

FLIGHT

The
AIRCRAFT
ENGINEER
and
AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 575 (No. 1, Vol. XII.)

JANUARY 1, 1920

Weekly, Price 6d.
Post Free, 7d.

Flight

The Aircraft Engineer and Airships

Editorial Office: 36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.

Telegrams: Traditor, Westcent, London. Telephone: Gerrard 1828.

Annual Subscription Rates, Post Free:

United Kingdom ..	28s. 2d.	Abroad ..	33s. 6d.*
-------------------	----------	-----------	-----------

These rates are subject to any alteration found necessary under abnormal conditions

* European subscriptions must be remitted in British currency

CONTENTS

Editorial Comment	PAGE
The Cape to Cairo Air Route	1
What Had to be Done	2
The Future of the Air Service	2
Palladium Arguments	2
New Knights of the Air	3
"A Happy New Year"	3
The Paris Aero Show	4
Some "B.A.T." Aeroplanes	13
The Calo-Cape Route	20
Correspondence	22
Visual Signals for Aircraft	23
Airsims from the Four Winds	24
In Parliament	27
The Royal Air Force	28
Model Aeroplanes	29
Sidewinds	30

DIARY OF FORTHCOMING EVENTS.

Club Secretaries and others desirous of announcing the date of important fixtures are invited to send particulars for inclusion in the following list:

Dec. 19 to ..	Paris Aero Show.
Jan. 4, 1920.	
1920	
Jan. 8 ..	How Airmen Find their Way. By Major H. L. Wimpey, R.A.F. Royal Aeronautical Society, Juvenile Lecture
April 18 to ..	Seaplane Competition at Monaco
May 2	
June 1 ..	Air Ministry Competition (Small Type Aeroplanes), Martlesham Heath
July ..	S.B.A.C. International Aero Exhibition at Olympia
July ..	Seaplane Contests at Antwerp
Aug. 1 ..	Air Ministry Competition (Seaplanes) Felixstowe
Sept. 1 ..	Air Ministry Competition (Large Type Aeroplanes), Martlesham Heath

EDITORIAL COMMENT



THE announcement made by the Air Ministry that the air route from the Cape to Cairo is practically ready, complete with aerodromes and landing grounds, for the actual opening of an aerial service from North to South Africa must come as a surprise to those who have not followed the

work of survey which has been going on since the Armistice. The Memorandum, which we publish,

The Cape to Cairo Air Route

details the major portion of that work, and notes the preparations which have already been made. These preparations are in an astonishingly forward condition, and although the pioneer flight yet remains to be made, it cannot be long now before we shall witness the commencement of what will be in the future a regular mail and passenger service over the whole length of Africa. That the work should have been completed at all in the short space of a year is surprising enough in itself, but when the terrific difficulties which have had to be swept away are taken into account, the achievement seems to be almost miraculous. No tribute is too high to pay to the three survey parties who have carried out the work in some of the most difficult country in the world. No continent has proved itself so unconquerable to the explorer as Africa. Little more than half a century ago the maps of the Dark Continent showed practically nothing but a well-defined coast line, with the interior represented by a white blank. The great lakes at the headwaters of the Nile were not shown. Tanganyika, which is really a great inland sea, did not appear. The sources of the Nile were unknown, while the Congo was represented by a doubtful line, which later exploration showed to be completely wrong. It was not until 1860 that Burton and Speke discovered Lake Tanganyika, and not till five years later was the mystery of the Nile elucidated by Speke. In 1874 Stanley made his greatest journey, during which he mapped the course of the Congo from its source to the sea, and surveyed the shores of Tanganyika and the Victoria Nyanza. Much has been done since, but the story is by no means complete even now. Yet we have strung out from one end of the continent to the other a line of aerodromes and landing grounds, over five thousand miles long, and the time is in sight when the trans-continental journey, which now entails from two to three months of arduous and often dangerous travelling, will be completed by aeroplane in a week. And yet there are some who still affect to believe that there is no future for aerial transport!

What Had to be Done

The official memorandum is as bald in its language as these documents almost necessarily are, but the record of what had to be done by the survey parties covers a story of enthralling interest. Especially

will those who have travelled in Central Africa be able to read into it something almost akin to romance. To prepare aerodromes and landing grounds for the projected aerial line, huge expanses had to be blasted out of the almost impenetrable bush. What the African bush is like no-one but those who have actual experience of travelling in it can possibly imagine. There is nothing with which it can be compared but itself. In some cases thousands of trees had to be removed to make a single aerodrome. In other places vast ant-hills had to be removed, some of the individual hills being 25 feet high by 45 feet in diameter—quite as large as an ordinary English dwelling-house. In one case the removal of these obstructions entailed the shifting of no less than 25,000 tons of material. Nor was the actual work the only difficulty which had to be dealt with. The deadly tse-tse fly forbade the employment of cattle or horses for traction purposes in infected areas. In other places the malarial mosquito abounded, while the white ant, which is one of the worst plagues of Africa, made construction work exceedingly difficult.

Not the least interesting, not to say picturesque, feature of the work of the survey was the readiness with which the native chiefs seem to have welcomed the advent of the winged white man. In Bechuana-land Chief Khama laid out a landing ground at his own expense in order that his country might come within the scope of the service to be ultimately opened up. Everywhere the natives seem to have been only too anxious to assist the work of the survey parties. Land has been freely given or placed at the disposal of the Air Ministry at a nominal rental. There has been no difficulty in securing all the labour necessary—which is indeed obvious from the wonderful record of progress shown by the report of the work accomplished. Truly, this is an age of wonders! It is well within the recollection of many who are still in the full vigour of life that "Darkest Africa" was almost *terra incognita* to civilisation. Yet now we see the spectacle of the African native welcoming the last triumph of the white man in the shape of the aeroplane and assisting willingly in the development of a mode of transport which little more than ten years ago was almost believed chimerical by many of those who are now among the foremost in its development.

The Future of the Air Service

The announcement that the trail has been blazed from one end of Africa to the other comes at an opportune moment to focus attention on the utterly unsatisfactory position of the Air Ministry under its present constitution. As *The Times* aptly puts it, the Air Ministry remains the Cinderella of the public services. The Prime Minister, in spite of all the reasoned criticisms which have been levelled at his policy, still persists in placing it under the control of the Secretary for War. A fortnight ago the Lord Chancellor delivered himself of the opinion that the control of civil aviation might very shortly pass to the Board of Trade. Fortunately, the latter idea has been promptly disposed of by Mr. Churchill himself, so that there is no need to elaborate it—it can be relegated to the limbo of the things that are better forgotten.

It does not look as though the Government had any policy at all regarding the future of this most important Service. Frankly, we had rather they

announced one with which we could disagree entirely and from beginning to end than that the present state of uncertainty should persist. There are several aspects of the question which we view with the greatest misgiving. It is not without significance that at this time when, as we have repeatedly pointed out, the Government seems to have no mind of its own, there should have arisen what seems to be a calculated campaign for a reversion to the bad old order of things in which the Air Service was simply an inconsiderable adjunct of the Navy and the Army. Sailors and soldiers—particularly the former and those who voice the opinions of the Navy in the Press—are at great pains to prove to the Government and the public that the only way in which we can secure ourselves against attack from the air is to place the Air Service again in a subordinate position to the older Services. We can quite appreciate the point of view of naval and military officers of senior rank and years of service. They are doubtless absolutely sincere in their convictions, but the worst of it is that they regard the question from an insular standpoint, which looks upon the Navy or the Army as the case may be as the first and only thing that matters, all other services and things being merely auxiliary to that older Service with which they are associated. Therefore, without presuming to doubt the *bona fides* or anyone concerned, it is possible to argue that they are prone to ignore the lessons of the War and to allow Service conservatism to narrow their vision.

It seems to us that there are two factors which count, and two only. These are the lessons of the past and the probabilities of the future. As regards the former, we would point out that it was only when the Air Force was established as a separate Service that we secured real efficiency in the air, either by sea or land. We agree that that efficiency was hastened by the efforts which had been put forth earlier, but no-one who watched with grave misgiving the ruinous competition of the two Services during the earlier years of the War can have any but the opinion that the creation of the separate Air Service enabled us to secure aerial supremacy over the enemy at a much earlier date than it could have been attained, if at all, under the old regime. That is going as far as any whole-hearted advocate of the separate Air Service would care to go.

Fallacious Arguments

Some of the arguments which are being adduced for a return to the old system seem to be utterly fallacious and merely designed to confuse the issues. For example, a well-known naval writer, Mr. Leyland, in a letter to the Press says: "It is probable that the possibility of attack from the air may yet affect the Navy profoundly, and it seems, therefore, imperative that the Navy should be master of its own means. If torpedoes are to be dropped by aeroplanes, they must be dropped by naval officers thoroughly acquainted with the torpedo and its use. The naval air officer must surely be as truly a naval officer as the gunnery or torpedo officer. He must not be merely embarked in an aircraft carrier as an officer owing allegiance to another Force."

Again, we understand the point of view of the naval writer who has given his life to the study of naval war—and knows little or nothing of war in the air. The latter is the trouble, first, last and all the time. But if we understand it we certainly do not agree with it. All these arguments are quite capable



"A Happy New Year"

"Flight" Copyright
(From an original drawing by Roderic Hill)
D 2

of being turned the other way about. It is just as easy to make out a case for the Air Service officer by saying that it is essential that the officer who drops the torpedoes must be an officer highly skilled in flying, with an intimate knowledge of the technical side of his profession, and that his actual qualifications regarding the torpedo itself need not be high. He has nothing to do but manoeuvre for position in attacking an enemy craft and, having got into it, to drop his weapon which has been set for depth and course before he took the air at all. Surely, it is not the intention of the authorities of the Air Ministry that officers of the Air Force should know nothing about the weapons they will have to use in war and that their training should be confined absolutely to the mere flying of their machines? Yet, if we are to accept such arguments as this of Mr. Leyland's at their face value, this is what is contemplated. Such a proposition is merely grotesque. Then, the same writer tells us that: "The Naval Air Service cannot be a mere offshoot of a distinct Service. It must surely be an integral part of the Navy, trained by it, under its direction, and always under its control."

That is very well in its way, but is scarcely convincing to the other side. It has been laid down already that the air squadrons which will operate with the Navy will be to a very great extent an integral part of the Navy, be trained by, be under the direction of, and always under the control of the naval commander-in-chief. They will, in fact, stand in pretty much the same relation to the Navy as do the Royal Marines. The latter are administratively a separate Service from the Navy, yet under naval command when afloat or serving on detachment at naval stations, almost exactly as we understand will be the case with the units of the Air Force similarly employed. If the system works well in the one case, as we know it does, then why not in the other? The whole fact of the matter is that the agitation is born of the inherent dislike of the older Service men to anything in the shape of innovation, even when the latter takes the shape of reform.

Nevertheless, it is a regrettable fact that the agitation is being fostered by the delay of the Government to pronounce upon a definite policy in regard to the future of the Air Service, and it will go on

increasing until such a policy has been laid down. In the meantime, it almost looks as though the Government were waiting until the agitation had grown to such dimensions as would apparently justify a reversal of the policy laid down at the end of 1917 in the Air Force and enable them to say that the whole weight of responsible naval and military opinion is against the continuance of the separate Air Service and it had therefore been decided, etc. We trust the representatives of the Air Party in both Houses will be very much on their guard against anything of the sort.

• • •

New Knights of the Air

As we were able to announce last week, the King has been pleased to confer the honour of knighthood of the Order of the British Empire, Civil Division, on Capt. Ross Smith and his brother, Lieut. Keith Smith, in recognition of their valuable services to aviation by their successful flight from England to Australia. Sergt. Bennett and Sergt. Shiers, who acted as mechanics to the successful airmen, have each been granted a bar to the Air Force Medal.

We congratulate them all on the well-deserved honour they have received to mark their erection of another notable landmark in aviation. Still, we have no doubt the memory of their successful adventure, which has demonstrated that neither distance nor any other obstacle can stand in the way of great achievement where the determination to succeed is present, will in future be more to these gallant Australian airmen than even the signal honour thus conferred by His Majesty. They have done something which had never been accomplished by man and they have brought Australia into closer contact than ever with the Motherland. They have pioneered an aerial route which will in the years to come, no matter how thickly the upper air may be populated by voyaging aircraft, be indissolubly linked with their names. As those of Livingstone and Stanley are associated with the opening up of Africa to knowledge and civilisation, so will the names of Ross Smith and his companions be joined with the aerial route to the Antipodes. That is an honour passing all other distinctions, high in esteem as the latter may be held among men.

◆ ◆

Sir Hugh Trenchard's Title

It was announced in the *London Gazette* of December 30, that Letters Patent have passed the Great Seal of the United Kingdom conferring the dignity of a Baronet upon Air Marshal Sir Hugh Montague Trenchard, K.C.B., D.S.O., of Wolfeton, in the County of Dorset.

Civil Aviation in France

The provision in the 1920 French Budget for civil aviation amounts to 233,000,000 frs. The credits granted for aeronautics in 1919 were just over 244,000,000 frs. but then conditions were somewhat different to those ruling at the present time. The 1920 figures are estimated as follows:—

Wages in the Service Aérien, 5,740,000 frs.; technical service, 980,000 frs.; manufacturers' service, 1,701,000 frs. The working costs in connection with these services are respectively 23,800,000 frs., 45,500,000 frs., and 4,830,000 frs. The sum set aside for premiums is 19,930,000 frs. The technical service will have at its disposal for experiments 38,500,000 frs., and for installations, 4,830,000 frs. A sum of 15,750,000 frs. will be offered in premiums for motor manufacture, and a quarter of that sum will be expended in land arrangements in connection with air routes, wireless, etc. 6,300,000 frs. will be spent on aerodromes in France and Algeria; and 63,000,000 frs. on land purchase and the construction of new aerodromes. The above is considered the minimum sum on which French aeronautics can be conducted without detriment to France's position.

Air Work on Indian Frontier

On December 17 the Titi Madda and Hassan, two sections of the Waziris who remain recalcitrant, were again bombed, and aeroplanes co-operated with good effect with the Derajab column in its operations at Mandanna Kach on the following day.

Katka, which had been a place of hostile concentration for the previous four days, was attacked by our aeroplanes on Christmas Day.

The Mahsuds have now surrendered.

R.A.F. or Army Rank

One consequence of the reduction of R.A.F. officers from approximately 30,000 at the date of the Armistice to about 4,000 at the present date, is that a large number of officers seconded to the Air Force from the Army have been returned to their units. This has raised the question as to whether officers who have not attained Army rank equivalent to their R.A.F. rank when they finally leave the Army shall reassume their R.A.F. rank. The point is now under consideration.

The First Zarahoff Professor

It is announced that Sir Richard Glazebrook, who was until recently Director of the National Physical Laboratory, has accepted the invitation to be the first holder of the Zarahoff Chair of Aviation, at the Imperial College of Science and Technology.



BY THE TECHNICAL EDITOR

By making use of the air mail service between Paris and London we were able to include in our last week's issue a brief reference to most of the aeroplanes exhibited at the Paris Aero Salon, as well as sketches of the majority of the complete aeroplanes shown. Owing to Christmas we had to go to press two days earlier than usual, and it was not, therefore, possible for us to prepare sketches of all the machines. In the present issue, however, we publish silhouettes, or more correctly speaking side elevation sketches, of the remaining machines, supplemented by a table containing, as far as the necessary material has been available, the chief characteristics of every machine shown, surrounded by diagrams of the machines. This table and its diagrams form, therefore, a very convenient means for ascertaining the main features of each machine exhibited, and may be regarded as a sort of index to the more detailed descriptions which are to follow in this and subsequent issues.

Before commencing a detailed reference to the various machines, a few general remarks and impressions may not be out of place. As the first aero exhibition of any real importance since the War, the *Salon de l'Aéronautique* at the Grand Palais, Champs Elysées, has naturally been looked forward to with a certain amount of expectancy. Constructors have had a little over a year in which to put into effect their ideas of the peace-time aeroplane, whether intended for the carrying of goods, mails, and/or passengers, or for sporting purposes. Regular air services have been run in various parts of Europe, and the experience thus gained might be expected not to have been without its influence on the design of what one may be permitted to regard as the 1920 models.

In view of the number and magnitude of problems that are awaiting solution we may have approached the Paris exhibition with too great expectations. On the other hand, there is so much yet to be done that one might be forgiven for expecting some really useful ideas for improvements in various directions. But we are forced to admit that we were, generally speaking, disappointed. Of real progress there is precious little to be discovered within the walls of the Grand Palais. Of comfortable upholstery and striking colour schemes, of "all modern conveniences," of first, second and third class passenger cabins with pretty wall-papers, of all these things and many others there is a superabundance.

