EDITORIAL COMMENT

OME exceedingly strong comments on Air Ministry methods of finance are contained in a letter from the Treasury on the action of the Administrator of Works and Buildings in cancelling a number of contracts entered into by the War Office and substituting revised terms which were more favourable to the contractors, increasing their estimated remuneration in bulk from £66,000 to £164,000. The letter in question states:—

Pity the Poor Taxpayer! Their lordships regret that the Administrator of Works and Buildings should have taken the step, which was clearly outside his competence as an officer of the Ministry of Munitions, of cancelling and revising, in a sense more favourable to contractors, the already liberal contract terms on which the aerodromes were being constructed for the War Office. As these contractors were receiving a percentage on their expenditure and incurring no risk, it is difficult to understand what public benefit could be derived from a change which increased their remuneration (by an amount which they note is estimated at £66,000) without (so far as my lords can see) securing in any particular an additional advantage to the State.

The complaints which their lordships have received from many quarters as to the waste of money which is arising in connection with aerodrome contracts reinforce their view that the form of contract on the cost plus percentage system is open to serious objection. In your letter of the 28th ultimo the Air Council represent that the alternative suggestions made by the Treasury are impracticable. My lords understand, however, that they are used by the Admiralty in the almost equally difficult ship construction contracts, though not in works construction.

"Serious Defects" It further appears that a recent test examination of the Air Ministry accounts and records for the expenditure on aerodrome construction brought to the notice of the Comptroller and Auditor-General defects in the system of control and accounting of such a serious character that he reported the circumstances to the Treasury, and suggested that the whole matter should form the subject of special inquiry by an independent body, the result of whose investigations might, if necessary, be brought before the Public Accounts Committee at a later period of the Session.

On every hand it appears that those responsible for the financial administration of the Air Ministry have been guilty of grave derelictions of duty. For instance, the Comptroller and Auditor-General complains that the action of the Ministry and the Admiralty, acting on their own initiative, had extended the award of the 12½ per cent. bonus to work done in Ireland, though that was not the intention of the Committee on Production. This action had resulted in very serious financial consequences, the Air Ministry having extensive works in progress in Ireland at the time.

It seems to us that the Lords of the Treasury are perfectly right to express their grave displeasure at the abuses which have apparently been rife. In the matter of the revision of contracts, by which, as we
The Regulations in Detail

As the full text of the Regulations will be found printed in another part of this issue of FLIGHT, there is no need for us to do more than glance briefly at a few of the principal points. To begin with, the rules as to the licensing of pilots are extremely stringent, as, in the interests of public safety, they must be. The applicant for a pilot's licence must pass a medical examination carried out under the control of the Secretary of State, and must produce a certificate of competency issued by the same authority, or be qualified as a Royal Air Force pilot. He must further submit proof of recent reasonable flying experience on the class of machine for which the licence is required, or, failing such proof, undergo practical tests. In the case of applicants applying for licences to fly machines other than those carrying passengers and goods, the proof of recent flying experience is, apparently, not required. The regulation is practically identical in the cases of navigators and engineers except that again the proof of recent flying experience is not demanded. Pilots' licences remain in force for six months and others for twelve, but there is an additional proviso that holders of licences may be required from time to time to undergo further medical examinations under the control of the Secretary of State. The fee to be charged for each licence issued and for each renewal is five shillings, but in the event of the applicant being required to carry out practical tests as indicated above the fee is to be a guinea. It is true the fees are not high, but we do not see why a pilot or navigator or engineer who is called upon to undergo a further medical examination under the regulations, it may be at the mere whim of some one in authority, should have to pay down five shillings and another guinea for the ordeal. It is not the cost but the principle which seems unjust.

The conditions governing inspection for airworthiness seem to be eminently sound. Certificates will be issued to "type aircraft" under conditions set forth in the Schedules, and for the issue of such certificates the sum of five guineas has to be paid. After the issue of a certificate to a type aircraft, any further aircraft of that type will be inspected for airworthiness by employees of the constructor, under arrangements approved by the Secretary of State, and if the aircraft in respect of which a certificate of airworthiness is desired conforms in all essential respects with the type aircraft, and is of satisfactory workmanship, the certificate will be issued at a charge of one guinea. That seems to be sound and sensible, and to promise the least possible interference from officials. There is, however, one query which might be propounded in connection with the issue of a certificate to a type craft. It is laid down that a certificate will only be granted for any type of passenger aircraft after the design has been approved by the Secretary of State and a satisfactory demonstration has been made in actual flying trials. Exactly what is meant by approval of design? Unless this point is definitely cleared up the inference
Flight—And the Men

Rear-Admiral CECIL F. LAMBERT, Director of Personnel, Air Ministry. "Flight" Copyright
Civil Aeronautics in Canada

The Bill providing for the control and encouragement of flying in all its aspects, the issue of licences, inspection of machines, and arrangement of air routes has reached its third reading in the Canadian Parliament. It is proposed to make the control of commercial flying a public monopoly.

Further Provisions for Safety

Stringent rules are made for the periodic inspection and overhaul of all passenger aircraft, while it is also laid down that no such aircraft shall on any day proceed on a journey until it has been inspected at least once on that day by a competent person licensed for that purpose under the Regulations. If the inspector is satisfied that the aircraft is fit in every way for the flight proposed, he must sign in duplicate a certificate to that effect, which certificate must be countersigned by the pilot or some other person in the employ of the owner, one copy to be carried in the aircraft while the other is to be retained by the owner. This seems again to be quite a sound arrangement. It definitely fixes the responsibility for failure in case of any accident due to causes which ought to have been foreseen and guarded against, and will, moreover, tend to ensure care in the work of inspection. Taken all round the Regulations, so far as they relate to the competency and fitness of aircraft and their crews and the consequent safety of aerial navigation, seem to leave very little to be desired. If they seem to go far, in the direction of stringency, that in itself is something to the good. We cannot, in the interests of the safety, leave any margin for serious accidents such as would tend to destroy the confidence of the public in the safety of aerial navigation, and we should much prefer at first to see the strings drawn a little too tightly rather than there should be any laxity either in the Regulations themselves or in their administration.

As we have said, there is no necessity to traverse the whole of the Regulations, which are completely self-explanatory. The whole subject of civilian air navigation is dealt with, including the rule of the road at sea. So far as we can see, there is no room for criticism here. The rules are essentially simple and easy to understand. It is impossible to draft any set of rules which will entirely prevent accidents, but a close adherence to those set forth in the Schedule to the Regulations will at least make accidents inherently improbable. As at sea and on the highways, accidents are caused in the air by one or both aircraft concerned failing to observe the rules which are based on common sense and experience, and if every aircraft pilot will keep that well fixed in his mind these rules will go far to prevent the kind of accidents they are intended to obviate.

The Private Owner

In one respect at least the Regulations lack clearness. Nothing is said as to the private owner who desires to pilot his own machine, nor is it laid down with anything approaching certainty what tests he is to be called upon to undergo, or what form of licence he is to have. Paragraph 3 of Schedule III does indeed say that "a person applying for a pilot's licence to fly machines other than goods aircraft must either be qualified as a Royal Air Force pilot or produce a certificate of competency issued by the Secretary of State." Will he have to pass the same tests as pilots of public-service machines? Will the Secretary of State delegate some other authority or body to carry out tests for pilots of this class of machine? Before the War the brevet of the Royal Aero Club, or one of the Clubs associated with the International Federation, was accepted all over the world. Is this to be abolished and the official test and certificate substituted? These again are questions which it would be as well to have answered at the start. They are relatively important and they require to be cleared up.

Prohibited Areas

At the time the Air Ministry published its first map of aerial routes a fortnight ago, some misapprehension seems to have arisen as to the precise areas over which flying would be allowed. In one quarter it was stated that the whole of the United Kingdom, with the exception of the stated routes, was to be a "prohibited area." This is not so. On the contrary, it is now made clear that, with the exception of the 71 areas scheduled by the Regulations as "prohibited," aircraft are free to fly over any part of the British Isles. As to the authorised main routes referred to, it is understood that additions are shortly to be made to these, as it can be determined what facilities and assistance can be afforded to aircraft using them. The whole question of prohibited areas, too, will be reconsidered from time to time, and it seems a fair assumption that a certain number of these will be removed from the schedule in course of time. Certainly a study of them gives one to think that some of them cannot be projected as to be permanently scheduled as a part of the defences of our shores.

There are other points which may occur to those who study the Regulations with close attention, but we think we have drawn attention to those which most seriously matter to those about to embark upon the business or sport of civilian flying.

The Japanese Air Service

A mission of 17 officers and 20 men of the French aviation service, headed by Col. Faure, has arrived in Tokyo to assist in the reorganisation of the Japanese Air Service. It is also stated that the French Government is sending 100 aeroplanes to Japan for the use of the Japanese Air Service.
"STRAFED."—This picture, reproduced from a drawing, prepared by the Air Technical Services, shows admirably the advantages of the Vee formation of flying. The fire of all the machines in the formation can be concentrated on a single target, in this instance a Fokker triplane.
THE TARRANT GIANT TRIPLANE

At last authentic particulars of the Tarrant triplane, regarding which rumour has been busy for some time, are available for publication. Guarded references to this interesting machine have been made from time to time, but these have been mostly of such a nature as to stimulate curiosity without satisfying it with facts and figures. A few days ago the veil surrounding the details of the machine was removed, and our representatives had an opportunity of examining the machine in every detail.

The general lay-out of the Tarrant triplane will be gathered from the accompanying illustrations. The chief characteristic is perhaps the triplane arrangement with top and bottom planes of equal span and a middle plane of considerably greater span than that of the other two. Next comes the power plant, which consists of six Napier "Lion" engines, four of which are mounted on the bottom plane, the other two being placed between the middle and the top plane, and driving tractor screws. The fuselage is of the monocoque type, and is of a very good stream-line form.

Originally the machine was designed for long-distance bombing, but it will now be converted into a passenger carrier. All the woodwork has been done at the Tarrant Works at Byfleet, but a good proportion of the metal work has been carried out at the Royal Aircraft Establishment at Farnborough. The most important feature of the Tarrant "Tabor" as regards construction is the adoption of the Warren type of girders to wood construction. In metal, this girder has long been employed, but practical difficulties, chiefly in regard to terminal attachments, has hitherto delayed its employment where wood is the material.

Without actually seeing the machine, the quotation of dimensions is apt to convey only a vague sense of her great size, but when it is mentioned that the span of the middle plane is a little over 130 ft., and the height from the ground to the top plane is 37 ft. 3 ins., some idea can be formed of the magnitude of the task of constructing this machine. The weight of the Tarrant "Tabor," as the machine is named, is approximately 45,000 lbs., of which 9,000 lbs. is available for passengers and cargo, while 10,000 lbs. are taken up by the fuel for the six engines, which develop an aggregate of 2,700 to 3,000 h.p. With all engines running at full throttle the speed is estimated at 110 m.p.h., giving a range of about 900 miles, while at the "cruising speed" (the most economical speed) the range is calculated to be about 1,200 miles. This is with 10,000 lbs. of petrol on board and carrying 9,000 lbs. of passengers and cargo. If fewer passengers are carried and the tankage increased, the range can be very considerably extended.

When the machine was inspected a few days ago, she was nearly ready for flight, and barring unforeseen accidents she should be ready for testing very soon.

Mr. W. G. Tarrant, of Byfleet, Surrey, is to be congratulated upon his courage in tackling such a costly experiment in the interests of the development of the large commercial aeroplane of the future, which cannot fail to benefit the cause of aviation not only in this country, but throughout the world. He has associated with him a number of specialists, of whom we mention only a few. Capt. E. T. Rawlings, D.S.C., general manager of the firm, will be remembered as being one of the crew of the Handley Page bomber which flew from London to Constantinople, dropping bombs with good effect on the latter city. Capt. T. M. Wilson, of the Technical Department of the Air Ministry, was lent to the firm by that Department, and has now left the Ministry and joined Mr. Tarrant permanently. It was to a very great extent due to Capt. Wilson that the machine was turned into a practical proposition. The pilot of the Tarrant triplane will be Capt. F. G. Dunn, A.F.C., who will be remembered by most readers of FLIGHT as one of the Grahame-White pilots at Hendon before the War. Finally it should be mentioned that Majors Turner and Grinstead, of the R.A.E., have rendered valuable assistance in the construction and erection of the machine.

Time does not permit of a more lengthy description of the Tarrant triplane this week, but we hope to publish an illustrated detailed description at an early date.
THE TARRANT GIANT TRIPLANE: A drawing of the machine as she will appear in flight.

The power plant consists of six Napier "Lion" engines.

"Aerograms"

In the course of his lecture on April 30, under the auspices of the Industrial Reconstruction Council, Mr. Holt Thomas outlined a scheme for combining the services of the aeroplane with the telephone and telegraph in the transmission of long urgent messages, which would be called aerograms. He said the general idea was to telephone or telegraph a message to the aerodrome where it would be taken down in shorthand, carried, say, to France in a plane, and dispatched from there to its destination. Such a system, he thought, would be invaluable for dealing with long Press cables. A message of 3,000 words between Paris and London could be delivered by aeroplane long before it had got across the cable. Moreover, the aeroplane would probably be carrying millions of words and other things as well at the same time. The economy in labour by the use of such a method would be enormous.

It was not going to be easy to organise a service. The public would have to pay for speed in the aerial mail, and for that reason he was not a great believer in passengers, for they would not be able to pay the rate that would be necessary if they were to be transported quickly; if the transportation was not going to be quick, the passenger had better travel by the old method. Until the time of aerial liners was reached it would be impossible to make aerial travel pay.

