FLIGHT

The AIRCRAFT ENGINEER & 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

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

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Jan. 9	Mr. R. J. Parrott, Hons. Member : "The History and Evolution of the Avro Training Machine," before I.Ae.E.
Jan. 22	Major R. V. Southwell, A.F.R.Ae.S. (Superintendent, Aerodynamics Department, National Physical Laboratory) : "Some Recent Work of the Aerodynamics Department, N.P.L."
Jan. 23	Lieut. N. A. Olechnovitch, Member : "A Few Experiments with Shock-Absorbing Hulls for Flying Boats," before I.Ae.E.
Feb. 5	Air Commodore C. R. Samson, C.M.G., D.S.O., A.F.C., A.F.R.Ae.S. : "The Operation of Flying Boats in the Mediterranean," before R.Ae.S.
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Feb. 20	Mr. H. L. J. Hinkler : "Flying in Australia," before I.Ae.E.

EDITORIAL COMMENT.

A FEW weeks ago we referred to the "rotor ship" of a German inventor, Herr Anton Flettner, in which large vertical cylinders, rotated by auxiliary engines of relatively low power, were employed to increase the propelling power of the wind, the effectiveness of the rotors being considerably greater than that of ordinary sails. We suggested at the time that such rotors might conceivably be adapted for use on aircraft, as it appeared that the lift obtainable was far in excess of that produced by any known wing section. In a subsequent issue of FLIGHT we published a diagram showing a suggested method of testing a rotor on a light 'plane in order that the principle of the rotor might be explored at relatively low cost.

Rotating Cylinders

We have now received, from Mr. G. W. Lewis, Director of Aeronautical Research in the United States, copies of a report on tests carried out in the 5-ft. wind tunnel at the Langley Memorial Aeronautical Laboratory on rotating cylinders, and extracts from this report are published elsewhere in this issue of FLIGHT. As far as we are aware, this is the first time authentic results of such tests have been published, and as the subject is one of very considerable interest—not impossibly to aeronautics—we are naturally very gratified to be able to place before our readers the results contained in Technical Note No. 209 of the American National Advisory Committee for Aeronautics. Incidentally, the issue of this document is one further proof of the promptness and thoroughness of American methods, and is in striking contrast with the tardy manner of issuing British Reports and Memoranda. These American Technical Notes are not set in type, as are our reports and Memoranda, but are "Roneoed," the illustrations being either produced by the same method, or in some cases in the form of blueprints. While, it is true, limited copies only can be produced, in this manner, they can certainly be produced very quickly, and where the subject is one of immediate interest, or of an urgent nature, these Technical Notes are prepared, pending the issue of fuller reports. To show the rapidity with which information can be, and is, sent out in this manner, it may be mentioned that Technical Note No. 209 is dated December, 1924, and that thus the tests are of quite recent date, and yet here we have the results on this side of the Atlantic early in January. In this country we should probably have had to wait at least six months before information of this sort was issued. However, after this slight digression, let us return to the subject of rotating cylinders.

That the fundamental conception of an air stream acting on a rotating cylinder is not new will be realised when it is stated that as long ago as 1852 Professor Magnus carried out, at the request of the Royal Prussian Artillery Commission, some experiments with a rotating cylinder placed so as to be in a current of air produced by a hand-driven centrifugal blower. Magnus was not, of course, in a position to measure the differences in pressure on the high-velocity and low-velocity sides of the cylinder, but by means of vanes placed at the sides of the cylinder, close to its walls, he was able to demonstrate that such a pressure-difference did exist, or at any rate that the streamlines were altered by the rotation of the cylinder. The results served to explain certain phenomena in connection with rotating projectiles, but the effect was looked upon as detrimental, as, indeed, it was, for the particular purpose investigated, and it does not appear to be until quite recently that the idea of applying the Magnus effect has occurred to anyone, Herr Flettner having been the first to put it to practical use.

The American experiments on rotating cylinders, although possibly not the first to be carried out, the Göttingen laboratory having made certain tests for Herr Flettner, are the first of which the results have been published, at any rate in this particular form, and are, therefore, of special value. On examining the tables and graphs, one is at once struck by the fact that the drag coefficient of the rotating cylinder is smaller than that of the stationary cylinder between $r = 0 \cdot 5$ and $r = 2 \cdot 0$. When the value of r is increased beyond the value of 2, the drag again increases, and the maximum observed value of L/D (7·8) occurs at $r = 2 \cdot 5$, the drag coefficient then having very nearly the same value as that of a stationary cylinder. Thus, from the point of view of efficiency, it would appear that r should be kept at approximately 2·5, *i.e.* the ratio of circumferential to translational speed should have about this value. There is, however, no indication that the actual lift is limited in this way, the lift coefficient, or C_{cw}, as it is expressed in the report, increasing with increased value of r. If it be imagined that the rotating cylinder is employed to give lift, this means, of course, that even at very low airspeeds the cylinder can, if driven by the engine, support the machine. The cylinder (we are referring to the smooth cylinder) tested in the wind tunnel was $4\frac{1}{2}$ inches in diameter, and about 5 feet long, so that the area was 1·875 sq. ft. At 3,600 r.p.m. and a wind speed of 7 metres per second, the "lift" or cross-wind force, was 2·21 kgs., or 2·6 lbs./sq. ft. This at a horizontal speed of about $15\frac{1}{2}$ m.p.h., and there is no sign of a limiting value to the lift coefficient having been reached.

The experiments further indicate, in the case of the smooth cylinder, that less power is required to rotate the cylinder in a wind than in still air, so that evidently there is a reduction of friction. In this connection it is of interest to note that the power consumption is roughly proportional to the speed only. For instance, at 1,500 r.p.m. the power consumption was 23·8 Watts, and at 3,000 r.p.m. the consumption was 44·8 Watts only. It therefore appears as if the main obstacle to employing the rotating cylinder as an aircraft "wing" is likely to be a mechanical difficulty in running it at high speeds, and not one of power consumption.

Unfortunately the tables given in the report do not include power consumption at 7 m./s. and 3,600 r.p.m., otherwise it would have been possible to find how much power was, under those conditions, being expended in order to lift 4·86 lbs. It is, however, illuminating to examine the case for which figures *are* given. At 15 metres per second and 2,700 r.p.m., *i.e.* when the value of r was very low (1·08) and consequently the L/D ratio poor (2·22), the cross-wind force was 1·578 kgs. (3·47 lbs.); the power consumption was 37·2 Watts (0·05 h.p.). To this figure, however, should obviously be added that for the power necessary to drive the rotor through the air—in other words, to overcome the drag. As the drag force was 0·71 kg. (1·56 lb.), and the speed 15 m./s. (49·2 ft./sec.), the drag horse-power was $1 \cdot 56 \times 49 \cdot 2 : 550 = 0 \cdot 15$ h.p. Thus the total power expended in lifting 3·47 lbs. was 0·2 h.p., or a lift of 17·3 lbs./h.p. In view of the fact that this figure was attained under unfavourable conditions, there is every reason to expect that had it been possible to run the rotor at higher speeds the lift per horse-power would have far exceeded anything hitherto attained with ordinary aerofoil wings. At any rate it seems fairly clear that at low speeds at least quite exceptional lift per horse-power can be obtained with a rotor. At high speeds, of course, considerations connected with the strength and balance of the cylinder soon place a limit on the values of r attainable.

The tests of a compound strut were, it will be seen, somewhat disappointing, but in this connection we would refer briefly to experiments made in Holland, and of which we hope to give details next week. These experiments were made with the rotor built into the leading edge of an aerofoil, and it was found that although the section used was not a very efficient one, the addition of the rotor resulted in a very considerable increase in lift coefficient. There thus seems to be a possibility of combining the rotating cylinder and the ordinary aerofoil in such a way as to increase the lift. In the Dutch experiment the rotor was placed centrally in the leading edge, but it is at any rate conceivable that other positions may be found to give even better results.

Although it is always dangerous to prophesy in these matters, it appears, from what has been published, that the application of the rotating cylinder principle to helicopters, or direct-lift machines, in which the blades of the lifting screw are in the form of rotors, might be simpler of solution than the corresponding application to aeroplane wings.