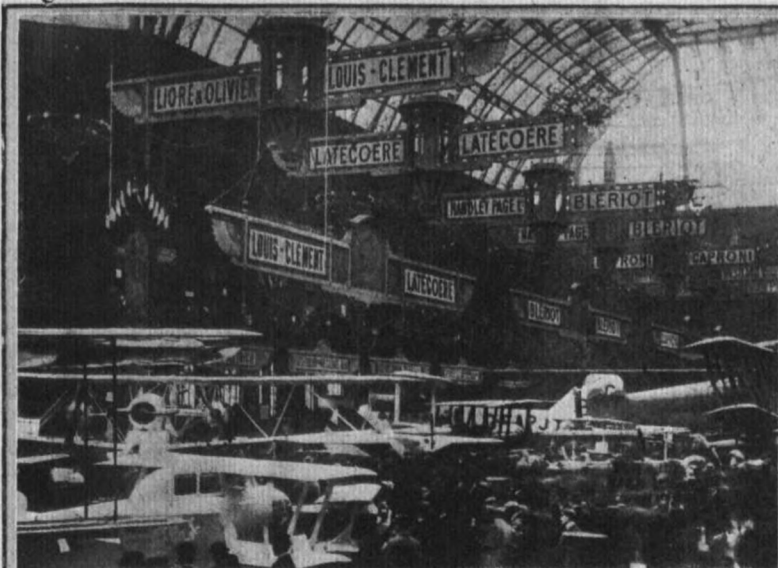
But none of these things are essential to the regularity, the safety and the sound progress of commercial aviation. All the things which really matter appear to have been left severely alone. Of variable area or variable camber wings—or other means for reducing the landing speed of a machine—of special undercarriage designs intended to enable a machine to alight on or start from almost any kind of ground, of instruments for helping the pilot and navigator

to maintain their machine on its proper course and right-side-up, of means for marking aerodromes in a fog or in the dark and enabling the machine to be flown under these



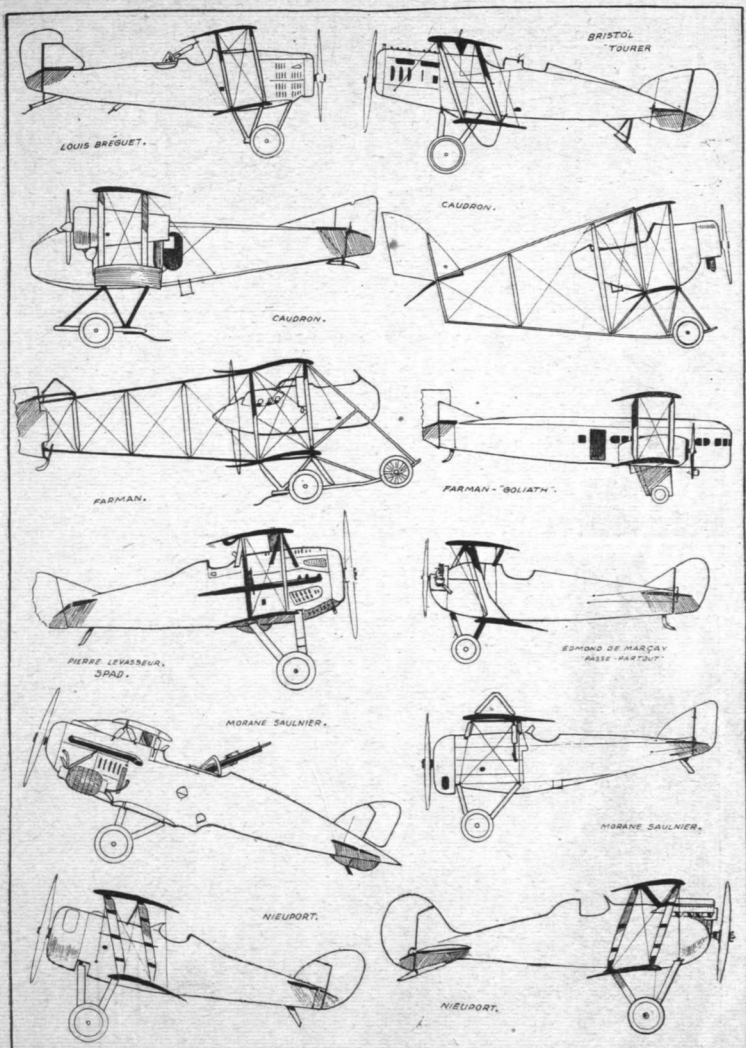
THE PARIS AERO SHOW: A view from the gallery showing the "sausage" balloon in the central dome

"Flight" Copyright



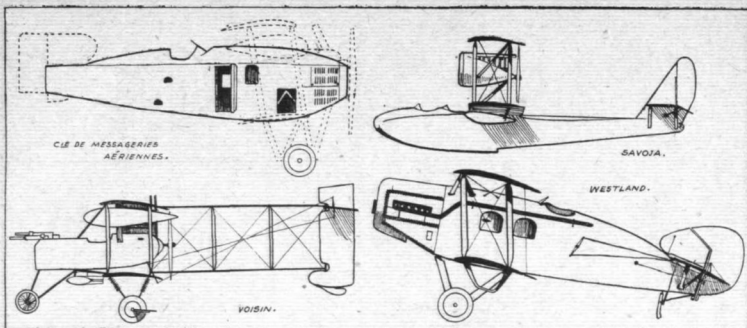
"Flight" Copyright

THE PARIS AERO SHOW : Some general views. Top left: the signs above each stand are arranged so as to be visible from any point of view ; in bottom left may be seen the Handley Page, the Blériot and the Caproni ; Top right : the Farman Goliath in the foreground ; Bottom right ; General view. In the foreground the Airco 16



AT THE PARIS SHOW. Silhouettes of some British and French machines

"Flight" Copyright



Some more silhouettes from the Paris Show

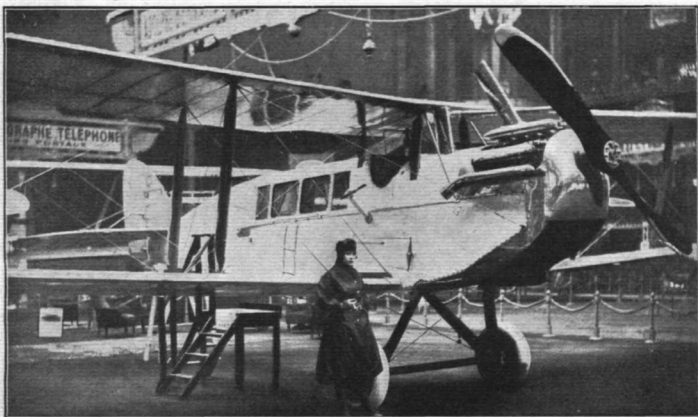
"Flight" Copyright

conditions, of means for travelling at high speed at great heights, of these and a number of other problems that have to be faced and solved before commercial aviation in all its aspects can come into its own, there is scarcely a trace to be found. It is a pity to have to admit it, but the fact cannot be denied.

One thing, about which we personally have never had any doubts—at any rate during the last four or five years—is very clearly brought out: the British machines are, generally speaking, far ahead of the French equivalents. Now and then the French designer scores with his sense of the artistic, with his eye for the graceful outline or flowing curve. Sometimes he shows an inventiveness of mind which his British colleague lacks. But when it comes to carrying the ideas into effect, to give them expression in terms of downright sound engineering, the British designer can more than hold his own. We feel sure that we can state this without fear of being accused of boosting our own constructors, as we heard

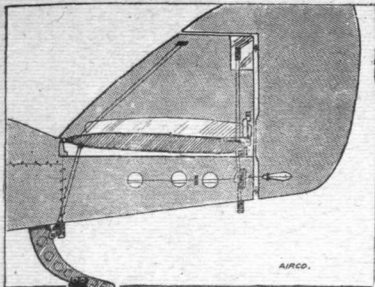
more than one French aeronautical engineer admit the excellence of British designs.

To take one particular instance, that of metal construction. The Boulton and Paul P. 10 is at least two years in advance of any French metal construction shown. For that matter, it is no exaggeration to state that the B. and P. 10 is the machine of the show, from a constructional point of view. It is, as a matter of fact, the only machine which marks any real progress in aeroplane construction. Other machines there are which show excellent workmanship and irreproachable detail design, but they are one and all designed along orthodox lines, quite excellent in their way, but with no attempt at originating new forms of construction which shall prove superior in some way to older methods. As for the other examples of metal construction, it is safe to say that in no instance have the designers succeeded in developing more than about 50 per cent. of the actual strength of the metal used. In the Boulton and Paul machine the rolled sections



THE AIRCO STAND: The lady attendant in her flying costume attracted quite a lot of attention. This costume is the design of Lady Duff Gordon (Lucille), and can be carried in a small box and slipped on over the ordinary dress

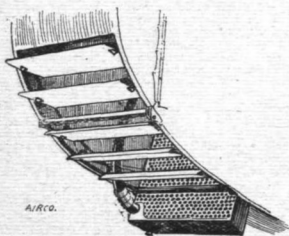
"Flight" Copyright.



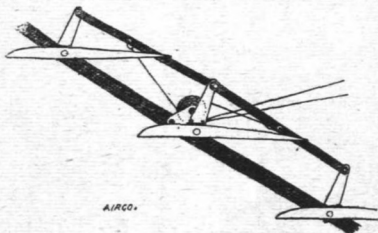
"Flight" Copyright

THE AIRCO 16 : Sketch showing movable mounting of tail

used have only been discovered after extended experiments, and tests to destruction have proved that practically the entire strength of the steel has been developed. This means that full advantage can be taken of the superior weight-



AIRCO.



AIRCO.

"Flight" Copyright.

ON THE AIRCO 16 : This extremely neat machine has a very ingenious device for varying the cooling. The radiator is no longer movably mounted, but the amount of air is controlled by slats along the bottom of the nose of the body

strength ratio of steel over that of wood, with, it may be presumed, considerable advantage from the point of view of durability and resistance to climatic conditions.

While thus claiming a certain amount of "ascendancy" for British machines in general, as regards engineering perfection, when it comes to the problems that are going to make or break the aeroplane as a commercial vehicle there is as little evidence of anything attempted among them as there is among constructors of other nationalities at the show, and our own constructors appear just as satisfied to provide the upholstery and the etceteras, and to let it go at that, as are those of France. We should like, before closing these general remarks and proceeding to a detailed description of the various exhibits, to point out that although we have ventured to criticise the lack of serious attempts at solving the problems that really are of paramount importance, we quite admit that many machines shown represent all that is best in aeronautical engineering as we have come to know it during the War. It is merely a question of having gone for the things which, to our way of thinking, are of secondary importance, while leaving alone those that will form the determining factors in the future equation of commercial aviation.

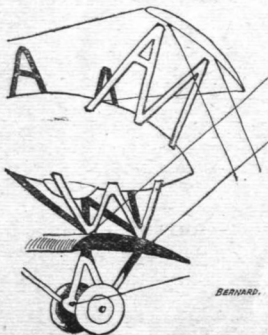
As all the British exhibits were dealt with at some length in our issue of December 18, and many of the more important French exhibits were referred to in last week's issue, we have decided to arrange our detailed descriptions of the machines in alphabetical order, as indicated in the accompanying table of dimensions and other characteristics.

The Aircraft Manufacturing Co. (Airco)

The main exhibit on this stand is the beautiful new Airco 16, which, as it happens, is shown to the best possible ad-

vantage by the fact that the neighbouring stand—the Ansaldo—is empty, thus allowing one a better view of the Airco than is possible to obtain of most of the machines at the show. The new Airco 16 is very similar, generally speaking, to previous machines carrying this series number, and which have been doing such excellent service on the London-Paris air route. It is, however, now fitted with a 450 h.p. Napier Lion aero engine, which has necessitated a slight alteration to the nose of the machine. The manner in which the installation of the Lion has been effected is a credit to the designers, the nose being a very graceful appearance and, at the same time, a very efficient arrangement both from the aerodynamical and from the engineering point of view. The radiator is placed, as in some of the previous models, projecting through the floor of the fuselage, but it is now rigidly fixed. To vary the cooling as desired a very ingenious arrangement has been designed. This is illustrated by some of the accompanying sketches. The floor of the nose of the fuselage is formed by a series of slats, shaped somewhat like ordinary wing sections. These slats are pivoted and operated by cables from the pilot's seat. When the shutter formed by these slats is closed the floor of the body makes a smooth unbroken curve, with only a short length of radiator projecting. According to the amount of opening of the shutter, the amount of air admitted to the radiator is varied, until when the slats are horizontal, the maximum of air is admitted to the space around the radiator.

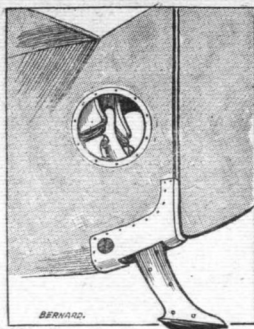
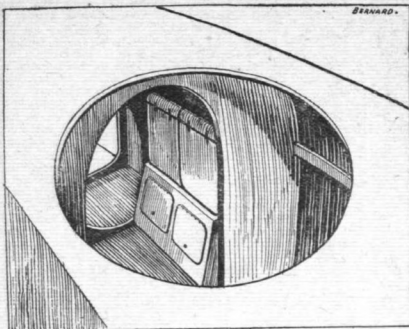
The machine is finished to the highest degree, and it looks extremely well in its "show paint." The pilot's seat and passengers' accommodation are arranged as in earlier models, i.e., the pilot sits in front of the cabin, where, by the way, his view cannot be particularly good, while the four passengers



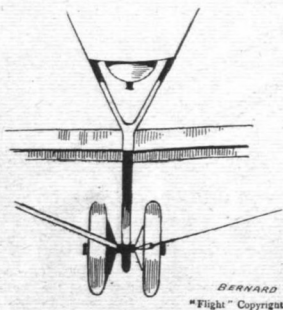
BERNARD.

"Flight" Copyright

View of the Vee engine-struts and single undercarriage struts of the Adolphe Bernard mail machine



ADOLPHE BERNARD : On the left, a view into the "mail van," and on the right, the tail skid



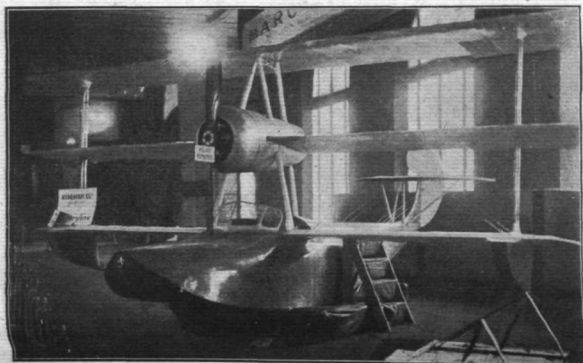
THE ADOLPHE BERNARD MAIL CARRIER :
Front elevation of one of the undercarriages

face alternately aft and forward. The cabin is most luxuriously finished in keeping with the rest of the machine. A two-way wireless telephone outfit by Marconis is carried, which allows the pilot to speak up to a distance of 100 miles and to receive messages from a similar distance.

In addition to the complete Airco 16, there is on this stand a very interesting scale model of the Hendon aerodrome, with the Airco works in the background. Various types of D.H. machines are shown on the aerodrome, as well as a model of a Hucks' starter. A full-size Hucks' starter is shown in front of the Airco 16, ready, apparently, to start the Lion engine. On a series of panels are shown specimens of Airco fittings and parts, which give an excellent idea of the workmanship put into the Airco machines. Not the least interesting item on this stand is formed by a series of coloured photographs of machines on the ground and in the air. These are extremely well done, and have quite got away from the mechanical touch which one so often associates with coloured photographs.

Adolphe Bernard

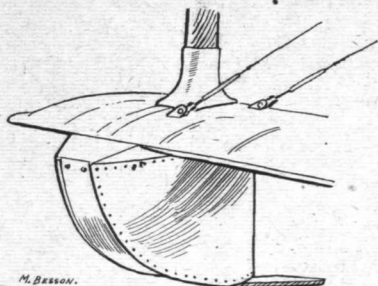
The twin-engined machine shown on this stand is rather in a dark corner and thus does not, perhaps, attract the attention which it deserves. Superficially the machine looks much like any twin-engined machine, but a closer inspection reveals a number of interesting features. The fuselage is built entirely of wood, the longerons are roughly of rectangular section, or rather of a very flat L section with rounded corners. To them are attached the struts by means of three-ply corner pieces. The bracing is also of wood, in the form of long strips running



The Marcel Besson Flying-Boat : This neat little machine has two seats side by side, and is driven by a 60 h.p. Le Rhone engine

"Flight" Copyright

from corner to corner. In each bay the strip running in one direction is single, while that running across it is split so as to accommodate between its two halves the corresponding



M. BESSON.

"Flight" Copyright.

MARCEL BESSON : Sketch showing one of the wing-tip floats of this interesting little triplane flying-boat

single strip. The pilot is placed on the left-hand side in front, and control is by wheel and foot bar. A central passage leads through to what in the military machine was the rear

The two 200 h.p. Hispano-Suiza engines are placed in the angle between the Vee engine struts, and are supported from below by single undercarriage struts, braced laterally by wires. The petrol supply is automatic by two A.M. pumps forcing the fuel to a small gravity tank under the top plane. There are no petrol taps whatever in the whole petrol supply system.

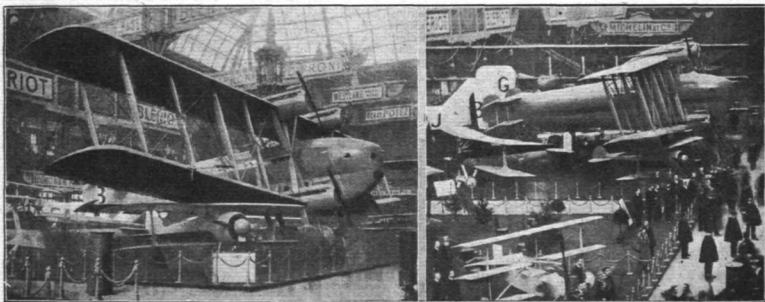
Marcel Besson

This constructor shows a very neat little triplane flying boat, fitted with one of the fine little 60 h.p. le Rhone engines. The two seats are placed side by side in the boat, and dual controls are provided. Although the machine looks very lightly built one doubts if the engine is sufficient for a two-seater flying boat in anything but a very smooth sea. For school purposes and for use over sheltered waters the machine should, however, be quite a handy little craft.

Louis Blériot

Although the Blériot and Spad machines are shown on the same stand, we prefer to deal with them under separate headings as the Spads and Blériot machines are in reality totally different although built by the same company. Of Blériots there is only one machine, the Mammoth. Photographs of this giant have already been published in *FLIGHT*, and we have mentioned that we are not particularly enamoured of the design. The distribution of the engines so far apart cannot but have an evil influence on the controllability when one or more engines are switched off, and in this respect the Mammoth is a good deal reminiscent of the ill-fated Tarrant triplane.

