.

QUEENSLAND SECTION.

For the purpose of forming a Queensland Section of The Australian Aero Club, a meeting convened by Lieutenant H. Bowden Fletcher, D.F.C., was held on September 26, in the offices of the *Live Stock Bulletin,* Brisbane.

The meeting was enthusiastically attended by officers of the A.F.C. and R.A.F., and an inaugural dinner will be held on November 5.

Queensland readers of this journal should communicate with the provisional chairman, Mr. J. J. Knight, or the provisional secretary, Captain H. E. Rydon, "Isanhale," Cotton Street, Sandgate, Q.

NEW SOUTH WALES SECTION.

A general meeting was held on September 15 in the Lecture Hall of the Royal Society of New South Wales, Mr. Frank Bignold presiding.

Mr. Reginald Lloyd, managing director of Aerial Services Limited, referred to the proposed flight from England to Australia and to the lack of suitable landing stations *en route.*

"I speak," said Mr. Lloyd, "purely in the commercial interests of flying. I am not an aviator, but I have lived in Singapore, I know the Malay Archipelago, and I have surveyed Australia from south to north.

"Unless a man is courting suicide, it would be impossible for him to land anywhere between Singapore and Australia.

"Around Singapore itself the best of a bad selection of sites is the racecourse, and this is no easy place for an airman to land on as it is surrounded by tall palms. The Malayan country positively bristles with rubber trees. At Timor nothing can be done until a considerable sum of money has been spent on it.

"From Darwin to Cloncurry an airman would have three classes of bad country to negotiate; none of it is suitable for a landing without preparation. In the extreme north the country is scrubby desert, riddled with high sandhills which would break an airman's wings; in the so-called "open" country one finds high grass and small rocks rising six or seven inches from the ground, and boulders weighing anything from a few pounds to seven or eight cwt. Other difficulties are found in the "gidgea" country which is a mass of small, spiky twigs, huge chasms and fissures into which a horse could disappear, and ashy ground so soft that the motor cycles which accompanied my recent expedition were often buried well above the axles; it sometimes took us from five to six hours to cover half a mile.

"I am confident," continued Mr. Lloyd, "that if the whole route is carefully prepared, it will be quite possible to fly in safety from England to Australia, but an airman must land occasionally and I am absolutely opposed to 'stunt' flying."

Mr. Edward Purnell suggested that a delegation, representing the New South Wales, Victorian and South Australian Sections, wait upon the Prime Minister with a request that the Government subsidise the flight.

Mr. Lloyd: "I am absolutely opposed to the Government having anything to do with flying." (*Hear, hear.*)

Captain G. F. Hughes, M.C., A.F.C.: "The obvious reply is that the Government cannot subsidise. Without proper preparation the thing resolves itself into a freak flight, involving a certain amount of dash and originality, but nothing more."

The following resolutions, after lengthy discussion, were finally carried by a large majority.

(1) That a sub-committee, consisting of Captain Geoffrey F. Hughes, M.C., A.F.C., 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.

(2) That in the opinion of the Australian Aero Club (New South Wales Section) it is inadvisable that the flight be attempted until such time as depôts and landing places, necessary for such flight, be provided; that the Club, as a representative body, is apprehensive of the many difficulties which present themselves and which, in its opinion, would militate against success; and that it views with alarm the injury which would be done to aviation by a failure to provide against all contingencies.

* * * *

A special general meeting of the New South Wales Section was held in the Royal Society's rooms on September 30, the chair being taken at 8 p.m. by Lieutenant-Colonel W. Oswald Watt, O.B.E.

Minutes of the previous meeting having been confirmed and adopted, Colonel Watt called upon Mr. E. T. Fisk, M.Inst.R.E., to deliver a long-promised lecture on the subject of Wireless Telegraphy and Telephony in their application to Aircraft.

At the conclusion of Mr. Fisk's address (which is printed on pp. 447-451), Colonel Watt, in proposing a very hearty vote of thanks, said: "We all appreciate the trouble Mr. Fisk has taken to give us a lecture on wireless as applied to aviation and it is a very great advantage to the Club and to aviation generally that prominent gentlemen in Mr. Fisk's position are taking such a keen interest in the subject. There can be no question that the success of aviation will depend in the future, as it has in the past, very largely on wireless, and its importance can never be underestimated."

Flight-Lieutenant Sydney Pickles, A.F.R.Ae.S., R.N.A.S., in response to Colonel Watt's cheery invitation to "Come along up here, Pickles, and tell us something about manufacturing aircraft in Australia!" said:—

"I did not expect to make a speech regarding aircraft manufacture. I have

prepared no notes and I had been hoping to hear Colonel Watt's views on legislation before speaking at all. I am interested in the proposal that imported aircraft should come in free and am strongly against any such suggestion. The importation of manufactured wooden parts should be very heavily taxed in order to help on the industry in Australia."

Captain Roy King, D.S.O., D.F.C.: "Where will you get your workmen?"

Flight-Lieutenant Pickles: "There is ample skilled labour in Australia—and enough plant here, too. The war is over and Australian mechanics who have been doing that class of work overseas are now back here. In England, I found that the Australian mechanic is a much better workman than those of other countries. He is not quite so servile, but he gives better work. I have employed American, French and Dutch mechanics and I prefer the Australian every time. (*Hear, hear.*)

"Aeroplanes can be quite easily manufactured in the Commonwealth and there is absolutely no need to import them. Manufacture could be commenced tomorrow. It may take considerable time before an aero engine can be *entirely* manufactured in Australia, but the fact remains, it can be done. The wood-work can be manufactured here and there is plenty of Australian timber eminently suitable for the purpose."

Captain King: "Have Australian timbers ever been practically tested?"

Flight-Lieutenant Pickles: "From information which I have obtained, it has been found quite suitable and I am quite satisfied that there is timber in Australia that can be used for aviation."

Captain King: "Has it ever been used?"

Flight-Lieutenant Pickles: "Yes, for the repair and maintenance of aeroplanes in Australia."

Captain King: "But only in parts of minor importance?"

Flight-Lieutenant Pickles: "Australian woods have been used for wing-spars, which —as anyone familiar with the structure of an aeroplane will agree—are extremely important."

Colonel Watt: "How about your engines; can you make them here?"

Flight-Lieutenant Pickles: "Undoubtedly."

Mr. E. J. Hart: "Without infringing patent rights?"

Flight-Lieutenant Pickles: "There is no patent of the aeroplane engine, but various people hold patents on *details* of different engines—in fact I hold one or two myself—but the standard engine, as a complete unit, is not patentable. For some reason which is not at all clear to me, there are many people who maintain that Australia is not in a position to manufacture aeroplanes and aero engines."

Captain King: "How long do you think it will be before you can manufacture aeroplanes in Australia?"

Flight-Lieutenant Pickles: "I prefer not to answer that question; I have lots of ideas in my mind at the present moment and I do not intend to show my hand in this matter."

Captain King: "In your opinion, can aeroplanes be manufactured locally in sufficient quantities to supply the needs of Australia?"

Flight-Lieutenant Pickles: "In a very short while we shall not only be manufacturing aeroplanes to supply our own needs, but also for export."

Captain King: "Will they be of Australian design, or a copy of English designs?"

Flight-Lieutenant Pickles: "It will not be necessary to copy English designs. Australians have very materially helped in the manufacture of aeroplanes in England, and I do not see why they cannot do the same here in their own country. As regards duty, I consider that the woodwork and engines should be heavily taxed. They can be made here, and the sooner the better, not only for commercial aviation in Australia, but also for national defence."

Lieutenant-Colonel Watt, having been invited to state his views on air traffic regulations, said:—

"Our Secretary has rather alarmed me with the request that I should deliver an address. I come of Scotch parentage and my forebears were all church elders. They taught me to believe that an address should always be based upon a text. If I am to deliver an address, I must have a text of some sort, so I shall take my text this evening from a sentence in Mr. Fisk's interesting lecture. Mr. Fisk said: *You are in the happy position of having no legislation at present.*

"As an introductory, I will ask Mr. Hart to read the following correspondence between the general secretary of The Australian Aero Club and the Prime Minister's Department on the subject of Air Traffic Regulations:—

The Secretary,
Prime Minister's Department,
Treasury Buildings,
Melbourne.

Dear Sir,—In the expert opinion of the Committee of The Australian Aero Club it is considered advisable that the Commonwealth Government should immediately take steps for the control of such civilian aviation as is taking place in the Commonwealth at the present time, otherwise, it is the opinion of the Committee that if aviation is allowed to be carried on in its present unrestricted form, fatalities are unavoidable, and commercial aviation within the Commonwealth will be seriously handicapped by such fatalities.

It is submitted by the Committee that the Air Navigation Regulations, published in a supplement to the *London Gazette,* on April 30, should be immediately put into operation, particularly Schedule 1 (dealing with registration of aircraft), Schedule 2 (Licensing of personnel) and Schedule 3 (Certificate of airworthiness of passenger aircraft, and periodical overhaul and examination of such aircraft).

For your information I am enclosing a copy of the complete regulations.

The Australian Aero Club has a Section in New South Wales and Victoria, and Sections in process of formation in Western Australia and South Australia, also Tasmania. Each of these Sections is controlled by a Committee of seven, four members of the Committee being qualified pilots, and the Club will place all its resources at the disposal of the Government to assist in the carrying out of these regulations.

Should there be any assistance or information the Government requires, we shall be only too pleased to supply it.

Trusting you will give this matter your immediate attention.

Yours faithfully,
HECTOR SLEEMAN,
Hon. General Secretary.

July 22, 1919.

Commonwealth of Australia,
Prime Minister's Department,
Melbourne, August 7, 1919.

To The Hon. Secretary,
Australian Aero Club,
Melbourne.

Dear Sir,—With reference to your letter of the 22nd July last, relative to the control of civilian aviation, I desire to inform you that the Commonwealth Government has, at present, no power to control passenger or commercial aviation within any State of the Commonwealth.

The representations of your Committee should, therefore, be addressed to the Governments of the States concerned by the branches of the Club, in those States.

Yours faithfully,
M. L. SHEPHERD,
Secretary.