Canadian Aces Over London

The crack Canadian pilots who were privileged to provide an escort for the procession of Dominion troops through London on Saturday last were deeply disappointed that stringent instructions from the Air Ministry prevented any "stunts" being performed, especially bearing in mind the performance by the Australian flying officers a week previously. Their stately flight was none the less appreciated by the thousands who turned out to see the Overseas troops pass by. The machines were commanded by Lieut.-Col. R. Leckie, D.S.O., D.S.C., D.F.C., and one flight was led by Maj. A. E. McKeever, D.S.O., M.C., and the other by Capt. D. R. MacLaren, D.S.O., M.C., D.F.C., while among other famous aces aloft were Capt. C. O. Johnson, M.C., Maj. J. O. Leach, M.C., A.F.C., Capt. C. Falkenberg, D.F.C., Maj. A. D. Carter, D.S.O., Capt. E. Burn, D.F.C., Lieut. G. R. Howson, M.C.
Entrance Fee and Subscription for New Members

In accordance with the Resolution passed unanimously at the Annual General Meeting of the Royal Aero Club, on March 31, 1919, the Subscription for Members elected on or after May 31, 1919, will be £7 7s. per annum, and the Entrance Fee £5 5s.

Club Bedrooms

The House Committee at its Meeting on April 28, 1919, decided that the price of Bedrooms on and after May 1, 1919, should be 6s. per night.

World's Aeronautical Records

The Fédération Aéronautique Internationale is the sole authority for granting World's Records of flying performances, and the Royal Aero Club is the official representative of the Federation for the British Empire.

The Fédération, being International, it has not been possible for any World's Records to be ratified during the War, and consequently any statements which have been published as to World's Records having been made during the War are not official, and are likely to mislead the public.

With the resumption of civilian flying, the Royal Aero Club will be in a position to supervise attempts on records under the Fédération Aéronautique Internationale and the Competition Rules of the Royal Aero Club.

A person wishes to claim a World's Record for a flying performance carried out since 1914, is particularly urged to adhere to the Competition Rules of the Royal Aero Club.

The following information concerning the "Vimy-Rolls" entered for the Transatlantic flight has come to hand, and should prove of considerable interest.—ED.

The Transatlantic Contest

During the past week the principal development in connection with the Transatlantic contest has been the accession of the Vickers-Rolls-Royce machine to the list of entries. Details of this machine are given below, and photographs are reproduced on the next page.

The four-engined Handley Page machine, with Rolls-Royce engines left Liverpool on May 2, and it is not expected that it will be ready to leave Newfoundland before the June full moon.

With a view to giving them a better chance of getting away in certain winds, Messrs. Hawker and Raynham have been searching the island for an auxiliary aerodrome, but so far they have not met with any success. The weather has been so unsettled as to prevent any attempt at the flight.

Dr. Alexander Robinson, the Postmaster-General, has sealed a second mail and handed it to Mr. Raynham for conveyance across the Atlantic. The stamps are specially surcharged "First Transatlantic Aerial Mail" on the ordinary three-cent stamps. To prevent forgery each stamp is initialed by the Postmaster-General.

While preparing to start for Newfoundland on May 3, two of the United States flying-boats were damaged. Two wings of the N.C. 1 were completely destroyed, and the lower elevator and tail plane of the N.C. 4 were badly damaged. The fire was caused by a spark from an electrically-driven pump falling on a drum of petrol, which took fire. It is expected, however, that N.C. 2 will be sent to Newfoundland as soon as the weather permits.

The N.C. type of boat has a span of 125 ft. The lower wing span is 94 ft. The wings are 12 ft. chord. The length of the hull is 44 ft. 9 ins. Its gasoline capacity is 1,890 gallons, contained in 10 separate tanks. Four 400 h.p. Liberty motors are fitted.

The Vickers "Vimy"—Rolls-Royce

The following information concerning the "Vimy-Rolls" entered for the Transatlantic flight has come to hand, and should prove of considerable interest.—ED.

The construction of the Transatlantic "Vimy" has now been completed at the Weybridge aeroplane works of Messrs. Vickers, Ltd. This aeroplane is practically similar in every respect to the standard "Vimy" as supplied to His Majesty's Government. Two standard 350 h.p. Rolls-Royce engines are installed. The capacity of the petrol tanks has been increased to 865 gallons, and the lubricating oil tanks to 50 gallons. With this quantity of fuel the machine has a range of 2,440 miles. The maximum speed is over 100 miles per hour, but, during the flight across the Atlantic the engines will be throttled down to an average cruising speed of 90 miles per hour. The span of the "Vimy" is 67 ft., and overall length 51 ft. 6 ins. The chord of the planes is 10 ft. 6 ins. A wireless telegraphy set, capable of sending and receiving messages over long distances, will be carried, and the pilot and navigator will wear electrically-heated clothing.

The pilot, Capt. J. Alcock, D.S.C., was born at Manchester in 1892, and received his technical engineering education at the Empress Motor Works, at Manchester. He became
THE VICKERS "VIMY-ROLLS."—Three-quarter front view. The machine will be piloted by Capt. J. Alcock, D.S.C., and the navigator will be Lieut. A. W. Brown, whose article on elementary navigation was published in "Flight" recently.

Interested in aviation in its early days, and adopted it as a profession. He took the Royal Aero Club’s Flying Certificate at Brooklands in 1912, and rapidly rose to the head of his profession, taking part in a large number of the early competition flights, amongst others the well-remembered race London to Manchester and return in 1913, in which he secured second place.

At the outbreak of War he immediately joined the R.N.A.S., and was posted to Eastchurch as an instructor. Later he became the Chief Instructor of the Aerobatic Squadron. He did valuable work on the Turkish front, where he won the D.S.C., and held the record for long-distance bombing raids. He was eventually taken prisoner by the Turks owing to an engine failure, and remained as such until the end of the War.

The navigator, Lieut. Arthur Whitten Brown, A.M.I.E.E., M.I.M.E., A.M.F.A.I.E., who will be known to our readers as the author of a recent article in Flight on elementary navigation, was born in Glasgow in 1886, and his parents were American citizens. He is an engineer by profession, and received his practical training with the British Westinghouse Co., which is now allied with the Vickers Co. He received a thorough knowledge of surveying, and being interested in aviation, naturally devoted study to aerial navigation as applied to surveying. He enlisted in the University and Public Schools Corps in 1914, later receiving a commission in the Manchester Regiment, and served with the 2nd Battalion in France during 1915. He then transferred to the Royal Flying Corps as an observer, and was wounded and taken prisoner of war in the same year.

He was later interned in Switzerland, and repatriated in December, 1917, since which time he has been engaged with the Ministry of Munitions on the production of aero engines, and has put in a considerable amount of flying at home stations. He is also a pilot of some experience, and has flown many types of machines.

Lieut. Brown, after duration tests in the Transatlantic "Vimy," considers he will have no difficulty in making a successful Atlantic flight. He intends to rely upon a system of navigation similar to that employed in marine navigation, and will carry wireless instruments capable of receiving and despatching messages for a distance of 250 miles, and be able to communicate with passing vessels.

The preliminary flights were successfully carried out at Brooklands Aerodrome, Surrey, by these two officers, who expressed themselves completely satisfied with the tests. The Rolls-Royce engines ran perfectly, and the aeroplane left the ground with its load of four tons of petrol and oil after running a very short distance on the ground.

The aeroplane has now been dismantled and packed in cases. It is awaiting shipment to Newfoundland, and will be accompanied by the pilot, navigator, and mechanics, with their full equipment.
DRAWING OFFICE DATA

(Continued from page 595)

V.—SUNDRY TABLES.

ALTHOUGH the ordinary engineers’ pocket-books etc., of various materials, there are many which are generally give a number of different tables of weights, not entirely reliable, or which do not take into account the ultimate tensile strength of the materials.

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Fig. 31.

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Fig. 32.

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account the special requirements of the aircraft industry, which are in some cases somewhat different to those obtaining in other branches of engineering. Thus, in the case of mild-steel plates, for instance, which are extensively employed in aircraft construction for various fittings, the importance of maximum strength for minimum weight calls for somewhat smaller tolerances than are generally considered.
necessary for a good many of the other purposes for which mild steel plates are employed. In Fig. 31 is shown the maximum and minimum permissible thickness for standard wire gauges ranging from 6 to 24. It will be seen that greater accuracy is demanded for thin plates than for thick. This, of course, is due to the fact that a given difference of, say, .005 in. will form a much greater percentage of the thin plate than of the thick one. When determining the strength of a mild-steel fitting, it is often

| Outside Diameter in Inches | \( \frac{1}{4} \) | \( \frac{2}{16} \) | \( \frac{3}{32} \) | \( \frac{5}{32} \) | \( \frac{7}{32} \) | \( \frac{9}{32} \) | \( \frac{11}{32} \) | \( \frac{13}{32} \) | \( \frac{15}{32} \) | \( \frac{17}{32} \) | \( \frac{19}{32} \) | \( \frac{21}{32} \) | \( \frac{23}{32} \) | \( \frac{25}{32} \) | \( \frac{27}{32} \) | \( \frac{29}{32} \) | \( \frac{31}{32} \) |
|---------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Weight of Copper Tubes in lbs per foot run | | | | | | | | | | | | | | | | | | | | |
| Weight in lbs per cut - 100 ft | | | | | | | | | | | | | | | | | | | | |

| Outside Diameter in inches | \( \frac{1}{4} \) | \( \frac{2}{16} \) | \( \frac{3}{32} \) | \( \frac{5}{32} \) | \( \frac{7}{32} \) | \( \frac{9}{32} \) | \( \frac{11}{32} \) | \( \frac{13}{32} \) | \( \frac{15}{32} \) | \( \frac{17}{32} \) | \( \frac{19}{32} \) | \( \frac{21}{32} \) | \( \frac{23}{32} \) | \( \frac{25}{32} \) | \( \frac{27}{32} \) | \( \frac{29}{32} \) | \( \frac{31}{32} \) |
|---------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Weight of Aluminium Tubes in lbs per foot run | | | | | | | | | | | | | | | | | | | | |
| Weight in lbs per cut - 100 ft | | | | | | | | | | | | | | | | | | | | |
convenient to be able to find at a glance the tensile and shearing strength of a certain width of the material. To tabulate these for all the widths that might be required would result in too cumbersome a table, but in the two right-hand columns of the table in Fig. 31 the tensile and shearing strengths of the various gauges have been tabulated for a width of 1 in. From these it will be a simple matter to find the strength for any width. The figures are based on steel having a tensile and shearing strength (ultimate) of 26 tons per square inch and 20 tons/square inch respectively.

Figs. 32 to 37 inclusive give weights of various plates and tubes, some of which—as, for instance, aluminium and especially Duralumin—are not usually included in the ordinary pocket books. These tables will scarcely need any explanation, and have been found in practice to be very convenient for reference purposes.

(To be concluded.)
AIR NAVIGATION

BY MAJOR H.E. WIMPERS, R.A.F.

The subject of air navigation has been chosen because with the ending of the War this becomes the most important of the unsolved problems relating to aviation. It is unsolved mainly, I think, because the actual operations of the War, apart from certain individual efforts of great merit, did not reach the point at which really long flights were made. Had the activity of the War continued there is little doubt that long-distance air navigation would have been impelled to as high a degree of actual achievement as was attained by other branches of the new science of aeronautics.

It happens that one particular aspect of the navigation problem did indeed attract quite a considerable amount of attention during the War, and it may surprise some of my audience to learn that the problem of bomb-dropping is one of navigation in miniazure. A little reflection will show that this must be so. It is essential that the course-made-good horizontally by the released bomb shall carry it correctly to its target, and moreover that this journey shall be completed in a period of time precisely equal to that occupied by the falling bomb in its vertical descent to the earth. This course-made-good may happen also to be the course steered, but this is exceptional and will occur only in up or down wind attacks. In general the attack will be in any direction relative to the wind, and the course-made-good will therefore be totally different to the course steered. Any increase in the intensity and accuracy of anti-aircraft defence makes it more than ever necessary to attack across wind; and it therefore follows that bomb sighting requires a solution of the very same horizontal vector triangle of aircraft motion as falls to the air navigator. Thus, it happens that the most important form of air navigation, that called "dead reckoning" or "D.R." already has received much more attention during the War than would have fallen to it for air navigation pure and simple.

Navigation in practice sometimes requires no more of the airman than recognising the towns, rivers, and railway junctions near which he flies, much as an automobile driver would do. Of this simple form of the art nothing more need be said. Sometimes, however, the land will be obscured by cloud or fog; sometimes the course will lie across the ocean; sometimes across deserts. If the safety of the craft and its crew is to be reasonably assured in each of these cases, provision must be made for navigation by very best scientific methods available.

Fig. 1 is a map prepared by the American journal Aeronautics to show alternative routes for crossing the Atlantic. The map is divided into three parts, each representing the central Atlantic with its boundaries. The purpose is the actual navigator's work in planning an air voyage, and in making the necessary observations en route—particularly in those features wherein his work differs from that of the sea navigator.

**Sea Craftsmanship**

All navigation begins with the sea. In the early days of sailing ships a knowledge of the surface winds in all parts of the navigable oceans was of first importance. Such knowledge was entirely empirical, and those who possessed it thought very little indeed of such effects as surface friction, and still less of the then unrealised importance of the weather conditions tens of thousands of feet above them. Coupled with an empirical knowledge of the average behaviour of
surface wind was an empirical knowledge of the ocean tides.

With the advent of the higher speeds of steam-driven ships the tide became more important as a factor deflecting the ship from its course, although the greater momentum due to swifter motion made the penalty of misjudgment very much heavier.

Aircraft are concerned with another ocean—that of the air itself. Its tides are far less easy to predict than the tides in the sea, and are of far, far higher velocity. Its tides are the winds themselves and their intensity may range to 100 miles an hour or even more. Here are no permanent tide charts to guide the would-be navigator, be his need ever so pressing. Long experience of surface winds has enabled his maritime predecessor to 'om some rough judgments of the ways of such winds.