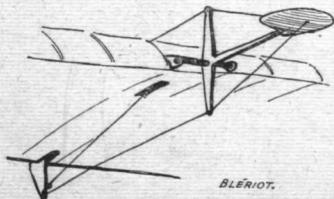
The Mammoth carries 26 passengers in addition to the pilot and engineer. The passenger cabin is arranged in two stories, a sort of first and second class in fact. Access to the cabin is through a trap door in the floor, the trap door carrying a ladder which, when the door is closed forms a sort of rein-



"Flight" Copyright.

THE BLÉRIOT-SPAD STAND : Two views of the Blériot Mammoth

gunner's cockpit, which is now occupied by the "postman." Along each side of the passage are placed mail boxes neatly arranged and easily accessible.



BLÉRIOT.

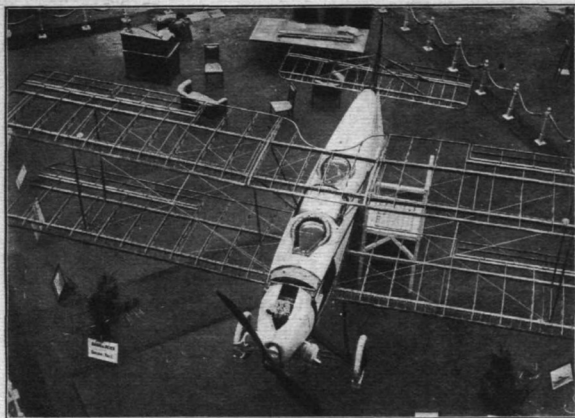
"Flight" Copyright.

THE BLÉRIOT "MAMMOTH" : Sketch of the aileron balancer

forcement of the fuselage floor. In section the body is very unusual and may, perhaps, best be described by saying that its section is reminiscent of the shape of an ordinary key hole. The reason for this section is apparent on viewing the machine from in front. By keeping the lower part of the body comparatively narrow the propeller tips have sufficient clearance without the necessity of spacing the engines too far apart laterally. Above the engines the body is then made wider, as it is not in the way of the airscrews, and more space is thus provided. The idea of the engine arrangement is, we believe, that in case of flying with something under full load, it is possible to fly on two engines: the upper engine on one side and the lower engine on the other. In theory this may be quite possible, but in case of the upper or the lower engines both being out of commission the trim of the machine would, one imagines, be seriously upset. The wing bracing is of the type which formed such a prominent feature of the Spad machines during the War, and although for the small Spad biplanes it was quite satisfactory one does not altogether like it for a machine of the size of the Mammoth.

Boulton and Paul

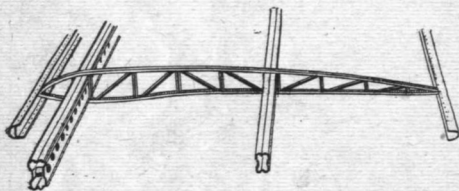
As already mentioned, the Boulton and Paul all-metal machine, P. 10, is the machine of the show, from a con-



The Boulton and Paul P 10 : Seen from the gallery

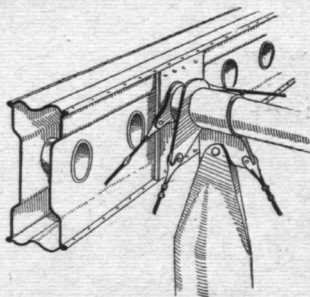
"Flight" Copyright

structural point of view. Mr. J. D. North aided by a very able staff of assistants has here produced something which marks a very real step forward in aeroplane construction. Personally we have always been believers in metal construction for aircraft, but we admit that until now we had scarcely thought the time ripe yet for its introduction. After seeing the P. 10 and discussing it with Mr. North, we are inclined to think that the time is already here when metal construction,



"Flight" Copyright

THE BOULTON AND PAUL P 10 : Sketch showing general wing construction

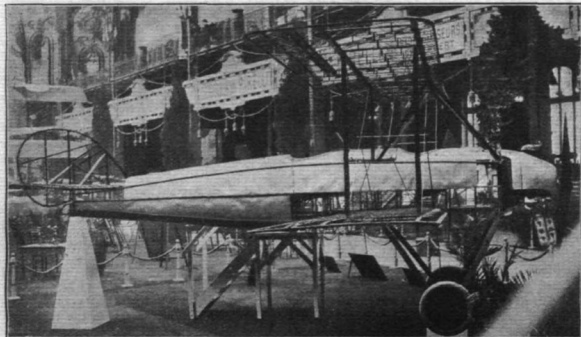


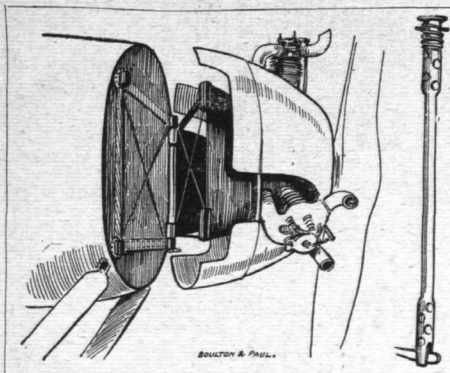
"Flight" Copyright

Sketch showing spar construction and inter-plane strut attachment on the Boulton and Paul P 10 all-metal machine

The Boulton and Paul P 10 : Side view

"Flight" Copyright





"Flight" Copyright.

THE BOULTON AND PAUL P 10: Sketch showing hinge mounting of engine, and on the right, one of the substantial hinge rods on the Boulton and Paul P 10

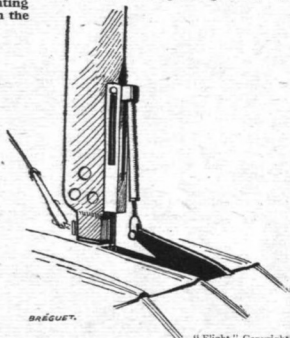
if scientifically carried out, is not only possible as a substitute for wood, but is even superior in many respects. For instance, the weight of the P. 10 actually comes out lighter than the same machine built in wood in the ordinary way, while its strength is, if anything, superior to that of the wood machine. This, however, is not the chief point of the design, although it incidentally proves to what state of perfection Boulton and Paul have carried metal construction. The chief advantage will probably be found in the longer life of the steel structure. We understand that although ordinary steel and not rustless steel has been used, the manner of treating and varnishing the metal components has proved so effective that prolonged tests have failed to show any signs of the metal parts rusting after prolonged exposure to moisture. The effect which this side of the question of metal construction will have upon the life of a machine can hardly be exaggerated. For use in tropical climates especially, the steel machine should last very much longer, and consequently be cheaper in the long run, than would one of the ordinary wood construction.

In the space at our disposal in a show issue we cannot hope to do justice to a machine like the P. 10, but we hope at some future date to be able to publish a detailed account of its constructional features. In the meantime, a few brief notes will have to suffice. The fuselage of the B. and P. P. 10 is built up, as regards the front part, of four tubular longerons.

In the rear part the body is of the monocoque type, with oval formers of channel section, placed back to back and connected by short lengths of tube. The longitudinal stringers are also of steel, of a double S section. The covering is in the form of special fibre sheets, riveted to the metal parts. This sheet is fire and damp resisting.

The two seats are placed in tandem, and dual controls are fitted. The engine—a three-cylinder radial air-cooled Cosmos Lucifer—is so mounted that the engine, by undoing a long hinge bolt, can be swung around the bolt on the opposite side, when the back of the engine with its accessories is readily accessible. This is an excellent feature from the practical point of view, and one to which more attention should be paid generally. The piping, etc., is so arranged that it does not require disconnecting when the engine is swung out. In the accompanying sketch the piping and other paraphernalia are omitted for the sake of clearness.

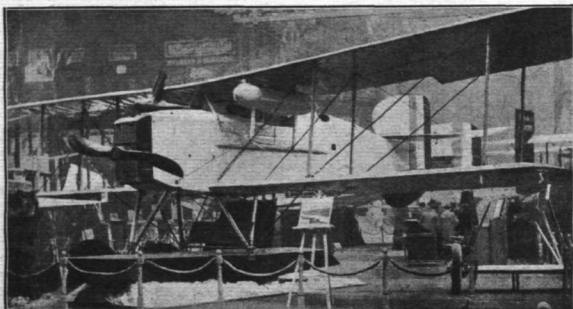
The wing structure is also entirely built of rolled steel sections, the shape of which may be seen in one of our sketches. The spars are roughly of I section as regards their external shape, but are built up of thin, rolled sheet steel. The flanges are corrugated and are attached to the webs by riveting. The webs are provided with lightening holes, slightly



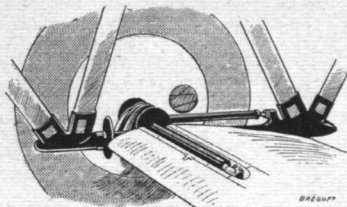
"Flight" Copyright.

Sketch showing aileron-operating gear on one of the Breguets

■ ■ ■ ■ ■
 ■
 ■ The Breguet Sea-
 ■ plane: The
 ■ undercarriage of
 ■ all Breguet ma-
 ■ chines is so de-
 ■ signed that a
 ■ wheel undercar-
 ■ riage can be sub-
 ■ stituted for the
 ■ floats, or vice
 ■ versa, in a few
 ■ hours
 ■ "Flight" Copyright
 ■
 ■ ■ ■ ■ ■



flanged to give greater stiffness. The two web plates are connected at intervals by horizontal lengths of tube, these tubes being flanged over both inside and outside the web plate so as to prevent it from bending laterally. The manner in which this is done is extremely neat, and must have required



"Flight" Copyright

Detail of axle attachment on one of the Breguets

a number of experiments before a satisfactory way was discovered. Later, we understand, these tubes will be replaced by sheet steel rolled into a tubular shape.

The inter-plane struts, which in the show machine are of ordinary stream-line tube, but which will later be replaced by built-up sheet steel struts, are attached to the compression struts a short distance inside the spars, which makes a very neat and compact job of an otherwise somewhat awkward joint.

The undercarriage is at present of the usual Vee type with stream-line steel tube struts and rubber shock absorbers, but later an oleo undercarriage will be fitted. With this wholly inadequate reference we must leave the P. 10, hoping to return to it in more detail at a later date.

Louis Breguet

Three complete machines are shown by Breguet. Of these one is the ordinary Breguet Fighter which did such good work in the War straining Huns. This machine, which carries a formidable armament consisting of no less than five machine guns, is not perhaps of such immediate interest now that the War is over, but it serves as a useful reminder of the time when, militarily, a nation's welfare depended on its aerial preparedness. The machine is already well known, and does not require much by way of a description here. Suffice it to say that the armament was arranged as follows: Two synchronised machine guns firing through the propeller, two mounted on a rotatable gun ring, and one placed so as to fire in a downward and rearward direction through an opening in the floor of the fuselage. The class number of the machine is 17c2. The lift bracing is unusual in that there are no lift wires in the inner bay, the landing wires of which run from the top of the fuselage.

The second machine shown on the Breguet stand is a seaplane of the cabin type. The central float is very wide and shallow, having a single step. The bottom aft of the step is flat, while the nose of the float has a Vee bottom which gradually flattens out towards the step. The float is so mounted that it can be removed and replaced by a wheel undercarriage. Wing tip floats are fitted. The seaplane, which is fitted with a 300 h.p. Renault engine, has a cabin accommodating three passengers, while the pilot sits in the open, behind and above the cabin. As in all Breguet machines the fuel tanks, which contain, in the case of this machine, sufficient for a six hours' flight, are mounted between the planes some distance out from the body. The manner of supporting them on the cross formed by the bracing cables is shown in one of our illustrations.

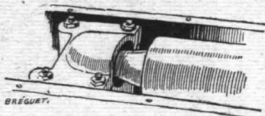
Finally, it might be added that the tail float, which is of the Vee bottom type, is mounted underneath the usual tail skid, the removal of the float being a matter of a very short time.

Perhaps the most interesting of the Breguet machines shown is the large passenger machine known as the Berline. The series number of this machine is XVIII T. In addition to six passengers accommodated inside a comfortable cabin, the machine carries a pilot and a wireless operator, a very powerful wireless set being carried. The 440 h.p. Renault engine is placed behind a nose radiator, and is covered in by an aluminium cowl provided with numerous louvres.

The undercarriage gives the impression of being extremely strong, and forms a letter W, as seen from the side, the lower points of the struts being joined by a longitudinal horizontal

member carrying the shock absorbers. The short divided axle has a form of ball and socket joint for its hinge, and the axles rest in grooves in the top of the fairing which covers the cross members of the undercarriage. The tail skid is of wood, terminating at the rear in a leaf spring. The rear two-thirds of the wooden skid is enclosed in a thick aluminium casing.

The biplane wings are connected by steel tube struts in aluminium stream-line casings. The lift tension members are stranded cables, while the anti-lift wires are solid piano wire. The wire strainers used are very similar to those which were fitted on the early Breguet biplanes many years before



"Flight" Copyright

Chassis detail and shock-absorber on Breguet

the War. The ailerons are balanced in the usual way, but the method of operating them is unusual. The cranks are horizontal (or nearly so), and from them cables pass up inside the rear inter-plane strut fairing, as shown in one of the accompanying sketches. Altogether the Breguet Berline gives the impression of being a very workmanlike job, and as similar machines have done well on the Paris-London service, alternating with the Handley Pages, this impression may be trusted to be correct.

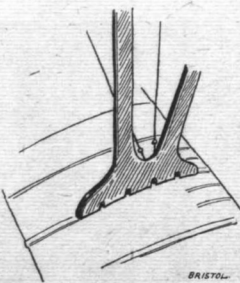
The Bristol Machines.

The British and Colonial Aeroplane Co., Ltd., make a very fine show with three complete machines and an excellent scale model of the Bristol Pullman triplane, which is far too large a machine to make it possible to exhibit it on the stand.

The front of the stand is occupied by the Bristol Tourer, a peace-time version of the famous Bristol Fighter. Fitted with a Siddeley Puma engine and a gravity tank in the centre section of the top plane, the machine looks slightly different from the F2B, but the family relationship is unmistakable. The aft cockpit, which was formerly occupied by the gunner, now accommodates an ordinary peaceful passenger, and the flat top of the aft deck is now covered over with a deck fairing, which adds considerably to the appearance of the machine. Capable of a speed of 120 m.p.h. and with a cruising speed of 85 to 90 m.p.h., this machine should make a strong appeal to the aerial tourist, especially as the price is extremely low, judged by present day standards, namely, £1,200.

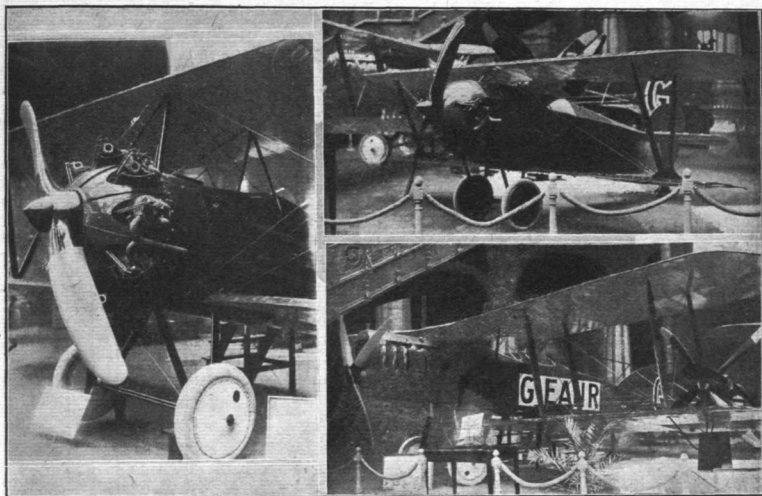
The second machine shown is a racer, known as the Bristol Bullet. Although by no means a small machine the Bullet is very fast indeed, probably somewhere in the neighbourhood of 165 m.p.h. It is fitted with a Cosmos Jupiter engine of 450 h.p., neatly covered in except for the top of the cylinders, a very neat oil cooler is placed on the top of the fuselage,

where its fins, metal channel section strips placed back to back, are in contact with the oil container and also exposed to the air from the propeller. The outstanding feature of the Bullet is its great strength. As the machine is intended for "stunting" and racing the factor of safety has been kept extremely high. This has been accomplished, as regards the main planes and tail plane, by fitting double spars. The consequence is that the wings are of nearly double the strength of ordinary wings, while the double spar arrangement has the



"Flight" Copyright

THE BRISTOL BABE: Attachment of lower plane to foot of Vee struts



ON THE BRISTOL STAND: On the left, the nose of the Bristol Bullet. Top: The Bristol Baby, and below, the Bristol Tourer

advantage that the pull on the bracing wires is nicely centralised in the middle of the spars. The factor of safety of the Bullet is said to be such that the machine can safely be put through any sort of aerial acrobatics at its full speed of about 165 m.p.h. There is no doubt that this machine will be heard a good deal of in the races of 1920.

Last, but by no means least, though smallest, there is the new Bristol Babe, a small single-seater sporting machine fitted with a two-cylinder opposed air-cooled Siddeley engine. The Bristol Babe is of very pleasing appearance, with its small bottom plane and Vee inter-plane struts, and its three-ply covered fuselage. We are told that the machine flies very nicely, its longitudinal sensitiveness being by no means so great as one might expect in a machine of this small size.

The fuselage is built up of a light framework covered with three-ply wood, which is in turn covered by fabric. In this manner the ply-wood is well protected, especially as it is painted with two or three coats of red lead on the inside. The bracing, in addition to that formed by the three-ply covering itself, is in the form of a series of crosses of thin wood laths, the sides of the body being divided horizontally by an auxiliary longeron, and the cross bracing being both above and below this. The pilot's cockpit is very comfortable and

quite roomy, considering the small size of the machine. The view obtained is very good on account of the low position of the top plane and the narrow chord of the bottom wing.

Ailerons are fitted to the top wing only, and are operated by cables passing over pulleys in the bottom plane, the aileron crank levers being horizontal, somewhat after the manner of German aeroplanes. The lower plane has practically three spars, as the leading edge is very strongly built, thus forming really a third spar. The Vee inter-plane struts, of which there is only one pair on each side, are reinforced by blocks at the bottom, where they spread out so as to form a rigid attachment for the bottom wing.

