

FLIGHT

The
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AND
AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

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DIARY OF FORTHCOMING EVENTS

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

1927	
Jan. 13 Professor F. C. Lea, D.Sc., M.Inst.C.E., M.I.Mech.E. "Some Experiments on the Effects of Repeated Stresses on Materials," before Inst.Ae.E.
Jan. 25 Mr. F. S. Barnwell, B.Sc., O.B.E., A.F.C., F.R.Ae.S. (Honours Member). "Some Notes on the Design of Airscrews," before Inst.Ae.E.
Feb. 10 Mr. H. P. Folland, F.R.Ae.S., M.B.E. (Honours Member). Paper, to be announced later, before Inst.Ae.E.



Towards the Rising Sun

ALTHOUGH so far very bad weather conditions have rather interfered with its progress, the flight of the first of the De Havilland "Hercules" aeroplanes, with three Bristol "Jupiter" engines, may be regarded as marking an important milestone in the history of British aviation. All too long has Great Britain been content to sit down and operate a heavily subsidised air route between London and Paris—a route which is never likely to be of any particular use to anyone except as a sort of full-scale experimental establishment, but which we have had to keep alive because other nations operated subsidised air services over it. The real salvation of British civil, sometimes euphemistically called "commercial," aviation lies, without a doubt, in aviation planned and carried out on Imperial lines, and the departure, on Saturday last, December 18, of the first "Hercules" marks the beginning of real practical Imperial aviation. As our readers are already aware, the new three-engined De Havilland machines are intended for the Cairo-Karachi route, the portion of which from Cairo to Baghdad has been operated by the Royal Air Force for some considerable time, but which is to be handed over, early in the new year, to Imperial Airways, Ltd., a contract having been signed according to which this company is to be subsidised for running the service as a civil undertaking.

At first the service is intended to be a fortnightly one in each direction, and meteorological, wireless and refuelling stations have been established along the route at Cairo, Gaza, Rutbah, Baghdad, Basra, Bushire, Bundar Abbas, Chahbar and Karachi. It might be objected that machines with three engines of 425 h.p. each represents a good deal of power to use on a machine designed to carry comparatively few passengers, but it should be recollected that, not only will machines have very strong head winds to fight,

calling for a high cruising speed, but also that the country, over portions of the route at any rate, is of such a nature that emergency landing grounds are not readily found, so that machines must be employed which are capable of continuing for many miles with only two engines running. Furthermore, the Arabian Plateau is situated at a considerable height above sea level, while the atmosphere is very hot, both of which factors reduce the lifting power of a machine, so that it will be seen that there are very excellent reasons for the adoption of machines with a good power reserve.

To begin with, the service will, as we have already said, be a fortnightly one, and at first it will only extend as far as Basra on the Persian Gulf. This is due to the fact that the entire fleet of machines is not yet ready. The remaining machines will, however, be delivered during February, March and April, and the service will then be extended to Karachi. According to the present time-table a machine will leave Cairo on Wednesday at 1 p.m., arriving at Karachi at 4.45 p.m. on the following Saturday. In the opposite direction machines will leave Karachi on Thursdays at 6 a.m., and arrive in Cairo at 10 a.m. on the following Sunday. Later on it is hoped that the volume of traffic will justify a weekly service, or possibly even twice a week.

The regular operation of the Cairo-Karachi section of the new Imperial air route to India and Australia will in itself enable a very considerable saving in time to be effected. Thus a traveller going to Karachi from London by sea takes 17 days to do the trip. By using the air route from Cairo to Karachi he completes the trip in 10 days, thus saving a whole week. The sea route to Baghdad and Basra occupies 23 and 22 days, respectively, while the air route will only take 8 days. As a beginning this is excellent, and doubtless, when the volume of traffic justifies it, night flying over, at any rate, portions of the route will be put into operation, when the saving in time will be very greatly increased. At the moment it seems doubtful whether air passengers would care to spend two or three days travelling continuously. The noise will probably be rather too trying for this to be an attractive proposition, except in cases of emergency, but there does not seem to be any technical reason why air mails should not be flown at night, since only by doing this can the full advantage of the speed of air transport be realised. Ultimately, of course, there will be an extension beyond Karachi, but at the moment it seems uncertain whether this will be by seaplane or by airship. We shall probably still have to wait a long time for airships to be capable of regular air-line work, and in the meantime it would be wise to run an experimental seaplane service from Karachi to Bombay, Calcutta, or even Rangoon.

As regards the departure of the first machine for the Imperial air route, this was piloted by Capt. Wolley-Dod, and carried as passengers Sir Sefton Branner, Air Commodore Weir and Mrs. Weir, and Capt. Gladstone, who is going out to organise the new Khartoum-Kisumu air service, another Empire air undertaking which is likely to prove a useful link in the ultimate Cairo-Cape Town line, just as does

the Cairo-Karachi section of the Cairo-Australia service of the future. The second machine left Croydon on December 20, piloted by Capt. Hinchliffe. On December 27 a third "Hercules" will depart from Croydon, carrying, among others, the Secretary of State for Air, Sir Samuel Hoare and Lady Maud Hoare, who are opening the new air lines officially and will travel as far as India in this machine. As they will have left before next week's issue of *FLIGHT* is distributed, we take this opportunity of wishing them *bon voyage*, and trust that their flight may prove instructive and interesting. In time to come we feel sure it will be regarded as historical. British aviation owes a great deal to Sir Samuel Hoare, who, like the Director of Civil Aviation, Sir Sefton Branner, never loses an opportunity of demonstrating by personal example his belief in civil aviation. To Lady Maud Hoare also our thanks should be expressed for thus sharing with her distinguished husband the task not only of opening officially the new Empire air route, but of travelling several thousands of miles by air in order to be able to do so.

Another Pioneer Venture

Christmas, 1926, seems destined to see the inauguration of a good deal of British Empire aviation in one way or another. We have already referred to the departure of the first de Havilland three-engined machines for the East, on board of the first of which is Capt. Gladstone, *en route* to organise the African air service from Khartoum to Kisumu. Before the year is out yet another air venture—one might even almost say adventure—will be well on its way. This is the surveying expedition to Northern Rhodesia which is being sent out by the Aircraft Operating Co. The members of this expedition, which will be under the leadership of Maj. Cochran Patrick, are leaving on December 31, taking with them several de Havilland 9's specially modified to suit the conditions to be met with in the work to be undertaken. These machines have been fitted with special undercarriages, and are powered by A.D.C. "Nimbus" engines. They will carry the new "Eagle" cameras which are operated by electric motors, and both vertical and oblique photographs will be taken. On a recent visit to the exhibition held by the Aircraft Operating Co. at the Air Ministry, Gwydyr House, we had an opportunity of discussing with Maj. Hemming and Major Cochran Patrick some of the details connected with this expedition, and photographs of the district over which the survey is being carried out promised a lot of hard work for those responsible. Emergency landing grounds have to be cleared and maintained, while the actual work of surveying and photographing from the air will be by no means easy on account of the nature of the country. However, every precaution is being taken, and the equipment used is the most up to date which it has been possible to obtain, so that the expedition starts well prepared for all emergencies. Again we wish all concerned the very best success, and shall follow with interest the progress of their work in the furtherance of British aviation.

To our Readers: Greetings and all Good Wishes for Christmas and the New Year.



The PARIS AERO SHOW 1926

(Concluded from p. 835.)

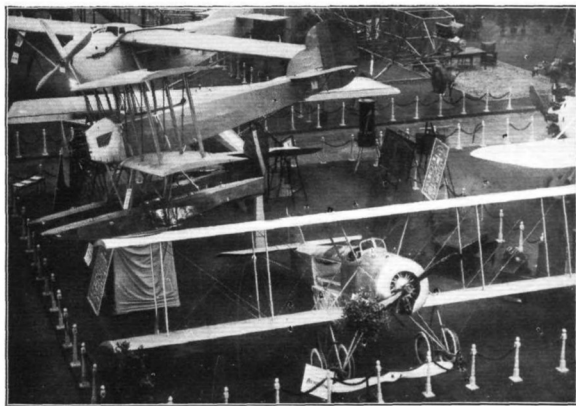
HANRIOT

It may, perhaps, be said that the *Société des Avions Hanriot* holds in France a position somewhat analogous to that occupied in this country by A. V. Roe & Co. Like the Avro company, the Hanriot firm is among the pioneers of aviation, the late M. Rene Hanriot having been among the earliest workers, and his original monoplane nicknamed in the early Brooklands days the "Henrietta," still being affectionately remembered by quite a number of British pilots. A somewhat later type of monoplane, rather like the early Nieuports in its general lines but with a different undercarriage, was flown a good deal in this country just before the outbreak of war, by one Sabelli, and will also be remembered by many of our readers. One should not, however, push the analogy between Hanriots and Avros too far, since whereas the latter have produced very large and powerful machines which have been adopted in recent years, it is believed that Hanriots have lately concentrated almost entirely on school machines, some of which correspond very closely to our Avro 504's.

The death of M. Rene Hanriot has left the management of the firm in the hands of his son, Marcel Hanriot (who, in the early days of flying, had the distinction of being the world's youngest pilot), and, judging from the machines exhibited at Paris, M. Marcel is carrying on the family tradition of pro-

ducing extremely useful school machines, as well as low-power *Avions Santaires*.

The fact that the three Hanriot machines exhibited at Paris were all either actual training types, or special applications of training types, explains why there was, in their design and construction, nothing novel which requires particular note. All three machines have done good work in their respective spheres, and have been supplied in considerable numbers to the French and to foreign air services. The type H 14 S ambulance plane has rendered excellent service in the Morocco campaign, and what the type lacks in load-carrying ability (it is fitted with a le Rhone rotary engine of 80 h.p. only) it makes up for by its great manoeuvrability and very low landing speed. It seems likely that such a machine could take off and alight almost anywhere, advantages compared with which the carrying of but a single stretcher case is probably insignificant. Anyway the machine is, we believe, intended mainly for advanced working right up to the field of battle, and doubtless the wounded were, in many cases, transferred to faster and more powerful machines for transport to base hospitals. The type seems to have possibilities, certainly under conditions such as those that obtained in the Moroccan affair, and the low power ambulance machine might be useful in parts of the British Empire also.

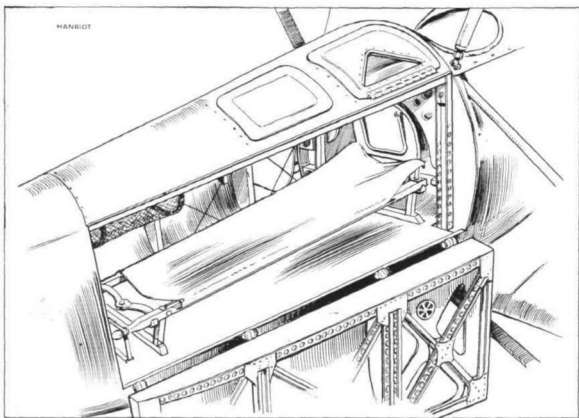


The Hanriot Stand: In the foreground the H.14 S Ambulance machine with 80 h.p. le Rhone engine. Behind that the H.41 training seaplane with 120 h.p. Salmson, and in the background the H.35 advanced training machine with 180 h.p. Hispano.