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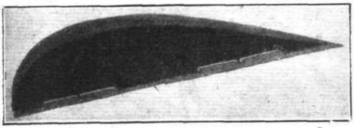
Replacing R.A.F. Personnel

THE naval ratings and marines who are to replace certain of the R.A.F. personnel hitherto employed in aircraft carriers are ordered to be drafted gradually to units of the Fleet Air arm in these vessels. The airmen thus rendered surplus will be disembarked at the nearest R.A.F. base at each stage, as arranged between the commanding officer of the carrier and the R.A.F. officer commanding the base concerned. The men for each flight or unit will be detailed by the commanding officer of the carrier from the total numbers borne on the ship's books, replacements in each flight or unit being made gradually as additional ratings are drafted to the ship.

GLIDER COMPETITIONS IN RUSSIA



A "Revolutionary" Design from Russia: The "Parabola" monoplane, constructed by Cheranovsky, which flew well at the Second Soviet Union Glider Competitions. It is seen in flight from below.

As far as aviation is concerned Soviet Russia appears determined to make every effort to be "in the running" with other nations of the world. Officially, much is being done to build up a sound aviation "industry"—or whatever the equivalent of "industry" may be in Soviet Russia. Not only is the technical side of aviation receiving every attention, but the practical side is also active. For instance, the construction and flying of gliders has for some time past received enthusiastic support from various parts of Russia, and two Glider Competitions have already been held, one in 1923 and the second last September, both taking place at Feodossia in the Crimea. The 1923 competition, it may be noted, was won by a Russian enthusiast, Leonid Youngmeister, of Moscow, who made a duration flight of 1 hour 2 mins. on his "Arzeuloff" monoplane glider.

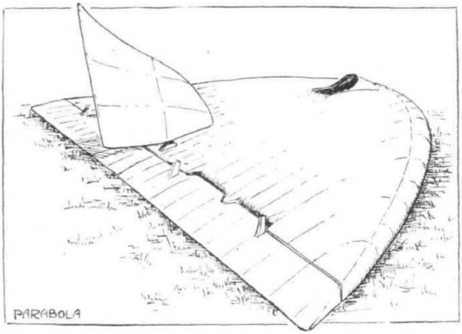
The second gliding competitions of the Soviet Union held last year opened on September 7 and continued until September 25. Altogether some 48 machines were entered, and 38 of these were flown—quite a good percentage. Most of the gliders were constructed by student and workmen clubs, organised by the "O.D.V.F."—"Society of Friends of the Air Fleet."

Feodossia, where the competitions took place, was very suitable for gliding, the hills being about 150 m. (nearly 500 ft.) above the valley. As regards the machines, perhaps the following brief notes on some of the principal types may be of interest.

The Artamonoff: This is a monoplane, resembling in general appearance the well-known German Martens glider, constructed by the students of the technical commercial school at Moscow to the design of a student named Artamonoff, of the Acadeny of Flying. It has a span of 13 m. (42 ft. 7 ins.) and weights, empty, 80 kgs. (176·4 lbs.). The wing loading is 7·5-8 kgs. per square inch (1·5-1·6 lbs. per sq. ft.).

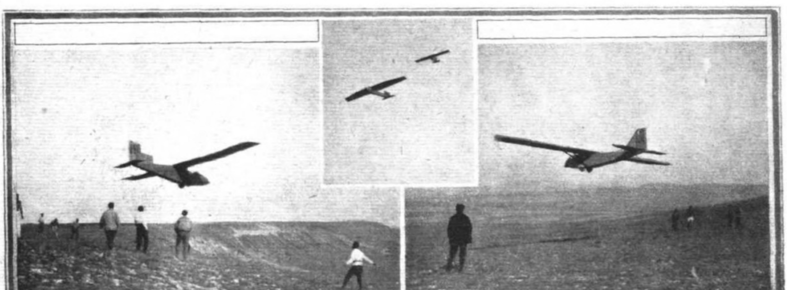
"Kpir": Another monoplane, built by Kieff students, having a thick wing mounted on the top of the fuselage and braced from the bottom of the latter by inverted V struts. It is 12·6 m. (41 ft. 4 ins.) span and has a wing loading of 10·5 kgs. per sq. m. (2·15 lbs. per sq. ft.). This machine put in a lot of flying—in all 7 hours 49 mins.

"Moskvitch": This glider, which put up the longest duration flight, is a "high wing" monoplane of the canti-



The "Parabola" Monoplane Glider: The general design of this "all-wing" glider will be gathered from the accompanying sketch, which is a threequarter rear view from above.

lever type. Its span is 13·5 m. (44 ft. 4 ins.) and its wing area is 20 sq. m. (215·2 sq. ft.). The weight empty comes out at 90 kgs. (198·4 lbs.), and the wing loading 8 kgs. per



GLIDING IN SOVIET RUSSIA: Three views taken at the Second Soviet Union Glider Competitions held at Feodossia (Crimea) last September. On the left is seen the "Kpir" monoplane, constructed by the Kieff Polytechnic Students' Club, starting off piloted by Jakovtchouk. On the right the "Red Flyer of Leningrad" starting. Inset will be seen Sernov on the "Artamonoff" monoplane (lower) and the "Kpir" (upper) in full flight.

sq. m. (1·6 lbs. per sq. ft.). The tail surfaces, both vertical and horizontal, are of large proportions.

"Parabola": This glider, constructed by Cheranovsky, is of somewhat unusual design, and it caused no small amount of wonder, not only on the part of the spectators, but the pilot as well, by accomplishing several good flights up to 1 min. 20 secs. and showing a flat gliding angle, and rather good controllability. It consists of a single thick-section wing of parabolic plan-form. The pilot sits in a cockpit located within the wing near the leading edge. It has a single wheel, enclosed in a streamline casing, mounted underneath the wing immediately below the pilot. The ailerons which, we believe, extend along the full length of the trailing edge (*i.e.*, the full span), serve, when moved together, as an evelator, and as lateral balancers when moved differentially. A "tail" skid is fitted beneath the vertical rudder. The "Parabola" has a span of 10 m. (32 ft. 10 ins.), a wing area of 20 sq. m. (215·2 sq. ft.) and a net weight of 58 kgs. (127·9 lbs.). The wing loading is 6·5 kgs. per sq. m. (13·3 lbs. per sq. ft.).

The first duration flights were made by two of last year's successful competitors—Arzeuloff, on his monoplane, and Youngmeister, on the "Moskvitch" monoplane. The former remained up for 1 hour 17 mins. and the latter 1 hour 20 mins. On September 22, Sernow, on the "Artamonoff" monoplane, made a flight of 4 hours 20 mins., Jakovtchouk, on the "Kpir" monoplane, running him very close with a duration of 4 hours 15 mins.; both flew at heights varying from 200-300 metres (650-980 ft.).

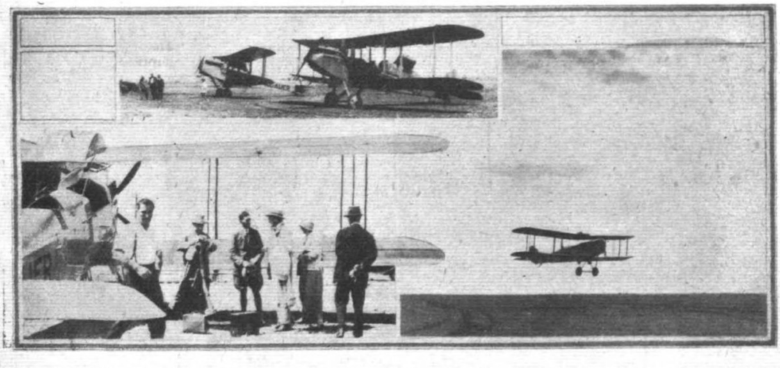
On the following day, September 23, Youngmeister, on the "Moskvitch," beat previous records by remaining in the air for 5 hours 15 mins. his greatest altitude being 312 metres (1,023 ft.) above the starting point. This was the best effort of the competitions.

Altogether, during the competitions, 578 flights were made, and the total duration of all the flights amounted to 27 hours 2 mins., which performance compares very favourably with that of this year's Rhon meeting, viz., 110 flights. There were, unfortunately, two accidents in which two of the competitors, Klementieff and Rudrit, were killed.