The undercarriage is of the simple Vee type, with very narrow track, as the undercarriage struts are vertical in front view. It is a question whether it would not be advisable to fit wing tip skids, but this is a small matter which could easily be attended to if it is found necessary. The tail skid is very simple, consisting of a small steel leaf spring. We understand that it is contemplated to place the Babe on the market at a price in the neighbourhood of £400, at which figure the machine should, we think, find ready purchasers.

(To be continued.)

A Martinsyde for the Coupé Deutsch

This speed competition for Coupé Deutsch is to be given an international turn, the Royal Aero Club having sent to the Aero Club of France an entry of a Martinsyde. In the meantime M. Sadi Lecoq is testing a Nieuport with which he intends to make an attempt to win the Cup.

New Height Record Claims

It is claimed that on December 20 Lieut. Roger with two passengers climbed to an altitude of 6,000 m., notwithstanding the fact that he had to fly through a dense fog during the first 4,000 m. This is stated to have beaten the performance of M. Poulet who reached 5,420 m.

On December 24 Casale added another 800 metres to the record. With two passengers on a Spad S 27, three-seater limousine, fitted with 300 h.p. Hispano motor, Zenith carburettor and Lumiere propeller, he climbed to 6,800 metres.

He started from the Buc aerodrome and his flight lasted for 1 hour 3 mins.

The Next Gordon-Bennett Race

The Aviation Committee of the Aero Club of France is suggesting to the Fédération Aéronautique Internationale that the next competition for the Gordon-Bennett Aviation Trophy should be held over a cross-country course of 300 kilom., made up of three rounds of a circuit over the plains of Beauce.

The Aero Club of France will give the winner a prize of 10,000 francs.

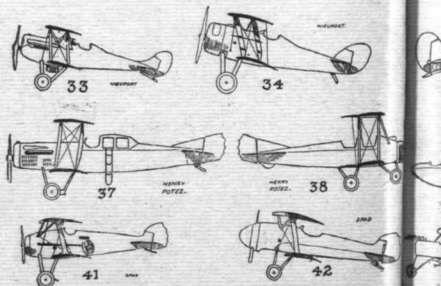
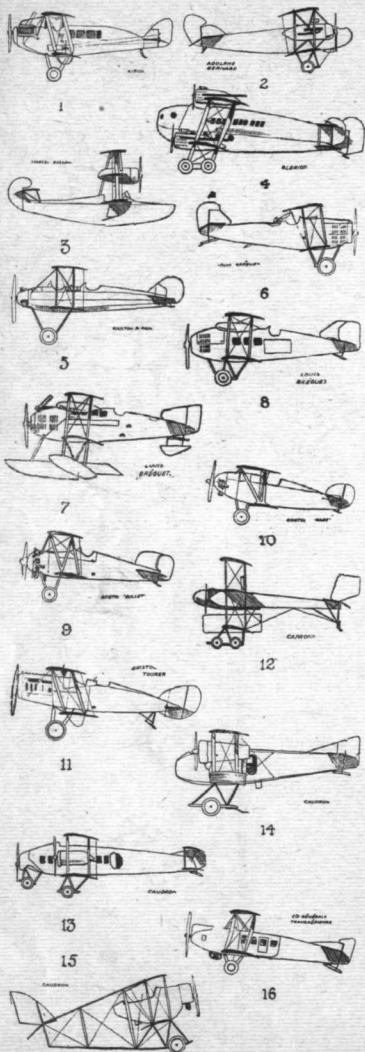
An Aerial Derby at Hamburg

According to the *Berliner Tageblatt*, an aerial Derby is to be held at Hamburg this year, and the prize fund will total 200,000 marks.

The PARIS AERO

Tabulated Particulars

No.	Make.	Name or Series No.	Type.	Engine.		No. of Passengers.
				Make.	h.p.	
1	Aéro	D.H.16	B	Napier Lion	450	4
2	Adolphe Bernard	A.B.5	B	le Rhone	200	1
3	Marcel Besson	Flying boat	T	le Rhone	60	1
4	L. Bleriot	Mammouth J	B	Hispano-Suiza	300	26
5	Boulton & Paul	P.10	B	Cosmos Lucier	100	1
6	L. Breguet	17 C.2	B	Renault	450	1
7	L. Breguet	XIV T	B	Renault	300	3
8	L. Breguet	Berline	B	Renault	450	2
9	Bristol	Bullet	B	Cosmos Jupiter	450	0
10	Bristol	Babe	B	Siddeley	40	0
11	Bristol	Tourer	T	Siddeley Puma	230	1
12	Caproni	Triplane	T	Fiat A.12	200	4
13	Caudron	C.25	B	Canton Unné	240	10
14	Caudron	C.33	B	le Rhone	80	1
15	Caudron	G.5	B	le Rhone	80	1
16	Cie. Gl. Transaerienne	Salon	B	Renault	450	5
17	L. Clement	Racer	M	Hispano-Suiza	120	0
18	L. Clement	Triplane	T	Anzani	30	1
19	Farman	F.60	B	Salmon	260	20
20	Farman	David	B	le Rhone	60	1
21	Farman	School	B	Renault	50	1
22	F.I.A.T.	A.R.F.	B	Fiat A.14	200	2
23	Lafcoere	Postal	B	Salmon	750	2
24	P. Levaquer	S.A.B.	B	Hispano-Suiza	300	0
25	Lioré and Olivier	Fl. boat	B	Salmon	150	4
26	E. de Marçay	Limousine	B	le Rhone	150	1
27	E. de Marçay	le Rhone	B	le Rhone	60	0
28	E. de Marçay	Passé - Par-tout	B	A.B.C.	70	0
29	Morane Saulnier	A.S.	M	le Rhone	80	0
30	Morane Saulnier	A.R.	M	le Rhone	80	1
31	Morane Saulnier	A.L.	M	le Rhone	130	0
32	Morane Saulnier	A.N.	B	Liberty	400	1
33	Nieuport	20.C.1	B	Hispano-Suiza	300	0
34	Nieuport	28	B	le Rhone	180	0
35	Nieuport	Racer	B	Hispano-Suiza	300	0
36	Handley-Page	W.8	B	Napier Lion	450	13
37	H. Potez	S.E.A.7	B	Lor. Dietrich	370	1
38	H. Potez	VIII	B	H. Potez	50	1
39	Savoia	S.16	B	Fiat A.12	300	3
40	Spad	S.30	B	Anzani	45	0
41	Spad	S.27	B	Hispano-Suiza	300	2
42	Spad	S.29	B	le Rhone	80	1
43	Vestib	X	B	Renault	300	1
44	Westland	Limousine	B	Rolls-Royce	275	3



HOW at a GLANCE

the Machines

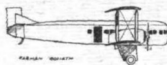
Speed, m.p.h.	Weight (lbs.)		Length.	Span.	Height.	Area.	Load (m.p.h.)	Load (m.p.h.)
	Empty	Loaded						
130	3,077	4,645	ft. in.	ft. in.	ft. in.	sq. ft.	lbs.	lbs.
102	3,657	6,960	37 3	64 3	12 0	895	17-4	7-7
93	8,360	16,660	50 10	89 1	21 2	1,550	13-8	10-7
104	1,164	1,700	26 0	30 0	12 0	509	17-0	5-5
138	—	—	—	—	—	—	—	—
203	—	—	—	—	—	—	—	—
160	1,700	2,300	24 1	31 3	9 8	395	5-35	7-8
80	460	683	14 11	19 8	5 9	108	17	6-34
100	1,720	2,800	25 9	39 8	10 1	495	12-2	6-25
87	11,000	17,000	42 11	96 0	20 8	2,223	28-3	7-6
104	7,500	12,100	62 8	82 6	18 0	1,670	16-1	7-25
83	1,950	3,040	30 10	37 3	9 10	504	19	6-5
70	750	950	21 2	44 3	—	390	11-9	3-28
116	3,300	5,280	35 3	48 0	—	700	11-7	7-55
—	—	—	—	—	—	172	8-2	8-57
—	—	—	—	—	—	140	12-4	2-67
100	4,400	10,200	46 3	92 6	16 6	1,720	19-6	5-75
87	440	880	21 0	23 6	—	—	14-7	—
162	—	—	—	—	—	—	—	—
104	—	—	—	—	—	—	—	—
137	—	—	—	—	—	—	—	—
93	5,500	8,600	39 7	72 6	12 7	970	15-3	8-85
87	390	835	18 3	19 7	—	167	13-9	5-
112	300	383	14 10	16 6	6 0	102	9-7	5-2
68	330	417	12 6	13 3	4 6	91-5	11-7	4-55
102	220	1,100	18 6	25 10	10 4	140	13-7	7-85
93	880	1,380	22 4	34 8	11 4	393	13	7-15
138	980	1,540	19 2	20 3	8 2	140	8-55	11-
124	2,570	4,000	27 7	38 10	9 0	440	10	9-1
127	1,670	2,420	21 5	32 0	—	500	8-05	8-35
128	880	1,570	20 8	26 5	—	174	8-7	9-10
90	1,370	1,835	20 5	19 10	—	140	6-1	13-1
12	—	—	—	—	—	—	—	—
24	2,420	5,650	30 5	46 5	10-7	473	9-8	7-7
12	483	925	18 7	26 3	8 2	304	28-5	4-55
05	2,860	4,630	33 0	49 3	11 11	570	15-4	8-1
87	616	880	19 8	25 7	7 5	—	10-5	—
43	1,870	2,770	24 0	32 1	9 5	—	9-25	—
03	1,790	1,230	19 2	25 5	7 10	—	15-4	—
12	—	3,460	28 6	38 2	10 9	440	15	8-2



17



18



19



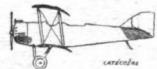
20



21



22



23



24



25



26



27



28



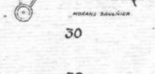
29



30



31



32



33



34



35



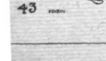
36



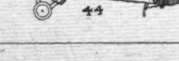
37



38



39



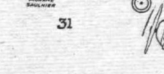
40



41



42



43



44



45



46



47

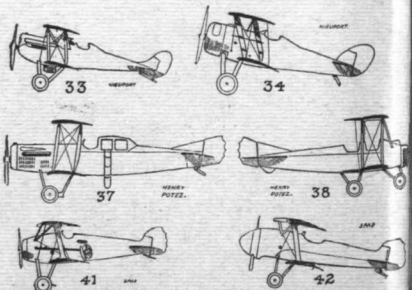
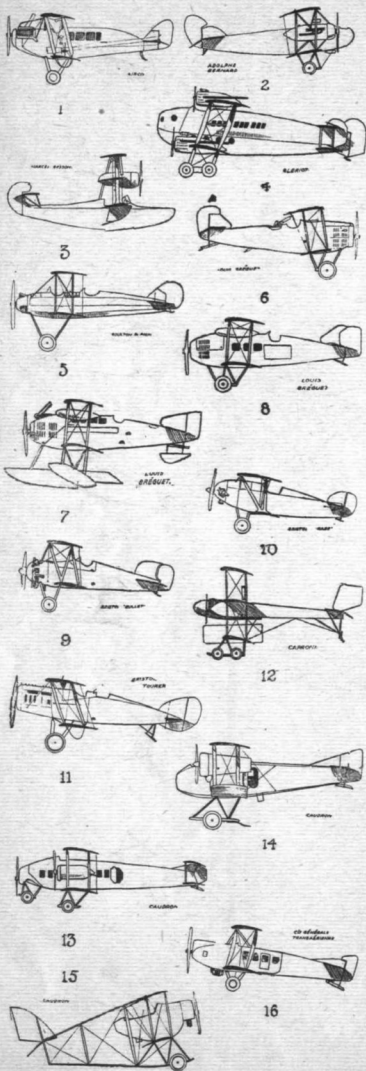


48

The PARIS AERO

Tabulated Particulars

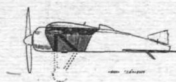
No.	Make.	Name or Series No.	Type.	Engine.			No. of Passengers.
				No.	Make.	h.p.	
1	Aéro	D.H.16	B	1	Napier Lion	450	4
2	Adolphe Bernard	A.B.3	B	2	Hispano-Suiza	300	1
3	Maurice Besson	Flying boat	T	1	le Rhone	60	1
4	L. Bleriot	Mammouth	B	4	Hispano-Suiza	300	26
5	Boulton & Paul	P.30	B	1	Cosmos Lucifer	100	1
6	L. Breguet	17 C.5	B	1	Renault	450	1
7	L. Breguet	XIV T	B	1	Renault	300	1
8	L. Breguet	Berline	B	1	Renault	450	1
9	Bristol	Bullet	B	1	Cosmos "Jupiter"	430	1
10	Bristol	Dale	B	1	Siddeley	40	1
11	Bristol	Tourer	B	1	Siddeley Puma	430	1
12	Caproni	Triplane	T	3	Fiat A.12	200	4
13	Caudron	C.25	B	3	Canton Unné	250	16
14	Caudron	C.33	B	2	le Rhone	80	1
15	Caudron	G.3	B	1	le Rhone	80	1
16	Cie. Gl. Transaérienne	Salon	M	1	Renault	450	1
17	L. Clement	Racer	B	1	Hispano-Suiza	480	0
18	L. Clement	Triplane	T	1	Anzani	30	0
19	Farman	F.60	B	2	Salmon	260	20
20	Farman	David	B	1	le Rhone	60	1
21	Farman	School	B	1	Renault	80	1
22	F.I.A.T.	A.R.F.	B	1	Fiat A.14	700	1
23	Latécoère	Postal	B	1	Salmon	340	1
24	P. Levasseur	S.A.B.	B	1	Hispano-Suiza	300	0
25	Lioré et Olivier	Fl. boat	B	3	Salmon	260	4
26	E. de Marçay	Limousine	B	1	le Rhone	60	1
27	E. de Marçay	—	B	1	le Rhone	60	0
28	E. de Marçay	Passé - Partout	B	1	A.B.C.	70	0
29	Morane Saulnier	A.S.	M	1	le Rhone	80	0
30	Morane Saulnier	A.R.	M	1	le Rhone	80	1
31	Morane Saulnier	A.L.	M	1	le Rhone	180	0
32	Morane Saulnier	A.N.	B	1	Liberty	400	1
33	Nieuport	29 C.1	B	2	Hispano-Suiza	300	0
34	Nieuport	28	B	1	le Rhone	150	0
35	Nieuport	Racer	B	2	Hispano-Suiza	300	0
36	Handley-Page	W.8	B	2	Napier Lion	450	15
37	H. Potez	S.E.A.7	B	1	Lor. Dietrich	370	1
38	H. Potez	VIII	B	1	H. Potez	50	1
39	Savoia	S.16	B	1	Fiat A.12	300	1
40	Spad	S.30	B	1	Anzani	45	0
41	Spad	S.27	B	1	Hispano-Suiza	300	2
42	Spad	S.29	B	1	le Rhone	80	1
43	Voisin	—	B	1	Renault	300	1
44	Westland	Limousine	B	1	Rolls-Royce	275	3



SHOW at a GLANCE

of all the Machines

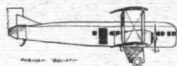
Duration (hours)	Speed (m.p.h.)	Weight (lbs.)		Length	Span	Height	Area	Load (h.p.)	Load (h.p.)
		Empty	Loaded						
3-5	130	3,077	4,645	ft. in.	ft. in.	ft. in.	sq. ft.	lbs.	lbs.
5	102	3,652	6,960	37 3	64 3	11 5	895	10-3	7-7
6-3	93	8,360	16,600	50 10	89 1	21 2	1,550	13-8	10-7
5	135	1,104	1,700	26 0	30 0	12 0	309	17-0	5-5
103	—	—	—	—	—	—	—	—	—
100	1,700	2,300	24 1	31 3	9 8	293	5-35	7-8	—
2-5	80	460	683	14 11	19 8	5 9	108	17	6-34
4-7	120	1,750	2,800	25 9	39 3	10 1	405	12-3	6-92
87	11,000	12,000	42 11	40 0	20 8	2,223	28-3	7-6	—
6	162	7,500	12,100	62 8	82 6	18 0	1,670	16-1	7-23
6	93	1,950	3,040	30 10	51 3	9 10	504	19	6-5
4	70	750	950	23 4	44 3	—	300	11-9	3-98
3-5	118	3,300	5,380	35 3	48 0	—	700	12-7	7-55
—	—	—	1,473	—	—	—	172	8-2	8-57
3-5	100	4,400	10,200	46 3	92 6	16 6	1,770	10-6	5-75
4	87	440	580	21 0	23 6	—	140	12-4	3-07
—	—	—	—	—	—	—	14-7	—	—
20	162	—	—	24 10	41 3	—	—	—	—
3-5	137	—	2,420	28 10	30 3	7 9	310	8-05	7-8
—	93	5,500	8,600	39 7	72 6	12 7	970	15-3	8-85
4	89	390	835	18 3	19 7	—	167	13-9	5-1
2	112	300	583	14 10	16 6	6 0	102	9-7	5-2
—	68	230	417	12 6	13 3	4 6	91-5	4-17	4-55
3	102	770	1,100	18 6	28 10	10 4	143	13-7	7-85
3	93	880	1,380	22 4	34 8	11 4	193	13	7-15
3	104	980	1,540	19 2	29 3	8 2	140	8-55	11-1
3	124	2,570	4,000	27 7	38 10	9 0	440	10	9-1
3-5	147	1,670	2,420	21 5	32 0	—	290	8-05	8-35
4	128	880	1,570	20 8	26 5	—	174	8-7	9-1
4	110	4,370	1,855	20 5	10 10	—	140	6-1	13-1
0-4	124	2,420	—	60 0	75 0	17 0	—	—	—
1-5	124	2,420	3,630	50 5	48 3	10 7	473	9-8	7-7
3	—	483	923	18 7	26 5	8 2	204	18-5	4-55
4	105	2,860	4,630	33 0	49 3	13 11	570	15-4	8-1
3	87	616	880	19 8	25 7	7 5	—	19-5	—
3	143	1,870	2,770	24 0	32 1	9 3	—	9-25	—
3	103	1,790	1,230	19 2	25 5	7 10	—	15-4	—
3	112	—	3,560	28 6	38 2	10 9	440	13	8-2



17



18



19



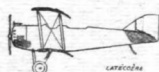
20



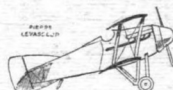
21



22



23



24



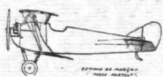
25



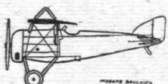
26



27



28



29



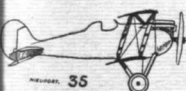
30



31



32



36



39



40



43



44

SOME "B.A.T." AEROPLANES

The accompanying illustrations show five types of machines, designed by Mr. Frederick Koolhoven, manufactured by the British Aerial Transport Co., Ltd. These five machines include a diminutive single-seater monoplane, a medium-powered school machine, a small single-seater speed machine, a slightly larger sporting two-seater biplane and a large commercial passenger or cargo-carrying biplane. The latter machine was fully described in our issue for April 17, 1919, and it only remains to say here that since that time this machine has already made a name for itself. It has made numerous successful journeys from England to various parts of France, Belgium and Holland, and proved itself extremely useful during the recent railway strike in carrying mails.