["FLIGHT"
Photograph

A low-power ambulance 'plane:
The Hanriot H.14 S., which is
fitted with 80 le Rhone engine,
has accommodation for one
stretcher case, the arrangement
being shown in
this sketch.

["FLIGHT" Copyright
Sketch

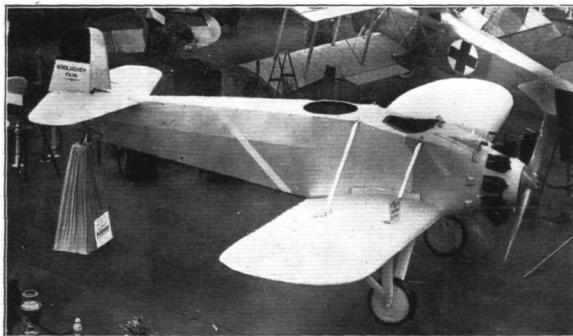


KOOLHOVEN

AN unfortunate mishap prevented Mr. Frederick Koolhoven from exhibiting exactly the kind of machine he had intended to show, and as a result it may be that a certain small amount of adverse criticism may have been directed against the F.K. 35 as it actually appeared at the Paris Show. In order to form a truer picture, it should be pointed out that a fuselage had been built for the F.K.35 resplendent in high show finish and truly representative of the care usually bestowed upon detail by this well-known constructor. Four days before the machine was due to leave for Paris, the Show fuselage was being taken out of one shop for transport to another, when a lorry came along and skidded into it, with disastrous results to the fuselage. For a time it looked as if our old friend Koolhoven was going to be prevented from exhibiting after all, but with his usual determination he set to work and decided that, happen what might, the F.K. 35 should be shown. The skeleton of a second fuselage was almost completed, this being intended for loading tests. A council of war was held, and although most of his assistant designers, shop foremen, &c., were very doubtful whether the second fuselage could be got ready in time, Mr. Koolhoven said it *had* to be got ready.

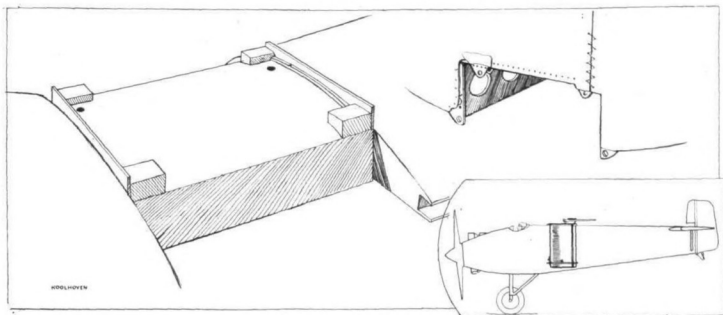
and by working on it two days and three nights, the fuselage actually was completed and the machine was sent to Paris, where it arrived in time to be fully erected and ready for inspection at the opening of the Show. Under the circumstances, however, it will be realised that one should not expect quite a Show finish, nor was the machine exhibited fully equipped, as it would otherwise have been. For all that, the little two-seater fighter attracted a good deal of attention, and, we understand that there is every likelihood that the licence to build the machine abroad will shortly be arranged for.

A general description of the F.K.35 appeared in our issue of December 2, and it will therefore suffice if we recall that the machine is normally a low-wing monoplane with fuselage of tubular construction, and an all-wood wing covered with plywood. A somewhat unusual feature of the wing is that although it has a fairly pronounced dihedral it is built in one piece, the centre fitting into a recess in the bottom of the fuselage and being held in place by a few bolts. The machine is not a cantilever monoplane, since it is braced some distance out by tubes sloping to the top rails of the fuselage, this feature having doubtless been necessitated by the fact



The Koolhoven F.K.35 is a two-seater machine convertible from monoplane into biplane. The engine is a "Jupiter." The circular cockpit coaming is designed to take the new Koolhoven gun turret.

["FLIGHT" Photograph



["FLIGHT" Copyright Sketches]

Some Koolhoven details: On the left, a view of the centre portion of the monoplane wing, showing how it fits into the fuselage. The cut out in the latter for the accommodation of the wing is shown on the right. Below is a diagram of the mounting of the Koolhoven mechanically-operated gun turret.

that the undercarriage is attached to the wings in order to get a very wide wheel track. The undercarriage is of the oleo type, which has been used by Koolhoven since about 1915, with two Vees under the wings and bent wheel axles, the free ends of which engage with the Vees outside the wheels.

The Jupiter engine is neatly cowled in, and the more usual metal spinner has been supplanted by a swelling of the actual propeller boss.

The lines of the fuselage are such that a distinct break occurs in the top longerons immediately ahead of the gunner's cockpit, the longerons sloping down sharply from this point to the engine. By this arrangement the gunner is placed relatively high and could, if necessary, fire forward and upward over the head of the pilot, provided his guns were elevated sufficiently for the bullets to clear the propeller tips.

In connection with the gunner's cockpit it should be pointed out that as exhibited the machine was incomplete. The circular coaming was intended for a new gun turret which has recently been patented by Mr. Koolhoven. This gun turret is in the form of a cylinder, carrying the guns, gunner's seat, ammunition racks, etc. It is so mounted in the fuselage as to be free to rotate, and the patented feature consists in the mechanism used for operating the turning of the turret. The type of engine starter in which energy stored in a flywheel turned by hand is used for starting aero engines, is probably already familiar to our readers. The same principle has been applied by Mr. Koolhoven for turning his mechanically-operated gun turret. In this case, however, the flywheel is spun, not by hand but by means of a pedal operated by the gunner's feet. Clutch mechanisms are incorporated in such a manner that by the movement of a single lever the gunner can lock the turret in any given position or can turn it in any direction, practically irrespective of the forward speed of the

machine. It is claimed that as an air fight generally lasts a few minutes only, and sufficient energy is stored in the flywheel to operate the gun turret for a much longer period, there should be no need for the gunner to speed up his flywheel during an actual fight, this being done during the intervals between fights. Details of the actual mechanism may not be given at the moment, but a diagrammatic representation of the arrangement is shown.

The Koolhoven F.K.35 weighs fully loaded 3,380 lbs., and as the wing area is 250 sq. ft., the wing loading is somewhat heavy, i.e., 13.5 lbs./sq. ft. Consequently, it may be expected that the landing speed must be somewhat high. Thus, if a maximum lift coefficient of 0.7 is assumed, the landing speed would be in the neighbourhood of 62 m.p.h. The estimated speed of the machine at 10,000 ft. is 162 m.p.h. Presumably this performance refers to the machine as fitted with the high-compression Gnome-Rhône Jupiter.

P. LEVASSEUR

Of the three machines exhibited by P. Levasseur one was a three-seater naval reconnaissance machine, of the type originated by this firm in which the undercarriage can be dropped, the fuselage being watertight, and the machine being steadied when floating on the sea by two small wing-tip floats. For this operation the propeller is locked by a special mechanism in a horizontal position, so as to prevent any tendency for the machine to nose over. The machine exhibited was generally similar to machines of this type shown at previous Paris exhibitions.

On exceptionally clean lines was the P. Levasseur V.I. C.2 two-seater fighter with Hispano engine. The general lines of this machine are illustrated by a sketch, while the undercarriage, which is chiefly remarkable on account of the absence of any springing other than that provided by the tyres, forms

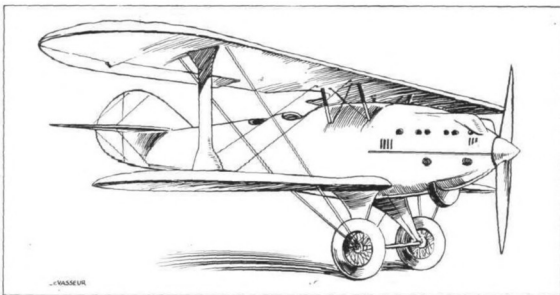


The P. Levasseur three-seater naval reconnaissance aeroplane is fitted with "droppable" undercarriage, water-tight fuselage and wing tip floats.

["FLIGHT" Photograph]

The Pierre Levasseur two-seater fighter has a rigid undercarriage, the only springing being provided by the tyres.

["FLIGHT" Copyright Sketch]



the subject of another sketch. Apart from its good lines the VI. C.2 is of straightforward design and construction. The fuselage is a semi-monocoque type, while the wings have metal spars and wood ribs.

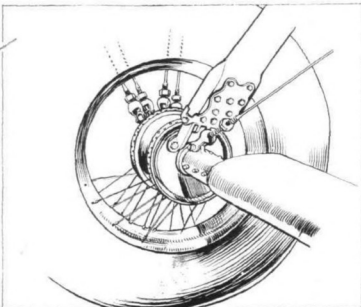
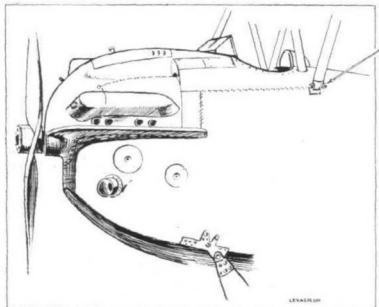
In some ways perhaps the most interesting of the Levasseur machines was the limousine type VII.T, fitted with Jupiter engine. This machine had a very spacious and well-appointed cabin with seating accommodation for six passengers. The fuselage construction of the VII.T is of the type originated by this firm some years ago, in which the main structure consists of two fore and aft members forming Warren girders. These members are of multi-ply construction, the joints between longerons and struts being formed by overlapping the laminations rather in the manner familiar from the construction of laminated wood air screws. It is claimed that this construction is very economical as regards strength for weight, and that it is very cheap to make and keeps its shape remarkably well in service. In the case of the VII.T cabin machine, this form of construction has the further advantage of making possible an entirely unrestricted cabin space. The actual machine exhibited had its cabin portion finished in the form of a Weymann body, which looked remarkably well. How it will withstand the wear and tear of commercial flying in all weathers remains to be seen. A notable feature of the VII.T was that its tail surfaces were of ample proportions, and certainly very much larger than those found on the majority of French machines. Perhaps this may be explained by the fact that M. Charles Frechet, the firm's Managing Director, spent a goodly portion of the war years in the British Air Board, and that he has ever since been keeping in very close touch with British aviation progress. It is notable that British machines have, generally speaking, considerably larger control surfaces than those of foreign nations, and in consequence are much more manoeuvrable at angles near, or even above, the stalling speed. The Levasseur VII.T should certainly share with British machines this manoeuvra-

bility and altogether looks a very promising commercial aeroplane. With a fuel load of 660 lbs, this machine has a pay load of 1,870 lbs., which appears to be a very useful commercial proposition.