But we cannot count on the long experience of the mariner, however hardly won and however powerfully expressed, will apply in the upper air; the formulation of even rough rules may prove not to be possible and the wind, and whether possible or not, certainly they are as yet unrevealed. Meteorology, ever willing to help but sometimes lacking the means, is at last beginning to place in a position in which it can include in its worldwide survey the study of the winds of the upper air. Such study is absolutely essential to the future of air navigation, and that this is beginning to be realised, witness the daily publication since January 21 last in The Times of tables of the "Wind Direction and Velocity in the Upper Air," the first of which is given herewith.

Monday, January 20, 1919—Morning Observations.
Wind Direction and Velocity in the Upper Air.

<table>
<thead>
<tr>
<th>Height above Ground</th>
<th>m.p.h.</th>
<th>m.p.h.</th>
<th>m.p.h.</th>
<th>m.p.h.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,000 ft</td>
<td>22</td>
<td>28</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5,000 ft</td>
<td>S.S.W. 14</td>
<td>S.W. 13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10,000 ft</td>
<td>S.S.E. 19</td>
<td>N.W. 43</td>
<td>W. 23</td>
<td></td>
</tr>
<tr>
<td>15,000 ft</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


These are given in miles per hour. Note here the importance of choosing the right level in which to fly. On this day in eastern counties the wind at 5,000 ft. was but 19 m.p.h., whereas at 10,000 ft. it was more than twice as much, whilst at 15,000 ft. the velocity had almost sunk to that at the 5,000 ft. level. Here the wind is seen first to increase with height and then to decrease, whilst the direction also changes considerably. But the more variable are the weather conditions the more necessary it is to have the right sort of meteorological information before setting out on a long air voyage.

Allowance for Wind.

It is easiest to allow for the effect of the wind by considering the aircraft to move straight ahead through still air, and then to consider separately the simultaneous shift—which we call wind—of this air ocean relative to the earth. If, for instance, an aeroplane starting from Hendon, heads due north for an hour at an air speed of 100 miles an hour, it would, if there were no wind, then find itself 100 miles north of Hendon, but if, in the meantime, there had existed a uniform wind such that the air in which the machine mounted at Hendon had since arrived at Reading, the aircraft would at the end of the hour find itself 100 miles north, not of Hendon but of Reading. Thus, in Fig. 2, the machine flies from H to A, whilst the air moves form H to R and from A to B; so that at the end of the hour the hour the machine finds itself not at A but at B. This is called a vector diagram, and the velocity vector HA is said to be added to the wind velocity vector AB giving HB as the answer.

Evidently this means also that a machine wishing to fly from H to B must set its head along the direction HA and not in the direction HB; the angle AHB, the angle between the course steered and the course-made-good, is a very important one, and known as the angle of drift. HA is the course steered and HD the course-made-good.

Note that on an "out and home" journey in the same wind and at the same airspeed the drift angles out and home will be equal. Thus, to fly A to C, see Fig. 3, when the wind is equal to BD in velocity and direction means setting the head of the machine along AB on the outward flight and along CB on the home flight. Then as AB and BC are equal the angles of drift (BAD and BCD) must also be equal. Thus, if a navigator knows the right angle of drift to allow for on his outward journey, he also knows it for his home journey if the same conditions as to wind and air speed remain.

So if air speed be known and wind be known, and a good compass be available, the navigator is in the easy position of being able to predict his position from hour to hour with complete precision. He is in the same position as would be the navigator of a ship who knew the record of his log and the precise effect of the tides. The maritime navigator makes use of this knowledge—of the best approach he can make to it—by plotting on his chart the position his ship would be in were there no tides at all, and this he calls the "dead reckoning" or D.R. position. He then corrects this position for the effect of the assumed tides, and so arrives at his "estimated position." This needs always to be recorded in the log no matter whatever other navigational methods may be employed as a check. The importance of keeping note of the D.R. and estimated positions has long been known; there are some graphic "instructions" in Hakluyt's voyages, dated 1580.

Our air navigator needs to keep his D.R. position just as carefully, but he is in the more fortunate position in that he can almost always determine the velocity and direction of the wind (his aerial "tides") from time to time by observation on the visible earth beneath. The ship navigator could only do this if the sea were transparent and he could see the motion of the ocean and so observe and measure his angle of drift. The air navigator can almost always count on obtaining a glimpse, from time to time, of the earth and so check his current estimate of the wind.

A curious and convenient relationship here comes to the
air navigator's aid. If he uses a horizontal bearing plate having a transparent centre and lays across it a rod pivoted at one end, as shown in the diagram in Fig. 4, so that its length AB is parallel to the direction of the drift of the ground, AC, the line of symmetry being parallel to the fore and aft lines of the machine, and if he then draws a pencil line, AB, on the bearing plate (previously oriented correctly) and then repeats this operation on a number of courses, he will obtain a wind star, and the intersection point, known as the wind point, will give him the velocity and direction of the wind. Thus, in Fig. 7 three such courses are shown, and all, it will be observed, intersect at the wind point; RC is then the velocity of the wind to scale, and the direction of RC relative to the bearing plate scale gives the direction from which the wind is blowing. The point R can, of course, be got by a cut of two lines only, but for accuracy such change of course should not be less than say 50 deg.; this can conveniently be done by turning first 25 deg. one way, and then the other and for equal times, since this does not interfere appreciably with the course desired to be made good. Of course, aircraft on closed patrols, for war purposes, change course several times on each patrol and a wind determination on the ground and so determining the length of PA, and hence the position of the wind point. Equally, once the wind point is obtained, the length PA will give the ground speed and the bar, AB, can be graduated directly in m.p.h.

The procedure for setting AB to the drift angle depends on the height. At low heights it suffices to view the ground vertically below, but at considerable heights it is much more accurate to observe the angle which an object passed over some minutes previously bears to the fore and aft line of the machine (a tail bearing). When over the sea a flare may be dropped to afford the necessary fixed point when nothing else is available.

As much as for the actual use of the method: the reason why the drift lines in Fig. 5 all pass through the wind point in this convenient manner may seem to need explanation to those who are not prepared to take such construction for granted.

Thus, in Fig. 6, if an aeroplane head due north along CA, and the observed drift line be AB, we know the closing side of the vector diagram will represent the wind, and that it must start somewhere along the line, AB, and must end at C. In short, AB is what is called a "position line" for the wind point. Now, head the craft on a new bearing say 75 deg. E. of N., along CD, and let DE be the observed drift line. Then we get a new vector diagram, and a new position line, DE, for the wind point; these two intersect at P, and this must, therefore, be the wind point, and PC the velocity and direction of the wind to scale (the scale being the same as that by which CA and CD represent the air speed). Probably the obtaining of a wind star in this way by flying on several courses in succession affords as accurate a way as can be devised for the ascertaining of the wind elements at any desired altitude and time. More, in the nature of the case, meteorological records must always be received some little time—not infrequently in practice, some hours—after the moment at which they were measured, whereas by this method the instantaneous values can be obtained and can be checked as often as desired.

It should also be noted that AP and DP, in Fig. 6, will measure the ground speeds along each of these courses. Hence, once the wind point is found and the instrument set accordingly figures can be given at once for the ground speed along any contemplated course and the probable duration of flight to cover any desired mileage over the ground.

Sometimes—in especially in an ocean flight—a suitable object for drift observations will be seen on the earth's surface, but it may not be so placed as to be in the aircraft's path, or it may not be noticed until it is too late or too far away. For such cases the relative path—see Fig. 7—instead of being AB may prove to be CD. How is one then to determine the course being made good?

Perhaps the best method is to take times and bearings of the object as it passes through the points E and G, such that the time from E to F is equal to the time from F to G. Then if the angles a and d are not more than 15 deg., it is easy to find CD, the course-made-good, by marking off AE proportional to the angle b and AG proportional to a and then to join FG. Thus, if a be 135 deg., and b say 13 degs., we mark off AE at a length of 1.5 in. and AG at a length of 1.55 in.; this gives as the points E and G. Draw a line through these points and we have the bearing of the course-made-good; its inclination to the course being steered will give the drift angle.

With airships the ability to hover can be made use of. If an airship heads up wind and reduces speed until some object below appears stationary, the speed of the airship relative to the air must be equal and opposite to the wind. Hence, the velocity of the wind can be read on the air speed indicator and its direction noted by reading the course being steered.

Whether this method was actually used by the raiding Zeppelin airships I do not know, but it appears that use was made by them of an alternative method. This alternative plan was to steer up wind and suddenly put the ship on a wide circular uniform turn; on completing 360 deg. change of course the ship would, if the wind be zero, be back over the starting point of the turn—in the other event it would be in the rear of this point by a distance equal to the space covered by the wind in the time of the turn. The additional time taken to recover this lost ground at a known air speed, is related to the total of the two times in the same proportion as the wind velocity is to the air speed.

Thus, if $T_1$ and $T_2$ be the two times and $V$ the air speed, then wind velocity = $T_1 V / (T_1 + T_2)$.

The Prediction of Wind

Air navigation requires two things of the meteorologists: first, that they shall provide accurate information as to the average weather conditions along any specified air route, and secondly that they shall provide a forecast of the probable winds in the upper air during the ensuing two or three days.
The former is necessary when planning out standard air routes in conjunction with their chains of landing grounds, and the latter is necessary in order to enable the navigator to select the best altitude for flight and the probable time table for his journey. Forecasting surface winds is, however, a difficult matter, and it may be that before long the science of meteorology may prove equal even to G. Taylor, Gold and Dobson. We may hope, therefore, that before long upper air will prove as capable of being predicted as the surface wind is, and that before long the pressure of the earth's rotation, p, the density of the moving air.

Careful researches along these lines have brought to light a surprising and most fortunate closeness of connection between the geostrophic wind and the actual wind. It is found in fact that the two may without any error be regarded as substantially identical. Sir Napier Shaw remarks on this:

"To assume that this balance of wind and pressure in the upper air is an operative principle of atmospheric structure may be thought a hazardous mode of procedure, and it requires the most scrupulous examination, but the proper course seems to be to accept it, at least until the proved exceptions are numerous enough to show that, under the prescribed conditions of motion approximately in a great circle, finite differences of pressure do exist in the air without the compensating velocity in the air currents. It need not be supposed that the balance is always strictly perfect, but that in ordinary circumstances the accelerating forces operating in the air are so small in relation to the pressures that we measure, that they are beyond our powers of observation."

Sir Napier Shaw also points out that in ordinary circumstances there is a deviation of some 20 to 30 degs. between the direction of the surface wind and that of the geostrophic wind, due to surface friction and in the direction which that friction would indicate. Dobson has shown that although the geostrophic velocity may be arrived at within 1,000 ft. of the earth, the calculated direction will not usually be obtained till 2,500 ft.; it follows, therefore, that if the surface frictional effects, always local and uncertain, are to be avoided, as accuracy in air navigation requires that they should, flight at a lower height than 2,000 or 3,000 ft. over land is undesirable. The effect is much less over the sea, and the equivalent heights would be lower. As a general rule, the velocity of the surface wind over the sea is one-third less than it would be were there no surface friction; and over the land two-thirds less than it would otherwise be. In the absence of surface friction the velocity would be that of the gradient wind. This loss of velocity of 33 per cent. over the sea involves the loss of about half the wind's kinetic energy; the missing half is found in the energy of the ocean bakes.

Fog is so much the worst enemy the air navigator has
to face the fact that it may not be out of place to consider the conditions which govern its occurrence. Fortunately meteorologists, are usually able to provide warnings when this danger is imminent, but the human subject to vibration, the compression stroke of an internal combustion engine, is fairly well known. It is, for instance, known, that whenever the ground is exceptionally cold so that there is a sharp rise of temperature from the ground upwards and at the same time a slow drift of the air from the cold region the weather is likely to be foggy. The "reversed temperature gradient," as it is called, prevents the air below it from escaping upwards. The air below has a sort of "friction" with the earth's surface over the city. The smoky pall will presently spread as the smoke finds itself unable to escape.

It might be expected that in a freely moving atmosphere the "cocked hat" would become equalised everywhere, i.e., that it would become pale and unshaded. In air navigation the same is the case. But in this situation the compressibility of the air the law of temperature change is much simpler, being in fact for a well churned atmosphere the same as that which governs the temperature of the air in the compression stroke of an internal combustion engine, i.e., the temperature changes approximate to the adiabatic. Our well-churned atmosphere would have not a uniform temperature, but one falling off at the rate of one degree C. for each 100 metres of altitude. This condition sometimes arises, and when it does the following curious phenomenon occurs viz., that any portions slightly colder than their neighbours tend to descend to the bottom. Thus, on such occasions the whole atmosphere is very unstable.

When, however, the temperature falls off less rapidly than the adiabatic would seem to, the assumption that is, it is still stable. It is very stable when the temperature is isothermal, and exceedingly so under a reversal of gradient. A steeper falling-off in temperature than the adiabatic would seem to be impossible. Newfoundland fogs are proverbial, and since Transatlantic flight may well start from that island, the conditions for air navigation there would be said to be very unpropitious. It must be remembered, however, that these particular fogs are chiefly known by their effects on ships, and that the essential danger for air navigation is fog over land, and not for fog, as if fog anywhere, be always low-lying and can be flown above, but fog over a landing ground is another matter.

**Checks on Position**

So much for winds and fogs. We now come to the action which the air navigator needs to take to check his estimate of his DR position. In sea navigation, the usual check on the estimated position is by an observation of the sun by day or the stars by night. A single observation gives a "position line," i.e., a line on the chart somewhere along whose length the true position of the ship must be. Thus, if in Fig. 8 A be the estimated position of the ship, and BC a position line found by the observation of some heavenly body, it would be assumed that the real position of the ship would be somewhere on the shift from A to B attributes the minimum error to the estimate. If BC is sometimes called a "sumner-line"; mathematically it is the locus of all points in the neighbourhood of A, at which the heavenly body observed has the same altitude. A knowledge of that altitude, therefore, tells the navigator his position must be somewhere along this line, but it does not indicate the exact spot; for that a second observation is required.