"I have not looked up the details of this matter," resumed the speaker, "but am pretty sure about my main facts. The first aero club in the world was the French Aero Club; another was the Royal Aero Club of the United Kingdom. We have not got legislation yet and thank God for it. There are a lot of people in politics who know nothing about aviation and if the control is left to politicians we should probably get something which would tie our hands completely. If, on the other hand, we exercise our full rights, we have —by virtue of our affiliation with the *F.A.I.—the control of the whole world.

"The International Aeronautical Federation took control of aviation, and the aero clubs issued certificates to aviators. If a pilot did not hold a certificate he was not allowed to carry on; without that certificate he could not take part in any race or sporting event.

"It was aviation pure and simple, not politics. (*Hear, hear.*)

"If he did not obey the rules his certificate was suspended and he was not allowed to fly anywhere. Let me quote an example of the power of the Royal Aero Club.

"In 1911, Graham Gilmour (an entrant for The Circuit of Britain) was flying over the Henley Regatta course a week before the race, and touched the water with the wheels of his machine, a Bristol Box Kite. This act of flying low, in contravention of

* *Fédération Aéronautique Internationale.*

the rules of the Royal Aero Club of the United Kingdom, resulted in Gilmour's immediate disqualification from The Circuit of Britain.

"Another instance occurred during the following year. A French airman, Brindejonc de Moulainais, while on his way to participate in a big race, flew over London at a low altitude. He was immediately disqualified by the Royal Aero Club and prevented from competing in this race.

"The Australian Aero Club is affiliated with the Royal Aero Club and if we take control in New South Wales, we can completely overcome the present deadlock. General Legge is entirely in sympathy with anything that will help to control aviation. The whole trouble is that when the original Federal Constitution was framed, no mention was made about handing over the air to the Commonwealth.

"As an aero club we can control the air. If we inspect an aeroplane and find that it is not safe, we can advertise the fact; if we let the public know that it is unsafe we can prevent the commercial pilot from getting any passengers. For every crash, commercial aviation in Australia will probably go back fifty years. With Government co-operation, our committee, or some official of the Club, would inspect any aerodrome that is started, and it would be the duty of the Club to see that that aerodrome was in perfect order. The Government must work through the Aero Club, and with one or two politicians to co-operate with us, we ought to get along very satisfactorily. I would ask representatives of the Press to particularly note that I used the word "co-operate," not "control." (*Laughter.*)

"During the last few weeks certain people have been giving exhibitions over the city. It is only a matter of time when there will be a crash, and when that happens, it will put aviation back many years in this country. (*Hear, hear.*)

"Under the F.A.I. rules, flying is absolutely prohibited over cities except at a reasonable height. We must not have crashes here. If we take up the line that the Aero Club—and not the Government—is the body that controls the air, we can control these people who fly over cities; we can prevent them from flying to the public danger, and so avoid crashes. If they attempt to ignore our authority, we can take good care that they are not allowed to fly in Australia—or any other part of the world for that matter—and I certainly think that we are the body which should enforce the rules. We have only to make a start." (*Prolonged applause.*)

The views of members having been invited—

Captain G. F. Hughes, M.C., A.F.C., said: "I entirely agree with the remarks of Colonel Watt. If we allow aviation to get into the hands of politicians the result would probably be rather awful. The only difficulty is that of finance. At the present time our club is not financially strong enough."

Captain Roy King: "I quite agree with Colonel Watt, but I cannot see how we can control the air. In the first place, as Captain Hughes reminds us, this Club has not enough finance; secondly, we should require to employ trained men to examine aircraft and to pay them large salaries for their services. I cannot see, either, how we can get authority to go out and control."

Colonel Watt: "I quite see the difficulty as regards finance."

Captain King: "I certainly think that we must have a Commonwealth Act, because, with present conditions, any pilot can fly over any town in Australia. He can fly any old bus and there is nothing to stop him. There are several aeroplanes flying over the cities now that are absolutely not airworthy, and in a very short time we are going to have trouble with them. I understand that a conference of the State Premiers was held last week in Melbourne. Whether the Air Navigation Act and the necessity for Commonwealth control of aviation were discussed or not I do not know; the conference was secret."

Mr. Hart: "Would your own * Company co-operate with the Aero Club in allowing its machines to be inspected by the Club's officials?"

Captain King: "Certainly."

Colonel Watt: "A first-class company would only be too glad to do so."

Captain King: "We want our aeroplanes inspected and we want our aerodromes inspected. We solicit inspection by skilled men at all times."

* The Larkin-Sopwith Aviation Company of Australasia, Limited.

Colonel Watt: "If all the aerial transport companies would co-operate, that would help quite a lot."

Captain King: "The Club must appoint inspectors who thoroughly know their job."

Colonel Watt: "We brought back quite a few in the *Kaisar-i-Hind* who are quite competent to do this work and who would be very glad of the opportunity."

Captain King: "Personally, we are continuously agitating for an Air Navigation Act. There is absolutely nothing done and I understand that the whole trouble is that one of the State Premiers will not assent to the proposed Federal control of civil aviation."

Mr. Hart: "Which is the State in question?"

Captain King: "I was informed in Melbourne that it is our own State, New South Wales. Commercial aviation is not going to benefit anybody in Australia until it is controlled by a body of experts acting under Commonwealth auspices. Take the case of a pilot leaving Melbourne and flying in any direction for, say five hours; he *must* cross one or other of the border lines and in so doing he automatically comes under different rules—so long as we have State Government. To know all the rules for each State that man would have to be a solicitor-pilot. For instance, on a flight from Queensland to Tasmania, he must necessarily be familiar with at least three distinct sets of air regulations."

Lieutenant-Colonel P. W. Woods, D.S.O., M.C. (Managing Director of Aerial Company Ltd.): "I can only endorse the remarks made by Colonel Watt and Captain King. I think any Company would agree to have its machines inspected by experts; that would ensure safety. The Government should consent to the proposed administration because they would have the right people in the right place. There is no doubt that a lot of machines which have been flying about lately have been unsafe and that their accidents have been camouflaged."

Mr. Fisk: "It appears to me that there should be no difficulty in the Commonwealth passing an Act. They passed the Wireless Telegraphy Act and they passed the Merchant Shipping Act. There seems no reason why they should not pass an Act for aviation. The Act is absolutely necessary for the control of aviation, but we require to know the position of the Club in connection with the Act. The Aero Clubs represent the recognised aeronautical experts of this country and I think that they could offer definite advice which the Government will be very glad to receive. If you barrack for it strongly enough you are almost certain to obtain control; you could then arrange for your Club's inspectors. As the position stands to-day, I do not think you will have sufficient power, but with the Act and the appointment of your own inspectors under that Act, you will have the power. Similarly you would avoid having the Government controlling the air in an undesirable manner."

Flight-Lieutenant Pickles: "I certainly agree with Captain King that we must have central control; it is ridiculous for each State to control different rules."

Colonel Watt: "Each of the six States must pass an Act which will have the control of aviation. It must be controlled Federally. New aviation companies are springing into existence and at least two shipments of machines are now on the water. How many companies will be registered in New South Wales alone in the next twelve months?"

Captain King: "About eight."

Colonel Watt: "How many aerodromes?"

Captain King: "From eight to twelve."

Colonel Watt: "Don't you think that we could find members who would undertake to inspect the aerodromes and machines and so start something to improve matters? They would give their official opinion to the Club as to whether the aerodromes are satisfactory and the aeroplanes airworthy."

Captain King: "We need real live men at the head of the Clubs in each State. (*Hear, hear.*)

Flight-Lieutenant Pickles: "On that point a very undesirable position may arise from the formation of a committee in any way commercially interested in aircraft. If powers of legal control over the industry were given to those commercially interested, it might easily happen that a manufacturer, like myself for instance, could have a new type of machine condemned through the influence of interested persons."

Colonel Watt: "By the time that that comes into force we shall probably have a Federal Act passed. I think we ought to form a sub-committee to go into the matter."

Mr. Hart: "I have prepared a list of names of about twenty-four members who have held commissions in the A.F.C. and R.A.F., and who are in no way interested in aviation from a commercial standpoint. We should have not the slightest difficulty in appointing a highly technical committee for the purpose of inspecting machines."

Mr. S. H. Deamer: "I think that we should ask the members (whose names we have just heard) if they are willing to act in the manner suggested, and then ask the Club that a committee be formed to state what is the correct procedure for their appointment as inspectors."

Colonel Watt: I think we could, without the slightest difficulty, form a sub-committee from the Club, and then ask the Commonwealth and State Governments for recognition. The State Government can prevent an airman from leaving the aerodrome at Richmond or from carrying his machine on the State railways. We could let the State Government know that we consider a man is not a good enough pilot to carry passengers and we could then put a spoke in his wheel if he attempted to do so."

Mr. Deamer: "If we advertise a machine as not being airworthy we are liable to damages if, by so doing, we cause that man to be stopped."

Captain King: "We would require a central committee governing the whole of Australia. In the event of us controlling New South Wales, who is going to give us permission?"

Colonel Watt: "Refer Mr. Holman to the International Aeronautical Federation."

Mr. Deamer: "There is nothing to stop a man from flying a machine; if you attempt to prevent him you risk a libel action. We may say that before a machine can be flown it must have satisfied our inspectors, but if a man refuses to permit inspection, we cannot compel him to do so. We should have a sub-committee formed to consider the whole of the difficulties and then make direct representations to the Commonwealth Government. We are all agreed that we want Commonwealth and not State control. We consider that the Club is the best to administer aeronautical legislation. With regard to passing an aerodrome, we can inform the Government that an application has been lodged by a business concern for the registration of an aerodrome and if, after inspection, our sub-committee approve of it the matter can go on. We cannot say, though, that we consider such and such a person is not competent to fly his machine, because if we do, we will have damages to face. We must have legislation."

Colonel Watt: "What I want to know is whether your Company, Captain King, would advertise that a machine is airworthy and that we had passed it. If a company publicly advertises that the Aero Club has approved of its machines, the public would then be satisfied that the machines are safe. We must convince the Government that the Aero Club is in earnest."

Flight-Lieutenant Pickles: "I certainly think that the Club should be consulted."