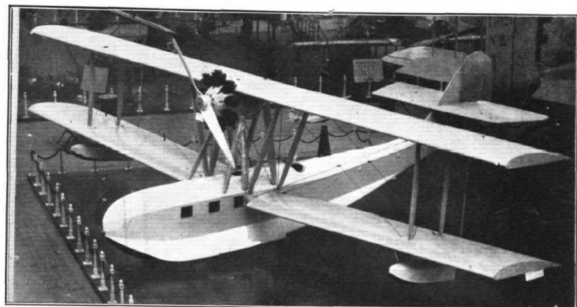
LIORE ET OLIVIER

ALTHOUGH the main character of the French Aero Show of 1926 was distinctly military, a few commercial aircraft were exhibited, and the firm of Lioré et Olivier can claim the distinction of showing two commercial types and no military types at all. The LeO H.190 is a single-engined tractor flying-boat, with Gnôme-Rhône engine. This machine is similar to that which recently successfully accomplished the flight from Marseilles to Madagascar, following the coasts and rivers of Africa. The type generally resembles previous machines built by this firm, and it was noticed that although the hull is not of the circular section type to which we are accustomed in this country, its flat tumble-home sides, surmounted a planing bottom shaped more like those found on British flying-boats. Instead of the straight Vee bottom to which hitherto the majority of French flying-boat constructors have confined themselves, the LeO H.190 has these surfaces curved into reverse curvatures. This machine has a useful load (i.e., paying load) of 2,245 lbs., which seems very good for a flying-boat. In the machine exhibited, part of this paying load was intended to be in the form of six passengers, the remaining weight being made up of luggage and mails or goods.

The second machine exhibited on this stand was the LeO 21 commercial aeroplane, which is fitted with two Jupiter engines. This machine is somewhat reminiscent of the Farman Goliath, what with its square wing tips and its forward cabin projecting a long distance ahead of the wings. We understand that several of these machines will shortly be placed on the London-Paris service of the Air Union. It might here be mentioned that this machine is



Details of the rigid undercarriage on the P. Levasseur two-seater fighter. On the left the nose of the "Avion Marin," showing skids intended to prevent machine from nosing over on alighting on the water.

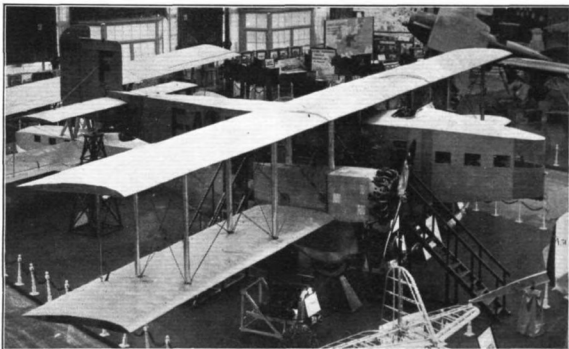


Marseilles-Madagascar: The Liore and Olivier LeO H.190, with "Jupiter" engine, was the type used in the flight across Africa. Behind the machine may be seen the tail of the large LeO 21 twin-engine commercial aeroplane.

[© FLIGHT Copyright]

The Liore and Olivier LeO 21 is a twin-engine commercial biplane with two "Jupiter" engines.

[© FLIGHT Photograph]



a slightly modified version of the LeO 20 three-seater night bomber, recently adopted by the French Military Air Service. An unusual feature of the machine is that the undercarriage consists of two entirely independent units, one being placed under each engine, in a forked structure with the wheel partially enclosed in a large mudguard. The cabin is divided by the pilot's cockpit into two separate compartments, of which the rear one accommodates 12 passengers and the forward one six passengers. This cabin arrangement is partly illustrated by a sketch.

LOIRE-GOURDOU-LESEURRE

CONSIDERABLE changes in the machines exhibited by this firm, as compared with those which it had been intended to show, and details of which were published in FLIGHT of December 2, are to be recorded. Thus the L.G.L. 23 TS ambulance machine was absent from the stand, while in place of the 33 C.1 with 450 h.p. Lorraine engine, a type 35 C.1 with Renault engine was shown. The type 32 C.1 previously described in FLIGHT was exhibited in the manner beloved by French constructors, i.e., on a steeply banked turn, but its proximity to the floor made this attitude look rather alarming.

Generally speaking, the L.G.L. machines are very much alike, whatever the type, in that they are parasol monoplanes with strut bracing, a good deal like the Morane-Saulnier machines in appearance, although we believe quite different in detail construction. The fuselage construction is of the welded steel tube type, while the monoplane wings have duralumin spars and wood ribs.

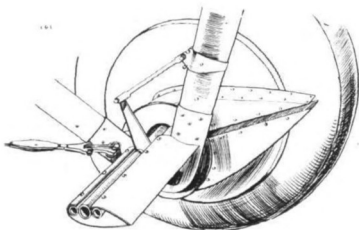
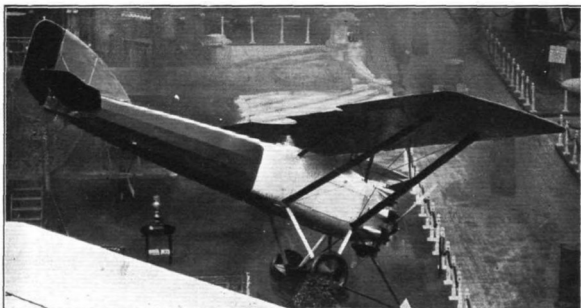


[© FLIGHT Copyright Sketch]

The cabin of the Liore and Olivier LeO 21 is partly divided by the pilot's cockpit. The same door in the starboard side gives access to both sections of the cabin.

The L.G.L.32 C.I., with "Jupiter" engine, was exhibited in a somewhat alarming attitude.

["FLIGHT" Photograph]



["FLIGHT" Copyright Sketch]

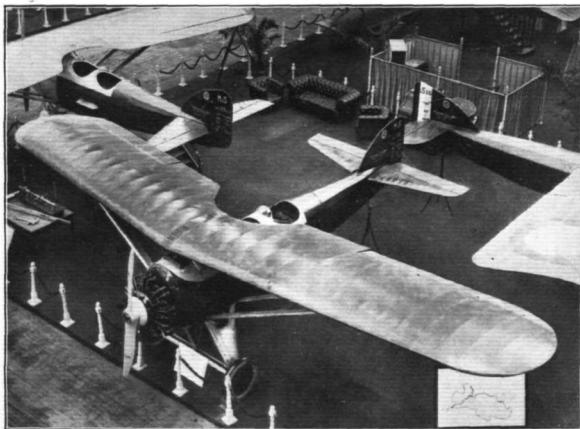
The shock-absorbers on the Loire-Gourdou-Leseurre machines are enclosed in fairings, the crank shown being intended to prevent axle and fairings from turning.

The fuselages are very long and slender, a fact that may help to improve the effectiveness of the rather small tails. The wing bracing struts have short steadying struts to the wing spar, a feature of which we personally are not very much in favour.

A feature of the L.G.L. undercarriages is that the shock absorbers are enclosed in streamline casings, a short crank anchored to the undercarriage leg preventing the axle and casings from turning, as shown in one of our sketches. The two L.G.L. machines were not exhibited with armament, but this consists of two fixed guns firing through the propeller, and two more fixed guns mounted on the wing and firing above the propeller. The wing structure has been specially stiffened against the recoil of the two wing guns.

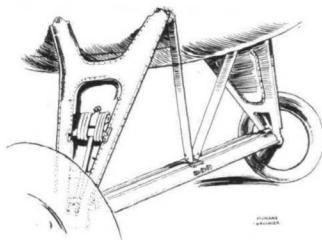
MORANE-SAULNIER

THE three parasol monoplanes exhibited on this stand were all of the same general type, the main differences being in the power plants and, in the case of the 35 EP 2, wire bracing above and below the wing, as compared with the rigid strut bracing of the other two types. The machines are very popular in France for school work and touring, and this firm has had such lengthy experience of this class of work that it may be expected to know exactly what is required. The



The Morane-Saulnier exhibit consisted of three parasol monoplanes, of which the type 132, with 120 h.p. Salmson, is shown in the foreground.

["FLIGHT" Photograph]



["FLIGHT" Copyright Sketch

The Morane-Saulnier monoplanes have their shock-absorbing gear enclosed in the undercarriage legs.

type 129 E.T. 2 can be said to represent the accumulated experience of the firm as far as school machines are concerned, the letters E.T. representing the words *Ecole de Transition*, the type being intended for intermediate school work, forming

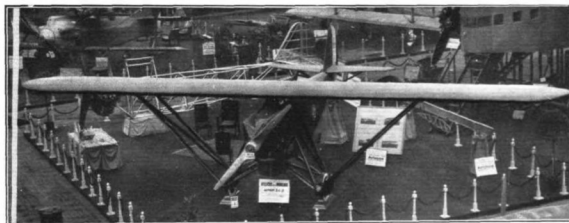
a stepping stone between the E.P. (*Ecole Primaire*) type and the more powerful machines. The third machine shown, type 132, is intended mainly for touring, but can also be used as a school machine. As is usual with Morane-Saulnier aeroplanes, the workmanship and finish are excellent. Of special constructional features there are few which are not well known, but the rather neat arrangement of the shock absorbers inside the fuselage leg is worthy of mention, and is illustrated by a sketch.

ATELIERS DES MUREAUX

It may, perhaps, be remembered that at a previous Paris Aero Show the Ateliers des Mureaux exhibited a Vickers-Vimy commercial aeroplane. This year the firm showed a machine of its own design, and a skeleton fuselage illustrating the construction. The complete machine was a parasol monoplane two-seater fighter, type 3 C.2. This was submitted for the *Avion Marin* which, as recorded in our issue of December 2, it had been intended to exhibit.

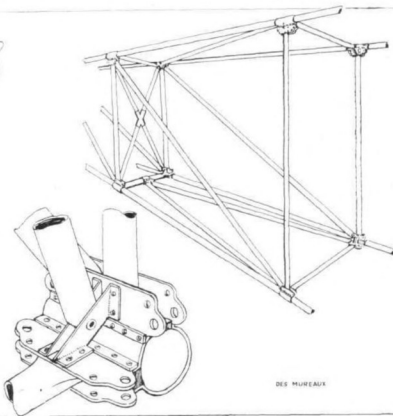
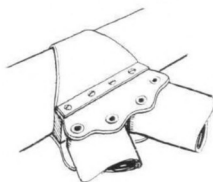
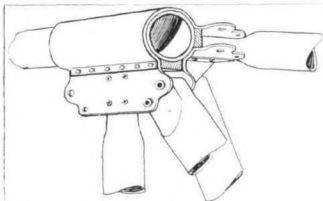
The machine has a very unusual arrangement of its wing and undercarriage bracing, as the photograph and sketch will show, and it is difficult to see what advantage the designers expect from such a forest of struts. The wheels are each carried in a duralumin frame, which is in turn supported from fuselage and wings. The travel of the wheels is obviously very limited, while it seems probable that the air resistance of all these struts at the points where they converge must be very high indeed owing to "interference effects."

Details of the fuselage construction are shown by sketches. It will be seen that the form of construction, with plain



The Ateliers des Mureaux exhibited a type 3C2 with unusual monoplane wing bracing. Behind it may be seen the skeleton of an all-metal fuselage.