If a further position line such as GH could be obtained, then we should know, within the limits of instrumental and observational error, that the ship's position must be at F. Thus, if GH were also to be obtained, it would be assumed to be inside the "cocked hat," which is shown shaded. In air navigation the same methods of observation can be employed, as soon, at any rate, as observational instruments capable of accurate use in the air are available.

To sea the situation is in part different. Here it is required to measure the angular elevation of any heavenly body above the visible horizon. This visible horizon at sea is never a great way off; thus from an observing point 50 ft. above the surface of the water in addition its eye is always raised, in order to attempt to use an ordinary sextant from an aircraft, however, brings on up against the serious difficulty that from a height of 5,000 ft. the horizon is nearly 90 miles away, and the height of air to be passed through is ten times as great as in the previous instance. With the least haze, therefore, a definite line for the horizon will not be found. Quite certainly the upper line of some haze or cloud lying at an unknown height. To avoid horizon difficulties, an artificial horizon may be employed; this may be either some gravity controlled level or a gyrostatic mechanism. The former is much less troublesome under a reversal of gradient. A steeper falling-off in temperature than the adiabatic would seem to be impossible. It has been found possible to determine from an aircraft the compass direction from which wireless waves are being received, and although the time is yet ripe for a discussion of aviation, in this method of navigation, however, is that "estimated positions" by dead reckoning must always be logged; then, that position lines derived from astronomical observations or directional wireless should be obtained as a check on the positions so logged.

A point which may perhaps be worth bringing out is that a combination of bearing and timing observations on a wireless station which is being passed to port or starboard enables the drift angle to be determined without the earth itself being visible. Thus if in Fig. 9 an aeroplane, A, is steaming a course, BC, and making good a course, ADE, and that there is such a station A where the wireless waves are sent, to plot a wireless position line; and if two such beacon station are sending and are suitably placed, a "cut" may be obtained. Or one such position line may be obtained with observation with observation by astronomical means. Care must be taken in plotting wireless position lines on a Mercator chart, since great circles on such charts need to be represented by approximately a number of readings, however, this error can perhaps be reduced to manageable limits.

A gyrostatic means of preserving the level are much more attractive in theory, and thanks to the energy and ingenuity of inventors, there is a good prospect of practical success being achieved; but such apparatus is usually bulky for such work, and this weighs against its greater accuracy.

Apart from altitude observations with sextants, azimuth readings will be found advisable—as at sea. This opens up a field for research in which much has yet to be done. Another point which has only recently come under discussion is the movement of fog. It is well known that the air over a field for research in which much has yet to be done. Another point which has only recently come under discussion is the movement of fog. It is well known that the air over a number of readings, however, this error can perhaps be reduced to manageable limits.

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Gyrostatic means of preserving the level are much more attractive in theory, and thanks to the energy and ingenuity of inventors, there is a good prospect of practical success being achieved; but such apparatus is usually bulky for such work, and this weighs against its greater accuracy.
"From Lord French's War book, "1914," which is now appearing in the Daily Telegraph in instalments, the first use of aeroplanes by the Allies in actual operations is given as Saturday, August 22, 1914. Speaking of the opening phases of the Battle of Mons on this day, Lord French says:

"The intelligence reports, which constantly arrived, and the results of cavalry and aircraft reconnaissances, only confirmed the previous appreciation of the situation, and left no doubt as to the direction of the German advance; but nothing came to hand which led us to foresee the crushing superiority of strength which actually confronted us on Sunday, August 23.

"This was our first practical experience in the use of aircraft for reconnaissance purposes. . . The number of our aeroplanes was then limited, and their powers of observation were not so developed or so accurate as they afterwards became. Nevertheless, they kept close touch with the enemy, and their reports proved of the greatest value.

"Whilst at this time aircraft did not altogether replace cavalry as regards the gaining and collection of information, yet by working together as they did the two arms gained much more accurate and voluminous knowledge of the situation.

"It was, indeed, the timely warning they gave which chiefly enabled me to make speedy dispositions to avert danger and disaster."

"Interest in the Transatlantic flight is as keen with the public in the United States as on this side. American officialdom also takes a broad view of the event, and the latest note from New York records that the U.S. naval tender "Melville" is already round about mid-ocean, with a crew of experts, journalists and cinema operators on board to handle at least the American section of competitors in this historical event.

In the West-end of London a booking agent has had a sign painted whereon is the following legend:—

"Agents for the principal Flying, Steamboat, and Railway Companies."

Aviation, it will be noted, takes premier place.

A good subject for dissection upon the mentality of the Hun is afforded by a proposition put forward recently to a British newspaper representative in Berlin by a young ex-officer with the Iron Cross. He was desiring of engaging a Press agent in the United States for the purpose of exploiting Udet, the "ace," who proposes to tour the States with the Fokker machine in which he claims to have shot down 65 Allied airmen! This young Hun was apparently quite surprised at the correspondent's suggestion that perhaps the United States might not enjoy the spectacle. He said Udet hoped to join the American Army as a flying instructor.

"Nothing less than an aeroplane to get about on is now employed by up-to-date "special correspondents" of the great dailies, judging by the reports now being sent from the European centres of unrest. "Since I arrived by an aeroplane of the Bavarian Aerial Lloyd from Berlin on Thursday," is just by way of sample of the means taken to impress superiority upon the humble motorist or weary train traveler of every day life.

"Apropos the self-sealing petrol tanks for aeroplanes, to which reference was made last week by Lieut. J. Imber, a young Canadian officer, and the inventor, the following are some details of this safety tank as given by Mr. Imber:"

"The secret of the self-sealing tank lies in the fact that I used the enormous hammer-head pressure set up by the bullet when passing through the petrol to close the exit hole. The hole where the bullet goes is a mere pin-prick; but where it pushes the petrol through the opposite side it leaves a hole you can sometimes put your head through.

"Therefore I made the tank in three parts. Inside is a light framework of aluminium tubing and baffle plates to stop the swish of the petrol to the hole. The secret of the self-sealing tank lies in the fact that I used the enormous hammer-head pressure set up by the bullet when passing through the petrol to the hole. The hole where the bullet goes is a mere pin-prick; but where it pushes the petrol through the opposite side it leaves a hole you can sometimes put your head through.

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"The same thing happens when the tank is "crashed," but in a reverse manner."
THE MARCH OF THE OVERSEAS TROOPS ON MAY 3rd.—A view of the troops rounding Kingsway after passing Australia House (in the distance). Above is a picture, from an untouched negative, of the attending air escort of fourteen Canadian aeroplanes.

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When we were small (and deary-me, how long ago that was!) we used to sneak out privily and buy forbidden "pornographic" books at a penny, which had more bite in them than the rather goody-goody literature authorised by the home authorities. There was always an aerial Raffles in them, a criminal of unlimited resource, who got away with the swag in a flying machine of wondrous design, dripping the corpses of his victims over-side with a series of sickening thuds.

Now it is seriously argued by the daily press that steps have been taken to put a stop just this sort of thing. In America already possesses a winged policeman. These appendages are not visible in the photograph, which shows the customary heavy-jawed Irish-American cop, "fly cop" in fact, to use another hallowed Americanism. They are of M. Eiffel's section, unknown to angels, and he is to chase the coy house-breaker with them.

PERUSING the popular prints, it would seem that it is much easier now to buy an aeroplane straight off the counter, so to speak, than to secure delivery of a motor-car. The Grahame-White Bantam, the Blackburn Monoplane, and several other light and handy vehicles for the private owner, are selling round about four hundred and fifty pounds. We shall see them in the "Bargain Basement" yet, with an "eleven-three" tacked on to the end of their price!

PARODYING Molière, we can say "On la reclame sa'-elle se nicher?" Mr. Harry Tate announces with an awful gravity that he intends to be the first comedian to fly round the world. "His object, as he has said in his programme, is to vindicate his jejune opinion with what he regards as a fact that this gentleman with the mirthful moustache will girdle the earth until about the time when his classic car has reached Brighton.

THE SCRIBES of the dailies (a queer breed) have dredged the dictionary for adjectives to describe the work of the Australian pilots on the occasion of the recent "march past" from the Mall to the Mansion House. "Heroic glory-laden soldiers," "spectacular steeple-chasing in the sky," "death-defying aerobatics," "aerial jazz display," etc., etc. We who were pilots on the occasion of the recent "march past" of many others.


The London to Bristol airway was opened on May 1 by a Bristol-Rolls-Royce "Coupe," which brought Mr. H. J. Thomas, Director and Works Manager of the British and Colonial Aeroplane Co., Ltd., to town to keep an appoint­ment with Maj. Gen. Seely at the Air Ministry. The machine, which was piloted by Lieut. Uwins, is a fast one designed to carry one passenger in a warm closed-in coupe, fitted with a writing desk and other conveniences, including telephonic communication with the pilot. In spite of strong wind and heavy showers of rain, a quick passage was made, and the machine landed at Hounslow 58 min. 5 sees, after taking off before dawn, with a parcel of Daily Mail, Daily Herald, Daily Express, and Evening News, which were dropped along the route by parachute. The weight of the machine, with its appendages, is some 3,000 lb.

The first flight under the new regulations was that of a D.H.9 with 250 h.p. B.H.P. engine, which left Hounslow before dawn, with a parcel of Daily Mail; afterwards returning to Blackfriars Bridge, where the machine landed at Hounslow 58 min. 5 sees, after taking off at Filton.

During the afternoon a Handley Page Rolls-Royce machine, with ten passengers on board, was flown to Manchester by Maj.-Col. W. F. Douglas, M.C., D.F.C., and a Sopwith Gru, with passenger Mr. H. J. Saint, were flown from London by Col. A. L. E. H. J. Saint, D.S.C., and passenger, Capt. D. Greig, being injured.

CIVIL AVIATION

OF NOTE

The Accident to Gen. Sykes

As aeroplane taking Maj.-Gen. Sir F. H. Sykes, Con­troller-General of Civil Aviation, to Paris, met with an accident on the afternoon of May 3, at Kenley. The pilot, Capt. B. G. C. Allen, was killed. Maj.-Gen. Sir F. H. Sykes was badly shaken, but was able to motor to London. He was removed in the evening to a private nursing home, and is making good progress.

The machine had begun to leave the ground. Gen. Sykes scrambled out of the machine, and extricated Capt. Knott, but the latter was so severely injured that he died on his way to the hospital.

FLIGHT!

May 8, 1919

The accident happened at a height of about 50 ft., soon after working soberly in the cloistered calm of one of the Inns of Court wondered who had started a saw-mill outside when the business began. Several ripe old residents were heard to express a wonder as to whether the pilot did not read the sign prominently displayed here: "The Porters and Police have Instructions to remove any Persons making a noise within these Precincts." As for the adjectives of the chronic­lers, we extemporised a few that were much more pungent, but no matter!

"No strap-hanging in the air," the Daily Herald assures us. Thank the kindly gods for that. We have strap-hung (unbeautiful verb!) in tubes, in railways, we have tittered on our toes (or somebody else's!) ever since the War began. The horses in our wires are sore, and it is a relief to hear that there is some place where one sits. But if ever the traffic combine butts into the aerial business you may be sure that their pockets will have left weather flaps underneath from which you are to swing by your teeth (passengers with false teeth may have halters). In central Africa the Distant Railway would do very well, for we believe the denizens of those parts have been thoughtfully provided by nature with tails for the purpose indicated.

SPEAKING seriously for a moment, nothing could be more regrettable than the sensational and ill-informed publicity now being given to aeronautics. On the strength of one short trip in an aeroplane any facile scribbler feels privileged to inflict his jejune opinions on the credulous public, together with all the wildest flights of his rudderless fancy. It is not, nor it cannot come to good. Any glib clap-trap about the wilderness of these prognostications would be indeed a prophet in the wilderness. The awakening, and the attendant revulsion, will come, we fear, after the first bad accident in which a passenger machine is concerned. After that aviation may be saved from its sordid friends, and will be free to develop as it listeth.
FLIGHT

CIVIL AVIATION

The Air Ministry makes the following announcement:—

These regulations, which have been in force for some time (see editorial below) apply to the United Kingdom only. They do not permit of civil aircraft flying from England across the Channel to any foreign country, and are not applicable elsewhere.

In pursuance of the powers conferred upon me by the Air Navigation Acts, 1911 to 1919, and all other powers enabling me in that behalf, I, the Right Honourable Winston Spencer Churchill, one of His Majesty's Principal Secretaries of State, by order make the following regulations:

1. No aircraft shall fly within the limits of the British Islands and the territorial waters adjacent thereto unless the following conditions are complied with:

(a) The aircraft shall be registered in the prescribed manner:
(b) The aircraft shall bear the prescribed registration and nationality marks:
(c) The personnel of the aircraft shall be licensed in the prescribed manner:
(d) The aircraft shall be in airworthiness condition as may be approved by the Secretary of State:
(e) The aircraft shall not fly over any prohibited area as defined by these regulations:
(f) The provisions of these regulations as to general safety, and the rules as to lights and signals and rules of the air, as set out in these regulations, shall be duly complied with:
(g) No mails shall be carried without the consent in writing of the Postmaster-General, and no wireless apparatus shall be installed or worked except as provided in the regulations:

2. Without prejudice to the last foregoing regulation—

(a) A passenger aircraft carrying passengers shall not—(1) fly within the limits aforesaid unless it has been certified in the prescribed manner as airworthy, and examination before each flight are complied with, and all the prescribed certificates in relation to airworthiness are carried in the aircraft;
(b) Land or take off except at the aerodromes and at altitudes as will enable the aircraft to land outside the city or town should the means of propulsion fail through mechanical breakdown or other cause;
(c) Carry out any exhibition flying or exhibition flying over any city or town area or populous district; or
(d) Carry out any trial flying or exhibition flying over any regatta, race meeting, or meeting for public games or sports, except where specially authorised for in writing by the proprietor of the aerodrome or meeting.