The sporting machine, F.K. 27, will, no doubt, be remembered by some of our readers by the good show it put up on the occasion of the last "Aerial Derby." For a two-seater machine it is certainly on the small side—being, in fact, only slightly larger than the famous B.A.T. "Bantam"—the span being only 26 ft. A special feature of this machine, from the social point of view at any rate, is that the seats are arranged side by side, in spite of which the cockpit is exceptionally roomy and comfortable. In construction it follows usual B.A.T. practice, which has been found so satisfactory in previous models, the main feature of which consists of three-ply wood construction of the fuselage. The engine fitted, a 200 h.p. A.B.C. "Wasp II," gives the machine a high performance, the maximum speed being 140 m.p.h., whilst the machine is, at the same time, very easy and safe to fly.

again, is on the same principle as the "Bantam." One of these machines climbed to 21,000 ft. in 14 mins.

The school machine, F.K. 24, known as the "Baboon," is a dual control tractor biplane, fitted with a 170 h.p. A.B.C. "Wasp I." It embodies most of the constructional features of the other models, and is, we understand, a particularly easy machine to fly. The exceptionally wide wheel base of the undercarriage, common to all B.A.T. machines, is an important feature from the point of view of a training machine. Another noteworthy feature with the "Baboon" is that all the control surfaces, the *ailerons*, elevators and rudder, are interchangeable—quite a point of high import where the question of saving time in replacements is concerned.

In size, one of the smallest aeroplanes in the world, in construction, the simplest ever designed, the "Crow," F.K. 28, stands in a class entirely by itself. The main idea in the production of this little machine has been to provide the flying public with an aerial equivalent of the motor cycle. The overall span of the "Crow" is 15 ft., and the overall length 14 ft., but if even this should prove to be too large for storage purposes, it is an exceedingly easy matter, with the aid of a spanner and a pair of pliers, to dismantle the machine completely in a few minutes—there are no bracing wires to worry about, and the unscrewing of 12 nuts removes the main plane, which is in one piece. The pilot is seated in a small nacelle mounted on a large central skid between the wheels. The engine, a 40 h.p. A.B.C. "Gnat," is mounted on the front of the plane, and forms an easily detached unit complete with mounting, petrol and oil tank. The petrol



The B.A.T. "Crow" (F.K. 28), the "motor-cycle of the air." It has a span of only 15 ft., and is fitted with a 40 h.p. "A.B.C. Gnat"

The "Basilisk," F.K. 25, is designed primarily as a single-seater fighting biplane, and is noteworthy on account of its remarkably high speed, which comes out at over 160 m.p.h., with a 320 h.p. A.B.C. "Dragonfly" engine. This machine,

and oil tanks contain sufficient for a two-hour flight, or 150-mile journey. The weight of the machine is only 220 lbs.

The following is a comparative table of the characteristics of the aforementioned machines:—

Type.	Span.	Chord.	Gap.	Area main planes.	O.A. length.	Weight (fully loaded).	Useful load.	Speed range.	Climb (mins.) (a) 5,000 ft. (b) 15,000 ft.
	ft. ins.	ft. ins.	ft. ins.	sq. ft.	ft. ins.	lbs.	lbs.	m.p.h.	
F.K. 24 "Baboon" ..	25 0	5 7	4 8½	259	22 8	1,350	400	40-90	(a) 5
F.K. 25 "Basilisk" ..	25 4	4 6½	—	212	20 5	2,028	370	52-162	(a) 2
F.K. 26 Commercial ..	46 0	6 6	6 6	580	34 8	4,500	1,000	50-128	(b) 9½
F.K. 27 Sporting ...	26 0 22 10	5 7	3 11	200	20 7	1,475	400	50-135	(a) 4 (b) 19 (a) 3 (b) 15

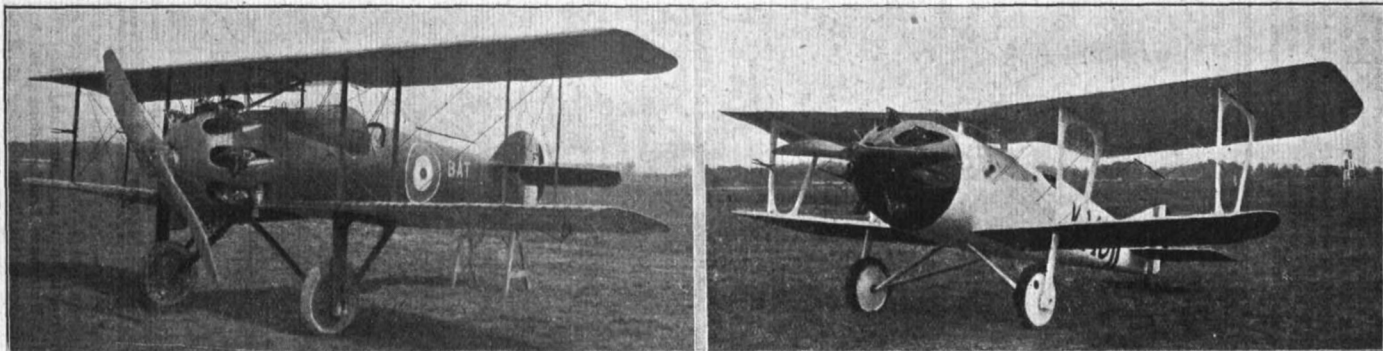
New Secretary of the R.Ae.S.

It is announced by the Royal Aeronautical Society that Lieut.-Col. W. Lockwood Marsh has been appointed Secretary of the Society, and that he takes up the duties from today (January 1). Congratulations to the Society and to Col. Lockwood Marsh.

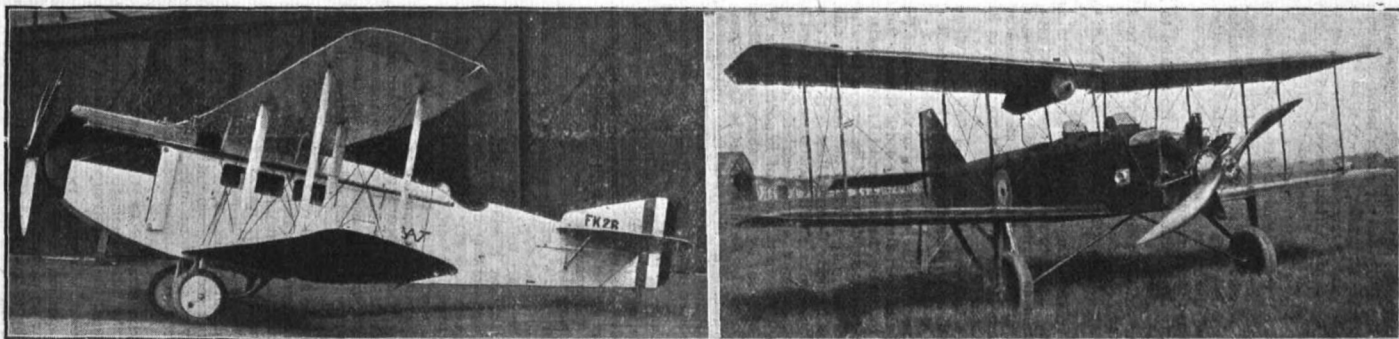
Morocco to the Canaries

The French naval Lieutenant Lefranc, who left St. Raphael some time ago for a tour over the French West African colonies, on December 24 flew from Agadir to Las Palmas, one of the Canary Islands, a distance of about 400 miles, over the Atlantic.

A QUARTETTE OF B.A.T. AEROPLANES



TWO SPEEDY B.A.T. MACHINES: The F.K. 25 "Basilisk" fighter and the F.K. 27 sporting two-seater. The former has a 320 h.p. A.B.C. "Dragonfly" engine, and the latter a 200 h.p. A.B.C. "Wasp II"



TWO MORE B.A.T. MACHINES: The F.K. 26 commercial passenger or mail-carrier (400 lbs. load), which has already carried out a good deal of cross-country work as well as many trips to Belgium and Holland, and the F.K. 24 "Baboon" training machine

THE CAIRO-CAPE ROUTE

The Air Ministry makes the following announcement:—

"It is interesting to note what has been done in the matter of preparing the all-British air route between Cairo and the Cape, now available for traffic.

In December, 1918, three survey parties, known respectively as Nos. 1, 2 and 3, African Survey Parties (No. 1 under the command of Major Long, D.S.O., No. 2 under Major Emmett, and No. 3 under Major Court-Treath and Capt. Storrledge.—Ed.) were despatched to explore and as far as possible prepare the most suitable air route through Africa. These parties were instructed to get into personal touch and work in conjunction with the administrative authorities in each zone, and the happy results of this policy, maintained throughout, have been very marked.

"No. 1 party dealt with the section from Cairo to Nimule (Soudan).

"No. 2 party dealt with the section Nimule to Abercorn (Rhodesia), and

"No. 3 party dealt with the section Abercorn to Cape Town.

"Each party, consisting of six officers and a certain number of other ranks, has for the past year been collecting all available information as to its own particular section, and has, with the aid of parties of natives, cleared aerodromes and landing-grounds at distances of about 200 miles or less along the route selected.

"The route follows the Nile from Cairo to Wady Halfa, thence the railway to Shereik, from which place it conforms to the course of the Nile to Khartoum.

"From Khartoum the course is to the west of the White Nile to Eleri, and then almost due south through the Uganda Protectorate to the northern shore of Lake Victoria. Partly owing to the extremely disturbed nature of the atmosphere above the lake the route skirts it on the eastern side, passes over what was formerly German East Africa to the southern end of Lake Tanganyika, and thence crosses Northern Rhodesia to Livingstone, whence a south-easterly course is followed to Bulawayo. The next town of importance on the route is Pretoria, and so by Johannesburg and Bloemfontein across Cape Colony by Beaufort West to Cape Town.

"The preparation of many of the landing-grounds has involved a great deal of labour. In places it has been necessary to cut aerodromes out of dense jungle, to fell thousands of trees and dig up their roots, while the soil of innumerable ant-hills has had to be removed by hand, being carried in native baskets, as practically no barrows or other equipment were available. Moreover, where tsetse fly prevailed no cattle could be utilised for cartage purposes.

"To those unacquainted with this country it will come as a surprise to learn that ant-hills are often 25 ft. in height and between 35 and 45 ft. in diameter. As one cubic yard of ant-hill weighs about 2,670 lb., some idea may be gathered of the labour necessary to clear the ground at such a place as, for instance, that at N'dola, in Northern Rhodesia, where 700 natives were working from April to August of this year and roughly 25,000 tons were removed from the ground cleared. Blasting was tried, but was found to be unsuitable.

"However, now that the initial work of clearing has been completed, it is not anticipated that the cost of maintenance will be heavy. Native labour is generally abundant and cheap, and it is estimated locally that even in the worst cases, i.e., those of landing-grounds situated in the fast-growing bush and forest country, only small annual charges will be incurred.

"In practically every case land was provided free of cost or at purely nominal rent by the local administrations who have arranged to guard the stores deposited at the aerodromes and to assist in keeping the aerodromes and landing-grounds cleared of bush.

"In some cases landing-grounds were prepared entirely by such local authorities. For instance, at Serowe, Chief Khama laid out such a ground at his own expense in order that his district should be linked up with the route. He also rendered considerable assistance in preparing that at Palapwe.

"It has been arranged for the survey parties to return shortly, and the intention is to organise the route into six areas, each under the general supervision of a British official.

"Some Difficulties

"The first portion of the journey along the Nile Valley should present no particular difficulties to air traffic. Communications by telegraph, river and railway are fairly good, and landings can be safely effected, if necessary, at many places apart from the prepared grounds.

"In the central zone, however, difficulties are more

numerous. Most of this is covered with dense bush and tropical forest, and landings at other than the prepared grounds will be exceedingly dangerous if not impossible. In some parts there is no land transport, with the resultant difficulty of providing the necessary stores at the aerodromes. Moreover, at some places tsetse fly prevents the use of cattle so that, failing the provision of light motor transport—for which special roads would have to be prepared over some



CAIRO-CAPE AIR-WAY : Skeleton map, by courtesy of *The Times*, of the route.—Various alternatives suggested for the air route between Cairo and Cape Town are here seen. The route finally adopted is that shown by the continuous black line as far as Broken Hill. Thence the route is continued by Livingstone, Bulawayo, Pretoria, Johannesburg, Bloemfontein, and Beaufort West

sections—native bearers will have to be used for the carriage of stores. Shortage of water and the frequent occurrence of areas infested by mosquitoes and white ants increase the difficulties. The fact that the survey parties have, in the face of such obstacles, completed their work within twelve months is worthy of notice.

"For most of the southern section, with the exception of Northern Rhodesia, conditions are considerably better. Railway and telegraph facilities are good, and stores can be distributed without much difficulty. The climate, too, is healthy, and forced landings could be negotiated in many places without serious danger.

Communications

"There are wireless stations at various points within touch of the chain of grounds. Generally speaking, cable and land line communications are good, with the exception of those across certain sections such as that between Abercorn and N'dola and others in Central Africa, where considerable delay may be experienced.

Comparative Overland Journey

"In view of the saving of time which will be effected by the eventual opening of this air route it is of interest to compare the time at present required to complete the journey overland.

"The distances and method of overland journey following as far as possible suggested aerial route are:—

"Cairo to Khartoum—

"1,342 miles—3½ to 4 days.

"Rail Cairo to Shellal, 555 miles, 23 hours.

"Steamer Shellal to Halfa, 208 miles, 42 hours.

"Rail Halfa to Khartoum, 579 miles, 24 hours.

"Khartoum to Lake Albert—

"1,411 miles, 21 to 24 days.

"Steamer Khartoum to Redjaf, 1,096 miles, 14 days.

"Ground transport, Redjaf to Nimule, 150 miles, 5 to 8 days.

"Steamer, Nimule to Butiaba, 165 miles, 2 days.

"Lake Albert to Lake Victoria—

"350 miles, 5 to 12 days.

The Funeral of Sir John Alcock

IMPRESSIVE scenes marked the funeral, with military honours, of Sir John Alcock at Manchester on December 27. The body had rested from Christmas Day in the Church of Holy Innocents, Fallowfield; after a brief service it was taken to Manchester Cathedral for the funeral service and the burial took place at the Southern Cemetery. A Royal Air Force firing party came at the head of the procession, and buglers with them. Maj.-Gen. Swinton C.B., D.S.O., officially represented the Royal Air Force, and Squadron-Leader E. R. Moon, D.S.O., the Minister for War. The committal sentences and the concluding prayers having been said, three volleys were fired and the "Last Post" was sounded, two aeroplanes meanwhile circling overhead.

Simultaneously a memorial service was held at St. Paul's, Knightsbridge, and among the large congregation were Sir Trevor Dawson, many representatives of Messrs. Vickers, Ltd., and prominent members of the Royal Aero Club and the Royal Aeronautical Society. The King and Prince Albert have sent messages of sympathy to Mr. and Mrs. Alcock. The King's message, forwarded by Lieut.-Col. Clive Wigram, was as follows:—

"The King desires me to express his deep sympathy with you in the untimely and tragic death of your distinguished son, whose name will ever occupy an honoured place in the roll of British airmen who never spared themselves in order to uphold the honour of their country. It was with pleasure His Majesty recently decorated your son for his great feat in crossing the Atlantic, and the King feels that the early loss in the prime of manhood of so valuable a life is an irreparable loss."

The message from Prince Albert read:—"I am desired by His Royal Highness Prince Albert to express to you his deep and sincere sympathy for the loss of your gallant son. Your son's services to his country, both in war and peace, will ever be remembered."

The Aero Club of America cabled:—"Please convey to Sir John Alcock's family our deepest condolences and express on behalf of American aeronautical world our realisation of the great and irreparable loss sustained."

Capt. Howell's Body Recovered

WORD came from Lloyd's agent at Corfu on December 24 that the body of Capt. Howell, the pilot of the Martin-gyde machine which was flying to Australia, had been recovered and reverently buried below Beautiful Mountain.

"Ground transport, Butiaba to Entebbe, 100 miles, 4 to 10 days.

"Steamer Entebbe to Muanza, 170 miles, 1 to 2 days.

"Lake Victoria to Lake Tanganyika—

"80 miles, 15 days.*

"Ground transport, Muanza to Tabora, 200 miles, 10 days.*

"Rail, Tabora to Kigoma, 260 miles, 2 days.

"Steamer Kigoma to Abercorn, 350 miles, 3 days.*

"The steamer service is uncertain.

"Abercorn to Broken Hill—

"475 miles, 10 to 15 days.