["FLIGHT" Photograph



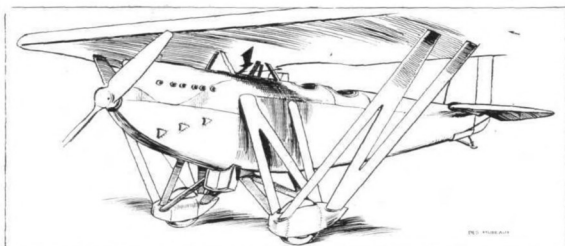
DES MUREAUX

["FLIGHT" Copyright Sketches

Simple metal construction at Paris Show. These sketches show the details of the form of fuselage construction used on the Ateliers des Mureaux machines. Compared with some of the metal work exhibited, this particular form is simple and should be cheap.

The 3 C.2 two-seater fighter of the Ateliers des Mureaux is a parasol monoplane with unusual wing bracing.

["FLIGHT" Copyright Sketch]

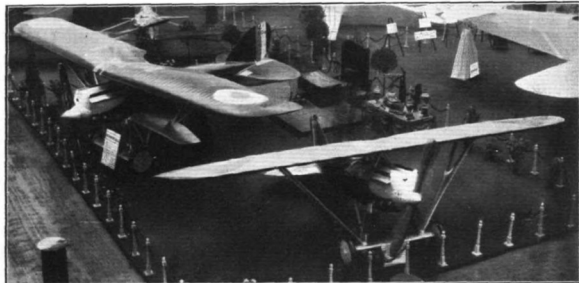


duralumin tubes and plain sheet fittings, is very simple, and might have a good deal to recommend it if applied to a more commonsense general design.

NIEUPORT-ASTRA

The two machines exhibited by this firm were generally similar, the type 42 C.1 being the older type, while the type

the machines were beautifully finished, and it is worth noting that the cockpit arrangements were among the best in the show, a very great deal of trouble having quite obviously been taken to ensure the best lay-out for the instruments, armament, etc. A feature of both Nieuport-Delage machines is the duralumin "backbone" unit, to which all the main weights such as engine, undercarriage, crew, equipment, etc.,



The two Nieuport-Delage fighters. On the left the type 42 C.1, a "sesquiplan," and on the right the new 48 C.1, in which the diminutive lower wing has disappeared altogether. These machines had uncommonly fine cockpit arrangements.

["FLIGHT" Photograph]

48 C.1 is the very latest product of M. Delage, the firm's chief designer. Both machines are of typical Nieuport-Delage lines, and the main difference between them is that in the type 48 the small lower plane has disappeared altogether. The wing bracing is in the form of a single "Y" strut on each side, the struts being built up from sheet duralumin of fairly thick gauge, but without internal stiffening. As is usual,

are attached, and for which the *monocoque* rear portion of the fuselage forms but a streamline fairing.

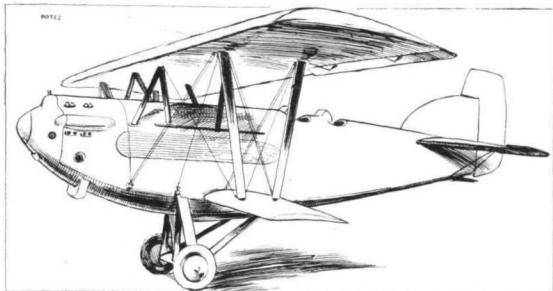
HENRY POTEZ

ALTHOUGH one of the younger of French aircraft firms, the Potez Company has managed to establish for itself an excellent reputation for good work, and their machines are

The Potez 25 Army-Co-operation biplane is of recent design.

["FLIGHT" Photograph]





The H. Potez 28 G.R. long-distance reconnaissance biplane is, in spite of its large span, a single-bay machine. The belly of the fuselage contains extra fuel tanks.

["FLIGHT" Copyright Sketch

always on sound straightforward lines. Large numbers have been supplied, not only to the French air services, but also to those of many foreign powers, including the Little Entente, Denmark, Estonia, Japan, Spain and Portugal.

The three Potez machines exhibited at Paris were all generally similar in design, i.e., single-bay biplanes with small bottom plane and large top plane, and struts raked outwards at a pronounced angle. Most impressive of the three was, perhaps, the 28 G.R. (the letters indicate *Grand Raid* or *Grande Reconnaissance*), with 550 h.p. Renault engine. This machine is shown in a sketch. It was, it might be mentioned, on this machine that the brothers Arrachart established a new world's distance record by flying from Paris to Basra non-stop. The record has since been beaten, but the flight was undoubtedly a most meritorious one. The machine is chiefly remarkable for its large size (for a single-bay biplane) and for the large petrol tanks housed in the "belly" of the fuselage. Both cockpits are placed very far aft in the machine, and one would imagine that the view is not as good as in the smaller Potez machines.

The Potez 25 G.R., with 450 h.p. Lorraine engine, is almost identical with the third machine shown, the 25 A2, but carries no armament, and has a much larger petrol capacity, as will be seen from the data given in our December 2 issue. The 25A2, it should be pointed out, is the standard French Army co-operation machine. It is equipped with four machine guns, one firing through the propeller, two on a gun ring, and one firing through the floor towards the tail.

A feature of all Potez machines is the detachable engine units, and two such were shown on a stand. These detachable engine mountings are of very simple form, and attach to the main fuselage structure at four points only, thus rendering the operation of changing an engine a very simple one. These engine mountings are of heavy gauge duralumin, by the use of which practically no bracing, "crinkling," or other aids to stiffness are required.

SALMON-BECHEREAU (S.R.A.P.)

From the side view of the Salmon-Bechereau C.2, published in our issue of December 2, it was difficult to realise the complication of the strutting which a closer inspection of this machine at the show revealed. M. Bechereau, it may be

recollected, is an old hand at designing aeroplanes, having been responsible for the design of the Deperdussin monoplanes in the very early days of aviation, and during the war of the early Spads. With an experience like that behind him, one is justified in expecting from a designer a really fine piece of work, but frankly the machine exhibited on this stand could scarcely be so described as regards its design. One of our sketches this week shows the general scheme of the wing bracing, and it will be seen that this is of such a nature that there must be a good deal more strut area offering resistance than need be incorporated in a biplane with orthodox bracing. Unless the demand is, for some service reason not entirely obvious, a parasol monoplane at all costs, it is difficult to guess what was in the designer's mind. The fuselage is of excellent streamline form, and that the machine must be aerodynamically efficient in spite of its excessive amount of strutting, seems obvious from the official performance figures published in our December 2 issue, according to which the speed at 10,000 ft. is 220 km./hr. (136.6 m.p.h.). One cannot help thinking that with the same fuselage neatly put into a biplane structure an even better performance would have been obtained.

On this stand was also exhibited the fuselage of the Salmon-Bechereau mail aeroplane. Constructionally this machine, like the two-seater fighter, is of fairly orthodox construction, and neither machine calls for comment on this score. It was noticed, however, that in the case of both machines, and particularly in the case of the mail aeroplane, the rudder was of very small area.

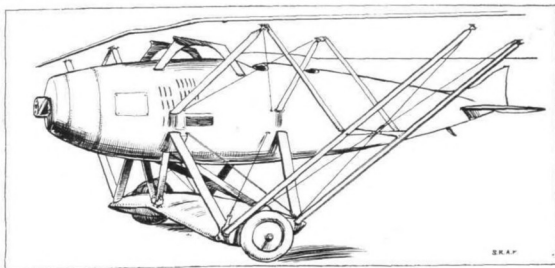
SCHRECK—F.B.A.

The machine exhibited by this firm (incidentally when the Company was founded the initial letters signified Franco-British Aviation Co.) is a single-engined amphibian flying-boat fitted with 450 h.p. Lorraine-Dietrich engine. The machine is of familiar F.B.A. design and construction, and it may be pointed out that it was this type which won the prize for commercial seaplanes in 1925 and a similar type obtained a world's altitude record carrying a load of 1,000 kg.

The F.B.A. 21 H.M.T.6 is unusual in so far as it is a commercial machine with the four passengers accommodated

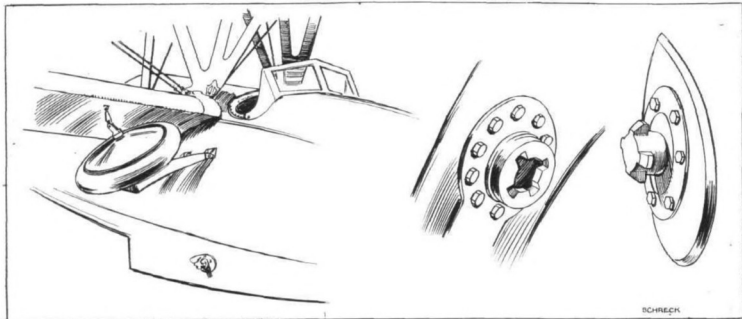
The Salmon-Bechereau two-seater fighter has an unusual strut arrangement. Both the main wing and the auxiliary wing supporting the undercarriage are set at a negative dihedral angle.

["FLIGHT" Copyright Sketch



The Schreck-F.B.A. amphibian has an open cockpit for passengers behind the wings, while the pilot's cockpit is in front. This type of machine won the competition for commercial sea-planes in 1925.

["FLIGHT" Photograph



["FLIGHT" Copyright Sketches

The undercarriage of the Schreck F.B.A. amphibian is raised by cables passing through the lower plane. When the wheels are lowered they are secured in position by the device shown, the male portion being mounted on the sides of the boat hull.

in an open cockpit behind the wings. This position of the passengers is undoubtedly one of the safest which it was possible to arrange for, but one would expect the open cockpit to be rather draughty, especially as the tips of the tractor airscrew come down almost to the deck in front, so that there will probably be a considerable amount of slip stream felt even aft of the wings. Otherwise the arrangement seems to have much to recommend it. The cockpit for the pilot and navigator is situated ahead of the wings, and the large wind-screen fitted is probably by no means an unnecessary part of the equipment. The machine is otherwise of normal design, and the only feature which calls for comment is the retractable undercarriage. The details of this are shown in a sketch. The undercarriage legs, which are in the form of multi-ply

wood formers, are hinged to the sides of the boat hull and are raised towards the wings by means of cables passing inside the lower plane. When the pilot turns a shaft in the cockpit the wheels are lowered towards the side of the boat, where they are locked in position by means of a form of bayonet joint, the shape and arrangement of which are shown in the sketch. This type of retractable undercarriage has been in use on F.B.A. machines for several years, and it is understood that it can be fitted to any of the firm's machines with the exception of the school types.

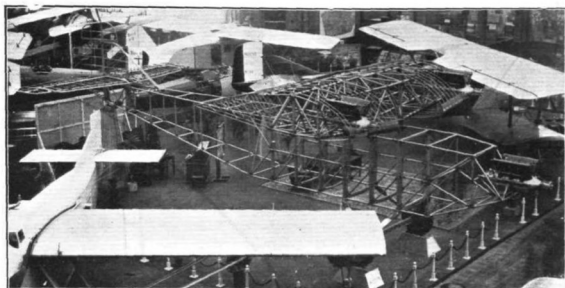
S.E.C.M.

ONE military and one commercial aeroplane formed the exhibits on the stand of this firm. The military machine



The S.E.C.M.-Amiot 120 B.N.2 is a long-distance two-seater night-bomber with 600 h.p. Renault engine. It is of all-metal construction.

["FLIGHT" Photograph



The S. E. C. M. 150T commercial machine, of which only the centre portion was exhibited (in skeleton). The wing construction is somewhat similar to the Junkers.