D.H.50 CARRIES DISTINGUISHED PASSENGERS

FROM time to time news reaches this country from Australia and elsewhere of the excellent work being done by de Havilland aircraft. Thus, it was learned recently that a D.H.37, with Rolls-Royce engine, secured first place in the Australian Aerial Derby, with a D.H.50 (Siddeley "Puma") second. Colonel Brinsmead's flight around Australia in a D.H.50 will also be recalled. We have now received three photographs taken on the occasion when, last year, Mr. S. M. Bruce, Federal Prime Minister of Australia, and Mrs. Bruce, with a party of friends, flew from Winton to Longreach and back. Mr. and Mrs. Bruce were passengers in a D.H.50, the rest of the party being distributed between the D.H.50 and a D.H.9. At the conclusion of the flight Mr. Bruce sent a telegram to the Editor of "Aircraft," our Australian contemporary, from which it is evident not only that the Federal Prime Minister enjoyed the flight, but that he has very strong views on the subject of the importance of aviation to Australia. Following is the text of the telegram:

"The flight I have just completed from Winton to Longreach has further impressed upon me the great importance of aerial transport to a country such as Australia with its enormous areas and great distances. I have realised for a long time now the undoubted importance of this method of transport to the people of Australia, and particularly to those who are pioneering our great outlying spaces. By this means they are brought in close contact with civilisation, and will be enabled to overcome those serious disadvantages from which they have suffered in the past. With the removal of those disadvantages a stimulus will be given to settlement in the outback, and one of the causes which have militated against our more rapid development will disappear for all time. Such an amazing advance has been made in this arm of transport during the last few years that it is difficult to visualise what may be accomplished in the future, but I am confident that air transport will become an increasingly important factor in our national life with each succeeding year. In the past progress in aviation has been retarded to a great extent by the apprehension of danger with regard to it, but such advances have been recently made that today to travel in a modern aeroplane is practically as safe as travelling in a motor-car. I wish every success to aerial transport in Australia, and hope that its rapid extension is now assured. The good progress which has been made up to the present, and the excellence and the efficiency of the service I have just utilised augur well for the future of aerial transport in Australia."



DE HAVILLANDS IN AUSTRALIA: Our photographs were taken on the occasion of a flight from Winton to Longreach and back, when the Federal Prime Minister, Mr. Bruce, Mrs. Bruce and a party were the passengers. Above are seen the two machines at Longreach aerodrome. On the left the Prime Minister and Mrs. Bruce are seen conversing with Mr. Fysh, while on the right the D.H.50 is seen taking off from Winton. Note the flat and apparently unlimited aerodrome.

TESTS OF ROTATING CYLINDERS*

By ELLIOTT G. REID

FOLLOWING on the publication in FLIGHT of November 27 and December 4 of the articles dealing with the Flettner "Rotor," we have received from Mr. G. W. Lewis, Director of Aeronautical Research in the United States, a copy of "American National Advisory Committee for Aeronautics Technical Note No. 209," which deals with tests on rotating cylinders. Extracts of this report are published below, lack of space preventing us from giving the report in full. The only omissions, however, are Figs. 2 and 3, which show the installation of the apparatus used for the tests, and Tables III and IV, giving data of cross-cylinder, and Tables V, VI and VII, giving data of compound strut. For all practical purposes the required data can be read off with sufficient accuracy from the graphs, Figs. 7-14 inclusive. We have, however, reproduced Figs. 15, 16 and 17, which show the flow around the smooth cylinder at an air speed of 5 m. per second and at rotational speeds of 600 r.p.m., 1,200 r.p.m. and 2,400 r.p.m.

Mr. Lewis, in his covering letter, states that further tests are being made in the direct application of the rotating-cylinder principle to actual aeroplane design.—ED.

Introduction

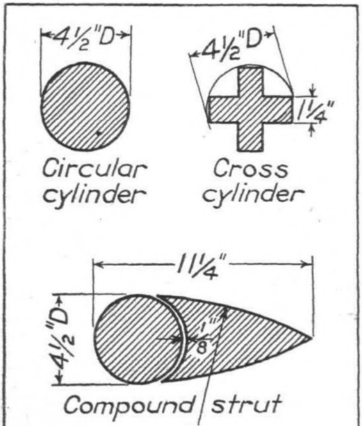
A COMBINATION of translation and circulation is the basic concept of the theory of airfoils proposed by Kutta, as well as those of Joukowski, von Mises, Lanchester and Prandtl (Reference 1). The tests described below constitute an attempt to measure the forces arising from controlled combination of these two types of flow.

The observed data consist of drag and cross-wind forces, air speed, revolutions per minute of the cylinder and electrical input to the motor driving the cylinder. Individual observations were made by bringing air speed and revolutions per minute to the desired values and measuring the other quantities simultaneously.

The programme of test was as follows:—The circular cylinder was tested at an airspeed of 15 m./s. (49·2 ft./sec.), and increasing rotative speeds until the power limit of the drive motor was reached. The air speed was then reduced to 10 m./s. (32·8 ft./sec.) and the process repeated. It became necessary to go to 7 (23) and, finally, 5 m./s. (16·4 ft./sec.) in order to reach a maximum "lift/drag" ratio.

The performance of the cross cylinder, at 15 m./s. (49·2 ft./sec.), was very erratic. A marked hysteresis loop made its appearance in the vector diagram of resultant air force, and, when excessive vibration was encountered at 3,000 r.p.m. and 10 m./s. (32·8 ft./sec.) air speed, the work on this model was discontinued.

* Technical Note No. 209 of American National Advisory Committee for Aeronautics.



TESTS OF ROTATING CYLINDERS: Fig. 1: Dimensions of cylinders and compound strut used in the experiments.

TABLE I.—*Circular Cylinder.*

R.P.M.	D (kg)	CWF (kg)	C_D	C_{CW}	V (m/s)	r
25	1·136	—·010	·925	—·008	15	·010
500	1·136	+·010	·925	—·008	15	·200
900	1·026	—·020	·835	—·016	15	·360
1,020	·942	—·022	·766	—·018	15	·408
1,115	·852	—·007	·693	—·006	15	·460
1,240	·777	+·003	·632	+·002	15	·496
1,300	·754	·018	·614	·014	15	·520
1,300	·747	·043	·608	·035	15	·520
1,400	·740	·150	·602	·122	15	·560
1,500	·744	·283	·605	·230	15	·600
1,500	·740	·305	·602	·248	15	·600
1,600	·744	·400	·605	·326	15	·640
1,600	·744	·453	·605	·369	15	·640
1,700	·759	·608	·618	·495	15	·680
1,700	·751	·625	·611	·508	15	·680
1,700	·750	·598	·610	·487	15	·680
1,780	·751	·660	·611	·537	15	·712
1,800	·754	·673	·614	·548	15	·720
1,900	·757	·798	·616	·650	15	·760
1,900	·751	·815	·611	·663	15	·760
1,900	·757	·758	·616	·617	15	·760
2,000	·759	·873	·618	·710	15	·800
2,080	·765	·868	·622	·706	15	·832
2,100	·764	·997	·622	·811	15	·840
2,200	·764	1·073	·622	·873	15	·880
2,220	·787	1·158	·640	·942	15	·888
2,300	·772	1·188	·628	·967	15	·920
2,420	·754	1·278	·614	1·040	15	·968
2,500	·742	1·338	·604	1·089	15	1·000
2,600	·729	1·468	·593	1·194	15	1·040
2,620	·724	1·303	·589	1·060	15	1·048
2,700	·710	1·578	·578	1·284	15	1·080
1,300	·353	+·308	·646	·563	10	·780
1,500	·351	·418	·642	·764	10	·900
1,700	·338	·636	·618	1·163	10	1·020
1,900	·331	·758	·605	1·386	10	1·140
2,100	·322	·978	·589	1·789	10	1·260
2,300	·324	1·083	·593	1·980	10	1·380
2,500	·332	1·293	·607	2·362	10	1·500
2,700	·334	1·403	·611	2·564	10	1·620
2,900	·346	1·443	·633	2·639	10	1·740
1,800	·085	·605	·622	4·43	5	2·16
2,100	·105	·820	·769	6·00	5	2·51
2,400	·130	·995	·952	7·28	5	2·87
2,700	·151	1·110	1·105	8·13	5	3·23
3,000	·168	1·170	1·230	8·57	5	3·59
3,300	·188	1·250	1·376	9·15	5	3·95
3,600	·196	1·295	1·434	9·48	5	4·32
1,800	·167	·660	·624	2·46	7	1·54
2,100	·173	·860	·646	3·21	7	1·79
2,400	·181	1·140	·676	4·26	7	2·05
2,700	·197	1·365	·736	5·10	7	2·30
3,000	·222	1·700	·829	6·35	7	2·56
3,300	·256	1·945	·956	7·26	7	2·82
3,600	·287	2·210	1·070	8·25	7	3·07

S = 0·1741 m^2; q = 1·535 kg./m^2 (5 m/s.), 3·01 kg/m^2 (7 m/s.), 6·15 kg./m^2 (10 m/s.) and 13·81 kg./m^2 (15 m/s.).