The following resolutions, moved by Mr. S. H. Deamer and seconded by Captain Roy King, were carried by a large majority:—

(1) That the committee of the Australian Aero Club (N.S.W. Section) nominate a sub-committee to consider the best methods of controlling civil aviation in Australia.

(2) That the names of this sub-committee be submitted to a general meeting of the Australian Aero Club.

(3) That the sub-committee shall make its report to the Club.

Proposed by Mr. E. J. Hart, seconded by Flight-Lieutenant Sydney Pickles, and carried unanimously:—

"That Captain Gordon C. Wilson, M.C., A.F.C., D.C.M. (New South Wales Manager of the Larkin-Sopwith Aviation Company of Australasia, Ltd., which has entered one of its pilots and a machine for the proposed flight from England to Australia) be included in the sub-committee recently appointed to inquire into the conditions of the Anglo-Australian Flight."

The proceedings terminated with a cordial vote of thanks to Colonel Watt.

THE ANGLO-AUSTRALIAN FLIGHT

Captain G. C. Matthews, A.F.C., who will attempt the flight from England to Australia on a Sopwith *Transport*, enlisted in 1914 with the Light Horse. Leaving Gallipoli he transferred to the Camel Corps and thence to the Australian Flying Corps.

After winning his wings in Egypt, he embarked for England with No. 2 Squadron and was one of the fifteen officers who (under Lieutenant-Colonel W. O. Watt, O.B.E.), flew to France on *D.H.5's* on September 21, 1917. Captain Matthews gained his third star in France, returned to England and was there appointed Wing Examining Officer to the A.F.C.

Further particulars of this officer's war service were printed in the July issue of *Sea, Land and Air*.

Captain Herbert J. Larkin, D.F.C.
General Manager of The Larkin-Sopwith Aviation Company (Australasia) Ltd.

Captain G. C. Matthews, A.F.C.
Who will represent The Larkin-Sopwith Company in the flight from England to Australia.

After the Armistice Captain Matthews joined the Larkin-Sopwith Aviation Company of Australasia Ltd., and took a course in the Sopwith factory at Kingston-on-Thames.

On his flight to Australia he will be accompanied by another member of the Larkin-Sopwith Co., Sergeant Kay (late No. 3 Squadron A.F.C.) who has undergone a complete training course with the Rolls-Royce Company.

We are indebted to Captain Herbert J. Larkin, D.F.C., General Manager of the Company, for the following particulars as to the machine which his firm has entered for the flight.

The Sopwith *Transport* is fitted with a 375 h.p. Rolls-Royce engine and has a petrol capacity for over 1,000 miles non-stop flight. In accordance with the firm's policy only one engine is fitted, their contention being that the greater the number of engines, the less efficient the machine.

Captain Larkin explains this theory in the following words:—

"Much of the machine's power is sacrificed in overcoming the additional head-resistance of two or more engines, none of which is streamlined into the fuselage of the machine; also the extra stout structure necessary to provide a sufficient factor of safety for so powerful a machine offers more head-resistance per h.p. than does a single-engined machine. In point of speed, large machines are about twenty per cent. slower."

Captain Matthews' machine is to make exhibition flights in Australia and New Zealand.

The Larkin-Sopwith Company has established a New South Wales branch at London Bank Chambers, Pitt Street, Sydney. Captain Gordon C. Wilson, M.C., A.F.C., D.C.M., has been appointed manager.

The Victorian headquarters of this company have now been transferred to Aberdeen House, Fulton Lane, off 94 King Street, Melbourne.

NEW TITLES OF RANK IN THE ROYAL AIR FORCE

Australian officers who served overseas with the Royal Air Force or the old Royal Flying Corps, may be interested in the new titles for commissioned ranks of the permanent Royal Air Force. These are as set out below with their corresponding ranks in the Army and Navy:—

AIR FORCE.	NAVY.	ARMY.
Marshal of the Air.	Admiral of the Fleet.	Field Marshal.
Air Chief Marshal.	Admiral.	General.
Air Marshal.	Vice-Admiral.	Lieut.-General.
Air Vice Marshal.	Rear-Admiral.	Major-General.
Air Commodore.	Commodore.	Brig.-General.
Group Captain.	Captain.	Colonel.
Wing Commander.	Commander.	Lieut.-Colonel.
Squadron Leader.	Lieut.-Commander.	Major.
Flight Lieutenant.	Lieutenant.	Captain.
Flying Officer (or Observer)	Sub-Lieutenant.	Lieutenant.
Pilot Officer	Midshipman.	2nd. Lieutenant.

These new titles came into force on August 8, 1919.

CASTROL

As a factor in the united effort of British manufacturing concerns in the reorganisation of British commerce throughout the world, more especially in the outposts of the Empire itself, Messrs. C. C. Wakefield, of "Castrol" fame, have established direct representation in Australia. This movement is significant as part of the concerted action of the great British manufacturers in their scheme of post-war reconstruction to meet competition from markets which have not directly felt the stress of war.

The company have opened their head office in Somerset House, Moore Street, Sydney, under the management of Mr. Cyril L. Westcott, lately demobilised from the A.I.F., and have appointed as agents in Melbourne, The Larkin-Sopwith Aviation Company of Australia, 94 King Street; in Adelaide, Captain Butler, 64 Hindley Street.

In addition to "Castrol" Motor Oils and Castrol Lubricating Oils for internal combustion engines, they are carrying stocks of their highest grade lubricating oils for superheated and saturated steam and the Wakefield Patent Mechanical Lubricators and Appliances.

WIRELESS TELEGRAPHY AND TELEPHONY IN THEIR APPLICATION TO AIRCRAFT*

Although wireless communication is a very much older development than aviation, the history of the two arts will run parallel in the revolutionary effects they will produce in annihilating time and distance. In a country like Australia, which suffers from its isolation from other world centres as well as from the isolation of its vast inland territories, wireless and aviation will be two of the greatest factors in its future development.

Wireless can provide direct and rapid communication with all parts of the world and it will also give our inland residents a simple means of keeping in touch with the life, ideas and commerce of the capital cities and of the world at large. Aviation will provide a far more rapid means of transport than we have at present between Australia and the outside world, while its inland development will be equally great in providing rapid transport between the cities and back-blocks, and in bringing the most remote inland stations within a few hours' travel of the cities.

Besides the remarkable parellel in the benefits which Australia will derive from wireless and aviation, there is a very important and interesting point in the fact that the progress of aviation will depend very largely on the development of wireless, as will be explained later.

I believe I am right in saying that the war, particularly in its later stages, has done more to show to the world the great advantages of wireless and aviation than anything previous and the impetus which both received from wartime service will be carried into the more useful developments of Peace.

Although the future success of aviation will depend largely on wireless, the ultimate successful development of both will either be assisted or hindered by the nature of Government legislation and the method of administration.

I might say that in aviation at the present time you are in the more or less happy position of having no legislation. It might be better for the development of aviation if legislation were never introduced, but since there must be some authority to lay down the rules of the road and see that they are observed, some form of aviation Act appears to be inevitable.

When it does come, however, I sincerely hope that neither its clauses nor its method of administration will be such as to threaten aerial development. When a Government department is set up to administer an Act of that kind there is always a tendency for the officials to imagine that they are not only in charge of the Act for the benefit of all those who wish to enjoy the common advantages, but that they should convert these common advantages into a departmental monopoly. That has been attempted in wireless, but I am glad to say that wiser and more broad-minded counsels are prevailing, and if the same form of restrictions is applied in the early days of administering the aviation Act, the development of aviation in this country will be seriously handicapped.

The highways of the air for aviation and the highways of the ether for wireless communication should be free to all people in a free country and no Government department or other body should be permitted to erect barbed wire entanglements about these common highways. All you will require in aviation, as in wireless, are definite rules of the road for using your common highway and some authority to see that these rules are observed.

But for the initiative and enterprise of private citizens, we should have had no aviation and no wireless in the war. (*Hear,*

*A lecture delivered by Mr. E. T. Fisk, M.Inst.R.E., before The Australian Aero Club (New South Wales Section) at The Royal Society's Rooms, Sydney, on September 30, 1919.

hear.) Neither Wilbur Wright nor Count Zeppelin was a Government department.

Coming now to wireless in its practical application to aviation; there are two distinct methods of sending wireless signals, either from or to aircraft. These methods are commonly distinguished by the terms "Spark" communication and "Continuous Wave" communication. The spark method has been used in connection with aviation from the very early stages of the latter. In the earliest days of flying (in 1909-1910) wireless engineers in England set to work to adapt wireless apparatus for aeroplanes. There is no fundamental difference between wireless communication with aircraft and wireless communication with ships at sea, but there were some considerable problems involved in designing apparatus which could be successfully installed in and operated by machines in flight. These problems were particularly concerned with the limits of weight and size. At the outbreak of war in 1914, the design of spark wireless apparatus for aircraft had reached a stage as near perfection as possible. The development of continuous wave apparatus has progressed since 1914 almost entirely as a result of the widespread development of what is termed the "valve." For this marvellous instrument we are indebted to Professor J. A. Fleming, of the Marconi Company, who discovered its use as a highly sensitive wireless receiver and subsequently developed it in conjunction with Senatoré Marconi. The Fleming valve was still further developed by an arrangement which has been credited to Dr. De Forest in America.

One remarkable feature of this valve is that, in addition to being used as a receiver, it can be employed in a slightly modified form as a transmitter, thus we have one instrument which can send and receive wireless messages.

This is not a technical lecture and my time is short, therefore, I can only say, for the benefit of those who are not acquainted with the Fleming valve, that it is really an incandescent electric lamp with certain metal electrodes inserted within the glass, and its operation depends upon the fact that when the filament is heated a stream of electrons (or negative particles of electricity) is thrown off from the incandescent wire.

For wireless telegraphy, the spark type of apparatus gives a range of communication from an aeroplane varying from 20 to 100 miles, while continuous wave apparatus gives a range of from 80 to 300 miles. Within these limits the range in either case depends upon the size and power of the apparatus, and naturally upon the weight and space which can be used.

Another important development in aircraft wireless for which the valve is again large responsible is the wireless telephone. During the last few months of the war, this apparatus was used on formation flights with considerable success, and the Flight Commander was able to issue orders from his machine by wireless telephone and have them immediately received by every other machine in the flight. At the same time, he could communicate by telephone with the ground for varying distances up to five miles.