[“FLIGHT” Photograph]

is a single-engined night bomber two-seater with 600 h.p. engine. Like all S.E.C.M. products the machine was of all-metal construction, the fuselage being built up of metal tubing, whilst the wings had “X” girder spars of the type produced by this firm for several years. The machine was chiefly remarkable because of the fact that it was, in spite of its large span, a single bay biplane, the interplane struts being raked outwards at a very pronounced angle, due to the fact that the lower plane is of very much shorter span than the top. As distinct from so many French aeroplanes having a short bottom plane, the wing bracing is of orthodox type, and does not show the usual arrangement of lift wires running from the lower plane to the undercarriage, which seems to be so popular with French designers at present.

Of the second machine of this stand only the centre portion was shown, and this was exhibited in skeleton. It is to be a large commercial Vee-engined machine with three Hispano-Suiza engines. The fuselage is of typical S.E.C.M. tubular construction, in which the joints between struts and longerons are formed by wrapping metal sheet around the struts and longerons. This is a form of construction which the S.E.C.M. Company has developed to a high art, and which is certainly beautifully carried out, although it is a little difficult to see the necessity for this complication. The wing structure looks at first glance, somewhat like the well-known Junkers type with multiple tubular spars, but in reality it is quite different. To begin with, the main wing structure does not extend over the entire chord as is the case in the Junkers machines. It stops short aft at approximately mid-chord, while in front there is a separate leading edge formed of sheet metal. Moreover, when the structure is examined in detail, it is found that the top and bottom tubes of the spars occur one above the other, whereas in the Junkers construction a top tube occurs approximately above the midway point between the two lower tubes and vice versa. The method of joining all the various tubes together is also quite different from that used by Professor Junkers, and takes a form similar in general prin-

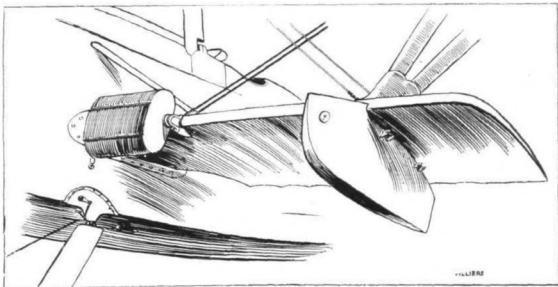
ciple to that employed in the fuselage construction, with sheet metal wrapped around the joint. One such joint was exhibited on the stand, and showed a large number of tubes meeting at a point. It was impossible not to admire the skill and craftsmanship which had enabled this joint to be made, but it is difficult to discover the necessity for going to such complicated methods of joining tubes together. From what will be gathered by inspecting the centre portion of this machine, the cantilever monoplane wing will have a very pronounced taper. The undercarriage appeared to be of the type in which the axle itself is rigidly mounted, but it was not possible to see whether or not shock-absorbing gear was incorporated inside the wheels. A photograph of a wheel, however, showed shock absorbers incorporated, although one doubts whether this type of wheel was actually used on the machine as exhibited.

VILLIERS

Two machines were exhibited by Francois Villiers, a comparative newcomer to the French aircraft industry. Of these one, the Villiers type No. 11 C.2, was an *avion marin* of the type designed to be able to alight on the sea in case of engine trouble. This machine is similar to other French machines of its class in that the undercarriage, a wood structure, is watertight so as to provide sufficient flotation to keep the machine from sinking until it can be picked up. The bottom plane, which is of smaller span and chord than the top plane, is attached to the watertight fuselage approximately halfway up the sides, or roughly at the level of the water line, and two wing tip floats provide lateral stability when the machine is at rest on the water. The undercarriage can be dropped before alighting in the sea, the propeller being locked in a horizontal position. The machine is otherwise of orthodox design, the only unusual feature being necessitated by the purpose for which the machine was designed. Owing to the raising of the bottom plane up to the centre line of the fuselage, the top

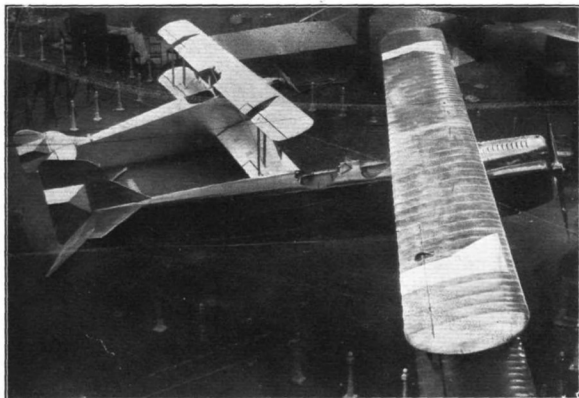
The Villiers “Avion Marin” has a very small bottom ‘plane’. Note the wing tip float and the Lamblin radiator on the leading edge. The undercarriage can be dropped, part of the release gear being visible in this sketch.

[“FLIGHT” Copyright Sketch]



Two Vojenska machines. In the foreground the S.16, a long-distance reconnaissance biplane with 450 h.p. Lorraine engine. In the background the little S.18, a school machine with 60 h.p. Walter engine.

["FLIGHT" Photograph]



plane is placed very high in relation to the body, doubtless in order to retain a good gap/chord ratio.

The other machine exhibited was a type V, two-seater night fighter equipped with landing lights and other equipment necessary to its function. In place of the Vee interplane struts of the *avion marin* the type V had single "I" struts built up of rectangular section duralumin tubes faired with sheet aluminium, and provided with incidence adjustment in the form of short rods from the main tube to the two wing spars. The machine is of normal construction, with ply-wood covered fuselage and wood wing spars and ribs. It is a clean-looking job and is credited with a top speed at ground level of 224 km./h. (139 m.p.h.).

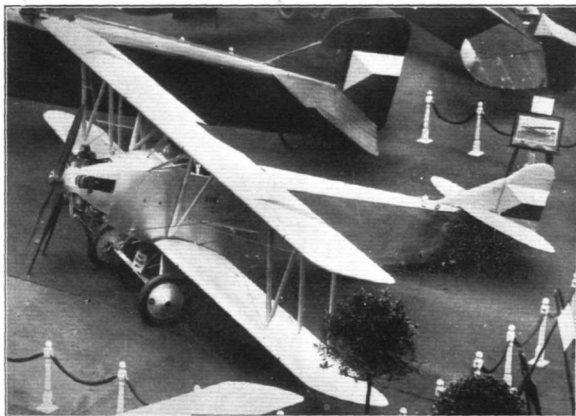
VOJENSKA TOVARNA NA LETADLA

THE Military Aircraft Factory of Prague was reported in our issue of December 2 to exhibit three machines. Actually,

however, but two were shown, the "absentee" being the type S.20 single-seater fighter with Skoda-built Hispano-Suiza. Presumably there was room for no more machines on the Czechoslovak stand, which already contained one Aero and two Avia machines.

Of the two machines shown by the Military Factory one was a little school machine with 60 h.p. Walter engine. This did not present any unusual features except in the arrangement of the wing bracing. Two of the accompanying photographs show the S.18, and from these it will be seen that the top plane is braced, in addition to the cabane struts, by a pair of Vee struts running to the point where the lower front spar meets the fuselage, whereas there is no attachment to the lower rear spar at this point.

The second Vojenska machine was the type S.16, which is shown from above in one of our photos. A feature which at once attracts attention is the high aspect ratio of the



The Vojenska S.18 school machine with 60 h.p. Walter engine. The wing strutting is somewhat unusual.

["FLIGHT" Photograph]



wings, the span of which is 15.5 m. (50 ft. 10 in.) for an area of 47 sq. m. (506 sq. ft.). The machine which is a long-distance reconnaissance or day-bombing biplane, with 450 h.p. Lorraine-Dietrich engine, is of all-metal construction, the fuselage being

built of steel tubes. The machine is of clean lines, and is credited with a top speed at ground level of 225 km. h. (140 m.p.h.). The ratio of empty weight to load carried is high, for mer being 1, 200 kg., and the latter 1,050 kg.

THE CAIRO-KARACHI AIR ROUTE

ON December 18 the first of the three D.H.66 "Hercules" air liners (three Bristol "Jupiter" engines) that have already been built for service on the Cairo-Karachi air route, left Croydon *en route* for Cairo. The machine set out at 7.45 a.m. with Mr. C. F. Wolley Dod and Mr. Warner as pilots, and Air Vice-Marshal Sir Sefton Brancor, Director of Civil Aviation, Air Commodore Mrs. Weir, Capt. T. A. Gladstone, a mechanic and wireless operator, forming the crew. Capt. Gladstone, it may be mentioned, is journeying to Egypt in connection with the Khartoum-Kisumu air service. The "Hercules" made a good trip to Le Bourget, arriving at 9.28 a.m. and leaving again at 10.10 a.m. A stop for lunch was made at Dijon at 11.43 a.m., the journey being resumed at 1.51 p.m. *en route* for Marseilles. Owing to the lateness of

the hour, however, a stop was made at Lyons, where the night was spent.

The next morning, at 9.40 a.m., the machine left for Marseilles, where it arrived at 11.5 a.m. The second "Hercules," piloted by Capt. Hinchliffe, followed No. 1 on December 20, whilst the third machine, as previously reported, will leave on December 27 by Sir Samuel Hoare, Secretary of State for Air, and Lady Maud Hoare, Air Vice-Marshal Sir Geoffrey Salmond (who is going to India to assume command of the R.A.F. in India), and Maj. C. L. Bullock, as passengers, officially inaugurating the service. "Hercules" No. 2 arrived at Marseilles on the afternoon of the same day it started from Croydon. (The D.H.66 "Hercules" was described in FLIGHT for July 10 and November 4 last.)

LIGHT 'PLANE CLUB DOINGS

London Aeroplane Club

The total flying time during the week was 20 hrs. 30 mins. There were three blank days owing to fog and rain.

The following members received flying instruction—J. J. Hofer, H. R. Presland, J. E. Sawyer, E. R. Wilson, M. P. Susman, H. Solomon, J. G. Crammond, A. J. Richardson, B. Roxburgh Smith, A. J. Lingard.

The following members had solo flights—C. E. Murrell, H. Spooner, Lady Bailey, S. O. Bradshaw, N. Jones, L. J. C. Mitchell, J. H. Salfery, G. Terrell, G. C. Bonner, A. R. Ogston, O. J. Tapper, K. V. Wright. The following members had joy rides—J. J. Hofer, Miss Wilson, Miss Morris.

The club will be closed down for one week from Thursday, 23rd inst.

The Hampshire Aeroplane Club

Report for week ending December 18.—Total flying time for the week, 8 hrs. 40 mins. Instruction flying, 4 hrs. 40 mins.; solo flying, 1 hr. 20 mins. test flights for visibility, etc., 40 mins.

The following members had instruction—Lieut. Heilmann, R.N. 1 hr. 25 mins.; Cooper, J. H. 10 mins.; Moloney, 40 mins.; the Hon. H. K. Grosvenor, 40 mins.; Everett, 30 mins.; Dickson, 25 mins.; Shepherd, 20 mins.; Stokes, 15 mins.; Nicholson, 15 mins.; Kerry, 10 mins.; Keeping, 10 mins.; Barry, 10 mins.; Preston, 10 mins.