TABLE II.—*Power Consumption of Circular Cylinder.*

Airspeed = 0.		Airspeed = 15 m/s.	
R.P.M.	Watts.	R.P.M.	Watts.
290	6·0	1,020	14·5
580	10·0	1,115	15·5
885	11·5	1,240	17·3
1,190	19·0	—	—
1,400	24·0	1,500	23·8
1,775	27·0	1,700	26·0
2,260	40·1	1,900	28·4
2,810	51·8	2,080	31·8
3,140	68·0	2,220	28·6
3,475	89·2	2,300	30·2
—	—	2,420	31·9
—	—	2,500	33·6
—	—	2,600	34·8
—	—	2,700	37·2
—	—	3,000	44·8

The first test on the compound strut, in which the gap between cylinder and fairing was $\frac{1}{8}$ in., showed this combination to be inferior to the circular cylinder when considered as an airfoil. A large scale effect was also found, coefficients for a fixed ratio of peripheral speed to air speed varying with the air speed. Tests with a $\frac{3}{8}$-in. gap were made next, but such a large increase of drag was found that no further combinations were tried.

After the completion of the force measurements, apparatus was installed to allow the introduction of smoke filaments into the air stream just in front of the cylinder, and a series of photographs were taken at various combinations of rotative and air speeds.

Reduction of Data—Presentation of Results

The air forces acting on the cylinder were assumed to be symmetrical about a horizontal plane through the tunnel axis, *i.e.*, the resultant air force was assumed to act in this plane. The dimensions of the set-up were such that a factor 1·965 had to be applied to the measured forces to give true forces acting on the cylinder. Coefficients were derived on a basis of projected area of the cylinder as follows :—

$$C_D = \frac{D}{qS}$$

$$C_{CW} = \frac{CWF}{qS}$$

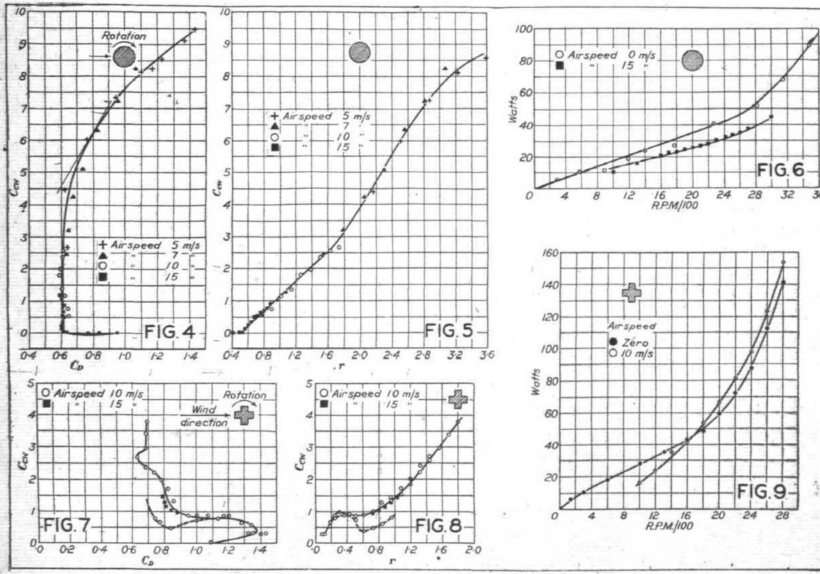
$$r = \frac{V^1}{V},$$

wherein q is the dynamic pressure, S the projected area of the cylinder, D the drag force, CWF the cross wind, or " lift " force, V^1 the peripheral speed and V the air speed.

The data from tests on the circular cylinder are given in Tables I and II. Fig. 4 is a vector diagram which shows the variations of resultant as well as component forces throughout the range explored, Fig. 5 indicates the variation of cross-wind force with the ratio of peripheral to translational speed, and Fig. 6 shows the power necessary for rotation at zero and 15 m./s. (49·2 ft./sec.) air speed. Corresponding data on the cross cylinder are given in Tables III and IV [not published—ED.]; Figs. 7, 8 and 9 are the vector diagram, plot of cross-wind force against speed ratio, and power consumption against revolutions per minute respectively. The data taken on the compound strut with $\frac{1}{8}$ in. gap are given in Tables V and VI [not published]; Figs. 10, 11 and 12 are plotted therefrom. Results from the second strut combination are given in Table VII [not published] and plotted in Figs. 13 and 14.

Discussion

As no mathematical or physical analysis of the results has been attempted, as yet, this discussion will, necessarily,



TESTS OF ROTATING CYLINDERS : Fig. 4 is the vector diagram in which the lift and drag coefficients have double the value of the corresponding British " absolute " units. The maximum L/D occurs where the tangent touches the curve and reaches the value of 7·8. Fig. 5 shows lift coefficient on basis of *r*, which is ratio of rotational to translational speed. In Fig. 6 the curves show the power required to rotate the cylinder in still air and in a wind speed of 15 metres per second. It will be noted that less power is required to rotate the cylinder in moving than in still air. Figs. 7, 8 and 9 give corresponding curves for the cross-cylinder. It will be noted that these are somewhat erratic.

consist in calling the reader's attention to those points which seem of greatest importance. Let us consider, first, the tests of the circular cylinder.

The sudden appearance of the cross-wind force at $r = 0 \cdot 5$ seems so definitely established that mere coincidence is doubtful. Unfortunately, no study of the smoke flow was made in this range, so it is not known whether there is an abrupt change in the flow pattern to account for the phenomenon.

Beyond the ratio $r = 0 \cdot 5$, the cross-wind force increases steadily through quite a range in which there is practically no variation in drag, the value of the latter remaining constant between $r = 0 \cdot 5$ and $2 \cdot 0$. With values of r greater than $2 \cdot 0$ the drag increases and the maximum ratio of lift to drag ($7 \cdot 8$) is attained when $r = 2 \cdot 5$ approximately. It is noted that the drag coefficient at this point is almost identical with that of the stationary cylinder.

The high values of C_{CW} result, of course, from the very unsymmetric velocity distribution around the cylinder. The smoke photographs (Figs. 15, 16 and 17) clearly depict the gradual distortion of the symmetrical flow pattern with increasing rotation and the building up of a very high velocity region opposite one of considerably reduced velocity. Thus the rotation produces the same sort of velocity distribution as does camber in the case of an airfoil. The greater dissymmetry of this flow, as compared to that about an airfoil, is undoubtedly due to the fact that the proportionate increase and decrease of the free stream velocity is considerably augmented by the rotation.

In connection with the variation of drag, the following points are noted :—The smoke photographs show that at small values of r the groups of streamlines from the two sides of the cylinder do not diverge so markedly as is the case with the motionless cylinder. This accounts for the first reduction of drag. Through the range in which C_D remains constant, although C_{CW} increases rapidly, there must be balance of the changes in the flow pattern around the up-stream and down-stream halves of the cylinder. With further increase of rotative speed, it is seen (Fig. 17) that the streamlines from the high velocity side wrap farther and farther around the cylinder. It seems probable that as the stagnation point moves back along the low velocity side, it will finally meet and merge with the point at which the two groups of streamlines reunite. A completely different type of flow will naturally result, and the rapid increase of drag and reduction in the rate of increase of lift are its characteristics.