Although the foregoing are interesting and extremely valuable, their importance to aviation is overshadowed by the great possibilities of the wireless compass and directional wireless signals.

The wireless compass, which enjoys several names including "direction-finder" and "radio goniometer," is not a particularly recent invention, although in the past few years it has been developed by Marconi engineers to a stage of perfection. The original invention is credited to two Italian gentlemen, Messrs. Bellini and Tosi, who have subsequently improved the apparatus in conjunction with Senatoré Marconi. It was largely in use during the war for locating enemy submarines, Zeppelins, warships and aeroplanes. Its use was extended by the Allies so that it became almost impossible for an enemy submarine or aircraft to use its wireless transmitters without having its position immediately located by Allied observers.

The flight of Zeppelins across the North Sea was followed so accurately by the Allies' wireless compass stations that the point of crossing the English coast could always be determined.

The Germans had an elaborate system of direction-giving wireless stations in Germany which were intended to assist the navigation of their Zeppelins, and although this scheme was successful in the early days, it was entirely overshadowed, both technically and practically, by the Marconi-Bellini-Tosi arrangement as used by the Allies, and the destruction of Zeppelins towards the end of their career has been credited in many instances to the successful use of the Allies' wireless apparatus.

At this point it is probably interesting to know that the Germans have not even succeeded in using continuous wave wireless in aeroplanes. A military order, issued late in 1918 by German Headquarters, directed that the closest attention be given to the section of the lines using this apparatus, and urging enemy troops to miss no opportunity of securing portions of continuous wave apparatus from captured Allied aeroplanes.

The modification of the Marconi-Bellini-Tosi apparatus is now so made that it can be fitted into any aeroplane. It consists of square loops of wire, wound on wooden frames which are fitted into the machine and by means of this arrangement a pilot or observer when flying can take the angular direction of any ordinary wireless stations, and by taking the bearings of two such stations the position of the aeroplane can be practically located on the chart. This apparatus is coming into very wide use and is is quite safe to say that in the near future no machine, particularly a machine engaged on long-distance flights, will go aloft without it.

Commander Grieve, after his attempt to cross the Atlantic with Hawker, stated emphatically "that the future success of aeronautics undoubtedly depends upon the use of the wireless direction-finder."

The American seaplanes *N.C.1, N.C.3* and *N.C.4* were equipped with this direction-finding apparatus. The Commander of *N.C.3* attributed his failure to cross the Atlantic very largely to the fact that he did not give sufficient attention to the proper installation of his wireless direction-finder. According to the wireless operator on the successful seaplane, *N.C.4*, the success achieved was due to the use of the direction-finder.

A well-known American wireless expert confirmed that opinion in the following words: "When regular transatlantic aerial services are established, it will be absolutely essential to have this apparatus installed in machines, and that the direction-finder will provide their chief means of navigation." He recommends the establishment of permanent wireless direction signals for transatlantic aviation which would be radiated from three high-power stations—one in America, one in Europe and one in Africa.

The wireless telephone can also assist in this navigation work across the oceans because the aeroplane or airship will be able to speak to sea-going vessels and learn their position in terms of latitude and longitude, while at the same time the direction-finder will give the bearing of the aeroplane in relation to the steamships; the cross-bearing from two such vessels will show the exact location of the aeroplane on the chart.

Although I have no definite information on the point, it has also been claimed that the successful transatlantic flight by Captain Alcock was assisted very largely by the wireless direction-finder. Captain Alcock's machine was equipped with this apparatus and it has been stated that he left Newfoundland intending to land at the great Marconi Station at Clifden in Ireland. The signals from that station could be received by the aeroplane throughout the flight and with the direction-finder the machine could be steered direct to the station. At any rate, it is a remarkable fact that Captain Alcock's machine landed right alongside the operating room of the Clifden station.

There is now a new method of direction-giving by wireless, which is effected by some apparatus recently patented by the Marconi Company, which sends out signals with a definitely limited range and a fixed direction. This might be likened to the beam of a searchlight. With this apparatus installed all over the country and at given points along the aerial routes, navigation, at all times, should become as certain and regular as the control of railway services by visible signals.

Imagine a machine flying between Melbourne and Sydney either at night or in

dense clouds or fog. That machine would pass through the restricted area of this wireless lighthouse and would hear a voice by wireless telephone continually repeating the title of the locality. One might say "This is Goulburn," another, "This is Albury," a third, "North Sydney Aerodrome," and so on.

There is one minor item which appears to be of great importance in wireless direction-finding and in long-distance aviation. That is the necessity for the development of what are known to cartographers as gnomonic charts.

These show the shortest distance between two points on the chart—*i.e.* a great circle track—as a straight line. This, as you are all aware, cannot be done on Mercator charts. Gnomonic charts are now being developed for use with the wireless direction-finder and their adoption in conjunction with aerial navigation would appear to be a matter of some urgency.

Everyone realises that for commercial aerial services a very complete organisation will be necessary and I think the wireless organisation will be of great importance, not only for the success of commercial aviation, but the successful development of private flying. There must be direction-finding stations and direction-giving stations on the ground, direction-finding apparatus, wireless telephone and wireless telegraph apparatus in the machines, and organisation for communication between one machine and another, between machines and aerodromes, and from one aerodrome to another. All these demand expert wireless organisation. That organisation is already available, although, so far as its application to aviation is concerned, it is yet in the embyro. A similar service has been organised throughout the world for merchant shipping, and it will be an extension of that which will serve and greatly aid the success of commercial aviation.

Again this success will demand the immediate co-operation of those interested in aviation with those interested in wireless. These two must work hand in hand together, and I offer my personal opinion that, if you are going to develop any form of regular services, the technicalities of wireless and the importance of organisation must not be overlooked. If your wireless is treated as a mere "gadget" and a sideline, it will not give you the service you need. You must not only have the assistance of the wireless engineer and the wireless organisation, but in your regular passenger services I believe that it will be absolutely necessary to carry a skilled wireless operator. The work which the wireless man will have to do in assisting navigation, as well as maintaining communication for both navigators and passengers, will be such as to demand the highest skill and constant attention. No matter what form of limited wireless course your mechanics may have taken, they will neither have the time nor the long practical experience which will be necessary for the successful application of wireless to regular commercial aerial services.

You will remember that both Hawker and Alcock had their wireless sending apparatus put out of commission in the early stages of their transatlantic flights. This failure was undoubtedly due to the fact that the wireless apparatus did not receive its due amount of consideration and attention. There is no reason why this accident should have occurred had the apparatus been properly controlled and properly looked after. Although this prevented them from sending messages, it of course did not affect their ability to receive messages or to use the direction-finder.

The wireless equipment of the *R.34* and its results show the importance which was attached to wireless for the first transatlantic airship flight. The *R.34* carried two skilled wireless operators. She was equipped with four distinct sets of wireless apparatus. For communication with ships and with ordinary coast stations, she had spark apparatus with a daylight range of 200 miles. For continuous wave communication she had an equipment with a range of 1,500 miles, by means of which successful communication was maintained between the Firth of Forth and the Azores. There was also a wireless telephone equipment with a range of 50 miles and, although the last to be mentioned, it is of first importance, the airship was equipped with the wireless direction-finder for the use of which the Marconi Company arranged for their

two big stations, one at Clifden in Ireland and one at Glace Bay in Canada, to send out signals.

Finally, I should like to quote the following from a paper read by Colonel Lyons, Acting Director of The British Meteorological Office, before The Royal Society of Arts: "It is hardly too much to say that radiotelegraphy, meteorology and aviation constitute one of the most closely linked triads of applied science it would be possible to conceive."

TRANSATLANTIC FLIGHT BY "R.34"
Wireless Record of the Trip

The following wireless messages were received by the British Air Ministry from the commander of the airship. British Summer time is indicated.

6.50 a.m.—Off Rathlin Island, north-east Ireland. Steering west. Going well. Fine.

9 a.m.—Position, 55 deg. 20 min. N., 10 deg. 40 min. W. (86 miles west of Tory Island). Course west. Speed 40 knots. Up to date averaged 45 knots.

11 a.m.—Going through thick fog. Everything going well.

1 p.m.—Position 55 deg. 7 min. N., 14 deg. 50 min. W. (250 miles from land). Speed 32 knots. Thick fog. All well.

3 p.m.—Position, 53 deg. 50 min. N., 17 deg. 50 min. W. Course west. True speed, 31 knots.

5.30 p.m.—Position, 53 deg. 50 min. N., 18 deg. W. (about 690 miles from home). All well.

7.10 p.m.—Position 53 deg. 50 min. N., 20 deg. W. (about 830 miles from home).

On the second day of the *R.34*'s progress, the Air Ministry issued the following bulletin:—

4 a.m.—*R.34* wirelessed position 52 deg. 50 min. N., 28 deg. 10 min. W.

7.11 a.m.—*R.34* reported her position 52 deg. 30 min. N., 30 deg. W. This is approximately half-way to Newfoundland.

7.15 a.m.—Warship *Renown*, in connection with *R.34* reports her position as 59 deg. N., 34 deg. 37 min. W., visibility good; sea smooth (this is the warship's position, not the airship's).

10 a.m.—*R.34* reports her position approximately 52 deg. 50 min. N., 34 deg. W.

7.30 p.m.—Marconi House, London, heard H.M.S. *Tiger* speaking *R.34* in 54 deg. 20 min. N., 40 deg. W. All apparently O.K.

4.55 p.m.—A message received from *R.34* gives her position as 52 deg. 10 min. N., and 40 deg. 30 min. W. The wireless set known as Type 15 had been slightly out of order, but had been adjusted.

In reference to the 4.55 wireless, the Air Ministry adds: "The message states that *R.34* had then expended 1,545 gallons of fuel, leaving 3,354 gallons, and having used a little more than a gallon a mile. The reference to the wireless set does not mean that she was deprived of communication, as she had two other wireless sets of shorter wave length."

The third day's progress (Friday) was reported as follows (British Summer time):—

3 a.m.—Position, 51 deg. 20 min. N., 48 deg. 40 min. W. (about 2,258 miles).