The soloists were—Lieut. Graham, R.N., 35 mins.; Preston, 25 mins.; Perlett, 10 mins.; Keeping, 10 mins.

Morning mist has been a nuisance several times this week, and in consequence, we are thinking of adopting the Lancashire Club's test for visibility, and would appreciate the loan of the telescope and half-crown which they used for that purpose. We have a perfect good Scotsman in the person of McCracken, who could be relied upon to do the observing of the coin.

There is one slight drawback to this test as applied to the Hampshire Club, in that our instructor also hails from north of the Tweed, and therefore it may be difficult to induce him to leave the ground in case he should lose sight of the half-crown.

To enable the status of this club to enjoy a well-earned rest, the premises will be closed from Thursday, December 23, to Wednesday, December 29, inclusive.

Lancashire Aero Club

Report for week ending December 18.—Total time for week, 9 hrs. 30 mins., made up as follows:—Dual with Mr. Brown: Messrs. Wade, 1 hr. 20 mins.; Crosthwaite, 50 mins.; Birley, 40 mins.; Leigh, 35 mins.; Hughes, 30 mins.; McNair, 25 mins.; Fallon, 25 mins.; Miss Emery, 25 mins.; Messrs. Newton and Harper, 20 mins. each; Hargreaves, Dodson, Anderson and Nelson, 15 mins. each; Costa, 10 mins. Solo: Messrs. Lacayo, 45 mins.; Costa, 15 mins.; Goodfellow and Hughes, 10 mins. each. Joy-ride, with Mr. Costa: Mr. Torres, 20 mins. Tests: 50 mins.

There is really nothing amusing to record, unless one includes the fact that Mr. Dobson, our Mono engine expert, went solo Wednesday. On the same day our chairman set off Helvellyn-wards on his super-Gosport, but had to turn back at Wudmeren on account of weather conditions. He got back to Woodliff safely through a mixture of fog and snow. The week was quite a stout effort.

John had
Great Big
Eversing
Wheels on
John had a
Great Big
Ole-
O.
John had a
Wonderful
Radial
Engine—
So "off"
(said John)

I have been challenged to say anything original this week about our deplorable weather. As it is practically the sole topic of conversation among our members, it is obvious that the only original thing left to say about it is nothing, which I propose to say accordingly.

A happy Christmas and good landings to everybody.

Midland Aero Club, Ltd.

Report for week ending December 17.—The Meteorological people have enveloped the aerodrome in a fog of the best quality, complete with particles of carbon, flying has been practically nil. The total flying time was 1 hr. 30 mins.

Messrs. J. Uratou and G. V. Perry made solo flights.

The Club will be closed down during the Christmas holidays, from December 23 to Wednesday, December 29.

The Newcastle-upon-Tyne Aero Club.

Report for week ending December 5.—Total flying time, 6 hrs. 15 mins.; dual, 6 hrs.; test, 15 mins.

The following members flew under instruction—Messrs. Turnbull, Wilson, Rammsen, Stawart, Wardill, Shaw, and A. Bell. Dr. Dixon flew for instruction for advanced dual instruction.

Report for week ending December 12.—Total flying time, 13 hrs. 30 mins.; dual, 9 hrs. 15 mins.; solo, 3 hrs. 15 mins.; passenger flights, 1 hr.

Members who flew with Mr. Parkinson under instruction—Messrs. Stawart, Mathews, J. M. Kennedy, Irving, Wardill, Turnbull, Bruce, Bell.

The following members flew solo for practice—Mr. Irving, Mr. Mathews. Pilot members flew with passengers as under—Dr. Dixon with Mrs. Watt and Mr. Catcheside; Mr. R. N. Thompson with Miss Willis, Mr. C. Thompson with Mrs. Heslop.

Mr. Parkinson took the following for joy rides—Miss Ward, Miss Bayliss, Miss Tiley, Mr. Fry, and Mr. Hay.

Flying was only possible on three days during the week, strong winds prevailing almost all the week. Only one machine is on service at present.

On two days, flying was possible for solo work or landings, Mr. Parkinson took Mr. Irving for instruction in short cross-country flights.

Report for week ending December 19.—Total time flown, 8 hrs. 40 mins. Dual 4 hrs. 25 mins., solo, 4 hrs. 5 mins., passenger 10 mins.

The following members flew under instruction: Messrs. M. Kennedy, A. Bell, R. Stawart, Turnbull, H. Ellis, Miesgale.

Mr. J. D. Irving and Mr. D. Mathews flew solo during the week.

Mr. Irving successfully passed the tests for his aviator's certificate on Saturday, in spite of a very strong and gusty wind.

Flying was possible only on Monday, Saturday and Sunday, owing to gales on the remaining days of the week.

On Friday, Mr. Ellis with Mr. Heppell as passenger brought up a new Renault Avro from Witney to Sherburn, completing the journey to Crumlington on Saturday. Unfortunately the Renault developed trouble during the last mile of the journey and it could not be put on service on Sunday.

G-EHLX (Moth), the only machine on service for training at present, had engine trouble on Sunday morning, a broken piston causing Mr. Parkinson to execute a very difficult forced landing while flying with Mr. Kennedy, who was under instruction at the time. The engine cut out just after leaving the aerodrome and it was only through Mr. Parkinson's skill that the machine was undamaged. The Moth and the Avro should be both on service for the holiday.

The Aerodrome will be closed down on Christmas and New Year's Day only. Flying will be as usual on other days.

The Yorkshire Aeroplane Club

Report for week ending December 17.—The total time flown this week was only 2 hrs. 35 mins., arrived at as follows:—Solo: 1 hr. 35 mins. dual, 40 mins.; test, 10 mins., and a joy ride given by Mr. Carter, 10 mins.

Messrs. Dawson, Mann, Watson and Wood flew solo, and Mr. Lax and Miss Woodhead received dual instruction.

On Saturday, the 11th, the First Aerial Commercial Traveller made his appearance at the Aerodrome when Messrs. R. Ogilvie and J. P. G. Phillips took us by storm in their Avro G-EHSS. They had set out from Birmingham a few days previously and had since been touring the country, calling at the principal towns en route for the purpose of taking orders for the Telfus "Super" Vacuum Cleaner, a sample of which was carried in the machine.

Mr. Phillips informed us that one of the other Clubs had been extravagant enough to purchase one for cleaning out the interior of their "Moths," but in spite of all the merits he claimed for this elaborate apparatus we refused to take the bait by following their example. Perhaps if the second arrangement came next time with a cheap line in "Super" rat traps we would consider giving him an order for some. It would certainly be a case of money well spent, some of the flour used in the making of the traps being a waste of our last peasant having been partially consumed by these pests during a recent week-end.

After our busy days' stay, the travellers left us for Manston in Kent, calling us to see on their way to complete some business.

Our next visitor was an S.E.G. (G-EBPD) piloted by Mr. Atcherley, who had flown over from York on the Monday. He had intended leaving again the same afternoon, but on account of the fog was obliged to wait until the next morning.

On Friday another Avro landed here, Mr. Baxter Ellis of the Newcastle Club, with Mr. Heppell, their Chairman, having come from Witney, Oxon. The machine, which was fitted with a Renault engine, had been bought from the Berkshire Aviation Company for the Club's use.

AIRISMS FROM THE Four Winds.

Helvellyn v. Aeroplane

The attempt to land on Mt. Helvellyn in an aeroplane, to which reference has already been made in *FLIGHT*, by the energetic chairman of the Lancashire Aeroplane Club, Mr. John Leeming, has, *pro tem.*, failed. Mr. Leeming set out from Woodford, flying a new Avro "Gosport," fitted with an Avro "Alpha" engine, on December 15, in company with Bert Hinkler, the Avro test pilot, in another machine carrying a press photographer. At the time of the start weather conditions were ideal, but they had not been in the air long before the weather changed completely. Clouds began to form in the sky, and ground fog made landmarks difficult to pick up. At Preston they ran into a severe hailstorm, and after a short stop at Lancaster crossed Morecambe Bay, striking heavy patches of sea fog, which could only be avoided by flying at 6,000 ft. Near Lake Windermere the two machines got separated in the clouds and mist, but eventually came together again, when conditions being so bad, it was decided to abandon the attempt and turn back. Steering mainly by compass, and encountering several hailstorms, they managed to return safely to Woodford in the gathering darkness, and landed there in a snowstorm. Mr. Leeming states that he will make another attempt.

German Air Liner's Forced Descent

ONE of the German Junkers three-engined air liners on the Amsterdam-Croydon route was forced to descend near Folkestone on December 15. One of the engines developed water trouble when over the Channel, and was therefore switched off. Shortly after, however, a second engine developed trouble, and so the pilot had to land. This was accomplished safely and the passengers proceeded to London by train.

"Moths' " Eastern Tour

CAPT. T. N. STACK and Mr. B. S. Leete, of the Lancashire Aero Club, have arrived safely at Baghdad, after a splendid flight in their D.H. "Moths" over some 860 miles of the Syrian desert, during which they encountered head winds, rain and sand storms. They left Cairo on December 14 and made their first halt at Amman, proceeding the next day to Ratbah Wells, thence on December 16 to Baghdad. They expect to stay at Baghdad for several days before starting on the difficult route along the Persian Gulf, and during this stay R.A.F. mechanics will overhaul the "Moths" whilst their owners will be entertained by their old R.A.F. Squadrons Nos. 45 and 70.

The French Madagascar Flights

LIEUT. BERNARD, who started from Madagascar on December 11 on the return flight to France, reached Mwanza, the southern extremity of Lake Victoria, Nyanza on December 15. Commandant Dagnaux, the third French pilot who is on his way out to Madagascar from France (he left Le Bourget in a Breguet XIX A.2-Renault on November 28), arrived at Fort Lamy (near Lake Chad) on December 16.

The Spanish African Flight

THE three Dornier-Wal flying boats of the Spanish Atlantic Squadron, under the command of Maj. R. Llorente, completed the third stage of the flight from Melilla to Fernando Po (W. Africa) on December 18, when they arrived at Port Etienne from Las Palmas. One of the machines had to make a temporary landing at Rio de Oro in order to carry out an adjustment.

The Swiss African Flight

LIEUT. MITTELHOLZER, who is engaged in an aerial scientific expedition to Africa, arrived in the Dornier "Mercury" seaplane at Cairo on December 17, and landed on the Nile.

A "Spare-Part" Non-Rigid Airship

THE U.S. naval air station at Lakehurst recently assembled a non-rigid airship—known as the J-3—for training and experimental purposes, utilising for its construction parts from various sources. The car and engines for the new airship were purchased from the Army Air Corps, the envelope from the Goodyear Tyre and Rubber Co., of Akron, and the control surfaces were made at the Naval Aircraft Factory, Philadelphia. The J-3 has two Wright I-type engines and a gas capacity of 220,000 cub. ft.; its cruising radius is about

1,000 miles. It made a successful test flight, and subsequent cross-country trips, under the command of Lieut. Clinton H. Havill, U.S.N., and now occupies a berth in the Lakehurst hangar alongside the "Los Angeles."