The fact that the power input is smaller with moving than stationary air indicates a reduction of air friction. This would be expected as the relative velocity of air to cylinder is reduced, around most of the circumference, by the rotation.

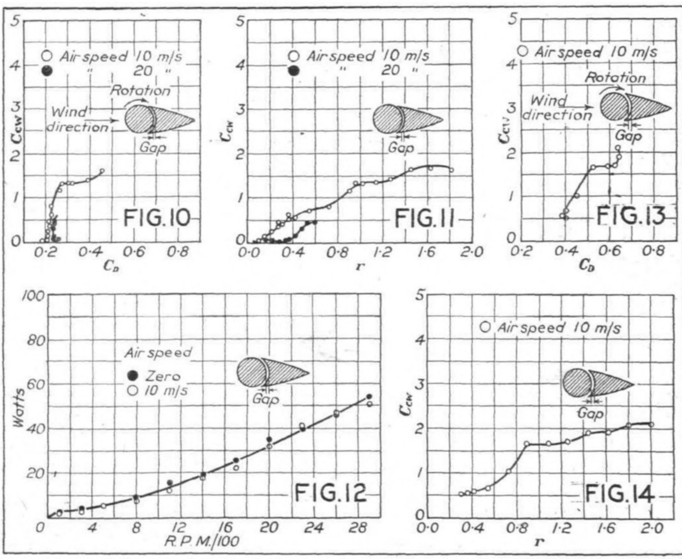
The characteristics of the cross cylinder, throughout the range covered, were very irregular. The relatively high power required to rotate this model prevented the reaching of high values of r. However, in the upper portion of the speed range, the data were fairly consistent, and as an L/D ratio of $5 \cdot 5$ was attained at $r = 1 \cdot 8$, it would not be at all surprising if the maximum L/D ratio for this cylinder were found to be larger than that for the circular one.

The hysteresis effect found at low values of r has received no explanation, but it may be mentioned that the lower values (dashed curve in Fig. 7) were observed when the rotative speed was increasing, air speed being held constant; as the rotative speed was reduced, the points on the upper curve were obtained.

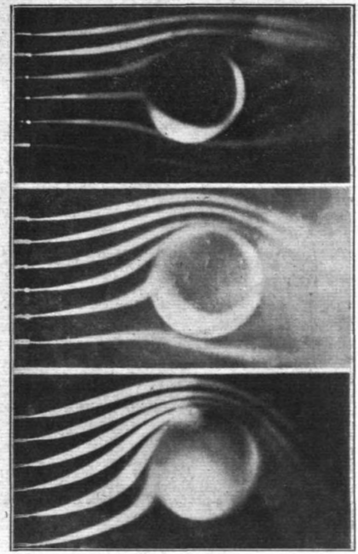
While the curve of C_{CW} *vs.* r, for the cross cylinder, is rather erratic, if the portion between $r = 1 \cdot 0$ and $1 \cdot 8$ were projected as far as the r axis, the intersection would occur at $r = 0 \cdot 5$. The slope of this section of the curve is identical with that of the first portion of the corresponding curve for the circular cylinder.

The power consumption of the cross cylinder is greater in moving than in still air at values of r greater than $1 \cdot 0$, but less at smaller ratios.

The results from the tests of the compound strut cover a



TESTS OF ROTATING CYLINDERS: Fig. 10 is the vector diagram of compound strut in which the front portion is formed by a rotating cylinder. In Fig. 11 lift coefficient is plotted on r, while in Fig. 12 is shown the power required to rotate the cylindrical portion of the strut. In Figs. 13 and 14 corresponding results are shown with the size of the gap between cylinder and fairing increased.



TESTS OF ROTATING CYLINDERS : The upper photograph, Fig. 15, shows the streamlines at 600 r.p.m. In the centre, Fig. 16, they are shown at 1,200 r.p.m. and in Fig. 17 at 2,400 r.p.m. The air-speed in all three cases was 5 metres per second.

very limited range. The slopes of the curves of C_{CW} *vs.* *r* are much lower than the preceding ones, even though the coefficients were computed on the basis of projected area of the cylinder rather than the transverse projection of the strut.

As regards L/D ratio, the smaller gap is best, and it is felt that if it had been possible to use still smaller clearance and practically eliminate any flow through the gap, much better results might have been realised. It is evident that with any appreciable gap, the circulation around the entire assembly is reduced by the flow between the cylinder and fairing.

It will be seen that lift appears at the smallest values of *r* observed.

Conclusions

The controlled combination of translational and circulatory velocities has shown that :—

1. The air forces obtainable by superposition of a circulatory flow upon the one arising from translation of a doubly symmetric body are several times greater than have ever been observed on any unsymmetric body.

2. Lift increases with circulation, although the law connecting the variables is not definitely established or its limits of application known.

3. The rate of increase of lift with rate of revolution seems practically independent of the shape of the rotating body, provided it is symmetrical about both axes in its plane of rotation, except at the very low speeds.

4. The drag of a blunt body in rectilinear air flow may be considerably reduced by the addition of a circulatory flow. (It seems probable that this results in a reduction in the width of the turbulent area behind the cylinder before any "downwash" or change in the direction of the discharged airstream appears. This is in accord with the Karman theory of resistance as given in Joukowski's "Aerodynamique," p. 203).

Bibliography

Reference 1.—Technical Report No. 116 : Applications of Modern Hydrodynamics to Aeronautics. By L. Prandtl. 1921.

Certain experiments have been carried out at the Dutch experimental laboratory on an aerofoil into the leading edge of which was fitted a cylinder. Tests were carried out with the gap between cylinder and wing closed and open, and with the cylinder stationary and rotating at various speeds. It was found that a very considerable increase in lift coefficient could be obtained in this way. Next week we hope to publish a brief *résumé* of the Dutch experiments.—ED.

New Year Honours

AMONG the names mentioned in the New Year Honours list the two following are of special interest in connection with aviation : *Knights Bachelor* : Alfred Henry Ashbolt, Esq. *Royal Victorian Order, G.C.V.O.* : The Rt. Hon. Weetman Dickinson, Viscount Cowdray. The former was lately Agent-General in London for Tasmania, and took a keen interest in the question of an airship service from England to the various Colonies. Viscount Cowdray will be remembered as being the first Air Minister in the world, it being in January, 1917, on the occasion of the reconstruction of the Air Board, that this office was created and filled by Viscount Cowdray.

The Home Defence Air Force

ON January 1, Britain's new Home Defence Air Force officially came into existence, and Air-Marshal Sir John Salmond took up the appointment of Chief of this new Force. There are at present some 18 defence squadrons in existence, and this number will be increased to 52 squadrons.

A Gordon Bennett Balloon Race this Year

A SECOND Gordon Bennett Cup for balloons has been definitely decided upon by the Belgian Aero Club, and will be competed for on June 7, starting at Brussels.

German Low-powered Aeroplane Competitions

DURING 1925 some 300,000 marks will be offered as prizes for low-powered aeroplane competitions in Germany. The competitions will be divided into three classes—for aeroplanes fitted with engines of 40 h.p., 80 h.p., and 120 h.p., respectively, while the prizes will be made up of the following : The Otto Lilienthal (105,000 marks) ; the "B.Z." (100,000 marks) ; the Boelcke (50,000 marks) ; and the Richthoven (45,000 marks). In the "B.Z." section machines will have to make five circular tours in Germany of from 120 to 750 miles, and extending over a period of ten days.

An American Transatlantic Airship Co.

WITH the object of operating transatlantic airship services between Boston and London, and Boston and San Francisco, a commercial airship company, with a capital of $50,000,000 (£10,000,000) is being formed in Boston. It is proposed to build twenty airships, each capable of carrying about 100 passengers and 50 tons of freight, and the passenger tariffs will be the same as the present steamship and rail fares.

Pulham Station to Re-open

PREPARATIONS are being made to reopen Pulham Airship Station, where the R.33 is expected to arrive next month. The R.33 will carry out tests here with the 100 ft. steel mooring mast.