"Ground transport, 475 miles, 10 to 15 days.

"Broken Hill to Cape Town—

"1,836 miles, 4½ days.

"Rail, Broken Hill to Bulawayo, 473 miles, 1½ days.

"Rail, Bulawayo to Cape Town, 1,362 miles, 3 days.†

"('Ground transport' may include motor, horse or bullock wagon or any form of local transport.)

"Thus the total distance by existing methods of communication is 6,223 miles, for which 50 to 74½ days would be required. Against this the total flying distance of the aerial route should not exceed 5,200 miles, as the pilot will stop only at the main stations. Taking 100 miles an hour as fair average flying speed, under favourable conditions, and when the route has become firmly established, only 52 hours actual flying time would be required to traverse the entire continent, or, say, about a week, flying 8 hours per day."

"The survey parties everywhere met with the greatest assistance and co-operation from the various local authorities, who evinced the utmost enthusiasm for the project. Such whole-hearted assistance has been invaluable, and it is certain that had it not been forthcoming the work could never have progressed as it has done.

"This co-operation, indeed, has been a 'most' encouraging feature throughout the period of prospecting, and is a happy omen for the successful opening of the route."

* Any estimate of time must only be very approximate, as a journey would be governed by the state of the track.

The body of Air-Mech. Fraser had not been recovered. Owing to bad weather it had been impossible to save the machine which had become a total wreck.

Sir Ross Smith's Flight

AFTER a succession of adventures Sir Ross Smith and his companions, during their attempt to fly from Port Darwin to Melbourne, met with another mishap at Charleville, in Queensland, about 1,477 miles from Port Darwin and 923 miles from Melbourne. After patching up the propeller at Anthony Lagoon, the Vickers-Vimy-Rolls flew via Cloncurry and Long Reach to Charleville, and it was at first decided to complete the journey by train, but later messages indicate that repairs may be carried out and the journey completed.

It is stated that the trouble with the propeller was originally due to a hawk at Calcutta, which flew into the propeller and cracked it.

A New Machine for Poulet

AUTUMN a message from Rangoon on December 12 announced that, following trouble with a propeller and then with one of his engines, Poulet had decided to pack up his machine and return to France, word comes from Paris that his friends in France have bought him a new Caudron which has already been shipped from Marseilles to Calcutta, and that he will continue his flight to Australia.

The New Antarctic Expedition

FURTHER progress in connection with the proposed expedition to the Antarctic in 1922 was made at the meeting at the Mansion House last week, at which Mr. J. L. Cope, the leader, outlined his plans. It was explained that aircraft will be taken, and part of the survey of the continent will, it is hoped, be carried out by means of aeroplanes. Representatives of the Air Ministry attended the meeting.

Canadian Ace Dead

THE Canadian Air Service has suffered a grievous loss by the death of Major A. E. McKeever, following an operation necessitated by injuries received in a motor-car accident at Toronto.

German Airmen Still Here

In the statement issued by the War Office announcing that a party of German officers and other ranks had embarked on Saturday for Germany, it was explained that with the exception of airmen and the naval prisoners concerned in the Scapa Flow sinkings, practically all the German prisoners of War have now left the United Kingdom.

CORRESPONDENCE

[The Editor does not hold himself responsible for opinions expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for insertion in these columns.]

LIFE PARACHUTES AND THE AIR MIND

[1986] Man-dropping, or, as the writer prefers to call them, life parachutes, are soon to be made compulsory on all civilian aircraft. Presumably the authorities will insist on certain types of parachute approved by themselves, and presumably also, they will specify the same types that they have already adopted for the R.A.F. A wholly unnecessary amount of reticence and secrecy has been maintained about these parachutes, and the public are totally ignorant of the principles and construction of man-dropping parachutes.

Presently, no doubt, they will be informed that a certain type has been "officially approved," and they will be required to install it on their machines. Not unnaturally the public will assume that it has been exhaustively tested under every possible condition likely to arise, and that they may rely on it as an efficient means of escape in case of disaster. It seems time then that the veil was lifted a little. Ever since the parachute section was organised fifteen months ago, its whole energy and attention seems to have been concentrated on one objective: to discover a parachute system that would function quickly (that is with a short drop) and with practical certainty when used from a machine flying normally, under control. Quite early on they appear to have made an arbitrary division of parachutes into two classes which they elected to define as "positive" and "non-positive," and from the onwards to have concentrated their investigations on the former type as being more likely to provide what they wanted. We may grant at once that they have been fairly successful in their quest; but then, who wants to escape from a machine flying normally, under control? So completely did they become obsessed by this "positive action" theory, that they seem to have utterly ignored the actual conditions attending an aeroplane crash. The net result is that they have adopted certain "positive" type parachutes which undoubtedly function beautifully under every-day conditions but which, in the opinion of some of us, may prove little better than death-traps if used from a machine which has crumpled in mid-air. Parachutes of the positive type have been in use for eighteen months or more now, yet today there is not a particle of evidence to prove that any man has ever escaped by one of them from a falling machine. Let the public make no mistake about this: if anyone should be up in a machine when—owing to something giving way—it gets out of control and starts to crash, he will be wise to remain in and fall with the machine, rather than trust himself to one of these parachutes. It is said that one of the makers of these "positive" type parachutes offers free insurance to its patrons. Rarely a month passes without one or more airmen being killed, and all the writer has to say is this: If within the next six months there is one single proved instance of a machine suddenly getting out of control and crashing owing to wing or tail plane giving way or some similar defect, and the passengers, or even one of them, escape unhurt by means of one of these parachutes he will hand over £500 to the Air Council to be presented to any charity they select. On the other hand, in the writer's opinion at any rate, the passenger equipped with any good form of "non-positive" parachute should have a fair chance of escape. Perhaps the writer may be allowed to express his estimate roughly in this way—

	Odds on parachute functioning successfully from machines flying normally under control.	Odds on parachute functioning successfully from machine suddenly crashing.	Odds against parachute functioning from machine suddenly crashing.
Positive type	200 to 1	—	6 to 1
Non-positive type	150 to 1	50 to 1	—

What, then, is the essential difference between the two types? A simple and fairly accurate description would be to say that the non-positive type is carried in a receptacle attached to the airman's person. It is withdrawn from this after the man has jumped overboard, either by means of strings, or by a subsidiary parachute, or some other mechanism, but there is no connection between it and the machine. On the other hand, "positive" types broadly speaking, function on one general principle. The parachute is carried in a

receptacle, either on the machine, or on the airman's person. In the latter case there is a cord connecting the apex or centre of the parachute to the machine, the man himself is always attached to the main cable the other end of which is joined to the parachute lines from the circumference of the parachute. When he jumps overboard his weight, provided he is falling faster than the machine, causes a pull or strain on the parachute, and withdraws it from its receptacle. Some of these parachutes require a pull of 40 to 60 lb. to withdraw them from their receptacle. Obviously, therefore, if man and machine are falling at the same pace, there will be no pull on the parachute; it will remain in its receptacle and the man will be dangling on the end of the parachute cable. So long as this cable remains free and untangled, there is always the chance that the man's velocity may eventually exceed that of the machine, in which case a "pull" will be created, and the parachute should leave its receptacle. But suppose before that happens the machine should commence to spin or roll over, what chance is there of the cable avoiding entanglement in the machine, possibly in some portion of a broken tail or wing. Surely it is a very slender chance. But suppose instead of one, there are two or three passengers, each dangling on the end of a cable, the probability of these cables becoming entangled is enormously increased. It would seem, therefore, that before deciding to install this type of parachute, the authorities must have made at least two assumptions:—(1) That the man, after he has gone overboard, will always fall faster than the machine; and (2) that the machine will not get into a spin or roll before the man has had time to leave it. Now, it is perfectly true that, a man leaving a falling aeroplane at a considerable height, will usually reach the ground first; because in certain positions an aeroplane is apt to fall comparatively slowly. But the velocity of fall of any irregular shaped body, such as an aeroplane, varies from time to time according to the position it assumes at the moment. An aeroplane falling nose down in the position of least resistance, will probably be falling at least as fast as the man, and if the engines are running it will fall faster. If the machine is falling faster than the man, the parachute will be drawn out, but below instead of above the man, and bearing in mind the suction developed by a falling aeroplane, there is some probability that the man will fall into his own parachute, or at any rate that the lines will become hopelessly entangled. Again, a falling aeroplane rarely, if ever, maintains the same position throughout its fall. It usually develops a roll or spin, or may turn end over end, especially if a wing or tail plane is broken. A consideration of these points seems to condemn assumptions 1 and 2 as utterly unwarranted. Having made them, one would at least have supposed that very careful and exhaustive experiments would have been undertaken to verify their accuracy. The parachute section has been in existence for some twelve months now, but so far as the writer knows, not one single practical experiment has been carried out to put these theories to the test. An illustration of the extent to which the authorities have allowed themselves to become hypnotised by this lure of a parachute which will permit of everyday descents from machines under control, with a minimum of risk, is their proposal to facilitate escape with these "positive" type parachutes by fitting trap doors in the floors of the larger machines. Exactly what use these trap-doors would be if the machine is upside down when the passengers have to leave it, is not very obvious. But let that pass. For the sake of argument, we will take the most favourable circumstances possible, and assume the extremely improbable, viz., that the machine is falling absolutely in the flying position, on a level keel and slower than a man. In the worst cases of disaster at sea, there are usually at least five to fifteen minutes before the ship founders. In the case of an aeroplane falling from a height of 1,000 ft., a passenger would have to get clear of the machine in four or five seconds at the most, if he would have any chance of saving himself by parachute. Imagine then three, or four, or five quite untrained civilians waiting to take their turn at two trap-doors, knowing that any chance of life depends on getting clear in a few seconds! If the authorities had wished to devise a stage property for an effective scene in a harlequinade, they could hardly have done much better than this. Unfortunately there is a tragic side to it. In the "non-positive" types, there is no mechanical connection between the parachute and the machine, and the position assumed by the latter and the rate of fall, are matters of very little importance. Various inventors, the writer

included, have devised forms of parachute with this non-positive action. The writer makes no special claim for his own particular device, but he does hold very strongly that the non-positive is the only present known type which will afford a reasonable chance of escape in the conditions referred to. The same equally holds good for an airship which bursts or catches fire without warning and falls at once. The writer naturally feels some diffidence in placing himself counter to the opinion and policy of the R.A.F. Technical Staff, and had he not on another occasion found

himself in a similar predicament in connection with the "Holt Landing Light," he would hardly have ventured to make these criticisms.

The writer has the same feeling about this parachute question: viz., that lives have been lost and will be lost, which ought not to have been if a different parachute policy had been pursued, and it is this feeling that has emboldened him to offer these criticisms.

H. S. HOLT, C.B.E.,
Lieut.-Col.

VISUAL SIGNALS FOR AIRCRAFT

The Air Ministry announces that the following "Notice to Airmen" (No. 2) has been issued:—

The following visual signals, based on the Convention relating to International Air Navigation, are published for the information of all concerned and will come into force forthwith.

STANDARD TABLE OF VISUAL SIGNALS OTHER THAN FIXED DAY OR NIGHT.

SIGNALS FOR USE OF AIRCRAFT.
Civil Aviation

Signal.	Ground or Sea to Aircraft Signification.	Aircraft to Ground or Sea, Signification.	Between Aircraft in flight. Signification.
Green Very's light or flash a green lamp and in addition make by Morse code its call sign.		Aircraft wishing to land at night on aerodrome having ground control.	
Call sign of a machine followed by a green Very's light or flashing a green lamp.	Permission is given to machine denoted to land. Aircraft are not to land		
One red Very's light or display of a red flare ..			
One red Very's light or make a series of short flashes with navigation lights.		An aircraft compelled to land.	Am compelled to land.
By day:—Three discharges at intervals of 10 seconds of a projectile showing on bursting white smoke, the location of the burst indicating the direction the aircraft should follow.	Warning to an aircraft that it is in the vicinity of a prohibited zone and should change its course. Ditto.		
By night:—Ditto, but showing on bursting white stars or lights.			
By day:—Three discharges at intervals of 10 seconds of a projectile showing on bursting black or yellow smoke.	Requires an aircraft to land. Ditto.		
By night:—Ditto, but showing on bursting red stars or lights.			
In addition to the above two signals to prevent the landing of aircraft other than the one ordered, a searchlight flashed intermittently and directed towards the aircraft whose landing is required.	Aircraft denoted to land.		
At sea:—Rockets or shells throwing stars of any colour or description fired one at a time at short intervals.	International signal for a vessel in distress.		
Succession of white Very's lights.	In distress, require immediate assistance.	In distress, require immediate assistance.	In distress, require immediate assistance.

Aerodromes and Landing Grounds

The Air Ministry announces that the following lists of aerodromes are issued as an addition to or amendment of the lists already published:—

LIST C.—*Stations temporarily retained for Service purposes.*

AMENDMENT.

The following seaplane station has been transferred to List E, and is now published in that list:—

Seaplane Station.	Nearest Railway Station.	Nearest Town.
Westgate (S)	Westgate ..	Westgate-on-Sea.

LIST D.—*List of aerodromes licensed as suitable for Avro 504 K and other similar types only. Except in very few instances accommodation does not exist. The licences have also in the majority of cases been issued for limited periods only.*

Aerodrome.	Location of Aerodrome.	Nearest Large Town.
Troon ..	Ayrshire Polo Club ..	Troon
	Ground.	

LIST E.—*Stations no longer in use by the R.A.F. These stations have been passed to the Government Property Disposal Board. They will be relinquished as soon as the Government Property thereon has been disposed of. In many cases the aerodromes are now under cultivation, but it is probable that the sites still form the best emergency landing grounds in the immediate neighbourhood.*

Seaplane Station.	Nearest Railway Station.	Nearest Town.
Westgate (S)	Westgate ..	Westgate-on-Sea.

Another Hounslow Aerial Lighthouse

The Air Ministry announces that the following Notice to Airmen (No. 3) has been issued:—

"A second experimental aerial lighthouse has been erected at Hounslow Aerodrome to further assist aerial night flying. This lighthouse is of 70,000 candle-power, and throws a revolving beam that attains its maximum brilliancy once every five seconds. The light will be in operation every night on and after Monday, December 29, 1919, and will be exhibited from sunset to sunrise."

The Aircraft Carrier "Hermes"

ARRANGEMENTS have been made for the aircraft carrier *Hermes*, built by Messrs. Armstrong, Whitworth and Co., to be towed from the Tyne to Devonport dockyard to be completed, thereby releasing men and facilities on the Tyne for merchant ship construction. The *Hermes* was laid down in January, 1918, and she will be one of the fastest aircraft carriers in the world, with a speed of 25 knots. She has a displacement of 10,400 tons, and the whole of her flying deck is available for aircraft to rise and land, as by the special arrangements made for the emission of smoke there are no funnels or other obstructions.

"How Airmen Find their Way"

This is to be the subject of the Annual Juvenile Lecture of the Royal Aeronautical Society, to be given by Major H. L. Wimperis, R.A.F., at the Royal Society of Arts, Adelphi, on January 8, 1920, at 3 p.m. The children of Members and their friends are specially invited. Application for tickets should be made to the Secretary, Royal Aeronautical Society, 7, Albemarle Street, W. 1.

AIRISMS FROM THE FOUR WINDS

A HAPPY NEW YEAR to one and all of the many thousands of readers of FLIGHT.

AND grateful thanks to all those well-wishers who sent us along seasonal greetings. Coming as they do from many quarters of the globe, they are a reminder of the host of friends which we number the world throughout. Reciprocation in every sense of the word.

"HOLTZENORFF, the Saviour of Berlin, and other Revelations" is the title of a German book by Lieut. Emil Selliger, one time of the Press Section of the German Navy Department. In an advance notice given by the Berlin *Lokalanzeiger* an extract is given from this book purporting to be an account of a conversation between Count Zeppelin and the ex-Kaiser in the Autumn of 1915.

Count Zeppelin is represented as having urged a simultaneous attack by all the German aerial squadrons on England, and particularly on London. To this the ex-Kaiser retorted: "You have already been seven times over London and killed two thousand people (sic): how many more lives do you want to destroy?"

"Your Majesty," replied Count Zeppelin, "Germany's existence is at stake."

But the ex-Kaiser vetoed the plan, saying "You shall not carry out attacks on England. It is sufficient to bomb military objects in the British capital, as hitherto."

We don't think?

N.B.—COUNT ZEPPELIN is dead and "*Ich und Gott*" is wriggling ever so strenuously at the near advent of his trial at the Bar of Civilisation. He is no doubt blaspheming as blatantly as ever for real "Dutch Courage"—in his favour.

SIGNOR D'ANNUNZIO has apparently "flown" from Fiume before Christmas, as he said he would, but it was in a British liner. Italy may, therefore, now hope to settle down to reality without the help of poetic soaring.

Is there really anything in telepathy, material or otherwise, after all? If there is, the supporters of this psychic

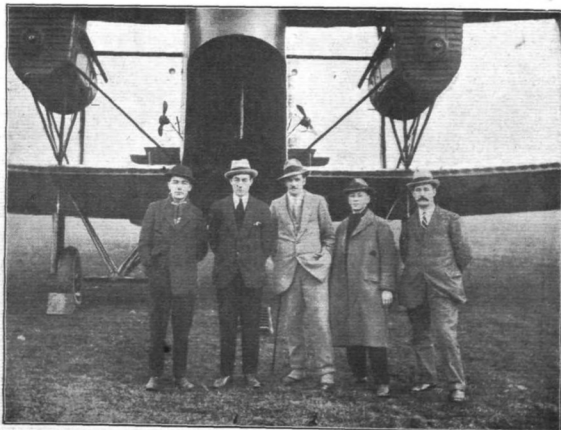
theory have a striking testimonial in its favour in the forebodings which a Melbourne cable states the father of the late Capt. Howell, the pilot killed on the Australian flight, had of his son's fate. On the evening of the 10th, while Mr. Howell, senior, was conversing with a naval officer, so the story runs, a disused clock in the room ticked in Morse and then fell silent. Mr. Howell was alarmed and immediately associated this as a premonition of some fateful happening to his son.