Mr. Phillips Crashes

MR. J. C. P. PHILLIPS, who, as recorded in a recent issue of *FLIGHT*, was carrying out an organised canvass in connection with a certain make of vacuum cleaner by way of the air, met with a mishap when flying from Leeds to Manchester. On approaching Manchester he encountered a strong gusty wind and was blown off his course towards Blackburn. It was whilst landing at Ripley—three attempts had to be made—that Mr. Phillips crashed. The machine was wrecked and Capt. Ogilvie, who was his passenger, was rendered unconscious, while Mr. Phillips received injuries to his face.

Big Air Concentration at U.S. Army-Navy Manoeuvres

WHAT is claimed to be the greatest concentration of aerial fighting forces ever held in America will take place on the occasion of the joint Army and Navy Manoeuvres at Narragansett Bay area, which start next May. Over 40 aircraft will accompany the Battle Fleet when it leaves its bases on the Pacific, added to which will be the squadrons from the Scouting Fleet and a formidable array of Army aircraft.

Air Police for Mexico

It is reported that the Mexican Director-General of Customs is presenting to the Secretary of the Interior plans for the acquisition of three aeroplanes equipped with machine guns and bombing apparatus for the purpose of establishing an air patrol to detect smuggling along the Mexico-U.S.A. border.

A Peruvian Air Service

PLANS are being prepared for a seaplane service on the Upper Amazon between Iquitos and Central Peru. This service, which will function under the general supervision of the Ministry of Marine, will be employed to map the Upper Amazon territory, as well as to carry passengers and mail. At present, the overland trip to and from Iquitos takes from 20—30 days, but by air it will occupy only 2 or 3 days.

A New Czecho-Slovak Air Transport Company

A NEW air transport company, with a capital of about £50,000, has been formed at Prague for the purpose of operating international air lines, the first of which will be between Toplitz and Trieste, via Prague, Brunn, Bratislava, and Zagreb.

Fog Hampers Cross-Channel Air Services

TWO weeks ago thick fog—stated to be the worst within memory—hung over Paris, with the result that it was practically impossible to continue the Continental air services to and from Le Bourget. No machines left Le Bourget on December 9 and 10, whilst one British and one French machine from Croydon, on December 9, had to land at Beauvais, the passengers—one being Sir Sefton Branner—having to proceed to Paris by rail. A third machine from Croydon got to Le Bourget, but was unable to land and had to return to Beauvais. These conditions, however, did not prevail at Croydon, otherwise there would have been an opportunity of testing the new fog-landing arrangements that have just been installed there. These, by the way, consist of a system of directional wireless signals in conjunction with a 20 ft. Neon tube, which indicates the best position and direction for landing. Neon lights, it may be pointed out, possess remarkable fog-penetrating qualities.

An Italian Parachute

AN Italian parachute, the "Salvator," which is used in the Royal Italian Air Force, was demonstrated by its inventor, Lieut. Freri, at Stag Lane Aerodrome, on December 4 before Air Ministry experts. Lieut. Freri ascended in a D.H. machine, and when at an altitude of 1,000 ft., made his jump. The parachute—which is carried in a neat pack on the back, and weighs only 14 lb.—opened smoothly and quickly, but owing to the wind being stronger than anticipated, some vigorous "swimming" actions on the part of Lieut. Freri were necessary in order to prevent the parachute from drifting into the hangars. However, a successful landing was accomplished.

THE ROYAL AIR FORCE

London Gazette, December 14, 1926

General Duties Branch

J. F. Griffiths is granted a short service comm. as Pilot Officer on probation, with effect from and with seny. Dec. 3; Pilot Officer on probation B. B. Dowling (Lieut. Col. A.R.O.) is continued in rank; Nov. 23 (since deceased) substituted for Gazette, Aug. 17.

The following are promoted to Reserve:—
Class A.—Flight Lieuts. M. Burbridge, A. E. Reynolds; Dec. 12. E. H. Attwood; Dec. 13. Flying Officers L. W. Beck, D. E. Hall, G. F. Mackay; Dec. 12. B. A. Davy; Dec. 13.

Class B.—Flight Lieut. C. A. Elliott; Dec. 12. Flying Officer H. A. Dinnage; Dec. 12.

Class C.—Flight Lieut. G. H. Allison; Dec. 13. Flying Officers C. H. F. Nesbit; Dec. 12. W. J. Brown; Dec. 13.

Flying Officer A. G. Pollard, V.C., M.C., D.C.M. (Capt. T. A. C. H. F.), resigns his short service comm.; Dec. 15. Flying Officer M. Kortright (Lieut., Suffolk Regt.), relinquishes his temp. comm. on return to Army duty; Nov. 20.

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Wing Commanders: E. H. Johnston, O.B.E., D.F.C., to R.A.F. Depot, Uxbridge, Supernumerary, pending posting on transfer to Home Establishment; 25.11.26. B. J. Ruskell, D.S.O., to No. 10 Group H.Q., Leamington, for Air Staff duties; 20.12.26. R. M. Hill, M.C., A.F.C., to H.Q., Egypt, for Technical Staff duties; 30.11.26. D. S. K. Crosbie, O.B.E., to R.A.F. Depot, Uxbridge, Supernumerary, pending posting on transfer to Home Establishment; 20.11.26.

Squadron Leaders: A. Conningham, D.S.O., M.C., D.F.C., A.F.C., to R.A.F. Cadet Coll., Cranwell; 20.12.26. T. Q. Studd, D.F.C., to No. 4 Flying Training Sch., Egypt; 29.11.26.

Flight Lieutenants: W. A. Harvey, to R.A.F. Station, Upavon; 14.12.26. W. H. Poole, A.F.C., M.M., to No. 1 Flying Training Sch., Netheravon; 20.12.26. P. M. McSwiny, to Armament and Gunnery Sch., Eastchurch; 10.1.27. W. R. Castling, M.B.E., to R.A.F. Depot, Uxbridge, on transfer to Home Establishment; 4.1.27. W. R. Castling, M.B.E., to Air Ministry, Directorate of Personal Services; 10.1.27. G. H. Cahill, to Marine Aircraft Experimental Establishment, Felixstowe; 4.1.27. S. T. Trencuan, M.B.E., to Marine Aircraft Experimental Establishment, Felixstowe; 8.12.26. P. Murgatroyd, to Helicopter Details, Egypt; 29.11.26.

Flying Officers: J. E. G. H. Thomas, to R.A.F. Base, Gosport; 9.12.26. N. T. Goodwin, to R.A.F. Depot, Uxbridge, on transfer to Home Establishment; 17.11.26. R. A. Cole, to Aden Flight; 24.11.26. F. G. Jennings, to Central Flying Sch., Wittering; 21.12.26.

Pilot Officers: B. B. Dowling, B. E. Moody, and W. J. Pickard, to No. 23 Sqn., Manston; 14.12.26. H. D. Gunton and R. H. Danks, to No. 13 Sqn., Andover; 14.12.26. A. Tindall and V. G. A. Hatcher, to No. 2 Sqn., Bircham Newton; 14.12.26. E. D. MacL. Hopkins, C. P. Ashton-Jinks, W. M. Phillips, and G. A. Underwood, to No. 4 Sqn., Farnborough; 14.12.26. F. Gower-Jones and C. J. Merritt, to No. 12 Sqn., Andover; 14.12.26. C. S. John, to No. 88 Sqn., Worthy Down; 14.12.26. H. C. Johnson, to No. 99 Sqn., Bircham Newton; 14.12.26. D. Mackenzie, to No. 207 Sqn., Eastchurch; 14.12.26. E. G. Seaton, to No. 16 Sqn., Old Sarum; 14.12.26. H. J. Walker, to No. 39 Sqn., Spittlegate; 14.12.26.

Stores Branch

Flight-Lieut. H. V. Robbins (Lieut., The Border Regt.) is granted a permanent comm. in this rank on completion of probationary service; Aug. 1, 1925.

Medical Branch

Flight-Lieut. (Hon. Spn.-Ldr.) W. R. Keith, M.D., A.M., relinquishes his temp. comm. on account of ill health; Dec. 10.

Chaplains Branch

The Rev. R. E. V. Hanson, O.H.E., M.A., is granted the relative rank of Air Commodore on appointment as Chaplain-in-Chief, R.A.F.; Oct. 25.

Reserve of Air Force Officers

The following Pilot Officers are promoted to rank of Flying Officer:—D. P. Jones; Oct. 27. R. A. Robertson; Nov. 8. F. M. Browne; Nov. 21. E. J. Dilnutt; Dec. 2.

The following Flying Officers relinquish their comm. on completion of service:—W. H. Herd; Oct. 23. G. A. Gower; Dec. 8. R. C. Rodger, M.C., D.C.M.; Dec. 9. C. G. Boothroyd, D.F.C.; Dec. 12. *Gazette* Nov. 30 concerning Flight-Lieut. A. Roberts is cancelled, and *Gazette* Nov. 23 stands.

Stores Branch

Flying Officers: L. N. Sargent, to No. 8 Armoured Car Co., Iraq; 1.11.26. R. Q. Bamber, to No. 14 Sqn., Palestine, instead of to H.Q., Transjordan and Palestine, as previously notified; 1.10.26. Flying Officer H. M. S. Dawes, to No. 24 Sqn., Kenley; 17.12.26.

Accountant Branch

Pilot Officers: R. E. Barrett, to No. 2 Sqn., Manston; 13.12.26. R. C. Clayton, to No. 14 Sqn., Palestine; 1.10.26. H. A. Murton, to Stores Depot, Iraq; 1.11.26.

Pilot Officers: C. Dook, to No. 8 Stores Depot, Milton; 16.12.26. W. S. Calder, R. S. Sweet, H. D. Connor, H. C. Bakes, J. E. Gregson, B. Chadwell, D. A. K. Viend, J. H. Glenn, and C. M. Johnson, to H.Q., Cranwell, on appointment to permanent comm. (on probation); 4.12.26.

Medical Branch

Flight Lieutenants: A. Dickson, M.B., to No. 20 Sqn., India; 26.10.26. **Flying Officers:** R. A. W. Kerr, M.B., and E. Thompson, to R.A.F. Hospital, Halton; 10.1.27.

Squadron Leaders: R. E. Bell, M.B., to No. 23 Group H.Q., Grantham; 6.1.27. C. St. C. Morton, M.D., D.T.M., and H. to R.A.F. Depot, Uxbridge; 4.1.27.

Flight Lieutenants:—G. H. H. Maxwell, M.B., to Elec. and Wireless Sch., Farnborough; 18.1.27. E. C. K. H. Foreman, to H.Q. Halton; 20.1.27. P. McCullagh, M.B., to R.A.F. Station, Tangmere; 17.1.27.

Chaplains Branch

Rev. A. McHardy, M.C., M.A., to No. 2 Flying Training Sch., Digby, on transfer to Home Establishment; 6.1.27.