3. The air routes and aerodromes so far selected are—:

1. The official Air Navigation Regulations (printed 1911 to 1919).
2. W.T., a hut or part of a hut will be placed at the disposal of civilian aviators as an information bureau, and an officer will be detailed to give information and render every assistance to those requiring it. These huts will be clearly marked with the letters C.A.T.O. (Civilian Aviation Transport Office).
3. Meteorological bulletins and other useful information will shortly be available. The following retail prices have been fixed:—

<table>
<thead>
<tr>
<th>Item</th>
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</tr>
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4.—(1) No place in the British Islands shall be used as an aerodrome or as a regular place of landing or departure by passenger aircraft carrying passengers, unless it has been licensed for the purpose by the Secretary of State, and any conditions of such licence are complied with.

5. In the case of any contravention of or failure to comply with this regulation, the proprietor of the aerodrome shall be deemed to have acted in contravention of or, as the case may be, failed to comply with these regulations:

6. The bulk of machines which will at first take part in civil flying, having been built as Service machines, are marked with red, white and blue rings, and bear Government numbers. The existing Government numbers will be allotted to these machines as temporary registration marks. When permanent marks are allotted the old registration numbers must be cancelled and the new permanent marks put on within 14 days of allotment. Owners of aircraft upon which the service ring markings are painted must obliterate them.

7. The Air Ministry has been given the wreckage of any machine to which an accident has occurred must not be disturbed. A formal release for the removal of the wreckage will be given by the Air Ministry.

The following was published in a supplement to the London Gazette on April 29:

Order of the Secretary of State under the Air Navigation Acts, 1911 to 1919.

In pursuance of the powers conferred upon me by the Air Navigation Acts, 1911 to 1919, and all other powers enabling me in that behalf, I, the Right Honourable Winston Spencer Churchill, one of His Majesty's Principal Secretaries of State, by order make the following regulations:

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(e) The aircraft shall not fly over any prohibited area as defined by these regulations:
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5. In the case of any contravention of or failure to comply with this regulation, the proprietor of the aerodrome shall be deemed to have acted in contravention of or, as the case may be, failed to comply with these regulations:

6. The bulk of machines which will at first take part in civil flying, having been built as Service machines, are marked with red, white and blue rings, and bear Government numbers. The existing Government numbers will be allotted to these machines as temporary registration marks. When permanent marks are allotted the old registration numbers must be cancelled and the new permanent marks put on within 14 days of allotment. Owners of aircraft upon which the service ring markings are painted must obliterate them.

7. The Air Ministry has been given the wreckage of any machine to which an accident has occurred must not be disturbed. A formal release for the removal of the wreckage will be given by the Air Ministry.

11. All applications for licenses of every class, aerodromes, air-worthiness of machines, pilots, ground engineers, etc., should be addressed to the Air Ministry (C.G.C.A.).
8. These regulations do not, except where otherwise expressly stated, apply— (a) to military aircraft; (b) to any aircraft or to any persons if and to such extent as the regulations may from time to time reserve to any person or persons to whom the said regulations are applicable, except as respects the whole or any part thereof and the provisions thereof is liable to imprisonment for a term not exceeding in every case the maximum term of five years or a fine of five hundred pounds, or both such imprisonment and fine.

10.—(1) Where any aircraft flies in contravention of, or fails to comply with, these regulations or any provision thereof, the owner of the aircraft, and also the pilot or commander, shall be deemed to have contravened the said regulations or the parts under inspection, whether at the works of the main contractor or of any sub-contractor.

Penalties

(a) Where any member of the personnel of an aircraft is guilty of any act of espionage to which the provisions of these regulations relating thereto. (b) Where any foreign aircraft, after first landing in the British Islands, proceeds to a foreign destination, all the provisions of these regulations shall apply— (a) to military aircraft belonging to or employed in the service of His Majesty; or (b) to any aircraft or to any persons if and to such extent as the regulations may from time to time reserve to any person or persons to whom the said regulations are applicable, except as respects the whole or any part thereof and the provisions thereof is liable to imprisonment for a term not exceeding in every case the maximum term of five years or a fine of five hundred pounds, or both such imprisonment and fine.

Licenses and Certificates

1. Certificates of registration shall be granted by the Secretary of State on satisfactory ground being shown to his satisfaction, after due inquiry, and his decision shall be final.

Provided that in special cases the Secretary of State may suspend any such licence temporarily and provisionally pending the holding of an inquiry. Any certificate relating to the airworthiness of an aircraft may be cancelled on application by the Secretary of State if he is satisfied that there is ample doubt as to the safety of the aircraft in question, or of the type of which it forms a part, in connection with the regulations relating thereto.

(3) Where any person is convicted of any contravention or failure to comply with these regulations in respect of any aircraft, the Secretary of State may cancel or suspend the certificate of registration of that aircraft.

Interpretation

The Interpretation Act, 1889, applies for the purpose of the interpretation of these regulations as it applies for the purpose of the interpretation of an Act of Parliament, and in all these regulations were an Act of Parliament.

13. Nothing in these regulations shall be construed as conferring any right to fly in any place against the law of the land or in breach of any of the regulations herein, or as prejudicing the rights or remedies of any person in respect of any injury to persons or property caused by any aircraft.

Short Title

14. These regulations may be cited as the Air Navigation Regulations, 1919.

WINSTON S. CHURCHILL.
One of His Majesty's Principal Secretaries of State.

Air Ministry, London.

April 26, 1919.

SCHEDULE I.—Registration of Aircraft

1. Certificates of registration of all aircraft shall be granted by the Secretary of State, and upon registration there shall be assigned to the registered aircraft a registration mark.

2. The applicant, unless the Secretary of State in special cases otherwise advises, must be a British subject, or, in the case of a foreign aircraft to be registered and have its principal place of business in the United Kingdom.

3. Application for registration shall be made to the Secretary of State.

4. The fee to be charged for registration will be one guinea.

5. Upon any change of ownership of registered aircraft, the certificate of registration shall lapse, but a fresh certificate may be applied for by the new owner.

SCHEDULE II.—Licensing of Personnel

1. Licences shall be granted by the Secretary of State. Applications therefor shall be made to the Secretary of State.

Pilots

1. A person applying for a licence to fly passenger or goods aircraft will be required to— (a) pass a medical examination carried out under the control of the Secretary of State; (b) produce a certificate of competency issued by the Secretary of State, or be qualified as a Royal Air Force pilot; (c) submit proof of recent reasonable flying experience on the class of machine for which the licence is required, or pass such theoretical practical tests.

2. A person applying for a licence to fly machines other than passenger or goods aircraft must either be qualified as Royal Air Force pilot, or produce a certificate of competency issued by the Secretary of State.

Navigators

1. A person applying for a licence to navigate passenger or goods aircraft will be required to— (a) pass a medical examination carried out under the control of the Secretary of State; and produce a certificate of competency issued by the Secretary of State.

2. A person applying for a licence to be engaged as engineer on passenger or goods aircraft will be required to— (a) pass a medical examination carried out under the control of the Secretary of State; (b) submit proof of sufficient knowledge and experience in the management of aircraft engines; (c) undergo, if necessary, practical and theoretical tests.

Other Persons

5. Persons applying for a licence by holders of any other type of licence who are required to pass the examination shall in each case be examined by the Secretary of State for such part of the examination as he may require.

SCHEDULE III.—Certificates of Airworthiness for Passenger Aircraft and Periodical Overhaul and Examination of such Aircraft

1. A certificate of airworthiness in respect of one aircraft of any type referred to as "a type", aircraft of that type of which any such approval is to be undertaken in accordance with the conditions set out in this schedule at a charge of five guineas for each licence.

2. After the issue of a certificate of airworthiness to a type aircraft, any further aircraft of that type will be inspected by the Secretary of State, or the employee of the constructor, under arrangements approved by the Secretary of State, and if the aircraft in respect of which a certificate of airworthiness is desired conforms in all essential respects with the type aircraft, and is of satisfactory workmanship and materials, a certificate of airworthiness will be issued in respect of such aircraft by the Secretary of State at a charge of one guinea.

Provided that the Secretary of State may take steps to test the inspector approved by the employees of a constructor or any person or persons duly authorised by the insurer, and his decision shall be final.

Provided that in special cases the Secretary of State may suspend any such licence temporarily and provisionally pending the holding of an inquiry. Any certificate relating to the airworthiness of an aircraft may be cancelled on application by the Secretary of State if he is satisfied that there is ample doubt as to the safety of the aircraft in question, or of the type of which it forms a part, in connection with the regulations relating thereto.

(3) Where any person is convicted of any contravention or failure to comply with these regulations in respect of any aircraft, the Secretary of State may cancel or suspend the certificate of registration of that aircraft.

"Licensed aerodrome" means an aerodrome licensed under these regulations.

"Prescribed" means prescribed by these regulations or by directions of the Secretary of State thereunder.

"Prohibited area" means any area referred to in Schedule VI of these regulations.

"Secretary of State" includes, in relation to any purpose of these regulations, any person authorised by the Secretary of State for that purpose.

The Interpretation Act, 1889, applies for the purpose of the interpretation of these regulations as it applies for the purpose of the interpretation of an Act of Parliament, and in all these regulations were an Act of Parliament.

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2. After the issue of a certificate of airworthiness to a type aircraft, any further aircraft of that type will be inspected by the Secretary of State, or the employee of the constructor, under arrangements approved by the Secretary of State, and if the aircraft in respect of which a certificate of airworthiness is desired conforms in all essential respects with the type aircraft, and is of satisfactory workmanship and materials, a certificate of airworthiness will be issued in respect of such aircraft by the Secretary of State at a charge of one guinea.

Provided that the Secretary of State may take steps to test the inspector approved by the employees of a constructor or any person or persons duly authorised by the insurer, and his decision shall be final.

Provided that in special cases the Secretary of State may suspend any such licence temporarily and provisionally pending the holding of an inquiry. Any certificate relating to the airworthiness of an aircraft may be cancelled on application by the Secretary of State if he is satisfied that there is ample doubt as to the safety of the aircraft in question, or of the type of which it forms a part, in connection with the regulations relating thereto.

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The Interpretation Act, 1889, applies for the purpose of the interpretation of these regulations as it applies for the purpose of the interpretation of an Act of Parliament, and in all these regulations were an Act of Parliament.

13. Nothing in these regulations shall be construed as conferring any right to fly in any place against the law of the land or in breach of any of the regulations herein, or as prejudicing the rights or remedies of any person in respect of any injury to persons or property caused by any aircraft.

Short Title

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WINSTON S. CHURCHILL.
One of His Majesty's Principal Secretaries of State.

Air Ministry, London.

April 26, 1919.
accompanying the directions of the Secretary of State may have been made in
flight trials that the aircraft is safe for the purpose for which it is intended.

**Periodic Overhaul**

5. All passenger aircraft which have been overhauled and certified as airworthy by competent persons appointed by the owners or users of them, according to the directions of the Secretary of State may direct, and such certificate or certificates must be produced to the satisfaction of the Secretary of State before an aircraft may be used in air navigation.

6. Aircraft inspected, overhauled, or certificated as provided in the foregoing paragraphs may be inspected by authorized representatives of the Secretary of State, for the time and date and nature of each certification. For this purpose the signature of the pilot may be accepted.

7. A copy of each certificate will be retained by the owner of the aircraft, and the duplicate copy must be carried in the aircraft.

8. No aircraft may be inspected by authorised representatives of the Secretary of State, and the Secretary of State is entitled under these regulations to cancel or suspend the certificate of airworthiness of any aircraft deemed to be in an unsatisfactory condition, and to take such other steps as may be necessary to ensure that an aircraft is safe for the purpose for which it is intended.

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**Examination before each Flight**

9. The pilot will be responsible for seeing that the aircraft, before commencing any flight, is in an approved condition, and does not carry more than the load specified in the certificate of airworthiness, and must sign a certificate to that effect.

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**SCHEDULE IV. — Registration and Nationality Marks**

1. The registration and nationality marks shall be such as the Secretary of State may direct.

2. The registration and nationality marks shall be affixed in black on a white ground in the following manner, and underlined with a black line:

---

**SCHEDULE V. — Rules as to Lights and Signals and Rules of the Air. Interpretation of Rules**

1. The word "aircraft" comprises all balloons, whether fixed or free, kites, airships, and flying machines.

2. A flying machine when in the air, or manoeuvring on land or water under its own power, shall carry the following lights:

---

**SCHEDULE VI. — Prohibited Areas**

1. Each of the places named or described in the following list, with the land immediately surrounding them, may be declared by the Secretary of State to be a prohibited area, by a resolution to that effect, which resolution shall be countersigned by another person in the employment of the Secretary of State, giving the time and date of such certification.

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1. Each of the places named or described in the following list, with the land immediately surrounding them, may be declared by the Secretary of State to be a prohibited area, by a resolution to that effect, which resolution shall be countersigned by another person in the employment of the Secretary of State, giving the time and date of such certification.

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**SCHEDULE X. — Rules as to Lights and Signals and Rules of the Air. Interpretation of Rules**

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2. A flying machine when in the air, or manoeuvring on land or water under its own power, shall carry the following lights:

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1. Each of the places named or described in the following list, with the land immediately surrounding them, may be declared by the Secretary of State to be a prohibited area, by a resolution to that effect, which resolution shall be countersigned by another person in the employment of the Secretary of State, giving the time and date of such certification.

---

**SCHEDULE XII. — Rules as to Lights and Signals and Rules of the Air. Interpretation of Rules**

1. The word "aircraft" comprises all balloons, whether fixed or free, kites, airships, and flying machines.

2. A flying machine when in the air, or manoeuvring on land or water under its own power, shall carry the following lights:

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May 8, 1919

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8. A fixed balloon shall carry in the same position as the white light mentioned in rule 3, three lights in vertical line one over the other, not less than 6 ft. apart. The highest and lowest of these lights shall be red, and the middle one white, and they shall be of such character as to be visible in all directions at a distance of at least 3 miles.