8 a.m.—Position, 48 deg. 40 min. N., 49 deg. 30 min. W. (about 2,303 miles).

2.17 p.m.—Position, 49 deg. 4 min. N., 50 deg. 20 min. W. (out over the Atlantic again, north-east of St. John's).

9 p.m.—Position, 46 deg. 56 min. N., 56 deg. 14 min. W. (south of St. Pierre Island).

9.50 p.m.—100 miles E.N.E. of Cape Breton.

Calls for Aid.

The remainder of the journey is recorded by the following wireless messages (British Summer time):—

Midnight, July 4.—Position, 59 deg. 40 min. W., 45 deg. 45 min. N.

July 5, 6.20 a.m.—Going well near Halifax.

9 a.m.—*R.34* encountered heavy electrical storms over Newfoundland and Nova Scotia.

10 a.m.—*R.34* sighted over Parrsborough, Nova Scotia.

3.59 p.m.—Signal from *R.34* asking for assistance received. Destroyers detailed and *R.34* informed accordingly.

7.50 p.m.—*R.34* sends the following wireless message:—"Position 45 deg. 21 min. N., 64 deg. W. Course true south-west. Running out of fuel after flight (from) Britain. Please tell me if your destroyers coming."

12.9 p.m.—*R.34* 170 miles north-east of Boston.

12.40 p.m.—United States destroyer *Bancroft* established contact with *R.34* and accompanied her across the Gulf of Maine.

July 6, 5 a.m.—*R.34* sends following wireless message:—"Position of *R.34* 67 deg. 30 min. W., 43 deg. 20 min. N. Course S.W.S. Flying at 1,500 ft. Come and meet us. Making for Boston. Very short petrol."

6.10 a.m.—Message from *R.34* "position now approaching Martha's Vineyard."

6.30 a.m.—Message from *R.34*, "We are sticking it. Think we will be O.K."

6.38 a.m.—"Will land Montauk and take on petrol."

1.35 p.m.—"Passed Montauk Point; making for Hazelhurst Field, Mineola. Expect land 2, Greenwich time."

3 p.m.—*R.34* landed at Mineola, Hazlehurst Field, Long Island, with only 40 minutes petrol left.

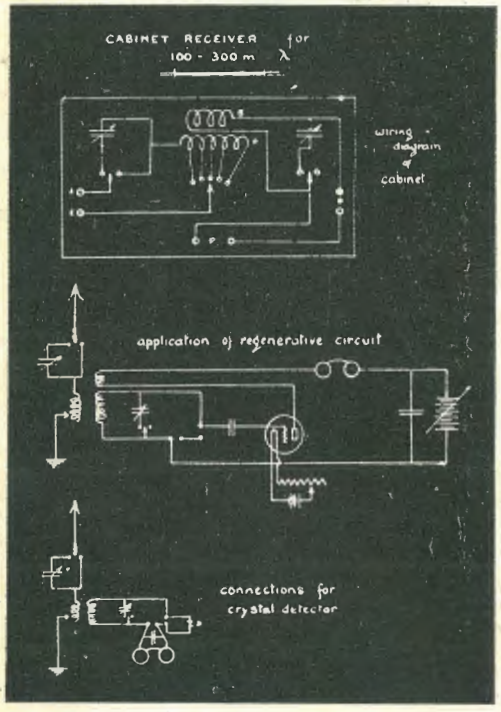
CONSTRUCTING A CABINET RECEIVER

FOR AMATEUR WAVE-LENGTHS ONLY

Especially Written for "Sea, Land and Air" by R. EVANS

After nearly five years of inactivity on the part of Australia's Amateur Radio Experimenters, the cloud of war is at last cleft asunder, revealing a panorama of most wonderful achievements and possibilities in the radio field.

The radio amateur, who, prior to the war was content to listen to signals of a thousand miles or so, now has at his disposal five years of progress difficult



to be imagined, in which he finds himself capable of quite readily receiving from many times this distance, even from Europe and America.

Wireless telephony has also proved itself capable of spanning the Atlantic and, with advent of the three-element valve, lends itself readily to amateur experiment.

Experimenters also have open to them improved methods of transmission, namely, the Arc, the Chaffee Gap, and the Valve.

These should provide a large amount of research and experiment, more especially as the amateur will require the maximum efficiency at so short a wave-length as 250 metres.

Elimination of jambing and interference should also be given ample consideration and, with this object in view, the writer will describe a cabinet type receiver, of novel design and simple construction, which, if built according to instructions, will respond to wavelengths ranging from 100 to 300 metres, and which will completely eliminate all interference from nearby commercial stations.

Those experimenters who, before the war, received 250 metre waves on 1,500 metre tuners, will at once realise the efficiency to be gained by the use of a special tuner, which completely cuts out all dead-end and losses from distributed capacity, etc.

Referring to the diagram, it will be seen that the tuner consists of primary and secondary coils of the disc type, the primary being variable and the secondary of fixed value.

Fine tuning is effected by means of the two variable condensers, which are of the balanced, or butterfly pattern.

The method of coupling variations is unusual for a cabinet tuner, but has the advantage of requiring less space and enabling an easy indication of the position, by means of the scale and pointer in the centre of the panel.

Arrangements have been made for the detector to be connected outside the tuner. This can be either of the crystal or valve type. (See wiring diagrams.)

Begin the construction by cutting out the front panel, which should measure 9in. x 4in. Use either $\frac{3}{16}$in. or $\frac{1}{4}$in. sheet "Bakelite" or ebonite. This should be filed square and a line scribed exactly through the centre, as shown in the panel drawing.

NIEUPORT and General Aircraft Co. Ltd.

CONTRACTORS TO H.M. GOVERNMENT

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

Cable Address :
"*Nieuscout Crickle*, London"

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

"Daily Mail" (London) Copyright

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

THE FIRST DELIVERY BY AIR OF NEWSPAPERS WAS UNDERTAKEN BY

BRITISH NIEUPORT

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

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

Working from this line, measure off and mark the positions for all holes; check all measurements carefully, and centrepunch ready for drilling. Before drilling, however, it will be advisable to engrave the condenser and coupling scales. This might at first appear to be a stumbling block, but such is certainly not the case, as quite professional-looking scales can be turned out very simply.

The writer has used the following method for some years, and finds that it compares very favourably with the machine-engraved scales.

The only tools necessary are a good pair of dividers, a rule, and a graver.

Sharpen one leg of the dividers to a graver point, and scribe the curves rather deeply.

Cut the straight lines and degrees with the graver, using the rule as a guide.

The figuring can also be cut with the graver, but will be found to be a little more difficult.

Try your first couple of scales on scrap material, to avoid spoiling your panel.

Now drill all holes and countersink the screw-holes around the edge of panel, also the eight condenser screw-holes and those for holding the primary coil in place.

Give the panel a matt finish by graining with some fine emery cloth on a block of wood. Clean off from end to end, keeping the grain parallel to the edges, after which apply a little lucca oil on a cloth and polish with the hand.

To complete panel it will now be necessary to fill in the scales and lettering with some white medium. The writer has found a mixture of zinc oxide and copal varnish, when applied in the form of a thin paste, to be very satisfactory for this purpose. Clean off surplus white with a soft cloth and allow to dry.

Next procure nine 4BA brass screws ½in. long, with cheese heads, nuts and washers to suit. These are for the contact studs, of which five are required for the primary and two each for the condenser switches.

It will now be necessary to file away the slotted part; to do this most satisfactorily proceed as follows:—Drill a hole in a piece of $\frac{1}{16}$in. sheet iron just large enough to allow the head of your 4BA screw to fit. Then from another piece of scrap sheet metal of any kind drill a second hole just large enough to admit the screwed part.

Solder these together, with the holes opposite, and your filing jig is complete.

Next take one of the screws, and fitting it into the jig, fasten in place by means of one of the nuts; place in the vyce, and file away the slotted part flush with the top of the jig.

Treat all screws in this manner, and finish with fine emery cloth.

This method ensures an even height of the studs, which is very necessary.

The switch blade for the primary, can now be cut from about 20-gauge hard brass, copper, or phosphor bronze. It is secured to the ebonite knob by means of the two small brass pins. Use the bottom of an ordinary brass terminal post for the switch spindle.

The two small condenser switches can be made from two complete terminal posts, the blade being tightly clamped between the nut and the base as shown.

A small piece of copper must be cut and drilled in order to make a connection to the switch spindle at back. Three will be required, also brass springwashers and nuts.

All ebonite knobs must be fitted with set-screws in order to keep them in correct position.

The knobs and pointers for the condensers and coupling are fitted together in a similar manner to the primary switch.

Next cut from 14-gauge hard brass wire, 12 pieces each ½in. long, and file one end square. These are for the stop pins, and are provided to prevent the pointers moving off the scales, and the switchblades from off the contact studs.

They should be a tight fit in the holes and should be carefully driven home, leaving about $\frac{5}{16}$in. projecting.

Use standard 4BA terminals for the aerial, earth phones and detector.

Lacquer all metal parts carefully, warm slightly and allow to set hard and dry.

The condensers, which are of the self-balancing type are the most difficult part of the cabinet to build, but if care is taken in fitting they will go together without much trouble.

Cut the fixed and the moving plates from 20-gauge brass, zinc or aluminium.

True them up and make perfectly flat. The plates are spaced by means of brass washers or nuts 1/8in. thick. It is most important that these washers be all exactly of even thickness.

An ebonite top-plate must be made for each condenser as per diagram, and provided with a brass plate and centre screw for adjustment. Use long 4BA screws for all the spindles for the moving plates and drill a small centre hole in one end and solder a washer as shown near the other. Find the position of this washer by experiment. In assembling, first screw on a nut to this washer, then a moving plate and alternate washers and plates until the desired number have been assembled. Secure them even and tightly with another nut. Assemble the fixed plates on the four 5BA screws shown in the diagram of the front panel and clamp tight as with the moving plates.

Use for the primary condenser ten moving, and eleven pairs of fixed plates, and the secondary condenser, two moving, and three pairs of fixed plates.

Take the spindle with the moving plates and fit a small spring washer on the front end, place spindle in position and fasten down the ebonite top-plate.