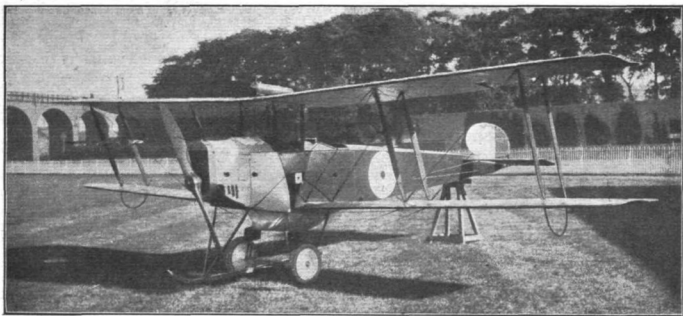
The First "Lighthouse" at Hounslow Aerodrome

Unfortunately, this proved only too real, to the regret of all those who knew and respected the late Capt. Howell.

MR. W. WATTS of Blackwater, Hants, when in the days to come, he is asked "What did you do, Daddy, in the Great War," might do worse, whatever else he may have patriotically carried through, than quote the statement made by Viscount Wolmer in Parliament last week when he asked the Under Secretary to the Air Ministry whether he was aware that during 1917 the Government compulsorily acquired a farm of Mr. W. Watts for the purpose of building cottages for the employees of Farnborough Aircraft Factory; that when they took it



The crew of the Handley Page (type 0-400) which recently flew from London to Warsaw. Capt. Herne is seen standing immediately under the nose of the fuselage, and on his left is Capt. McNaught Davis. This is the machine which it was said was chased by German air guards when flying from Cologne to Berlin



A standard type Avro fitted with a 100 h.p. Sunbeam "Dyak" engine

over the farm had been heavily manured and cultivated at Mr. Watt's expense, and by the action of the Government he was deprived of all his crops and had to dispense with 10 of his best cows at a sacrifice, and that Mr. Watts has been thereby ruined; that an expert valuer engaged by Mr. Watts has assessed his losses at £700, and that after keeping him waiting nearly three years the Government have offered him only £340; and whether he would cause enquiry to be made with a view to redress being given?

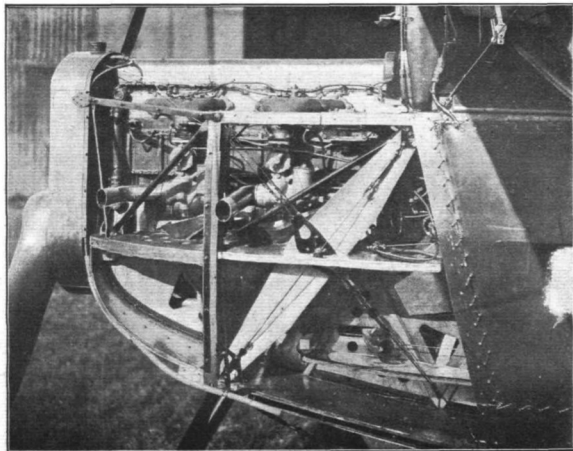
Mr. Kellaway was not at the moment able to answer the question but he proposed to "communicate with my noble and gallant friend as early as possible."

We hope he will and that it won't turn out to be just another "Dora, by Grace" ramp. What an indictment of injustice all these individual penalisation will make for the edification of future generations.

THE retirement of Mr. Frank Allen from the Managing Directorship of Moss's Empires, after a matter of 40 years' strenuous

theatrical work, has brought him under the usual press interviewer's notice. Quite a lot of intensely interesting reminiscences must be stored in the cranium of so renowned an expert, and it is to be hoped he will one of these days set to work to record his experiences. Mr. Allen has mentioned one characteristic current item which is fresh in his memory in relation to air-raids. "My friends," he states, "say I had a penchant for going up to the top of the Hippodrome when an air raid was on. We used to gather up the people from the street into our cellar, the old Hippodrome, where the horses were kept."

I remember one night, the worst raid of all, when all those people were killed at Odhams'. I was told they were not starting the performance at the Garrick. I went across, Shrapnel was peppering the street, but I got there all right and found all the principals ready, and an audience of about 40, mostly soldiers. 'Smiles' was on. I got them to start, saying that I would go into a box and buck them up by clapping for all I was worth.



A close-up view of the 100 h.p. Sunbeam "Dyak" engine installed in a standard Avro biplane

"They began. The row was tremendous. Bang! And I saw the performers wince, but they stuck to it. I clapped, and the soldiers, seeing what I was at, clapped too. And all the time the banging went on. It was really two anti-aircraft guns in the street between the Alhambra and the Garrick, but it sounded like bombs, and we all thought it was bombs. I never saw anything more plucky in my life than the way 'Smiles' was carried on. When I thanked them afterwards, they said, 'Oh, but if you hadn't been in the box backing us up we couldn't have done it.' That," I said, "was nothing compared to your job of remembering your lines, and so on."

In an official order just issued the Admiralty announce that the King has approved the grant of a clasp to the officers and men who have been awarded the "1914 Star" and who actually served under the fire of the enemy in France and Belgium between August 5, 1914, and midnight, November 22-23, 1914. A note states that service in the R.N.A.S. Dunkirk and certain other units does not qualify for the clasp. We wonder why not, if any of the individuals composing those units served under the same conditions.

SURELY the remarkable story of participation in a series of air-raids, as told of Mrs. Jessie Matcham at the London Sessions the other day, constitutes a record. It was in connection with a charge of false pretences, in which she was bound over to come up for judgment if called upon. Great Scott! after such experiences the place for this martyr of the Hun methods should rather be a niche amongst the heroines of the War. Here is what she did in the Great War.

Married to a professional man in 1914, her husband shortly afterwards joined the Army. That depressed her, and she went to Colchester, where she went through air raids. Later she removed to Southend, where she experienced two air raids in a week. Her husband went to France, and on his return she joined him at Hertford, where a serious air raid took place, and there were 40 or 50 casualties. In 1917 she went to live with relations in South London, and although she only stayed there ten nights there were raids on six of them. Next, please.

The Millennium at last!

The Rio de Janeiro newspapers announce the discovery by an engineer named Gaspar of a new system of power which, by reason of its vast superiority and cheapness, promises to supersede all other forms of power known hitherto, presumably for aircraft also.

Senior Percin Rele, the celebrated engineer and mathematician, has declared that as a result of the discovery ships and locomotives, instead of using coal, will in the future be equipped with chambers of enormously compressed air.

Or is it only hot air after all?

SHEFFIELD, through the Development Department of the Corporation, has held a meeting to consider the position of the future of the Coal Aston aerodrome. At an earlier conference the general opinion was that it would be wise to retain Coal Aston as a civil aerodrome, especially on account of its close proximity to the city of Sheffield, which is on one of the great civil aviation routes. Capt. C. A. Lewis, M.C., of Messrs. Vickers' Aviation Department, who spoke upon the subject, has drawn up a suggested scheme for the establishment of a daily air service between Sheffield and London. Two aeroplanes would fly from Sheffield to London in the morning, and two others would fly from London to Sheffield in the afternoon. At a cost per passenger per journey of £8, the undertaking would, it is estimated, yield 10 per cent. on an approximate capital outlay of £50,000.



HONOURS

It was announced in a supplement to the *London Gazette*, on December 16, that the King has been pleased to approve of the following rewards being conferred on Officers and other ranks of the Royal Air Force in recognition of gallantry in escaping from captivity while prisoners of war:—

Bar to the Military Cross.

Lieut. T. Capt. (now Sqdn.-Ldr.) T. W. Mulachy-Morgan, M.C. (R. Ir. Fus.); Lieut. A. J. Bett, M.C. (R.G.A. S.R.); and Lieut. (now Capt.) A. J. Evans, M.C.; Pilot-Off. (Hon. Flying-Off.) G. P. Harding, M.C. Flying-Lieut. E. W. Leggatt, M.C. (Wilt. R.); Lieut. S. G. Williams, M.C. (Devon. R.).

The Military Cross.

Lieut. L. J. Bennett; Lieut. T. B. Bruce; Lieut. S. E. Buckley (5th

To those travellers who like to have a record on their trunks and bags of their journeyings in "furrin parts," the latest detail introduced by the Lep Aerial Travel Bureau into their air-voyage organisation should appeal very strongly. This Travel Bureau now issue "sticker" labels in black and red on a brilliant yellow background, suitable for the adornment of the baggage of each voyager to Paris or elsewhere by air. This label even records the date, time, the route travelled, etc., and is, therefore, likely to be much sought after, by genuine travellers and—otherwise.

MORE "Dora, by Grace" trouble. This time it is the vicar of St. Peter's Church, Edmonton, the Rev. E. Selwyn Yates, makes claim from the Royal Air Force for £85 for actual out-of-pocket expenses and £100 compensation in lieu of bazaar and sale of work through the occupation of the Church Hall. He has been informed that the War Losses Commission has allowed him £85 only in full settlement of the claim. In his parish magazine, he says it is a "glaring act of injustice," that "the R.A.F. gained possession of our halls under false pretences," and that "as a last resource we are sending in all accounts of the transaction to Mr. Winston Churchill direct." Graciously, but he's lucky to get even his "out of pockets." He might easily have been brought in as owing the Government something on balance. Judging by the way other folk have been treated "by Grace," the Revd. gentleman should consider himself £85 in pocket.

WHY, just look at the case of the De Keyser's Hotel. The owners get nothing so far, and the "Crown" is even brazen enough to carry the case, to get out of liability, to the House of Lords. Not much "grace" about that. Just wonder whether counsel and other legal and Crown luminaries concerned trust to "by grace" for their remuneration. It may be the Lord Rosebery ramp may help to straighten, not to say flatten, out some of these Dora bureaucrats who exist—or should—"by Grace."

WHILE it is generally recognised that the Meteorological Office has played a most important part in the progress of aviation, especially during the War, it is not always realised that data obtained for aeronautical purposes has been useful in other spheres. In the annual report of the Meteorological Office for the year ending March last, it is pointed out that the information regarding the average pressure, temperature and density at different levels, originally asked for by those who were interested in the working of engines at different levels, and prepared by Mr. W. H. Dines, F.R.S., has been found also to be indispensable for questions of ballistics as well as other purposes of aviation.

As evidence of the immense development of the study of the upper air, the report shows that, whereas in 1914 observations with pilot balloons were confined to South Farnborough, Upavon, Aberdeen, and a few other stations which required an insignificant number of balloons, the issue of balloons for this purpose in 1918 reached the enormous number of 13,776 per month. For use with these balloons, with the assistance of the Northampton Institute, two new models of theodolite have been designed, and large numbers have been constructed and issued after testing in the Office.

THE Director also points out that "the rapid advance already made in the navigation of the upper air, and the prospect that flying over the open oceans will soon become common, are inducing aviators and their advisers to seek the latest meteorological information." He adds: "Every endeavour is made to meet the demands made in this direction."

Northants): "Capt. (now Maj.) D. B. Gray (Ind. A.); Flying-Off. D. W. Grinnell-Milne, D.F.C. (R. Fus.); Flight-Lieut. G. S. M. Inall, V.C.; Lieut. C. Kennard; Flight-Lieut. G. F. Knight (R.W. Surr.); Flying-Off. P. C. C. Martin (Can. Fld. Art.); Sec. Lieut. P. A. O'Brien; Lieut. F. J. Ortelweil; Lieut. S. S. B. Purves (Sec. H.); Flight-Off. (Hon. Flight-Lieut.) J. S. Poole, D.S.O. (R.R.R.C.); Flying-Off. L. C. Russell (R. Fus.); Flight-Lieut. L. D. Stewart (Ind. A.); Lieut. A. T. F. Flying-Off. A. P. Taylor; Lieut. J. K. Tullis (R.F.A.); Lieut. L. A. Wingfield, D.F.C. (R.F.A.).

The Military Medal.

21293 Sergt. J. Dempsey, R.A.F.; 143510 A/C/H. H. Harvey, R.A.F.; 42609 Sergt. W. Hawkins, R.A.F.

AVIATION IN PARLIAMENT

RIGHT

Guns and Aircraft Handed over by Germany

MR. BURGESS, CAPT., in the House of Commons, on December 16, asked what is the total number of guns and aircraft which has been handed over by Germany in accordance with the conditions of the Armistice; and how do these figures compare with the numbers laid down?

MR. CHURCHILL: The total numbers of guns and aircraft which have been handed over by Germany in accordance with the terms of the Armistice are as follows:—5,000 guns, 25,000 machine guns, 3,000 trench mortars, 1,700 aeroplanes. These figures are the numbers laid down.

Anti-Aircraft Station, Putney Heath

MR. ARNOLD, CAPT. asked the reason for maintaining the anti-aircraft station near the reservoir on Putney Heath; if the lorries employed there and the guns are of any possible use; and when will the station be closed down?

MR. CHURCHILL: The anti-aircraft station near the reservoir on Putney Heath has been maintained as it is the headquarters of the West London Anti-Aircraft Defences, and is responsible for closing down the forty-six stations in these defences. This work is nearing completion, and it is hoped to vacate Putney Heath in the early part of January next. The headquarters will then be transferred to one of the stations which it is proposed to maintain under the new scheme. The lorries referred to are employed on work connected with the clearing of the stations mentioned. There are no permanent guns at the headquarters.

Manston Park Station, Margate

SIR H. NIBB, on December 17, asked the Parliamentary Secretary to the Admiralty whether he will state under what statutory enactment, Regulation, or other authority possession was taken by the Department of the land at Manston Park, near Margate, belonging to Mr. J. Proctor; for what purpose is possession still retained, and whether it is proposed to occupy it permanently; if so, what is the reason for delaying negotiations for purchase; in the event of the Department proposing to give up possession, will he state what is likely to take place in the event of the property being sold, and under the condition they were at the time when the Department took possession before restoration to the owner; and what proposals has he to make for compensating the owner for the loss of the property, and the loss to the Admiralty, or is it the desire of the Department that the occupier should be compelled to proceed with his claim before the War Losses Commission?

MR. CHURCHILL: The answer to the first question is that this land was taken under the Defence of the Realm Regulations, to the second, that this is one of the stations which it is proposed shall be permanently retained for the use of the Royal Air Force; to the third, that the decision to retain this aerodrome has been made by the Admiralty, and the question of the compensation for which application will be made. In view of the above, the fourth question does not arise. The answer to the fifth and sixth questions is that the Admiralty is not satisfied that the owner has sustained any loss, but that matter can be discussed in the course of the negotiations which must take place when the Ministry is in a position to take final action.

Kenley Aerodrome

SIR STUART CROFT, on December 16, asked the Under-Secretary of State for the Air Ministry whether, in view of the danger to aviation landing at the Kenley Aerodrome on account of its exceptional altitude and liability to be enveloped in clouds and fog, as instanced by the recent fatal accident to the *Meridian*, and also in view of the annoyance caused to the residents of the district by the noise of arriving and departing aeroplanes, he will consider the permanent abandonment of the site and the restoration of the country so far as may be possible to the original agricultural use.

MR. CHURCHILL: The situation of this aerodrome, on which a large amount of money has been spent, renders it of great importance in connection with the Air Defences of London, and it is considered desirable that it should, therefore, be retained as a permanent station by the Royal Air Force. The advantages and disadvantages of the prevailing atmospheric conditions at Kenley were fully considered at the time when this decision was taken.

Airships for Commercial Purposes and India

MR. SIR H. FALCONER, on December 22, asked the Prime Minister if he is aware that the R. 34 and R. 39, the two latest rigid airships, are to be sold for commercial purposes; and if he will allow one of them to be retained for the use of the Indian Government on the North-West Frontier of India?

MR. BONAR LAW: The answer to the first part of the question is in the negative. I am making inquiries in regard to the suggestion in the last part of the question.

Seaplane Station, Hornsea Mere

CAPT. STANLEY WILSON asked the Parliamentary Secretary to the Ministry of Munitions whether he is aware that the Disposal Board of the Ministry of Munitions have advertised Hornsea Mere, in the East Riding of Yorkshire, as being for sale as a seaplane station; whether this has been done with his consent; and whether he is aware that this lake is private property which was acquired temporarily by the Admiralty under agreement with the owner in 1917?

MR. KELLAWAY: Hornsea Mere was advertised as being for disposal with a view to ascertaining whether the Government property there could be disposed of in any way other than by the dismantling of the buildings and plant. The Department has no intention of selling the buildings, which might be of use to the owner should be sold to her, and that the remainder, if any, should be sold for removal.

Air Estimates

MR. GLEYS, on December 23: I beg to ask a question of the Leader of the House in reference to a question which I had put down for the Secretary of State for War, in view of the importance of the reply which I have received. The question was:

"To ask the Secretary of State for War whether the memorandum by the Chief of the Air Staff issued with the Air Estimates had received detailed consideration by and the approval of the Board of Admiralty and the Army Council; and whether it is intended to supplement the memorandum by the Staff's memorandum with any comments passed on it by the Admiralty and the War Office in so far as those Departments are affected by the proposals contained in it."

In the reply which the Secretary of State for War courteously sent me he says:—

"No, Sir, it was stated in the memorandum that the organisation proposed was provisional. I was anxious that it should be published in order that the House might be informed at the earliest possible moment of the general outline of the proposed permanent organisation of the Royal Air Force. Dispositions are now proceeding which will be completed in the near future. The financial limits of the scheme must be taken as definitely settled by the Cabinet."

In view of the importance of that reply, which shows that there is no co-ordination between the technical heads of the Air Ministry, the War Office and the Admiralty, are we to assume that the terms of that memorandum by the Chief of the Air Staff are to be taken as final? The Government, and if not, will any fresh proposal receive the consideration of the Committee of Imperial Defence or the recognised experts of the Navy and

of the Army before they are presented to this House as the settled policy of the Government?