The American World-Flight

THE U.S. Secretary of War has approved the plan of the War Department to advance Captain Lowell H. Smith, who led the American World-Flight, 1,000 files on the promotion list, and Lieutenants Wade, Nelson, and Arnold 500 files each. For Captain Smith the advancement is equal to 13 years' service, and for the others four years' service. The increases in seniority become effective after they have been approved by the President and Congress. Mr. Austin Chamberlain received the following message from the U.S. Ambassador in London :—Under instructions from my Government, I have the honour to express the deep appreciation of the American Government for the many courtesies and assistance extended by the British authorities to the American aviators in their recent flight around the world. The American Government fully realises that without the co-operation of the various foreign Governments over whose territory the flight passed this achievement would not have been possible, and it is, therefore, particularly happy to express its gratitude to His Majesty's Government for its cordial co-operation.

LIGHT 'PLANE CLUB DOINGS

WE shall be pleased to have reports regularly from Club Secretaries, or those directly connected with new Light 'Plane Clubs, so that by keeping our readers informed on this matter the whole movement may be helped forward to the benefit of the clubs and the popularising of "that Air feeling."

Light 'Plane Clubs are being, or have been, formed at:—

London.—Lieut.-Com. H. E. Perrin, Secretary, Royal Aero Club, 3, Clifford Street, W.1.

Birmingham.—Major Gilbert Dennison, Secretary, Midland Aero Club, Handsworth.

Glasgow.—J. Allison, Esq., Jnr., 219, St. Vincent Street.

Lancashire.—C. J. Wood, Esq., Secretary, Lancashire Aero Club, c/o A. V. Roe and Co., Newton Heath, Manchester.

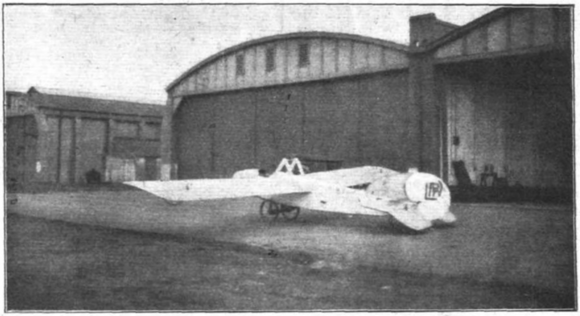
Newcastle-on-Tyne.—Alex. H. Bell, Esq., Hon. Sec., Newcastle-on-Tyne Light 'Plane Club, County Hotel.

Yorkshire.—Prof. G. Brodetsky, Yorkshire Aeroplane Club, Leeds University.

We have received the following reports on the progress being made:—

Lancashire Aero Club.—We show in the accompanying illustration a monoplane glider built by members of the Lancashire Aero Club and flown by them all last summer. This machine was in constant use from last May until September, and beyond minor repairs, such as one new axle, rubber cords holding same, a few new wires, no breakage occurred. The glider was slightly damaged in a crash at the beginning of September last, but was rebuilt by the end of that month. It is now stored until the club's headquarters at Woodford Aerodrome are ready. It will not be used for actual flying again, as several other gliders are to be built before the spring, but is to be fitted with a motor-cycle engine and used for "taxying." Members who have never flown before will be sent out on this machine, and so become accustomed to the feel of the "stick," the noise and wind from the engine, etc. It may be remembered that the same idea was used at the school at Hendon during the War, when the "Louse" was a special machine for this purpose.

The "L.P.W." monoplane glider, built last year by members of the Lancashire Aero Club, and which, fitted with a motor-cycle engine, will be used this year as a "taxi-instruction" 'bus.



Newcastle-on-Tyne Light 'Plane Club.—As previously reported, on Thursday, December 18 last, Major Scott addressed a meeting of the members and gave them a full explanation of the Light 'Plane Club Scheme. After this, the remainder of the meeting was devoted to routine business, chiefly dealing with reports from the various sub-committees appointed to (*a*) formulate rules, (*b*) arrange lectures, and (*c*) negotiate for use of flying ground. Dates for the first two lectures have been fixed as follows: January 8, "Timber, Its Uses and Properties in Aircraft Construction," by Mr. Alex. Peacock, Jun.; January 22, "Practical Flying Experiences," by Mr. W. Baxter Ellis. One of the members has kindly offered to commence a complete Probationary Flight Officer's Course as soon as a class can be formed.

BRITISH AIR MAILS IN 1924

THE Postmaster-General communicates the following particulars of air mail traffic during 1924:—There was a slight increase in the letter air mail to Paris (about 1,620 lbs. in 1924 as against 1,550 lbs. in 1923), but with the resumption of more normal conditions in the ordinary mail service to and from occupied Germany the letter air mail to and from Cologne showed a decline from about 9,700 lbs. in 1923 to about 5,700 lbs. in 1924. The London–Hanover–Berlin air mail during its period of operation from June 10 onwards carried about 1,350 lbs. of letters for Germany and places beyond. An afternoon air mail to Holland offered considerable advantage for midday postings from London, not only to Holland, but to Germany and beyond; the weight of mail carried during three months of operation was, however, only 84 lbs. Declines were shown in the air letter traffic to Holland (975 lbs. as against 1,470 lbs. in 1923) and to Belgium (190 lbs. as against 237 lbs.). In consequence of the competition of the weekly motor mail *via* Damascus, there was also a falling off in the letter air mail to and from Iraq (under 10,000 lbs. in 1924, as against about 18,900 lbs. in 1923). The air mail to Morocco and Algeria showed a 53 per cent. increase, from 1,137 lbs. to about 1,740 lbs. From May 26 facilities were offered for the substantial acceleration of letters posted throughout the day for Denmark, and of night-mail postings from London to Hamburg and district and to Sweden and East Norway, by the use of a Rotterdam–Hamburg–Copenhagen air service, combined with a supplementary morning air service from Hamburg to Copenhagen. The number of letters posted by this route was, however, small, and the total weight carried (for all the countries served) was only about 270 lbs. This route was closed for the winter early in October.

An inland air mail from Belfast to Liverpool was in operation during May and June, and in the course of about seven weeks attracted over 1,000 lbs. of mail. The air parcel traffic to Paris increased by over 14 per cent., to about 27,200 lbs., and that to Holland by nearly 20 per cent., to about 14,250 lbs.

There appeared, however, to be little demand for the facilities offered during the summer for air transmission of parcels to Denmark, Norway, and Sweden; the total quantity sent to these countries was only 850 lbs. To Germany, on the other hand, a total weight of about 4,100 lbs. was sent by air *via* Hamburg during the four months June to September, while in the succeeding three months the quantity sent at the same rate of postage *via* Cologne was about 5,800 lbs. During the same three months the German Post Office forwarded to this country by the Cologne–Croydon British Air service about 2,400 lbs. of air parcels posted by civilians. In addition, parcels to the total weight of 1,600 lbs. were posted for conveyance by this air route to and from the British Army of the Rhine during the year under review.

SOCIETY OF MODEL AERONAUTICAL ENGINEERS

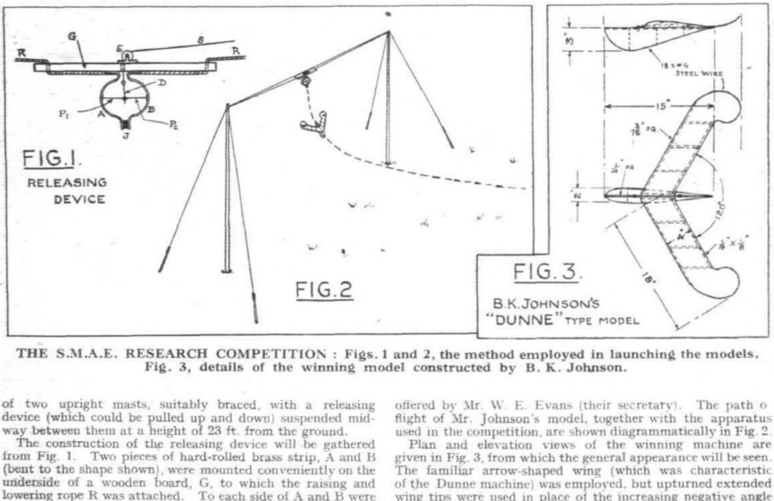
Report on Research Competition

IN the April 24 (1924) issue of FLIGHT particulars were given of a competition organised by the Research Committee of the S.M.A.E., in which it was stated that the committee was desirous of finding out, by the use of models, a means whereby the safety of flying by full-sized machines might be increased. The chief points aimed at were that "stalling" should be reduced to a minimum, and that in the event of a machine getting into a vertical dive after a stall, it should emerge from this dive in the shortest vertical distance possible. To this end the principal conditions of the competition were that the models were first to be tested to see that they were in gliding "trim," and then to be dropped vertically downwards from a height between 20 and 30 ft., the winning model to be the one which recovered flying equilibrium in the least vertical distance without stalling afterwards. This competition was therefore duly carried out on the Sudbury Flying Ground on October 18, and fortunately ideal weather prevailed at the time.