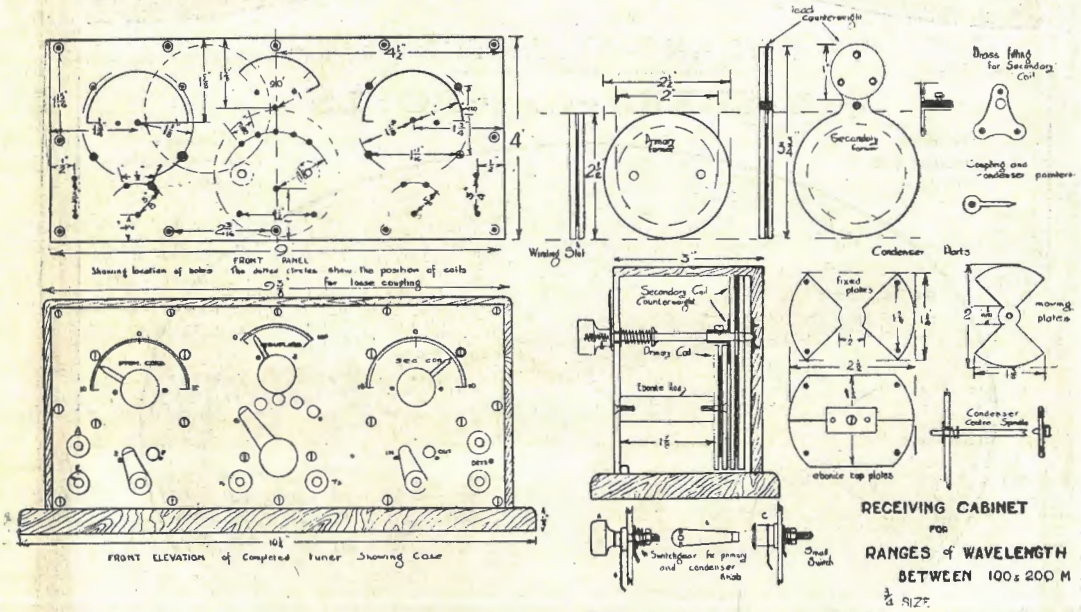
Adjust by means of the centre screws in top-plate until the moving plates lie between the fixed plates and move freely without fear of touching. Finally bridge the fixed plates on each side of condenser with a small piece of copper wire, when condenser will be complete.

It will be noticed with these condensers that the zero position comes to the centre of the scale, the pointer being moved to either side of the zero position with similar results.

We have next to consider the coils. First build the formers of thin wood and ebonite, and shellac well.

The secondary former is provided with a lead counterweight in order to balance coil where operating the coupling knob.

The details of the working of coupling coils and spindle are given clearly in the drawing and need no further explanation.



Wind the primary with a spiral coil of 20 turns of 24-gauge SSC wire, and tap off as under—

1st stud.	2nd.	3rd.	4th.	5th.
3	5	8	13	20 turns.

The order of these tappings to run from the outer to the inner turn, and not the reverse.

The secondary must be wound with 20 turns of 28-gauge SSC wire in one length.

The case can be left mainly to the reader's own discretion, though the writer would desire to point out that the rounded corners and flush fitting of the front panel improve the appearance. Wire up the tuner with 16-gauge copper

wire (bare), avoiding all unnecessary crossings, and paying every attention to insulation.

This tuner is intended for use with a three-element valve or audion, in which case the regenerative circuit shown will be found of wonderful value.

The regenerative or tickler coil can be wound similar to the secondary with about 10 turns of 28-gauge wire on a former similar to that of the primary, and for regenerative coupling can be placed at the rear of the cabinet in inductive relation to the secondary coil. Should the reader desire to use a crystal detector a small fixed condenser must be shunted across the telephone terminals.

Those readers who are interested sufficiently to build this receiver will certainly be more than satisfied with its capabilities.

In a future article the writer will describe the construction of a long wave receiver of modern design, and equally simple of construction, which should appeal to all those readers who are chiefly interested in reading the distant signals of Europe and America.

[Copies of original diagrams from which the foregoing illustrations have been reproduced are obtainable from the Wireless Press, 99 Clarence Street, Sydney.]

THE WIRELESS INSTITUTES

SOUTH AUSTRALIA COMES INTO LINE.

The first general meeting of the South Australian Section of The Wireless Institute of Australia was held in Adelaide on September 11, Mr. A. Mather presiding.

Office-bearers were elected as under:—President, Mr. A. Mather; Vice-Presidents, Messrs. B. H. Lee and E. Hambly; Honorary Secretary and Treasurer, Mr. C. E. Ames; Council, Messrs. H. C. Coles, R. M. Dunstone, D. W. Malpas, C. J. Poole, D. H. Smith and R. O. Watt.

The President gave a *résumé* of work done by the Institute in other States and explained that the new Section had been inaugurated for the purpose of promoting wider interest in wireless and encouraging its study and research in South Australia.

After discussion, it was decided that the age-limit for membership be fixed at 16 years.

The following resolutions were carried:

(1) That the rules of the New South Wales Section of the Institute be adopted.

(2) That *Sea, Land and Air* be the official journal of the South Australian Section.

(3) That, to bring the Institute within reach of all amateurs, the annual membership fee be 10/6, payable half-yearly.

(4) That the Secretary be instructed to co-operate with the Secretaries of other State Sections in the request that Permits or Licenses be granted by the Naval authorities to members of the Institute, and that these Permits be issued only through the Council of the Institute who shall have the power to enforce such regulations as may be made by the Government, and to suspend or cancel any member committing a breach of same.

(5) That the Secretary communicate with the Secretary of the local Section of The Australian Aero Club, with a view to incorporating with that body.

* * * *

A second meeting of the above Section was held on September 24.

Correspondence included a letter from the Secretary of the Victorian Section, in which particulars were given of a recent interview between that Section and the Naval Radio authorities; satisfaction was expressed at a possible resumption of wireless experimental work in the near future.

A letter was also read from the local Secretary of The Australian Aero Club, regretting that his committee—while fully appreciating that wireless and aviation were interdependent—were not at present able to consider the proposed affiliation.

The application of a lady enthusiast who desired to become a member of the Institute provided an interesting discussion, the motion being finally negatived by a majority.

Mr. R. O. C. Matthews was elected to the office of Treasurer.

For the interest of junior members a monthly lecture will be given; the series will be opened on November 5 by Mr. Mather and Mr. Matthews.

It was resolved that future meetings be held on the first Wednesday of each month.

VICTORIA.

A general meeting of the Victorian Section was held in the Marconi School of Wireless, Melbourne, on August 26, Mr. V. Nightingall presiding.

The Secretary read correspondence from the New South Wales Section relative to a recent conference in Sydney between that Institute and the Director of Naval Radio Services, and detailing the agreements made between them.

From the Naval Secretary a letter was read advising that Commander Cresswell had been instructed to confer with the Victorian Institute on matters affecting experimental wireless in that State.

The Secretary stated that the agreement made in Sydney could hardly be

improved on at the proposed conference in Melbourne. "If the conditions are honoured by Commander Cresswell in his report to the Naval Board," continued Mr. Conroy, "the experimenter will receive better treatment even than in pre-war days."

The council, he assured them, was working in their best interests, and if members would extend their patience a little while longer he, the speaker, was confident that they would soon gain the object they so earnestly desired.

It was unanimously resolved that a special meeting be called on September 4 to draw up rules for the successful working of experimental stations, and for the purpose of officially inaugurating the "Observation Committee."

Mr. H. Firth (Vice-president) in supporting the motion, stated that too much care could not be taken in the selection of the proposed committee, and urged that members qualified to accept office on that committee use every effort to bring about a successful issue.

The chairman then delivered the first instalment of an interesting lecture on Audions, employing a comprehensive apparatus which included several vacuum tubes.

The demonstration was followed with keen interest and terminated with a cordial vote of thanks to the lecturer.

* * * *

Radio-Commander Cresswell's letter is reproduced hereunder:—

Department of the Navy.
R.A.N. Radio Service,
Collins House,
16th September, 1919.

The Hon. Secretary,
The Wireless Institute of Australia,
(N.S.W. Section.)
Sydney, N.S.W.

Sir,—With reference to your letter of the 14th July last, I have to inform you that it has been decided to issue temporary permits to members of your Institute for the purpose of conducting experiments in Wireless Telegraphy.

As will be seen by reference to the form of permit attached, the issue of permits is limited to the use of "receiving" apparatus only, and the use of Valves to members possessing Morse operating qualifications, being able to receive at a speed of not less than twelve words per minute, and possessing a knowledge in the use and operation of valves.

The accompanying permit forms are forwarded with the request that your Council will investigate cases where applicants require a permit to operate valves, and make recommendations for issue or otherwise. These permits will be issued to members of your Institute through the Council upon the understanding that your Council is willing to assist the Department in exercising supervision over the use and operation of licensed stations.

The question of issuing permits to members requiring both transmitting and receiving licenses is receiving consideration, but such licenses can only be issued at the present time to meet special cases where investigation of Radio phenomena would be useless without the aid of transmitting.

Any applications submitted to this office through your Council for transmitting and receiving licenses should be investigated, observing that licenses can only be issued for transmitting and receiving stations using a wave length not greater than 250 metres, with maximum decrement .2 and maximum power of 100 watts at Generator Terminals of Oscillator, and that the operator must possess a minimum speed of twelve words per minute. The applicant should produce evidence to show that he desires to carry out a systematic scheme of experiments in Radio phenomena.

Yours faithfully,
F. G. CRESSWELL,
Acting Director of Radio Service.

TEMPORARY PERMIT FOR WIRELESS EXPERIMENTERS

The following is a copy of the Permit referred to in Commander Cresswell's letter (published on the preceding page) :—

DEPARTMENT OF THE NAVY,
R.A.N. Radio Service,
Collins House, Melbourne,
September, 1919.

Temporary Permit to use W/T Apparatus for Purpose of Receiving Wireless Telegraphy Signals.

THIS PERMIT is issued pending legislation on the matter of the issue of licences to amateurs and others for experimental purposes, and is strictly limited to "receiving" stations. Permits for transmitting stations cannot be issued at present, except in special cases.