9. Aircraft, which have the other on their own starboard side, shall keep out of the way of the other aircraft. In addition, the object to be avoided by the action of the giving-way aircraft alone, it shall take such action as will best aid to avert collision.

10. An aircraft, when moored near the ground, shall carry the lights referred to in rules 3 and 7.

11. In order to prevent collisions with surface craft—
(a) A flying machine when at anchor or moored on the water shall carry forward where it can best be seen a white light so constructed as to show the greatest light visible all round the horizon at a distance of at least 2 miles.
(b) A flying machine of 150 ft. or upwards in length, when at anchor or moored on the water, shall in the forward part of the flying machine carry one such light, or near the forward part of the flying machine, and at such a height that it shall be not less than 15 ft. lower than the forward light, another such light. The heights of the making machine shall be deemed to be the overall length.
(c) Flying machines of 150 ft. or upwards in span, when at anchor or moored on the water, shall carry a white light or lights of a size and brightness in excess of such light as specified in (a) of this rule.
(d) The lights of any flying machine which shall be deemed to be the maximum lateral dimension.

12. In the event of the failure of any of the lights specified under these rules to be carried by aircraft flying at night, such aircraft shall land at the first recognized safe opportunity.

13. Nothing in these rules shall interfere with the operation of any special equipment provided in respect to the additional station and signal lights for two or more military aircraft or for aircraft in formation, with the exception that the additional lights provided on aircraft which have been authorised by their respective Governments and duly registered with the aeronautical authorities of the country in which such aircraft are flying shall be used in accordance with the instructions which have been given to such operators.

14.—(a) Aircraft proposing to land at night on aerodromes having a runway shall—
(i) Give a white Very’s light or flash a green lamp and in addition shall make by international Morse code the letter group forming its call sign.
(ii) Permission to land will be given by the repetition of the same call sign from the ground, followed by—
(A) A red Very’s light, or flashing a green lamp.
(B) The firing of a red Very’s light or the display of a red flare from the balloon shall be taken as instructions that aircraft are not to land.
(C) An aircraft compelled to land at night shall, before landing, fire a red Very’s light, or make a series of flashes with the navigation lights.
(D) When an aircraft is in distress and requires assistance, the following signals shall be used or displayed, either together or separately—
(i) The international signal, S.O.S., by means of visual or wireless signals.
(ii) A Morse code distress signal, indicated by NC.
(iii) The distress signal, consisting of a square flag, having either a white, a red or blue flag, or anything resembling a ball or light, and in addition, sound a warning with any sound apparatus.
(iv) A signal, consisting of a succession of white Very’s lights, fired at short intervals.
(v) In, for, mist, falling snow, or heavy rainstorms, whether by day or night, and aircraft the water shall make the following sound signals with any sound apparatus—(a) if not anchored or moored, a sound at intervals of about 2 seconds, consisting of two blasts of about 5 sec. duration, with an interval of about 5 sec. between them; (b) if at anchor or moored a sound at intervals of not more than 1 minute, consisting of one blast of about 5 sec. duration.

15. Aircraft, which have the other on their own starboard side, shall keep out of the way of the other aircraft. In addition, the object to be avoided by the action of the giving-way aircraft alone, it shall take such action as will best aid to avert collision.

16. Every aircraft coming up with another aircraft from any direction more than 200 yards from any part of another aircraft.

17. In obeying and construing these rules, due regard shall be had to all dangers of navigation and collision and to any special circumstances which may render a departure from the above rules necessary in order to avoid immediate danger.

18. Aircraft carrying general cargo, other than ballast or sand from water, shall in the air be prohibited.
The long sides of the "L's" will indicate the borders of the neutral zone. The lights on the right-hand side will indicate a right-hand circuit. The right-hand zone will be marked by white lights placed in the position of an "L" and the left-hand side will be similarly marked by white lights placed in the position of an "L". The lines joining the lights indicating the top extremity of the long arm shall be the nearest point on the windward side of the aerodrome. The lights indicating the short arm of the "L" shall be placed so that the lights indicating the top extremity of the long arm shall be the nearest point on the windward side of the aerodrome and the direction of the wind, and the other shall be placed midway between the two lights marking the limits of the neutral zone.

Additional lights may be symmetrically placed along the boundary lines of the neutral zone and on the ends of the taking-off and landing zones, on the latter the three lights on the windward side. (See sketch on page 12.)

Two lights should be placed on the windward side of the aerodrome to mark the limits of the neutral zone mentioned in rule 40, the line joining the two lights on the windward side, for showing the extent of the aerodrome and the direction of the wind, and the other shall be placed midway between the two lights marking the limits of the neutral zone.

No fixed balloon, kite or moored airship shall be elevated in the vicinity of any aerodrome without a special authorisation.

All rounded obstructions must be protected on land within a zone of 50 yards, by means of suitable markings on obstacles dangerous to flying.

Every aircraft, when landing under its own power on water, shall give signals by throwing a spray of water or by noise, and for the purpose of these regulations shall be considered to be throwing a spray of water or by noise if the spray thrown is at right angles to the direction of the wind; two more lights shall be placed as follows: one on the leeward side of the aerodrome on the line through the three lights on the windward side, the other on the windward side, for showing the extent of the aerodrome and the direction of the wind, and the other shall be placed midway between the two lights marking the limits of the neutral zone.

Provided that the Secretary of State may by direction add any aerodrome to the list of appointed aerodromes from that date in respect of which these regulations shall apply.

For the purposes of these rules, "aerodrome" includes an aerodrome equipped with facilities for the reception and take-off of aircraft for the purposes of commercial or other air services;

In the event of any aerodrome without a special authorisation appearing to be dangerous or likely to become dangerous, the same shall be closed by the proper officer of Customs and Excise.

The Secretary of State may close any aerodrome not equipped with facilities for the reception and take-off of aircraft for the purposes of commercial or other air services where, in the opinion of the Secretary of State, there is a risk to aircraft or persons.

The pilot of an aircraft shall, before taking off from any aerodrome, notify the proper officer of Customs and Excise of the same and shall deliver to the proper officer of Customs and Excise at the aerodrome a declaration of the goods on board his aircraft signed by the proper officer of Customs and Excise as the clearance and authority for the exportation of such goods.

Arrival at and Departure from Appointed Aerodromes

2. No pilot shall enter or leave the United Kingdom, having over any aircraft or any part of the aircraft any chargeable goods, without the consent of a Customs officer at the aerodrome at which he departed for the United Kingdom.

3. The pilot of any aircraft arriving at or departing from an aerodrome shall, at such aerodrome, neither land before arriving at an appointed aerodrome, owing to accident, storms, or other force beyond his control, nor depart from the aerodrome in the circumstances above-mentioned without the consent of a Customs officer at the aerodrome concerned, unless the pilot is in due time furnished with a licence to land in such circumstances by the proper officer of Customs and Excise.

4. The pilot of any aircraft arriving at an appointed aerodrome shall carry or allow to be carried in the aircraft—

(a) any goods the importation of which is prohibited by the laws relating to Customs;

(b) any goods, except with the permission in writing of the Postmaster General,

unless the aircraft is registered under the Post Office Regulations for the purposes of the Post Office;

(c) any passenger unless the passenger is required to have a ticket of entry or a declaration of the goods on board signed by the proper officer of Customs and Excise.

5. Any aircraft entering the United Kingdom shall break or alter any seal placed upon any part of the aircraft or any chargeable goods carried in the aircraft by a Customs officer at the aerodrome at which he departed for the United Kingdom.

6. No aircraft shall enter or leave the United Kingdom, having over any aircraft or any part of the aircraft any chargeable goods, without the consent of a Customs officer at the aerodrome at which he departed for the United Kingdom, in respect of which these regulations shall apply. Provided that a pilot shall not be required to land an aircraft in the United Kingdom, having over any part of the aircraft any chargeable goods, if he proves that circumstances over which he had no control prevented him from landing at the appointed aerodrome and that, after such landings, he is not required by rule 7 (henceforward) to be landed by him, all goods carried in such aircraft shall, on examination by the proper officer of Customs and Excise, be declared for the purposes of these regulations and the provisions hereof respectively.

7. The pilot of any aircraft arriving at an appointed aerodrome shall sign the aircraft away from such place without his consent.

8. In the event of any aerodrome other than the appointed aerodrome at which he landed, the goods being of a description not prohibited by these regulations, the pilot shall obtain from the proper officer of Customs and Excise a certificate of entry, to which shall be attached a declaration of the goods on board his aircraft signed by the proper officer of Customs and Excise.

9. The pilot of every aircraft in which goods are to be exported shall, before entering the United Kingdom, apply to the proper officer of Customs and Excise for the issue of a certificate of entry, to which shall be attached a declaration of the goods on board his aircraft signed by the proper officer of Customs and Excise.

10. The pilot of every aircraft entering the United Kingdom shall sign the aircraft away from such place without his consent.

11. No pilot shall make any signal to or from an aircraft entering or leaving the United Kingdom except at an appointed aerodrome, and the pilot shall not, in the event of any aircraft being landed at any place other than an appointed aerodrome, transmit any signal which may be used to indicate that the aircraft is in accordance with the regulations for preventing collisions at sea, and for the purposes of these regulations shall give the special signals mentioned in such regulations.

12. No pilot shall make any signal to or from an aircraft entering or leaving the United Kingdom except at an appointed aerodrome, and no pilot shall remove such goods from such aircraft at such aerodrome until such further period as the Commissioners may allow.

13. All goods imported into or exported from the United Kingdom in any aircraft shall be examined at or near the appointed aerodromes at which they are unloaded or loaded, and no goods shall be unloaded or loaded in such circumstances without the consent of the proper officer of Customs and Excise.

14. All goods imported into an appointed aerodrome in any aircraft shall be duly examined and contained within thirty days of the time of the arrival of such goods at such aerodrome or within such further period as the Commissioners may allow.

15. No person shall make any signal to or from an aircraft entering or leaving the United Kingdom except at an appointed aerodrome, and no pilot shall, without the consent of the proper officer of Customs and Excise, unload any goods from the aircraft at such aerodrome until such further period as the Commissioners may allow.

16. No pilot shall take any goods from any aircraft such pilot has entered, except from aircraft arriving at an appointed aerodrome.

17. No person shall without the consent of the proper officer of Customs and Excise unload from any aircraft any goods loaded thereon for exportation to any foreign destination, or which are chargeable on such aircraft at the appointed aerodrome, and no person shall remove such goods from the aircraft away from such place without his consent.

18. No person shall make any signal to or from an aircraft entering or leaving the United Kingdom except at an appointed aerodrome, and no goods shall be unloaded or loaded in such circumstances without the consent of the proper officer of Customs and Excise.

19. In the event of any aerodrome other than the appointed aerodrome at which he landed, the goods being of a description not prohibited by these regulations, the pilot shall obtain from the proper officer of Customs and Excise a certificate of entry, to which shall be attached a declaration of the goods on board his aircraft signed by the proper officer of Customs and Excise.

20. All goods imported into or exported from the United Kingdom in any aircraft shall be examined at or near the appointed aerodromes at which they are unloaded or loaded, and no goods shall be unloaded or loaded in such circumstances without the consent of the proper officer of Customs and Excise.

21. If any aircraft arriving from a place outside the United Kingdom shall land in any place other than an appointed aerodrome, the pilot shall forthwith report to an officer of Customs and Excise or police officer, on demand, produce to such officer or police constable the log books belonging to the aircraft, and shall not allow any aircraft to be unloaded therefrom without the consent of an officer of Customs and Excise, and no passenger shall be allowed to disembark from such aircraft without the consent of an officer of Customs and Excise or police constable. If such place of landing shall be an appointed aerodrome, and shall also be required to produce to the proper officer of Customs and Excise the log books belonging to the aircraft and the proper officer of Customs and Excise shall be the clearance and authority for the exportation of such goods.

22. The pilot of any aircraft shall not enter or leave the United Kingdom, having over any aircraft or any part of the aircraft any chargeable goods, without the consent of the proper officer of Customs and Excise.

23. No pilot shall enter or leave the United Kingdom, having over any aircraft or any part of the aircraft any chargeable goods, without the consent of the proper officer of Customs and Excise.

24. The pilot of any aircraft arriving at or departing from an appointed aerodrome shall, at such aerodrome, neither land before arriving at an appointed aerodrome, owing to accident, storms, or other force beyond his control, nor depart from the aerodrome in the circumstances above-mentioned without the consent of the proper officer of Customs and Excise.

25. No pilot shall enter or leave the United Kingdom, having over any aircraft or any part of the aircraft any chargeable goods, without the consent of the proper officer of Customs and Excise.

26. No pilot shall make any signal to or from an aircraft entering or leaving the United Kingdom except at an appointed aerodrome, and no goods shall be unloaded or loaded in such circumstances without the consent of the proper officer of Customs and Excise.

27. Any pilot shall not, without the consent of the proper officer of Customs and Excise, unload any goods on board his aircraft at any place other than an appointed aerodrome, or shall not allow any goods to be unloaded therefrom or any passenger thereof to leave the aerodrome without the consent of an officer of Customs and Excise.

28. The pilot of any aircraft arriving at an appointed aerodrome shall sign the aircraft away from such place without his consent.

29. No pilot shall enter or leave the United Kingdom, having over any aircraft or any part of the aircraft any chargeable goods, without the consent of the proper officer of Customs and Excise.

30. No pilot shall enter or leave the United Kingdom, having over any aircraft or any part of the aircraft any chargeable goods, without the consent of the proper officer of Customs and Excise.