The necessary apparatus for dropping the models consisted of two upright masts, suitably braced, with a releasing device (which could be pulled up and down) suspended midway between them at a height of 23 ft. from the ground.

The construction of the releasing device will be gathered from Fig. 1. Two pieces of hard-rolled brass strip, A and B (bent to the shape shown), were mounted conveniently on the underside of a wooden board, G, to which the raising and lowering rope R was attached. To each side of A and B were soldered a piece of piano-wire, P_1 and P_2, with a loop made at each extremity, through which a steel wire pin, D, passes. To this pin was attached a piece of string, S, which passes over the pulley E mounted on the top of the board. The model is held in the jaws J, by first springing the brass strips apart, inserting the model, and then securing them together under pressure by putting the pin D in position. When the device has been pulled up level with the top of the masts, the string S is pulled and the model is released.

The following is a brief account of the events of the competition: Some twenty members of the S.M.A.E. were on the flying ground, and before the competition officially commenced the dropping apparatus was kept working at "full pressure" with competitors eagerly preparing their models for the "vertical dive." However, only six machines were eligible to compete, and all of these passed the test of gliding by hand-launching; but when it came to dropping the models vertically downwards only one recovered flying equilibrium without stalling afterwards; this was a modified "Dunne" type of model constructed by Mr. B. K. Johnson. This model got out of the vertical dive in approximately 10 ft. and then glided to earth steadily at a reasonably good angle. This performance was repeated again and again with exactly the same result each time, showing unquestionable consistency on each flight. The other competitors, Messrs. Tucker, Lansdown, Sherwen, Green and Hersom, unfortunately (in the judge's words), "killed their pilots several times over"! It must be mentioned, nevertheless, that Mr. Tucker's model made many praiseworthy attempts, but just failed to get out of the dive. Mr. B. K. Johnson was therefore awarded the Research Committee's prize, very generously offered by Mr. W. E. Evans (their secretary). The path o flight of Mr. Johnson's model, together with the apparatus used in the competition, are shown diagrammatically in Fig. 2.



THE S.M.A.E. RESEARCH COMPETITION: Figs. 1 and 2, the method employed in launching the models. Fig. 3, details of the winning model constructed by B. K. Johnson.

Plan and elevation views of the winning machine are given in Fig. 3, from which the general appearance will be seen. The familiar arrow-shaped wing (which was characteristic of the Dunne machine) was employed, but upturned extended wing tips were used in place of the increasing negative angle of incidence towards the tips as used on the Dunne. No tail or rudder was fitted to the model. The fuselage, triangular in section, was made from a central backbone of $\frac{1}{16}$-in. square birch, round which the steel wire framework was built and then covered with Jap silk. The drawing of the wing is self-explanatory. The weight of the model was 4 ozs. (as stipulated by the rules), and had a loading of 4 ozs. per sq. ft.

In conclusion, the performance put up by this model was so convincing that more experimental work is to be done to further exploit the possibilities of the Dunne machine, and to this end the Research Committee is engaged very actively in arranging further competitions on these lines.

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The "Los Angeles" (Z.R.3) to Make Another Big Flight

THE U.S. rigid airship "Los Angeles" (Z.R.3), it is reported, will make a flight next spring to Bermuda, Porto Rico and the Canal Zone, and probably to Europe or Honolulu.

Air Attacks in the Hedjaz

IN the reports on the trouble now prevailing in the Hedjaz between King Ali and Ibn Saud it is stated that the former's aeroplanes dropped what are described as harmless bombs between Jeddah and Mecca.

Czecho-Slovakia's D.H.50

THE D.H.50 biplane (Siddeley "Puma") purchased by the Czecho-Slovakian Government has been flown to Prague by Capt. C. D. Barnard, who will probably inaugurate a new service with this machine between Prague, Vienna, and Trieste.

THE ROYAL AIR FORCE

London Gazette, January 2, 1925

General Duties Branch

The following are granted permanent commns. in ranks stated (December 31, 1924):—Squadron Leader V. Greenwood, Flying Officer R. W. Hill. J. H. Parry is granted a short-service commn. as a Flying Officer, with effect from, and with seny. of, December 18, 1924. The following Pilot Officers are promoted to rank of Flying Officer:—C. F. Roupell (October 1, 1924); C. J. A. Delaney (November 15, 1924); F. Boston (December 14, 1924). Pilot Officer H. T. Messenger is confirmed in rank (December 6, 1924).

The following are restored to full pay from half-pay (January 1):—Air-Marshal Sir J. M. Salmond, K.C.B., C.M.G., C.V.O., D.S.O.; Flight-Lieut. E. R. C. Scholefield, A.F.C., D.C.M. Group Capt. P. B. J. de la Ferte, C.M.G., D.S.O., is placed on half-pay, scale B, from January 1 to 4, inclusive; Pilot Officer A. S. Hutton takes rank and precedence as if his appointment as Pilot Officer bore date August 13, 1923 (reduction to take effect from October 20, 1924); Pilot Officer G. L. Worthington is permitted to retain his rank on resigning his commn. (October 22, 1924); Flying Officer C. B. Godfrey is placed on the retired list, and is granted rank of Flight-Lieut. (December 31, 1924); the short-service commn. of Pilot Officer M. Russell is terminated on cessation of duty (December 31, 1924).

Stores Branch

The following are granted permanent commns. in ranks stated (December 31, 1924):—Flight-Lieut. W. A. O. Honey, Flying Officer C. H. Pownall.

Reserve of Air Force Officers

C. W. Sutcliffe is granted a commn. in Class A, General Duties Branch, as a Pilot Officer on probation (December 30, 1924):—Pilot Officer G. V. Yorke is promoted to rank of Flying Officer (December 30, 1924); Flying Officer H. Hickson relinquishes his commn. on account of ill-health and is permitted to retain his rank (December 31, 1924).

ROYAL AIR FORCE INTELLIGENCE

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

General Duties Branch

Group Captains: P. L. W. Herbert, C.M.G., C.B.E., to No. 1 Group H.Q. Kidbrooke, pending taken over command; 31.12.24. R. Gordon, C.B., C.M.G., D.S.O., to No. 3 Group H.Q., Spittlegate, to command; 2.1.25.

Wing Commanders: C. D. Breese, A.F.C., to No. 1 Sch. of Tech. Training (Boys), Halton, for tech. duties; 9.1.25. R. H. Verney, O.B.E., to No. 3 Group H.Q., for tech. staff duties; 16.1.25; F. L. Robinson, D.S.O., M.C., D.F.C., to R.A.F. Depot, whilst attending course at Staff College, Camberley; 21.1.25.

Squadron Leaders.—P. C. Maltby, D.S.O., A.F.C., to Station H.Q., S. Farnborough; 5.1.25; R. H. Peck, O.B.E., to R.A.F. Depot, on transfer to Home Estab.; 4.12.24.

Flight Lieutenants: E. S. Ades to R.A.F. Depot, on transfer to Home Estab.; 11.12.24; E. R. C. Scholefield, A.F.C., D.C.M., to Experimental Section, R.A.E., S. Farnborough; 1.1.25.

Flight Lieutenants: H. W. Woollett, D.S.O., M.C., to No. 111 Sqdn., Duxford; 15.1.25. T. Henderson, M.C., A.F.C., to R.A.F. Depot; 11.12.24. D. S. Don, to R.A.F. Depot on transfer to Home Estab.; 12.11.24.