Unless specially endorsed, this permit does not extend to the use of "valves." Permission to use valves will be granted only to those who are certificated W/T Operators or furnish satisfactory evidence that they understand the principles of valve working and can receive W/T Signals efficiently at a speed of not less than twelve words per minute.

This permit will lapse with the introduction of new Regulations governing the issue of licences for experimental and instructional purposes, when the necessary forms of application for licence will be forwarded to the holders of permits.

Issued to .....
Address .....
Telephone No. .....
(if any)

F. G. CRESSWELL,
Radio Commander,
Acting Director of Radio Service.

N.B.—This permit is not transferable, and applies only to the premises above specified.

WIRELESS FOR TONGA

Lack of means of rapid communication with the outside world has severely handicapped traders, growers and other residents of the Tongan group of Islands.

Their long term of isolation will soon be ended for, in the near future, direct wireless communication is to be established between Nukualofa and Suva.

The entire apparatus, which includes the latest magnifying valve receivers, power plant, storage batteries and specially designed masts, will be manufactured by Amalgamated Wireless (Australasia) Ltd., at the Company's Works in Sydney, and erected by Australian engineers.

A.I.F. WIRELESS CLUB

At the Engineers' Depôt, Moore Park, Sydney, some sixty returned members of the A.I.F. Wireless Squadron assembled on October 1 to discuss the proposed formation of a N.S.W. Wireless Club.

Provisional Committee and office-bearers were elected as under:—

President: Major C. W. C. Marr, M.C.

Secretary: Mr. A. R. Simpson.

Committee: Captain R. Clark, Messrs. J. Brier, J. R. Clark, A. J. Davidson, R. Forsyth, F. Graham and D. Reneberg.

A committee meeting wil be held on October 9 at 8 p.m. in Major Marr's rooms (Dymock's Chambers, Elizabeth Street, Sydney), for the purpose of formulating suggestions which will be considered at a subsequent general meeting.

MERCANTILE MARINE WAR SERVICE ASSOCIATION OF AUSTRALASIA

Patrons and office-bearers to the above Association have been elected as under:—

Patron: Commodore Dumaresq, C.B., R.N.

Vice Patrons: Dean Talbot, M.A., Captain Langley Webb, Captain Glossop, C.B., R.N., Dr. Arthur, M.L.A., Messrs. E. D. Gray, J. Kelso, J. J. King Salter, R.C.N.E., M.Inst.N.A., E. A. Beeby and H. P. Harriott.

President: Mr. R. T. Kearney, F.R.G.S., F.A.I.S.

Vice-Presidents: Captain Pascall, R.N.R., Captain A. Hayward.

Committee: Messrs. J. J. A. Davis, J. McLeod, L. Broome, V. Gardiner, C. C. Vernon, W. Lund.

Hon. Treasurer: Mr. C. A. Parrett.

Hon. Auditor: Captain V. E. Watkins, A.C.P.A.

Solicitor to Association: Mr. H. P. Harriott.

Honorary General Organising Secretary: Mr. Arthur Hayward; Assistant: Mr. V. Gardiner.

As temporary offices of the Association Messrs. Huddart Parker Ltd., have offered the use of the Phoenix Wharf, 27 Sussex Street, Sydney, the hours of attendance being:—

Monday to Friday, 7 p.m. until 9 p.m.
Saturdays ..... 2 p.m. until 9 p.m.

AERIAL TRANSPORT LIMITED

THE SYDNEY-ADELAIDE SURVEY

Major Lee Murray's Diary

[Major Murray's notes on his aerial survey from Melbourne to Adelaide (and return) appeared in our last issue. The second portion of the journey—Melbourne to Sydney and return—is described hereunder.—Ed.]

Saturday, August 2, 1919.

We left Melbourne at 3 p.m., following the road through Wallan and Kilmore to Seymour. Difficulty was experienced in obtaining benzine, but, considering the continuous rain and wet roads, good time was made.

Sunday, August 3.

Our departure from Seymour was delayed until midday by local difficulties in obtaining petrol on a Sunday. Of the road from Seymour to Benalla, the less said the better; it was an unbroken series of sand, bog-holes and large stretches of water—notably one with a sandy bottom, extending well over 100 yards. Benalla was reached at 3.45 p.m.; some slight carburation trouble decided us to spend the night here.

Main Road, Benalla-Wangaratta.

From Benalla through Glenrowan to Wangaratta the road was excellent and although we did not leave Benalla until late in the morning we arrived at Wangaratta in time for lunch.

Beyond Wangaratta—which was suffering severely from influenza—the conditions were reversed; so heavy was the road from Beechworth to Springhurst that we broke the two lower leaves of the front right spring. This necessitated a very slow and cautious run through Chiltern and Barnawatha to Albury—the first town at which spring steel could be purchased.

Tuesday, August 5.

Spent the day refitting springs and greasing and oiling the car throughout.

Glenrowan District. Hilly and Timbered.

Wednesday, August 6.

Left Albury at 10 a.m.

At Bowna a brake-lining burned out and delayed us an hour. We then pushed on through Holbrook and Kyamba where heavy roads cost us another spring, subsequently repaired at Gundagai. It was late evening when we arrived, but the local garage people were exceptionally good and had a new spring fitted by ten o'clock on the following morning.

Tarcutta. Very hilly and timbered.

Thursday, August 7.

On again through Bathurst and Cowra

(good all the way) and amid beautiful scenery up to Mandurama, where we spent three days.

Gundagai. Good flying country.

Sunday, August 10.

Back to Bathurst, where we spent the night. Here we met Lieutenant Ryrie, who had flown a *D.H.-6* from Sydney on the previous day, and was now joy-riding with the populace.

Kyamba. Open country, but hilly.

Monday, August 11.

Departed for Sydney.

The road through the Blue Mountains to Mount Victoria was excellent.

In the last-named town, running short of petrol I was directed to a certain hotel. The proprietor was in his garage and I asked if he would oblige me with a couple of tins, for which, of course, I would pay.

"I suppose I'll have to be kind to you," he commented. I expressed my gratitude. "Staying for lunch?" he then asked. As it was then not later than noon I replied in the negative. Came the following rejoinder: "When people who don't spend a bean in my hotel come to me for petrol I usually tell 'em to go to ——." Having suitably replied I left Mount Victoria, minus petrol, and lunched at Katoomba.

From this point as far as Penrith the road was again very bad, the final stretch, from Parramatta into Sydney being almost beyond description.

We reached Sydney in time for a late dinner at the Wentworth Hotel, and were here joined by Mr. Hector Sleeman (managing director of Aerial Transport, Ltd.), who was to accompany me on the return run to Melbourne. Our surveyor, Mr. D. K. Laidlaw had gone back by rail.

On Monday, August 18, we were entertained by the New South Wales Section of * The Australian Aero Club and left Sydney the following afternoon, spending the night at Picton.

Flat country near Penrith.

Wednesday, August 20.

From Picton to Goulburn and on to Yass.

Thursday, August 21.

Uneventful run from Yass, through Cootamundra, Wagga and Wangaratta.

The Blue Mountains.
Query—Where do we land?

Friday, August 22.

Between Wangaratta and Benalla we

* See *Sea, Land and Air*, September issue.

Another view of the Blue Mountains.
Same query.

struck a series of punctures. Later, after a magnificent stretch, with the car all out and doing from 48 to 52 m.p.h., we discovered that with the exception of the top leaf the whole of the front right spring had gone. Temporary repairs were effected at Benalla.

Saturday, August 23.

From Benalla to Seymour, on account of the patched-up spring and the heavy condition of the road, we proceeded with the utmost caution.

Seymour was reached late in the afternoon, and after repairing yet another puncture, we completed our trip to Melbourne at 8 p.m.

It should be noted that although we had trouble with broken springs (due to exceptionally bad roads, and to the heavy load which we carried) the trip throughout was entirely succesful in that we completely surveyed the route which is to be flown by our aeroplanes, and secured the best possible landing sites.

* * * *

[Major Murray sailed for England, *viâ* America, on October 8.—*Ed.*]

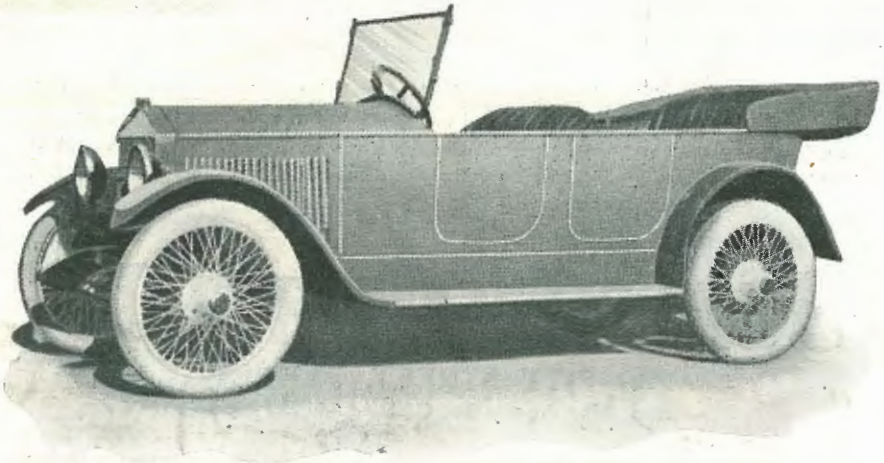
THE SCRIPPS-BOOTH "NEW SERIES"—SIX.

The "New Series"-Six, illustrated below, is a smooth running machine with a rakish appearance which compels attention. It is comparatively light in weight, but every ounce is solid strength, evenly distributed, the result being a light and serviceable car at a medium price, with all the qualities of a heavy car, but at a greatly reduced expenditure for upkeep.

The following are a few of the main features of the Scripps-Booth (new series six-cylinder model):—

Northway 6 cylinder 19 h.p. engine, with covered-in valves and die-cast pistons, combining strength and lightness. Ignition by Liberty; Bosch Magneto; Lighting and starting; the Remy system, automatically controlled by Thermostat. Marvel Carburettor; Stewart Vacuum feed. Exceptionally fine long wheel-base of 112 inches. Wire on cantilever wood wheels. Beautiful upholstery and complete with every convenience. Colours blue, grey, moleskin.