31. No pilot shall enter or leave the United Kingdom, having over any aircraft or any part of the aircraft any chargeable goods, without the consent of the proper officer of Customs and Excise.
SUPPLEMENTARY AIR REGULATIONS

This flight shall be carried out by the same aircraft within eight hours, and include the obligatory landings. The candidate shall, on the return of the aircraft, hand over the official reports to the proper authorities. He shall be permitted to continue his flights, subject to the payment of any deficiency arising from such flights, which will be charged to the candidate.

1. With reference to Regulation 1 (a) and Schedule I, applications for registration should be made to the Secretary, Air Ministry, London W.C. 2.

2. Application forms will be supplied on demand.

3. Application forms will be supplied to him by the Secretary of State, and include references to the Director of Research, Air Ministry, London W.C. 2.

4. Every applicant shall be examined by specially qualified men appointed by or acting under the authority of the Secretary of State.

5. The candidate must neither suffer from any disease or disability which renders him liable suddenly to become incompetent in the management of the aircraft.

6. The candidate must be able to use the language (in writing and speaking) in which the flight certification can be issued.

7. In order to ensure the maintenance of efficiency, every applicant shall be examined twice at least 3 months and 6 months after the date of his arrival in the United Kingdom.

8. In case of illness during the flight, the candidate shall, on his return, make a written report to the proper authorities.

9. At any time prior to the delivery of the aircraft for official trials, modifications to the aircraft may be made by the applicant, provided that full details of the modifications and drawings of the flight tests of the aircraft shall be transmitted to the Director of Research, Air Ministry, and that such as affect the safety of the aircraft shall be approved by the Secretary of State in accordance with directions in details in parts 6 and 7.

10. The candidate shall forward subsequently such drawings and particulars of the proposed aircraft as may be necessary for the checking in detail of the safety of the aircraft.

11. The information and drawings required for this purpose should be, where applicable, in accordance with forms to be supplied on application. (C.O. Form 17 and 73.)

12. The rules or rough sketches may be sufficient to enable the said checking to proceed provided they are fully dimensioned.)

III. Certificates of Airworthiness

1. With reference to Regulation 2 (1) and Schedule III, applications for certificates of airworthiness should be made to the Secretary, Air Ministry, London W.C. 2.

2. Application forms will be supplied on demand.

3. Subsequent to the forwarding to the Secretary, Air Ministry, of an application form duly completed for a certificate of airworthiness for a type of aircraft, the applicant shall forward to the Director of Research, Air Ministry, particulars of the arrangement drawings of the aircraft, and include references to the instructions which include two obligatory landings, during which the aircraft must come to rest, which shall not be at the point of departure, but which may be fixed by the proper authorities.

4. At the time of departure the candidate shall be informed of the time and furnished with a map. The judges will decide if the course has been correctly followed.

5. The rules or rough sketches may be sufficient to enable the said checking to proceed provided they are fully dimensioned.)

6. The applicant may be permitted to continue his flights, subject to the payment of any deficiency arising from such flights, which will be charged to the candidate.

7. The candidate shall forward subsequently such drawings and particulars of the proposed aircraft as may be necessary for the checking in detail of the safety of the aircraft.

8. The information and drawings required for this purpose should be, where applicable, in accordance with forms to be supplied on application. (C.O. Form 17 and 73.)

9. The applicant may be permitted to continue his flights, subject to the payment of any deficiency arising from such flights, which will be charged to the candidate.

10. The candidate shall forward subsequently such drawings and particulars of the proposed aircraft as may be necessary for the checking in detail of the safety of the aircraft.

11. The information and drawings required for this purpose should be, where applicable, in accordance with forms to be supplied on application. (C.O. Form 17 and 73.)

12. The rules or rough sketches may be sufficient to enable the said checking to proceed provided they are fully dimensioned.)

13. The applicant may be permitted to continue his flights, subject to the payment of any deficiency arising from such flights, which will be charged to the candidate.

IV. Anti-terrorist Measures

1. Anti-terrorist measures shall be taken in respect of all flights, and the proper authorities shall be informed of the intention to proceed, provided they are fully dimensioned.)

2. The proper authorities may be permitted to continue his flights, subject to the payment of any deficiency arising from such flights, which will be charged to the candidate.

3. The applicant may be permitted to continue his flights, subject to the payment of any deficiency arising from such flights, which will be charged to the candidate.

4. The rules or rough sketches may be sufficient to enable the said checking to proceed provided they are fully dimensioned.)

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13. The applicant may be permitted to continue his flights, subject to the payment of any deficiency arising from such flights, which will be charged to the candidate.
State on application. The aircraft will either be handed over to the applicant completed certificate, duly completed, certificates of airworthiness for subsequent aircraft at the official aerodrome for removal, or will be delivered by an official pilot to the aircraft and may depart from the approved complete set of which conform in all essential respects with a type aircraft for which a certificate of the aircraft.

Research, Air Ministry, a complete set of working drawings (process tracings) that differ considerably from the type aircraft, or in the case of an aircraft of State in accordance with detailed directions in para. 21 below.

Working drawings (process tracings) of the type aircraft that are in the possession of the Department of Air, will contain the information shown below.

PILOT'S CERTIFICATE OF GENERAL FITNESS OF AIRCRAFT BEFORE FLIGHT

Flying Machine Type \--- Preparatory to Flight from \--- Time to \--- Loading

This aircraft is considered fit in every way for the proposed journey.

Signed \---

Daily Certificate of Safety of Airplane

Flying Machine Type \--- Registration No. \---

I hereby certify that I have this day examined the airplane and that I consider it safe in every way for flight and that it is specified in the Certificate of Airworthiness.

Signed \--- (Ground Engineer)

Note.—Both certificates may be signed by the same individual if licensed for both flying machines and engine maintenance.

VI.—Instructions for Use of Log Books

1. With reference to Regulation 2 (c) and Schedule V, the several log books should contain the information shown below.

2. All entries in the log book should be in ink, except in the case of journey and signal log books, the entries for these may be made in pencil in a rough notebook but should be entered in ink in the log book every 24 hours. In the event of any official investigation the rough book should be kept in the pocket at the end of the aircraft log book.

3. A copy of the certificate of airworthiness should be made and signed by the pilot or competent person.

4. A copy of the log book should be kept in the possession of the pilot or person in charge of the aircraft.

5. No erasures should be made in, nor pages torn from, any log book.
A fully detailed engineering record of the life of the aircraft, including all acceptance tests, overhauls, replacements, repairs and all work of a like nature should be retained by the owner. The following particulars shall be recorded in the general register in connection with each aircraft :—

(a) Type of engine, series number, makers' name, power, normal and maximum speeds, and revolutions per minute. The date of acceptance, date of first and last flight, and date of last logbook entry. The weight of the aircraft with fuel and oil and water on board. (b) Details of the history of the aircraft, including all overhauls, tests, hours run, overhauls, replacements, repairs and all work of a like nature (see specimen sheet, the form of which should be followed).

IV. Signal Log.—(a) Type to which the aircraft belongs, its nationality and registration marks; the name, Christian names and nationality and residence of the owner. (b) Place, date and time of the transmission or reception of signals, the name and nationality of the person to whom a signal is sent or from whom a signal is received. (c) Name and nationality of the person in charge of the aircraft. (d) Date ; hour ; commanding officer ; route ; time in air; hours, mins. on ground, in air (state climbing or level) ; time run ; defects found ; particulars of overhauls or replacement ; time run since last overhaul ; hours, mins.—date of ; remarks ; signature of authorised person.

V. R.A.F. Aerodromes and Seaplane Stations.

1. With reference to Regulation 4 (d), the dues to be charged at R.A.F. aerodromes are as follows :—

A. — ACCOMMODATION

The charge for accommodation will be based on the floor space occupied, i.e., the product of span and overall length. With fields aircraft the span to be taken as the overall width when folded. Charges will be as follows :—

- For single 
  - Large type, over 1,800 sq. ft. £5.00 0 0
  - Medium type, not exceeding 1,800 sq. ft. £2.00 0 0
  - Small type, less than 900 sq. ft. £1.00 0 0
- For books of landing, 10 coupons
- For single

B. — LANDING FEES

These will be in respect of the use of the aerodromes, use of landing lights and beacons and supply of navigational information. The charges shall include any necessary work, e.g., starting machines, starting propellers, re-fuelling, etc. (For pushing machines with stopped departure.

Charge for first 24 hours, £2 0 0
Charge for second 24 hours, £1 0 0
Charge for each additional 24 hours, £0 10 0

Entrance fees to R.A.F. aerodromes shall be charged as follows :—

- 3.00 for not more than six persons
- 5.00 for not more than twelve persons
- 10.00 for not more than twenty persons

2. Proprietors of licensed aerodromes should, as far as possible, keep adequate first-aid appliances at all licensed aerodromes. The charge will be in the form of a lump sum for the period for which the aerodrome is required.

3. Arrangements will be made for the use of the telephone, telegraph, and Post Office facilities at R.A.F. aerodromes by civil firms using the aerodrome. Charges will be as follows :—

- £10 per annum for telephone, £10 per annum for telegraph
- £10 per annum for newspaper without advertising
- £20 per annum for advertising

4. The arrangements and charges at R.A.F. seaplane stations will be, as far as practicable, similar to the above arrangements and charges at R.A.F. aerodromes.

VII. — LICENSED AERODROMES

1. The proprietors of licensed aerodromes will be regularly supplied through the Air Ministry with the latest approved meteorological information, and will be responsible for exhibiting the same in a conspicuous place, and for supplying the same to pilots requiring it.

2. Proprietors of licensed aerodromes should, as far as possible, keep ready a supply of wind and weather information, and be able to indicate the result of the shot. It was stated that whilst the Government expected £50,000 on reproducing the apparatus, all that Lieut. Power had received was a sum of £30 in respect of out-of-pocket expenses.

Evidence as to the use of the invention was given by Mr. Power, Capt. A. H. W. Wall, Col. H. C. M. Drew and Col. J. G. Hearson. Mr. Watson, addressing the Commission in connection with the aerial mail service which is being considered. It was stated that the invention had been extensively used by the Government in training artillery observers. The flying student, seated in a little car suspended from the ceiling, looking down upon the target, and saw spread before him a very considerable area of country. The country was either represented by a coloured map or by photographs, and the pilot was able to see a piece of actual country reproduced. The apparatus would indicate the particular object which the instructor desired to be the objective of the guns. The observer, in his car suspended from the ceiling, signalled just as he would if actually flying. A gun was then fired according to the instructions. There was a flash and a puff of smoke, and the observer was able to indicate the result of the shot. It was stated that whilst the Government expended £50,000 on reproducing the apparatus, all that Lieut. Power had received was a sum of £30 in respect of out-of-pocket expenses.
THE LATE PETER LEGH

The toll of the air has been unusually heavy this last week, but no sadder tragedy has been recorded than the fatal accident to Mr. Peter Legh (late Flight Commander, R.N.A.S.), who was killed in a seaplane race held at Atlantic City recently. He was making an altitude test of a Bat "Basilisk"—the fighting scout biplane, designed and built by the British Aerial Transport Co., fitted with an A.B.C. "Dragonfly" 350 h.p. motor, when his machine was seen to burst into flames over Finchley and dive. The pilot jumped clear when near the ground, apparently in an endeavour to break his fall among some trees, but without success, and he fell into a field and was instantly killed.

The story of Peter Legh's career is one of remarkable devotion to aviation. Flying fascinated him during his school-days, and he gave all his spare time to the hobby with a rare enthusiasm. He was the only son of Maj. the Hon. Gilbert Legh, Grenadier Guards, a brother of Lord Newton, and was born in 1896 and educated at Wellington. His keenness for flying is indicated by the fact that at the age of 15 he had built a full-sized aeroplane at home during several school holidays, and fitted it with a second-hand aero-engine, of 20 h.p. He took it up and down a field at his father's house at Thornham, in Norfolk, for three weeks, and at last succeeded in getting it off the ground, but his experience ended in a collision with a fence, in which the machine was wrecked, to the great relief of his relatives.

On leaving Wellington, he served an apprenticeship of nine months at the Sojowith works at Kingston, acquiring considerable technical skill in the construction of aeroplanes. On the outbreak of war his determination overcame all obstacles, and on his eighteenth birthday he was already a certificated pilot, having been trained at the British Caudron School at Hendon, where he took his brevet (No. 927) on October 8, 1914. He joined the R.N.A.S. as a probationary flight sub-lieutenant and was first posted to Eastchurch. From there he went to Whitley Bay, Northumberland, where he was engaged in night flying and coastal patrolling. While at this station he had the distinction of being the first pilot to fly after a Zeppelin in the dark without landing lights or any of the facilities later on looked upon as indispensable. He was transferred early in 1916 to the Isle of Grain for experimental work, and flew practically every type of machine then in the possession of the R.N.A.S. He was quickly recognised as a pilot of exceptional ability, in spite of his youth, and did most valuable work for his country.

In May, 1916, he went to Dunquerque with No. 1 Naval Squadron, and saw considerable active service as a fighting pilot in France and Belgium until the following September. At this time a man with serious work to do and experimenting with Le Prēre rockets, and after being sent home on sick leave received special permission from the Admiralty to resign his commission in order to take up experimental work for Messrs. Armstrong, Whitworth and Co.

He flew all the productions of that firm from December, 1916, to June, 1917, when he was appointed test pilot for the British Aerial Transport Co. It is no exaggeration to say he has been one of the greatest assets of that company. His intimate technical knowledge of aircraft construction, combined with his amazing skill as a pilot, undoubtedly played a most important part in the production of new machines which have given remarkable performances.

To see him flying the "Bat" was an unforgettable experience. He did many years his senior have said on numerous occasions that he seemed a part of his machine, so skilful and complete was his mastery of it in the air. He could do anything with it, and the demonstrations he gave before experts, both in this country and in France, were surprising and impressive.

The "Bat" is, of course, what may be described as an abnormal machine, designed to Air Ministry specifications for abnormal fighting conditions. It is in no sense to be confused, as some of the daily Press appear to think, with commercial or sporting types of aeroplanes, and is not a machine for the novice. Peter Legh had flown it through all its various stages of evolution, and, as all his friends were aware, flew it with keen enjoyment.