NAVAL APPOINTMENTS

The following appointments were made by the Admiralty on December 15: **Lieutenants:** A. C. Sillar, R. F. C. Struben, S. B. de Courcy-Ireland, W. W. P. Shirley-Kollison, R. T. C. Woods, and J. D. Elliott, to *Furious* and as Acting Observer; H. D. Hillbeck, to *Furious*, add., and as Acting Observer; Nov. 22. J. V. Findlay, J. D. Dale, and K. W. Beard, to *Furious*, add., and as Acting Observer; Nov. 22. And to *Argus* and as Acting Observer (on comm.); H. Phillips, to *Royal Oak*; Jan. 1, and H. St. A. Malleon, to *Marlborough*; Jan. 3.

IN PARLIAMENT**Cooke-Schillowsky Turn Indicator**

COLONEL DAY, on December 15, asked the Secretary of State for Air the results of the tests of the gyroscope fog-gauge device; and whether any of these instruments have been ordered for use by the Royal Air Force. Sir Samuel Hoare: The Cooke-Schillowsky Turn Indicator, recently referred to in the Press, has undergone satisfactory tests, and arrangements are being made to order a number for extended service trials and for training purposes.

Flying Accidents

COLONEL DAY asked the number of officers and men of the Royal Air Force killed in flying accidents during each of the three years preceding the last convenient date, together with the number of fatal accidents in the French Air Force during the same period?

Sir S. Hoare: The figures as regards the Royal Air Force during the 12 months ending December 9 in each of the years named were as follows:—1925: 46 officers, 2 cadets, 28 airmen; 1925: 40 officers and 11 airmen; 1924: 48 officers, 1 cadet and 23 airmen. In addition the following naval, military or civilian personnel were involved in fatal accidents to Royal Air Force machines in the years 1925, 1924, 2. As regards the French Air Force, according to my information statistics of the number of fatal accidents are not made public by the French authorities. I may say, however, that in the course of a debate in the Chamber at the end of November, it was stated that there had been 13 fatal accidents in the French Military Air Service on a single type of machine in the space of two months. Whilst this, no doubt, represents an exceptional period such as all air services must experience from time to time, it is apparent from this fact and other confidential information in my possession that figures which have recently been cited in this House purporting to suggest that the accident rate in France has, during the past two or three years, been more favourable than in this country, are totally inaccurate.

Colonel Gretton asked the Prime Minister if an independent inquiry with a chairman not connected with the Air Force, will be set up immediately with full powers to investigate and report upon all the circumstances connected with flying accidents, both fatal and non-fatal, which have occurred recently in the Royal Air Force.

Mr. Baldwin: No, sir. As I informed the House last Thursday, I am

satisfied that every possible precaution is being taken and an inquiry of the kind proposed would, in my view, serve no useful purpose.

R.A.F. Machines

Mr. HAMMERLEY asked the Secretary of State for Air what proportion of the flying machines in use are pre-war design machines? Sir S. Hoare: Out of a total of 22 types of machine (excluding experimental machines) in use by the Royal Air Force to-day, there are only two which were designed prior to 1917—one a service and one a training type. The number of machines of these types at the present time represents, approximately, 36 per cent. of the total number of machines.

Italian Parachute

COLONEL DAY asked the result of the tests of the new type of self-propelled parachute, by Lieut. Freri, of the Italian Air Force, at Stag Lane Aerodrome?

Sir S. Hoare: The trial of the new Italian parachute at Stag Lane was a private demonstration, in the course of which a successful descent was made from 1,200 ft. by Lieut. Freri. Representatives of the Air Ministry attended by invitation, and the result of the test was considered to be sufficiently satisfactory to warrant further experiments.

Weather Forecasting

CAPTAIN GARRN-JONES asked the Secretary of State for Air whether he can report any progress in regard to the theories of weather on which the Norwegian meteorologist has been working in the Air Ministry during the past year?

Sir S. Hoare: Yes, sir; I am glad to say that the visit of the meteorologist in question, Dr. J. Bjerknes of Bergen, has had most satisfactory results. He came to London at the invitation of the Air Ministry during October, 1925, and remained until last March. During the time daily conferences took place between him and the members of the Meteorological Office, and at these meetings certain new principles introduced into weather forecasting by Norwegian meteorologists, as the result of recent research on the structure of the atmosphere, were demonstrated and discussed. The new ideas have proved of practical value, especially in forecasting the rapid weather changes which are of vital importance to aviation.

THE ROYAL AIR FORCE MEMORIAL FUND

The last meeting of the Executive Committee of the Fund for 1926 was held on December 15, at Idlesleigh House, Lord Hugh Cecil, P.C., M.P., in the chair.

The Honorary Treasurer announced that two very munificent donations had been made to the Committee by the Air Council—one in respect to the profits of the Royal Air Force Display at Hendon in July last, and the other donation being the Royal Air Force share of the Royal Tournament profits at Olympia in May and June last. Upon the proposition of Air Vice-Marshal Sir John Salmond a resolution of warm thanks to the Air Council for their generosity to the Fund was carried unanimously.

The resignations of Air Vice-Marshal Sir Geoffrey Salmond and Air Vice-Marshal T. I. Webb-Bowen of their membership of the Committee were submitted by those officers, on their proceeding, in the case of Sir Geoffrey Salmond, to take over the Command of the Royal Air Force in India, and in the case of Air Vice-Marshal T. I. Webb-Bowen, on that officer proceeding to take over command of the Royal Air Force in the Middle East at Cairo.

It was announced that acting on behalf of Air Chief Marshal Sir Hugh Trenchard (who was unable to be present), Air Vice-Marshal Sir Philip Game, Air Member for Personnel, Air Ministry, had laid a wreath, provided by the Fund, on behalf of the Royal Air Force at the foot of the R.A.F. War Memorial on the Victoria Embankment on Armistice Day.

The Committee were informed that a letter had been received from Sir Robert Lorimer, Architect of the Scottish National War Memorial, Edinburgh, to the effect that the Royal Air Force Bay of that Memorial, the funds for the erection of which were provided by this Committee, was almost completed, and that it is hoped the complete War Memorial would be ready for unveiling in the early summer of next year.

Next meeting of the Executive Committee will take place at the offices of the Fund, February 16, at 3 p.m.

The usual meeting of the Grants Sub-Committee of the above Fund was held at Idlesleigh House, on December 16. Mr. W. S. Field was in the chair, and the other members of the Committee present were:—Mr. L. M. K. Pratt-Barlow, O.B.E.; Squadron Leader Douglas Iron, O.B.E.

The Committee considered in all 14 cases, and made grants to the amount of £120 2s. 6d.

Next meeting, January 6, at 2.30 p.m.

At Buckingham Palace

H.M. THE KING received at Buckingham Palace, on Dec. 20, the Hon. Sir Samuel Hoare, Air Minister, and Air Vice-Marshal Sir John F. A. Higgins, whom His Majesty invested with the order of K.B.E.

Award of F.A.I. Medal to Sir Alan J. Cobham

At the Conference of the Federation Aeronautique Internationale, held in Paris on December 16-17, the F.A.I. Gold Medal for the year 1926 was awarded to Sir Alan J. Cobham for his flight from England to Australia and back. Thirteen countries were represented at the Conference, six of which put in claims for the F.A.I. Gold Medal in connection with performances carried out by their respective countrymen. Great Britain was represented by Lieut.-Col. M. O'Gorman and H. E. Perrin.

R.A.F. Accountant Officers

THE Air Ministry announces that the following candidates for permanent commissions in the Accountant branch of the Royal Air Force have been declared successful as a result of a competition held by the Civil Service Commissioners in September, 1926:

W. S. Calder, Kirkintilloch; F. E. Fuller, Worthing; R. S. Sweet, Hanwell; H. D. Connor, Ilford; H. C. Bakes, Bradford; J. E. Gregson, New Malden; B. Chadwell, Blackburn; D. A. K. Yiend, Forest Gate; J. H. Glenn, Manchester; and C. M. Johnson, Winchester.

A New Air Force Trophy

LORD ESHER has presented a handsome bronze trophy on an ebony pedestal to be awarded annually to the squadron of the Auxiliary Air Force judged to be the best all-round squadron of the year. The winning squadron for this year is No. 601, County of London Bombing Squadron, commanded by Lord Edward Grosvenor, and that squadron, therefore, becomes the first holder. The trophy will be presented at a later date during a parade of the squadron.

IMPORTS AND EXPORTS, 1925-1926

AEROPLANES, airships, balloons and parts thereof (not shown separately before 1910). For 1910 and 1911 figures see "FLIGHT" for January 25, 1912; for 1912 and 1913, see "FLIGHT" for January 17, 1914; for 1914, see "FLIGHT" for January 15, 1915; for 1915, see "FLIGHT" for January 13, 1916; for 1916, see "FLIGHT" for January 11, 1917; for 1917, see "FLIGHT" for January 24, 1918; for 1918, see "FLIGHT" for January 16, 1919; for 1919, see "FLIGHT" for January 22, 1920; for 1920, see "FLIGHT" for January 13, 1921; for 1921, see "FLIGHT" for January 19, 1922; for 1922 see "FLIGHT" for January 18, 1923; for 1923, see "FLIGHT" for January 17, 1924; for 1924, see "FLIGHT" for January 22, 1925; for 1925, see "FLIGHT" for January 21, 1926.

	Imports.		Exports.		Re-Exports.	
	1925.	1926.	1925.	1926.	1925.	1926.
Jan. . .	3,546	494	83,728	130,049	291	—
Feb. . .	985	2,039	85,639	40,416	20	6,341
Mar. . .	—	1,001	56,881	92,440	9,355	9,758
Apr. . .	321	536	78,041	160,832	6,732	5,051
May . .	520	342	74,844	118,539	15,278	—
June . .	190	24,866	71,005	—	—	150
July . .	184	13,033	159,262	39,047	870	—
Aug. . .	469	21,401	113,054	146,129	—	1,035
Sept. .	1,224	3,172	111,237	55,674	213	—
Oct. . .	460	528	114,563	41,968	855	30
Nov. . .	837	1,069	84,163	118,648	2,314	250
	8,776	71,531	1,032,421	1,010,253	36,595	22,615

PUBLICATIONS RECEIVED

The Approach Towards a System of Imperial Air Communications: Memorandum by the Secretary of State for Air, laid before the Imperial Conference, 1926. H.M. Stationery Office, Kingsway, London, W.C.2. Price 5s. net.

Whitaker's Almanack, 1927: Abridged Edition. J. Whitaker and Sons, Limited, 12, Warwick-lane, London, E.C.4. Price 1s. 6d. net.

Whitaker, 1927. Complete Edition. J. Whitaker and Sons, Limited, 12, Warwick-lane, London, E.C.4. Price 6s. net.

Notes on Distance Thermometers. By Negretti and Zambra, 38, Holborn Viaduct, London, E.C.1.

Monthly Journal of the British Empire Chamber of Commerce in the United States of America. No. 11, Vol. 6, November, 1926. 25, Broadway, New York, U.S.A.

AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: Cyl. = cylinder; I.C. = internal combustion; m. = motor.

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

APPLIED FOR IN 1928

Published December 23, 1926
30,910 SOC. ANON. POUR L'EXPLOITATION DES BREVETS KUNER. Apparatus for safely sending mail-bags, etc., from aircraft to the ground. (255,806.)

APPLIED FOR IN 1926

Published December 23, 1926
9,213 S. E. SAUNDERS. Hulls of boats. (261,979.)

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