This car is a thoroughbred in every respect and owing to its simplicity of control can be handled with confidence by ladies.



The Scripps-Booth "New Series"-Six.

LIST OF WIRELESS OFFICERS ATTACHED TO VESSELS OF THE AUSTRALASIAN MERCANTILE MARINE.

September 30, 1919.

SHIP.	OPERATOR.
Australpool	K. J. Dines
Australrange	C. Black
Australbrook	R. E. Haddock
Australford	T. W. Bearup
Australmount	A. R. Catford
Australmead	G. Pow
Australport	A. H. Jeremy
Australglen	J. R. Gilligan
Australpeak	C. H. Kidman
Australplain	———
Australcrag	E. S. Earngey
Apolda	J. W. McKay
Arahura	G. Donnelly
Aramac	R. D. Thompson
Atua	G. Ross
Arawatta	N. G. W. Scott
Bellata	T. V. Tressler
Bingera	J. D. Toohey
Bombala	T. Bannister
Bundarra	H. K. Burbury
Culburra	A. R. D. Davis
Challamba	H. W. Barnfield
Coolcha	M. A. Prudence
Cethana	K. L. Freeman
Canberra	———
Changsha	J. F. McGinley
Charon	J. E. Cleary
Coolgardie	R. S. Taylor
Cooma	J. H. Hawkins
Eastern	P. C. Gillon
Dimboola	A. F. Vipan
Flora	H. F. Harman
Indarra	T. A. Jones
Kanowna	W. J. Washbourne
Karoola	———
Karori	W. S. Harvey
Katoa	B. Boni
Katoomba	W. H. C. Phillips (s) E. H. Thomas (2nd) H. L. Macdonald (3rd)
Kurow	D. C. Lane (s) C. Hart (j)
Kowarra	H. Fullerton
Kaiwarra	C. Smith
Kaituna	R. R. Robinson
Kauri	V. Blight
Koromiko	A. O. Sutherland
Kaiapoi	A. E. Sheppherd
Kaitangata	S. G. Jones
Levuka	S. J. McVeigh
Loongana	W. E. C. Sawyer
Maunganui	V. M. Simpson (j)
Macedon	A. L. Dixon
Maheno	J. A. Heavey
Makambo	S. R. Dixon
Makura	L. G. Devenport (s) E. A. Hunter (j)
Maori	V. C. C. Parke-McIlveen (s)
Marama	J. H. Bennett (s) A. E. Lawrence (j)
Mararoa	H. A. Bloxham
Marsina	W. H. Richardson

SHIP.	OPERATOR.
Manuka	L. R. Dickson
Mataram	L. J. Glyde
Melusia	N. E. Watts
Minderoo	J. G. C. Higgins
Mindini	A. Stuart
Moana	J. F. Hutton (s) J. G. Campion (j)
Monowai	L. V. B. Sutton
Moeraki	S. A. Ludlow
Mokoia	F. N. Davidson
Montoro	N. W. Marshall
Morialta	R. Alexander
Morinda	F. C. Davies
Navua	J. A. Meek
Ngakuta	H. Bargrove
Niagara	W. J. Martin (s) G. Hugman (j)
Ooma	E. A. Miller (s) T. Ward (j)
Oonah	D. N. Quinn
Paloona	S. E. Brown
Paringa	L. S. Lane
Pateena	F. E. Duggan
Rakanoa	A. T. Blomfield
Riverina	E. J. Giles
Rotomahana	J. H. Williams
Rupara	G. Cook
South Africa	C. Williamson
St. Albans	W. H. Harris
Taiyuan	H. A. de Dassel
Tahiti	H. M. Lamb (s) J. Elmore (j)
Talune	H. Speed (s) T. H. McWilliams (j)
Tarawera	F. A. Hunter
Tofua	W. A. Hawkins (s) C. F. G. Taylor (j)
Ulimaroa	———
Victoria	F. J. C. Hall
Wahine	A. J. E. Corbett
Waihora	V. M. Brooker (s) F. L. Dawes (j)
Waimarino	A. Cuthill (s) L. H. Jones (j)
Waitomo	A. S. Dening
Wandilla	T. Chalmers
Wairuna	A. S. Smith
Waitemata	C. F. Griffiths (s) W. H. Brown (j)
Wanaka	W. E. Long
Waipori	H. E. Young
Westralia	M. A. Ryan
Whangape	C. H. Brown (s) R. W. Barnes (j)
Willochra	F. A. Cook (s) F. N. Williams (j)
Wodonga	J. Welch
Wyandra	R. M. Firminger
Wyreema	H. Tuson
Zealandia	— —
Zealandic	E. A. Burbury

Junior Operators on M.I.M.C.C. Ships.

SHIP.	OPERATOR.
Port Sydney	F. H. D. McIlveen
Mahana	F. L. Scott
Port Alma	W. M. McKenzie

Standing by—Sydney.

SHIP.	OPERATOR.
———	C. F. Green
———	R. R. Pilmore
———	H. F. Hartley

OUR QUESTION BOX.

R.H.G., Coogee:—(1) The position with regard to amateur licenses is explained in the current issue of this journal. There is no good reason why such licenses should not be granted in Australia as in other countries. (2) Wavelengths for transmitting apparatus will probably be limited to 250 metres, but reception will be unrestricted. Do not attempt to erect a station without a license. The Wireless Institute of Australia is closely watching the interests of amateurs and we would advise you to communicate with the N.S.W. secretary, Mr. Malcolm Perry, Box 2, King Street Post Office, Sydney.

George Reach, Middle Brighton:—(1) Many of the large shipping companies employ indentured apprentices who serve their time at sea and qualify for 2nd Mate's certificate. From that, a successful apprentice may become a junior officer and, by further study and sea service, work up to chief officer and master of a sea-going vessel. (2) Write to the Union Steamship Co. of New Zealand Ltd., Sydney; Australasian United Steam Navigation Company, Brisbane, and other Australian companies. Apply also to manager, Commonwealth Government Line of Steamers, Melbourne.

D. Williams, Woodonga:—We have referred your inquiry to the Superintendent of the Marconi School of Wireless, 422-424 Little Collins Street, Melbourne.

F. T. Murdoch, Rose Bay:—(1) Dr. Ettore Bellini was born at Foligno, Italy, on April 13, 1876, and educated at Naples University. In 1901 was appointed Electrical Engineer to the Royal Italian Navy, and in 1906 became Chief of the Naval Electrical Laboratory at Venice in which latter capacity he carried out research work dealing with the employment of wireless telegraphy on warships and submarines. Later, in conjunction with Captain Tosi, he invented the Radio-goniometer, an apparatus for directive wireless telegraphy. In 1910 the Bellini-Tosi system was installed at the Boulogne-sur-Mer station of the French Post Office.. (2) Mr. Roy A. Weagant was born at Morrisburg, Ontario, Canada, in 1881. Educated at Stanstead College, Stanstead, Quebec, and at McGill University, Montreal. Graduated from Electrical Engineering Course, 1905. Studied physics under Sir Ernest Brotherford and first became interested in wireless through witnessing some of his experiments in Hertzian waves. He gained engineering experience with the Montreal Light, Heat and Power Company, the Westinghouse Electrical Manufacturing Company, of Pittsburgh, Pa., and the De Laval Steam Turbine Company. He took up commercial wireless work in 1908 and entered the service of the Marconi Wireless Telegraph Company of America in 1912, where he soon rose to the position of Chief Engineer. He is a Fellow of the Institute of Radio Engineers and member of the Board of Directors and Standardisation Committee.

THE YEAR BOOK OF WIRELESS TELEGRAPHY AND TELEPHONY, 1919

The appearance of the seventh edition of the "Year Book of Wireless Telegraphy and Telephony" serves to emphasise the great extension of wireless working that has taken place under the strenuous conditions of a world-wide war. The whole of the information on recent wireless development is not yet available for publication, and in view of the large masses of data that have to be handled such publication must necessarily be slow.

The summary of the 1918 progress in the development of new apparatus and in high power and long distance wireless working is given in this volume in a handy and useful form, while the extensive recent alterations to Laws and Regulations relating to wireless working in various countries has brought this section of the Year Book up to no less than 475 pages.

Amongst other alterations a useful new feature has been added to the calendars in the form of a list giving particulars of the official holidays in the various countries of the world. The valuable section on land and ship stations and particulars of call signals has been overhauled and brought up-to-date as far as the current information allows. This section should also be of particular use to the wireless amateur and experimenter as soon as the present restrictions are relaxed, especially in view of the large increase in receiving ranges consequent upon the modern development of the valve amplifiers. Dr. J. A. Fleming has once again contributed with a valuable discussion upon "Maxwell's Electromagnetic Theory of Light and Its Important Relation to Wireless Signalling." The intimate connection between radiotelegraphy and aircraft is emphasised by an interesting article by Dr. W. H. Eccles dealing with the special maps for which the rapid progress of wireless and aeronautics is creating a demand. The uses of wireless telephony on aircraft are also dealt with amongst other matters in "A Review of the Methods and Progress of Radio-telephony" which is contributed by Mr. Philip R. Coursey. An instructive communication dealing with the "Experimental and Acoustic Characteristics of Telephone Receivers," by Dr. Louis V. King, has also a bearing upon the same thing.

Mr. I. Schoenberg's series of analytical notes and "Valve Patents in 1918" is likely to prove of great utility to experimenters in this field and forms an instructive addition to the similar series published last year, as does also the list of patent applications dealing with wireless, made during 1918.

A mention of the section on International Times and Weather Signals must not be omitted, especially on account of its great importance in connection with long distance aircraft flights. The map of the wireless stations of the world has again been brought up-to-date and now includes some 900 stations.

The Bibliographical notes have been revised and augmented, as have also the Definitions and the Five Language Dictionary of Technical Terms used in Wireless.

[Published at 9/6, copies of the Year Book may now be obtained from The Wireless Press at any of the following branches: Sydney, 99 Clarence Street; Melbourne, 422 Little Collins Street; Adelaide, Netter's Buildings, Gresham Street; New Zealand, Australasia Chambers, Wellington.]

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