MR. BONAR LAW: I am sure it will be recognised that I cannot give an answer without notice. What I do know is that the Admiralty, the War Office, the Navy, the Army, and the Cabinet, and that we approved it on general grounds. It is quite obvious that there must be negotiations between the Army and the Navy with reference to the subject.

MR. GLEYS: May I ask the Leader of the House whether he will impress upon his colleagues in the Cabinet the immediate importance of the formation of a Joint Imperial Staff?

MR. BONAR LAW: That is a very big question; it is receiving our attention.

R.A.F. Hair Mattresses

MR. MACQUISTEN asked the Secretary of State for War if he has foregone his demand for 100 tons of curled hair desired for the 7,000 beds for the R.A.F.; whether the hair tenders are being asked to sleep over in the Irish Press; and where and on what are the R.A.F. to sleep now?

CAPT. GUEST: The answer to the first part of the question is in the negative. The hair tenders have been definitely accepted by the Air Ministry and are now being issued from the trade by His Majesty's Office of Works (on our behalf) for the making up of this hair into mattresses. With regard to the second part of the question, nothing is known of this. The Air Ministry does not at present possess a *Contract Branch*, and therefore not in a position to invite tenders. The third part of the question does not now arise.

Disorder at Henlow

MR. W. THORNTON asked the Secretary of State for War if he is aware that on Sunday night, November 2 last, there was an outbreak of disorder among the R.A.F. men at Henlow station; that whilst the disturbance was being dealt with by non-commissioned officers, a number of men concerned entered hut No. 21 whilst the proper occupiers were in bed and asleep; that following the occurrence a number of the latter were picked up by the R.A.F. with inciting to mutiny and other counts, and without their defence being given were considered were considered to be mutinous and lost of grade; that such punishment has caused indignation and discontent; and if he will order an inquiry into the matter with a view to justice being done to innocent men?

CAPT. GUEST: The answer to the first part of the hon. gentleman's question is in the affirmative; to the second part, that the men who caused the disorder were dealt with in hut No. 21; to the third part, that these men were brought before the Commanding Officer, and that none of them were dealt with without their defence being considered. Four men were tried by court-martial, and six were sentenced to be tried by district court-martial. I do not think it is necessary to be tried by district court-martial. I have already been brought to trial, and the remainder were dealt with summarily. I am not aware that indignation and discontent has been caused by the way in which this outbreak has been dealt with. If the hon. member has any reason to believe some or any of the men who were in bed and asleep have been punished unjustly and will furnish me with the names, I will have that matter inquired into.

Aeroplane Durability

MR. W. THORNTON asked the Secretary of State for War whether he can state the average life in flying hours under peace conditions of two-engined aeroplanes capable of carrying 20 to 30 passengers and single-engined aeroplanes capable of carrying four passengers?

CAPT. GUEST: The period that has elapsed since civil flying under peace conditions commenced has been insufficient to allow such reliable data to be obtained as would enable a useful answer to be given to this question. The necessary data are being collected, and it is not possible to give any definite connection that if the proper replacements, both of engine and aeroplane parts, are made during the periodical overhauls, there is no reason why any aeroplane should not after several thousands flying there will probably be very little of the original machine left.

Officers (Rank)

VISCOUNT WOLMER asked the Under-Secretary of State to the Air Ministry whether officers promoted to the substantive rank of major for distinguished service rendered in the War by His Majesty in the New Year Honours List have been now instructed to vacate their position in the R.A.F. as majors, to relinquish this rank, and to report back to their old unit?

MR. KRYON: Promotion in the R.A.F. is given in respect of an officer's R.A.F. commission and is not Army rank. The number of Air Force officers has been reduced from, approximately, 30,000 at the date of the Armistice, to about 4,000 at the present date, and consequently a large number of officers seconded to the Air Force from the Army have been returned to their units. Promotions in the R.A.F. conferred as rewards for good service in the Air Force on officers seconded from the Army must necessarily become inoperative during the equivalent service of these officers in the Army unless they have attained equivalent rank in their parent service. The question of allowing officers, who have not then attained Army rank, equivalent to their R.A.F. rank, when they finally leave the Army to reassume their R.A.F. rank will again be considered.

Blackwater Farm, Government Acquisition

VISCOUNT WOLMER asked the Under-Secretary to the Air Ministry whether he is aware that during 1917 the Government compulsorily acquired a farm of Mr. W. Watts, Ivy Cottage, Hawley Road, Blackwater, Hants, for the purpose of building cottages for the employees of Farnborough Aircraft Factory; that when they took it over the farm had been heavily manured and cultivated at Mr. Watts's expense, and by the action of the Government of all his crops and other things were destroyed to his best cows at a sacrifice, and that Mr. Watts has been thereby ruined; that an expert valuer engaged by Mr. Watts has assessed his losses at £700, and that after keeping him waiting nearly three years the Government have offered him £100, and whether he will cause inquiry to be made with a view to redress being given?

MR. KELLAWAY: I am at present unable to answer this question owing to the trouble for investigation in this matter. I will communicate with my noble and gallant friend as early as possible.

Air Estimates (Memorandum)

MR. GLEYS asked the Secretary of State for War whether the Memorandum by the Chief of the Air Staff issued with the Air Estimates had received detailed consideration by and the approval of the Board of Admiralty and the Army Council; and whether it is intended to supplement the Chief of the Air Staff's memorandum with any comments passed on it by the Board of Admiralty and the War Office in so far as those Departments are affected by the proposals contained in it?

MR. TROYN: No, Sir. It was stated in the memorandum that the organisation proposed was provisional. I was anxious that it should be published in order that the House might be informed at the earliest possible moment of the general outlines of the proposed permanent organisation of the R.A.F. Dispositions are now proceeding which will be completed in the near future. The financial limits of the scheme must be taken as definitely settled by the Cabinet.



NOTE.—All communications should be addressed to the Model Editor.

Revolutions of Airscrews

THERE is a speed at which a given airscrew will give a maximum thrust and a minimum slip. If rotated beyond this speed it loses efficiency and slip increases, and it is therefore better to underpower the machine rather than overpower it, and gradually to work up to the correct amount. With single screw machines a tractor screw requires a slightly coarser pitch than a canard machine of similar weight, area, and dimensions, and generally requires more power. In those dim and hoary days of 1909, when tractors were avoided and the dictum was preached (very much an *obiter dictum* now, I fear) that tractors could never be consistent flyers, it was only the failure of model flyers to appreciate the principles and correlative functions of airscrews and aerofoils that was responsible for their meagre performances. The excellent results nowadays obtained are directly attributable to the cognisance of theoretical considerations. There are many clubs, even now, where the internecine conflict between the advocates of theory and practice continues. The point is that model flying for sport can only hold an ephemeral charm, whereas the study of aeronautics by this medium is absorbing in its interest.

Three "Canard" Models

Fig. 1 shows the model hydroplane built some time ago by the writer. It weighed complete about 11 oz. The mainspar was fretted out and covered with veneer, bracing wires being

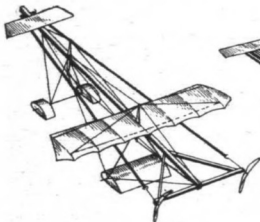


Fig. 1.

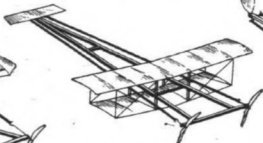


Fig. 2.

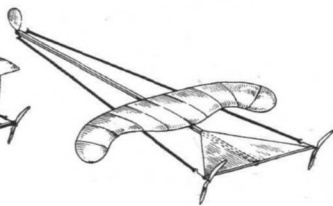


Fig. 3.

necessary owing to its extreme lightness (4 ft. 3 ins. long, weight $\frac{1}{2}$ oz. l.).

The floatational capacity was 33 oz.—three times the weight of the model, so that the floats would only just support the model. The capacity of hydroplane floats is calculated in the following manner: A cubic foot of water (1,728 cu. ins.)

weighs approximately 1,000 oz. Therefore $\frac{1728}{1000} \times \frac{11}{1} = 19$ cu. ins. to be displaced to float 11 oz., which is the weight of the machine. Now the floats would only just support the model if made with this minimum capacity, and since it is desirable that they should only be about one-third immersed, it follows that the floatational capacity should be three times as great = $3 \times 19 = 57$ cu. ins.

The rule is that the constant 1,728 should be multiplied by three times the weight of the model to obtain the total cubic capacity of the floats. I think two front floats and one rear one are best for floatational stability. In designing the floats it is advantageous to make them at least support their own weight in the air. Floats of high aspect ratio and small depth have given good results. The hand-launched model biplane (Fig. 2) has obtained a duration of 100 secs. Most features of its design are manifest from the perspective drawing. Fig. 3 shows the so-called "tail behind" type, flown with great success by Houlberg. Such models require

a great amount of tuning, and are seldom consistent flyers. It is essential that the swept-back wing should have a negative angle on the tips for purposes of longitudinal stability. The stabilising vane is also essential on the nose of the machine. Houlberg's best recorded performance with this type was 89 secs. (formerly the record).

(To be continued.)

Aero Models and Research Club

MR. C. J. BURCHALL, the Acting Secretary of the above Club, writes:—

"I wish to congratulate FLIGHT on its resumption of articles on the 'Model' aspect of aeronautics. I know it has long been felt that aeromodellists have not received much attention, especially as regards 'up-to-date' machines. The old Finsbury Park Club (now known as the Aero Models and Research Club) managed to keep going through the War, although depleted in membership owing to many joining H.M. Forces. However, the few left carried on, and, I think, have, by keeping to one type of model, viz., the tractor mono, managed to interest themselves in the science of model aeronautics to some purpose. I have made a duration flight of slightly over 3 min. with a special 'high aspect' 'bus, eventually losing it, for a week, it then being discovered at the top of a high tree right off the flying ground. A few general dimensions of this machine may be interesting. Length of spar, 31 in., which is of deep section very much like the body of a

real machine (viewed in side elevation) except for its greater length; span, 45 in., with a chord, central, of $3\frac{1}{2}$ in. tapering to 3 in. at tips; tail of wire, 18 in. span, with a maximum chord of 3 in. Fin and rudder combined, of approximately 18 in. area, and fitted with a 12-in. four-bladed tractor screw, which has been used by the club with success for a time. The weight in flying order is 6 oz., and the machine is driven by six strands of average $\frac{1}{4}$ -in. strip rubber. This machine is fitted with chassis and rises from the ground, but the greatest duration is obtained by hand-launching. Many other members can nearly equal this duration, a 60-sec. flight being quite a common thing. The remarkable thing about these models is their gliding range (we have had glides of 55 sec.) on quite small machines. Aero models still have a great hold of a section of the public quite as much as at any time prior to the War, and I think it only needs a little encouragement to enable it to come into its place as the most enjoyable and instructive of hobbies. Any enquiries from live aero-modellists regarding membership will be welcomed. Our flying ground is still Parliament Hill, Hampstead.

Note

The model Editor would like to get into touch with the Model Aero Clubs, and also to receive their monthly reports for publication. Will they therefore write to him c/o FLIGHT?

SIDE-WINDS

With a view to assisting their customers to the utmost extent, the Sunbeam Motor Car Co., Ltd., is arranging to open a service depot, where repairs and renewals to Sunbeam cars can be effected in the most expeditious manner by the company's own skilled and experienced workmen. The advantages of such a depot are many, particularly for those who do not reside within easy reach of the company's works at Wolverhampton, where, of course, there has always been a well-equipped repair department.

The service depot will be opened early in the New Year at Edgware Road, Cricklewood, London, N.W., where the Sunbeam Co. has acquired extensive premises covering an area of 40,000 sq. ft. of floor space, and in which will be installed all machinery necessary for a completely-equipped repair and spare-parts depot. This will be known as the Southern Service, Repair and Spare Depot, and Sunbeam car owners in London and the south and south-west counties are invited to make use of the excellent facilities offered by these new premises in the event of their experiencing any trouble with their cars. A large stock of spare parts for all types of Sunbeam cars will be carried, and customers may rely upon receiving that attention to which they have been accustomed in the past.

A NOTABLE feature of British engineering enterprises overseas is the great demand for exclusively British welding specialists. Twenty branch establishments of Barimar, Ltd., are in course of formation in various parts of the world, principally in the Overseas Dominions, and the parent company in London is exhibiting in its factories notices offering to give a bonus of £5 for every expert welder brought to its notice who, upon complying with its technical and other requirements, proceeds abroad at high rates of pay.

A VERY successful concert was held the other night in the new canteen completed by the Sunbeam Motor Car Co., Ltd. The concert was under the auspices of the Sunbeam (Moortfield) Musical Society, which comprises, in addition to an orchestra, a military band and a choral society. The programme consisted of a number of orchestral items extremely well rendered by a company of 50 performers, under the conductorship of Mr. T. E. Clarke. A number of vocal items by members of the company's personnel were a welcome variation, and a very large audience signified its appreciation of the various items in no uncertain fashion. The large hall was tastefully decorated, and the evening's entertainment was successful in every way.

FLYING schools and other civil aviation enterprises which are seeking to add to their equipment should note the sale which is being conducted by Messrs. Wetherall and Green at the Stag Lane Aerodrome of the London and Provincial Aviation Co.'s stock. Details of the items included in the sale will be found in our advertisement columns, but it may be briefly stated that they comprise a number of useful machines, a good many engines of various powers, and a couple of motor cars, not to mention a large quantity of miscellaneous stores, fittings, materials, etc. Catalogues may be obtained from the auctioneers at 22, Chancery Lane, W.C. 2, while the lots will be on view on January 12 and 13.

If you require anything pertaining to aviation, study "FLIGHT'S" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages xliii, xlii, xli and xlii).

COMPANY MATTERS

Sunbeam Motor Car Co., Ltd.

THE report of the Sunbeam Motor Car Co. for the year ended August 31, 1919, states that after paying all expenses of management and allowing for depreciation and income-tax and making provision for excess profits duty for the year (but before providing for directors' remuneration) the profit amounts to £120,952, to which must be added £87,168 balance from last year. The directors recommend a final dividend of 5 per cent., free of tax, and bonus of 6d. per share, free of tax, on the ordinary shares, place to reserve (bringing this account up to £100,000), £80,000, to war contingencies fund £25,000, and carrying forward (subject to directors' remuneration) £51,320.

J. Samuel White and Co.

An interim dividend paid of 5 per cent. (1s. per share), less tax, on the ordinary shares, has been declared.

PUBLICATIONS RECEIVED

Alternating Current Work: An Outline for Students of Wireless Telegraphy. By A. Shore, A.M.I.E.E. London: The Wireless Press, Ltd., 12-13, Henrietta Street, W.C. 2. Price 3s. 6d. net.

Telephony Without Wires. By Philip R. Coursey, B.Sc., A.M.I.E.E. London: The Wireless Press, Ltd., 12-13, Henrietta Street, W.C. 2. Price 15s. net.

How to Fly and Instruct on an "Aero." By F. Dudley Hobbs, B.A. London: Longmans, Green and Co. Price 3s. 6d. net.

Correct Lubrication. The Vacuum Oil Co., Ltd., Caxton House, Westminster, S.W.1.

The Odd Hint to the R.A.F. By Wing Commander. London: Thomas, Warden and Co., 324, High Holborn, W.C. 1. Price 2s. 6d. net.

The History of Castrol. C. C. Wakefield and Co., Ltd., Wakefield House, Cheapside, E.C. 2.

Timbers and Their Uses. By Wren Winn. London: George Routledge and Sons, Ltd., Carter Lane, E.C. 4. Price 10s. 6d. net.

Report No. 40. The Ferrosilicon Process for the Generation of Hydrogen.

Report No. 52. Temperatures in Spark Plugs Having Steel and Brass Shells. The National Advisory Committee for Aeronautics, Washington, D.C., U.S.A.

Rolls-Royce Aero Engines and the Great Victory: Seaplanes, Flying Boats, Airships. Rolls-Royce, Ltd., 15, Conduit Street, London, W.1.

Rolls-Royce Aero Engines and the Great Victory: Aeroplanes. Rolls-Royce, Ltd., Conduit Street, London, W.1.

Rolls-Royce Cars and the Great Victory. Rolls-Royce, Ltd., 15, Conduit Street, London, W.1.

AERONAUTICAL PATENTS PUBLISHED

Abbreviations: c—cyl. = cylinder; I.C. = internal combustion; m. = motors

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published January 1, 1920

15,393. E. R. CALTHROP. Parachutes. (135,884.)

15,394. C. CURTIS. Landing indicator for aircraft. (135,915.)

20,011. H. DE M. SNEEL. Manufacture of structural elements from rolled metal plates. (135,933.)

20,885. A. J. STEAD. Locking device for controls of aircraft. (135,970.)

21,170. J. C. HANSON-ELLERHAMMER. Engines. (135,979.)

APPLIED FOR IN 1919

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published January 1, 1920

939. W. C. RUSSELL. Means for adjusting blades of airscrew when in flight. (136,003.)

4,471. R. I. GLAZEBROOK AND A. PAGE. Anemometers. (136,041.)

NOTICE TO ADVERTISERS

All Advertisement Copy and Blocks must be delivered at the Offices of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT

The Aircraft Engineer and Airships

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.

Telegraphic address: Truditer, Westcent, London.

Telephone: Gerrard 1828.

SUBSCRIPTION RATES

"FLIGHT" will be forwarded, post free, at the following rates:—

UNITED KINGDOM		ABROAD*	
	s. d.		s. d.
3 Months, Post Free..	7 1	3 Months, Post Free..	8 1
6 " " " "	14 1	6 " " " "	16 1
12 " " " "	28 2	12 " " " "	33 1

These rates are subject to any alteration found necessary under war conditions.

* European subscriptions must be remitted in British currency.

Cheques and Post Office Orders should be made payable to the Proprietors of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, and crossed London County and Westminster Bank otherwise no responsibility will be accepted.

Should any difficulty be experienced in procuring "FLIGHT" from local newspapers, intending readers can obtain each issue direct from the Publishing Office, by forwarding remittance as above.