On the identical machine in which he met his death he had a few days earlier reached an altitude of 21,000 ft., and descended again inside 20 minutes, which sufficiently indicates the extraordinary climbing powers it possessed. On Saturday morning last he ascended again from Hendon for the purpose of making a further climbing test before handing the machine over to the Air Ministry, and he was equipped with oxygen and all the necessary apparatus. The official enquiry into the accident may, it is to be hoped, elucidate the mystery of its cause.

For the sake, however, of the future of civilian flying, now at a most critical period in its history, it cannot be too strongly emphasised that this was a service flight on a service machine, built for special fighting conditions, and was carried out under the ordinary routine of test work.

The loss of Peter Legh is a great loss to aviation, and must be felt with special severity to his colleagues of the British Aerial Transport Co., notably to Mr. Frederic Koolhoven, with whom he had been for so long and so closely associated.

Columbia secured second place, with Yale third and Amherst fourth. Columbia won the inter-collegiate aeroplane race, Yale being the only other entry.

Of the personal aspect of the tragedy, it is, indeed, difficult to speak. His loss is particularly distressing to all who knew him, for he had an unusually charming and lovable personality. He gave himself wholeheartedly to his work, and was never so happy as when in the air, for which he appeared to have a natural aptitude. He was always the very essence of modesty, brave in the highest degree, and ever eager to tackle new problems in the science of aviation. His handsome, boyish face had a freshness which appealed instantly to all who came into contact with him, and he will certainly be remembered with real affection by a wide circle of friends.

The loss of Peter Legh is a great loss to aviation, and must not be felt with special severity to his colleagues of the British Aerial Transport Co., notably to Mr. Frederic Koolhoven, with whom he had been for so long and so closely associated. To them and to his relatives one can only offer the deepest sympathy.

D. W. T.
AVIATION IN PARLIAMENT

Enemy Air-Raids (Defence Department)

Mr. Baldwin (Joint Financial Secretary to the Treasury): My right hon. friend, Mr. Johnson-Hicks, has asked the Secretary of State to the Air Ministry whether his attention has been called to the burning of the Paris-Bordeaux postal aeroplane on the 7th inst.; and whether he will cause experiments to be made and issued to the effect that more steel and less inflammable materials in the construction of civil aircraft are used. Mr. Pratt (Lord of the Treasury): I am aware of the actual cause of the accident referred to, but in the great majority of such cases fire is caused probably by the substitution of metal for framework and fabric, which would reduce only slightly the risk of fire or the probability of injury to persons. The question of metal sub- and replacement of inflammable materials in the construction of civil aircraft is the subject of an inquiry now being conducted under the supervision of the Exchequer.

Air Routes (Civil Aviation Department)

Mr. Johnson-Hicks, on April 30, asked the Under-Secretary of State to the Air Ministry whether his attention has been called to the burning of the Paris-Bordeaux postal aeroplane on the 7th inst.; and whether he will cause experiments to be made and issued to the effect that more steel and less inflammable materials in the construction of civil aircraft are used. Mr. Pratt (Lord of the Treasury): I am aware of the actual cause of the accident referred to, but in the great majority of such cases fire is caused probably by the substitution of metal for framework and fabric, which would reduce only slightly the risk of fire or the probability of injury to persons. The question of metal sub- and replacement of inflammable materials in the construction of civil aircraft is the subject of an inquiry now being conducted under the supervision of the Exchequer.

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London Gazette, April 19

The following appointment is made:—
Staff Officer, and Class (Q.)—Cap. A. H. S. Baker; Nov. 18, 1918.

Flying Branch

Capt. D. G. Donald to be actg. Maj., whilst employed as Maj. (A. and S.) from Aug. 30, 1918, to Feb. 12 (substituted for notification in Gazette of April 1 concerning Sec. Lieut. E. G. Mackenzie); Maj., whilst employed as Capt. (A.); Sept. 1, 1918. Capt. E. G. Mackenzie relinquishes his commission, on account of ill-health contracted on active service, and is permitted to retain the rank of Maj. ; April 30.

The rank of Lieut. (actg. Capt.) H. B. Langton (R.G.A.) is as now described, and not Sec. Lieut. (actg. Capt.), as stated in Gazette of April 1 concerning Sec. Lieut. F. W. R. MacHardy.

The following are transfd. to the Unemployed List under various dates:—
The surname of Sec. Lieut. W. G. Duncombe is as now described, and not Sec. Lieut. (actg. Capt.), as stated in Gazette of April 1 concerning Lieut. M. P. Laficur.

London Gazette, May 2

The following temporary appointment is made:—

Sec. Lieut. to be Lieut. (late Gen. List, R.F.C., on prob.), to be employed as Sec. Lieut. (A. and S.)—Lieut., Col. R. F. Ross, D.S.O.; April 3.

London Gazette, May 4

Sec. Lieut. to be Lieut. (A. and S.)—Capt. W. G. Adams relinquishes his commission, on ceasing to be employed ; March 25.

The following temporary appointment is made:—

Sec. Lieut. to be Lieut. (without pay and allowances) (Late Gen. List, S.R.)—Lieut., Col. C. G. F. Carver to be Sec. Lieut. (A. and S.), from (K.B.J.) ; April 17.

The following Sec. Lieuts. relinquish their commissions, on account of ill-health, and are permitted to retain their rank:—May 2.

The following Sec. Lieuts. to be Lieuts. :—June 1 (substituted for notification in Gazette of April 1 concerning Lieut. E. D. Whittle).—Lieut. E. D. Whittle (Staff Officer, C. in Aird. (Air).—Lieut., Col. C. G. F. Carver to be Sec. Lieut. (A. and S.), from (K.B.J.) ; April 17.

The following Sec. Lieuts. to be acting Maj. whilst employed as Maj. (A. and S.)—Lieut. E. D. Whittle (Staff Officer, C. in Aird. (Air).—Lieut., Col. C. G. F. Carver to be Sec. Lieut. (A. and S.), from (K.B.J.) ; April 17.

The following Lieuts. are granted a temp. hon. commn. as Capt. while specially employed:—In the News at Home.—Lieut., Col. C. G. F. Carver to be Sec. Lieut. (A. and S.), from (K.B.J.) ; April 17.

The following are transfd. to the Unemployed List under various dates:—
The following are transfd. to the Unemployed List:—Capt. A. H. S. Baker; Nov. 18, 1918 (substituted for notification which appeared in Gazette of April 18).

The following are transfd. to the Unemployed List:—Capt. W. G. Adams relinquishes his commission, on ceasing to be employed ; March 25.

London Gazette, June 9

The following notification in the Gazette of April 1 concerning Sec. Lieut. F. W. R. Johnson is cancelled:—En.)

May 19, 1918

THE ROYAL AIR FORCES

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SIDE-WINDS

To those concerned with the upkeep and maintenance of aeroplanes engaged in civil aviation the announcement made by the British Emaillite Co., Ltd., on the front cover of this issue of Flight, is of considerable importance. The doping scheme is one which has been fully tested successfully on active service on all fronts and under conditions varying from Arctic to tropical. Its success is the result of long experience associated with the use of the finest materials, and it is gratifying to know that the scheme is now available for use on civil machines and on aeroplanes built for foreign governments. The British Emaillite Co., Ltd., 5, Hythe Road, Cumberland Park, Willesden, N.W. 10, will be pleased to supply full particulars to anyone interested.

Any manufacturer who has a surplus stock of linen should note that Messrs. Aero Coverings, Ltd., are in the market for same. The material must, of course, be subject to A.I.D. inspection. Offers should be sent to the firm at 173, Piccadilly, W. 1.

The business of Barimar, Ltd., the well-known welding specialists, of 10, Poland Street, Oxford Street, London, W. 1, has been on an extension. There was never a time, apparently, in which there was such exceeding difficulty in getting suitable factory accommodation in Central London positions as there is to-day, and, after inquiries extending over some months, Barimar, Ltd., is offering a premium of £100 to the person who first puts them into touch with the owner of a suitable property with a floor space of 30,000 to 50,000 ft., the amount in question being payable as soon as negotiations are completed and possession of premises given. An impetus was, of course, given to the welding industry by the War, and there were many who thought that, once War-time activities slackened down, there would be less need for the services of the specialist in metal fusion. So far from this being the case, however, we learn that since the Armistice was signed the demands upon Barimar, Ltd., have more than doubled, and the company finds it a matter of some difficulty to comply with every request for immediate treatment.

Speaking at a staff dinner given by Messrs. Wm. Beardmore and Co., Ltd., in Glasgow the other day, Sir Wm. Beardmore, in reviewing the work of the firm, said he found they had provided 650 aeroplanes altogether of types ranging from Baby Sopwiths with 80 h.p. engines, B.E. 2C's with 70 h.p. engines, to the large Handley Page bomber with four engines of a total of 2,000 h.p. The first aeroplane was delivered on March 8, 1915. He considered, however, that the most interesting and important development of all, was the construction of rigid airships. The work of building the airship shed at Inchinnan was commenced in January, 1916, and so expeditiously was the work carried out by Messrs. Arrols that they were able to commence the building of the first ship in the middle of that year. Their first ship, R. 24, of 670,000 ft. capacity, was laid down on July 21, 1916, and her flight trial took place on September 20, 1917. The second ship, R. 27, with 1,000,000 ft. capacity, was laid down on March 16, 1917, and went through her flight trials on April 8, 1918. The third ship, R. 34—the one about which they had heard so much—has a capacity of 2,000,000 ft. It was laid down on December 9, 1917, and had her flight trials on December 20, 1918. He mentioned that the first of their ships was of the size originally used by Germany, and the last one, viz., R. 34, was equal to the largest they have built. Two other airships were in hand, one being practically the same as R. 34 and the other one to be 50 per cent larger, namely, 3,000,000 ft. capacity.

The firm also built the first seaplane carrier for the British Government—the “Argus”—and it had proved a great success.

The Regent Carriage Co. held a very successful Fancy Dress Ball last week at the King’s Hall, New King’s Road, which was largely attended by several hundred employees of the firm. The prizes were very handsome, three being for the best ladies’ and three for the best gentlemen’s costumes, and two special consolation prizes. The judges were Mr. and Mrs. Myles Scarff and Mr. Peter Arondel, and they had anything but an easy time to pick the winners. The prizes were presented by Mrs. Myles Scarff.

Messrs. Aylings and Sons, Riverside, Putney, whose name is well-known in connection with boating matters on the Thames, and who have been very busy the past few months, in preparation of a 350 h.p. biplane of their own design, which, we gather, embodies some novel improvements. At this juncture that is all the information we can give, but we hope before long to give full details.

Messrs. Aeroplane General Sundries, Ltd., whose head offices are at Fulwood House, Fulwood Place, High Holborn, W.C. 1, have opened a motor department and show-rooms at 55, High Street, Bloomsbury. During the War their business was confined to supplying aeroplane parts and fittings, which they are continuing, and the department which they are now opening at Bloomsbury is for the business of supplying auto-mobile component parts and general accessories.
RESETTLEMENT

There are many officers and men of the R.A.F. who are demobilised or are about to be demobilised. In order to assist those who are undecided or are seeking advice as to their prospects in civil life, the Editor has arranged for an expert, with wide experience of service, industrial and educational conditions, to give advice to those who may solicit it through the medium of this Journal.

Applications, which must be in writing, should be marked "Resettlement," and addressed to the Editor, FLIGHT, 36, Great Queen Street, Kingsway, W.C. 2. They will be dealt with in these columns, as far as possible, in rotation.

ARMAMENT, EX-CAPT., R.A.F.—We fear you would not possess sufficient technical knowledge for the kind of post you suggest. In the Service what really matters is the amount of actual work done, but in a works it is different. What is usually required in the latter is thorough practical knowledge with capability for design. This knowledge generally takes years to acquire. We think you would be best advised to approach one of the firms you mention with a view to spending a year or two in the works and subsequently specialising in Aerial Armament.

A.H.G., LIBET, R.A.F., B.E.F.—You can improve your knowledge by private study and by taking advantage of the Army Education Scheme. A few good books to read are: (1) "The Aeroplane," by A. Fage, A.R.C.Sc. (Griffin and Co. Ltd.); (2) "Design of Aircraft," by F. S. Barnwell (McBride, Nast and Co.); (3) "The Design of Aeroplanes," by A. W. Judge, A.R.C.Sc. (Whittaker and Co.). On demobilisation you will find that there are opportunities offered for a course of Aeronautical Engineering by the Appointment Department of the Ministry of Labour.

E.S.C., EX-LIBET, R.A.F.—Unfortunately many others are in the same position. We can only suggest that you seek employment in your normal profession.

J.A.C., EX-LIBET, R.A.F.—We think you are well advised in considering the motor trade. With your previous experience we cannot but anticipate that you will be successful.

G.M.H., EX-FLIGHT CADET.—We think you will be best advised to seek immediate employment in the profession in which you have served your apprenticeship, and in which you state you have had considerable experience. There is very little prospect of employment in any branch of aviation at present. Moreover, the supply is vastly in excess of the demand.

COMPANY MATTERS

Triplex Safety Glass Co., Ltd.

The nominal capital of the Triplex Safety Glass Co., Ltd., has been increased to £200,000. An issue of 60,000 £1 ordinary shares, which were offered to the shareholders at £1.50 premium, has just been made, totaling a sum of £90,000 shares issued. The issue was over-subscribed.

Vickers, Ltd.

The directors of Vickers, Ltd., announce a final dividend of 620 per share, payable after the 9th instant. Holders of share warrants to bearer will receive payment on presentation of coupon No. 23 at the registered office, Vickers House, Broadway, Westminster, S.W.

NEW COMPANIES REGISTERED

AERONAUTICAL AND PANEL PLYWOOD CO., LTD.


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