Flying Officers: J. W. Caddy to R.A.F. Base, Gosport; 9.12.24. (Hon. F./Lt.) F. P. Smythies, to R.A.F. Base, Calshot; 10.12.24. W. Smith to R.A.F. Depot (Non-effective Pool) on transfer to Home Estab.; 7.12.24. H. A. J. De S. Barrow to R.A.F. Depot (Non-effective Pool), on transfer to Home Estab.; 11.12.24. P. J. Phelan to R.A.F. Depot (Non-effective Pool), on transfer to Home Estab.; 8.12.24. J. F. V. Sugars to R.A.F. Depot; 30.12.24. H. J. Brown to No. 1 Flying Training Sch., Netheravon; 2.1.25. W. G. Jones to Inland Area Aircraft Depot, Henlow; 10.1.25. G. C. Sclater to No. 1 Sch. of Tech. Training (Boys), Halton; 28.12.24.

Flying Officers: C. H. V. Hayman, to R.A.F. Depot (Non-effective Pool) on transfer to Home Estab.; 28.11.24. F. St. D. B. Lejeune, to Sch. of Army Co-operation (No. 16 Sqdn.), Old Sarum; 25.12.24. R. S. Walter, to No. 1 School of Tech. Training (Boys), Halton; 1.1.25. L. G. Nixon, to R.A.F. Depot on transfer to Home Estab.; 12.11.24. R. L. Ragg, to No. 7 Sqdn., Bircham Newton; 29.12.24. J. H. Parry, to R.A.F. Depot, on appointment to a short service commn.; 18.12.24.

Pilot Officers: R. W. E. Bryant to No. 29 Sqdn., Duxford; 30.12.24. P. P. Grey to No. 19 Sqdn., Duxford; 30.12.24. G. D. Venables to No. 4 Sqdn., S. Farnborough, instead of to No. 13 Sqdn. as previously notified; 30.12.24. S. E. Bulloch to remain at No. 2 Flying Training Sch., Digby, instead of to No. 4 Sqdn. as previously notified.

Pilot Officers: G. D. Venables, to No. 13 Sqdn., Andover; 30.12.24. W. C. Ward, to No. 99 Sqdn., Bircham Newton; 29.12.24.

Accountant Branch

Flight-Lieut. R. Byrne, M.C., to H.Q., Inland Area; 1.1.25.

Medical Branch

Flight Lieutenants: H. McW. Daniel, M.D., to No. 41 Sqdn., Northolt; 6.1.25. A. E. Henton to R.A.F. Depot; 9.1.25. (Hon. Sq. Ldr.) F. W. Squair, M.B., T.D., to Central Flying Sch., Upavon; 3.1.24.

Flying Oficers: W. A. Beck, M.B., D.P.H., and J. Parry-Evans, to R.A.F. Depot; 22.12.24.

NEW YEAR HONOURS

IT is announced in a Supplement to the *London Gazette* that H.M. the King has announced his intention of conferring the following honours:—

Order of the Bath

C.B. (Military Division).

Air Commodore Arthur Murray Longmore, D.S.O., Royal Air Force.

Awards

His Majesty the King has been graciously pleased to approve of the following awards to the undermentioned officers and airmen of the Royal Air Force:—

Air Force Cross

Flight-Lieut. Rollo Amyatt de Haga Haig; Flying Officer Eustace Jack Linton Hope.

Air Force Medal.

240216. Sergt. Jackson Sydney Brett.

Half-Yearly Promotion List

The Air Ministry announces that the undermentioned are promoted with effect from January 1, 1925:—

General Duties Branch

Air Commodores to be Air Vice-Marshals: Charles Laverock Lambe, C.B., C.M.G., D.S.O.; John Miles Steel, C.B., C.M.G., D.S.O.

Group Captains to be Air Commodores: Cyril Louis Norton Newall, C.M.G., C.B.E., A.M., A.D.C.; Robert Gordon, C.B., C.M.G., D.S.O.

Wing Commanders to be Group Captains: Christopher Lloyd Courtney, C.B.E., D.S.O.; Sacheverell Arthur Hebden, O.B.E.; Lionel Wilmot Brabazon Rees, V.C., O.B.E., M.C., A.F.C.

Squadron Leaders to be Wing Commanders: Edward Osmond, C.B.E.; Alfred Horace Steel Steele-Perkins, O.B.E.; William Sholto Douglas, M.C., D.F.C.; Paul Copeland Maltby, D.S.O., A.F.C.; Edward Lancelot Tomkinson, D.S.O., A.F.C.; Douglas Claude Strathern Evill, D.S.C., A.F.C.; Rowland Francis Storrs Morton; Trafford Leigh Leigh-Mallory, D.S.O.; Sir Norman Roderick Alexander David Leslie, Bt., C.B.E.

Flight Lieutenants to be Squadron Leaders: John Reginald Howett; Eric Miller Pollard; Hugh Edmund Fowler Wyncoll, O.B.E., M.C.; Claude Alward Ridley, D.S.O., M.C.; George Clark Pirie, M.C., D.F.C.; Charles Ernest Hilton James, M.C.; William Whidden Hart, M.B.E.; John Hilliard Simpson; Geoffrey Henry Hall, A.F.C.; Arthur Francis Brooke; John Cotesworth Slessor, M.C.; William Douglas Budgeon, O.B.E.; John Joseph Breen; Patrick Huskinson, M.C.; Alfred Price Maurice, D.F.C.; Lionel Guy Stanhope Payne, M.C., A.F.C.; Theodore Quintus Studd, D.F.C.; Claude William Mackey; John Lyne Vachell, M.C.; Henry Dawes, M.B.E.

Flying Officers to be Flight Lieutenants: William Vazie Simons; Geoffrey William Hemming, D.S.C.; Harold Alan Hamersley, M.C.; Richard Douglas Starley, M.C.; Harry Noel Cornforth Robinson, M.C., D.F.C.; Alfred Douglas Rogers, A.F.C.; Lambert Eardley-Wilmot; Frederick Harry Isaac, D.F.C.; John Douglas Stirling Denholm; John Mary Joseph Charles James Ivan Rock de Besombes; John Augustus Hollis; Norman Cuthbert Saward; Frederick Charles Boughton Greene; Harold Charles Calvey; Cyril Ferdinand Briggs; Colin Peter Brown, D.F.C.; Dudley d'Herbez Humphreys; Stanley Miles Park; Francis Herbert Donald Henwood, D.F.C.; Gerald Gladstone Walker, M.C.; Charles Francis Toogood; Basil Royston Carter, A.F.C.; William Neville Cumming; William John Umpleby; James Bernard Allen; Francis Harbroe Shales; Eustace Jack Linton Hope; William Vincent Hyde; Gerald Stanley Shaw; George Birkett; William Ernest Staton, M.C., D.F.C.; James Theodore Paine; Kenneth Lenton Boswell; Alan Patrick Ritchie, A.F.C.; William Noble Plenderleith; Archibald James Rankin; William Robert Bathurst Annesley; Alexander Paul Davidson.

Stores Branch

Flying Officers to be Flight Lieutenants: Charles Herbert Pownall; Thomas James Organ; Charles Herbert Masters; Patrick Francis Connaughton; Harry Joe Barnham.

Accountant Branch

Squadron Leader to be Wing Commander: Charles Geoffrey Murray, O.B.E.

Flying Officer to be Flight Lieutenant: Arthur Egbert Vautier, M.C.

Medical Branch

Squadron Leader to be Wing Commander: Thomas Stalney Rippon, O.B.E.

Squadron Leader to be Honorary Wing Commander: Edgar Huntley, M.B., B.S.

Flight Lieutenants to be Squadron Leaders: John Turnbull Thomson Forbes; James Kyle.

Flight Lieutenants to be Honorary Squadron Leaders: Williamson Rust Reith, M.D., A.M.; James William Hancock Steill, M.B.

Princess Mary's Royal Air Force Nursing Service

Acting Senior Sister to be Senior Sister: Miss Maggie Moddrel.

Sisters to be Senior Sisters: Miss Catherine Emma Jenkins; Miss Emily Mathieson Blair.

Sister to be Acting Senior Sister: Miss Evelyn Rose James.

Staff Nurse to be Acting Sister: Miss Kate Maud Beall.

"The History and Evolution of the Avro Training Machine"

ATTENTION is drawn to a meeting of the Institution of Aeronautical Engineers on Friday, the 9th inst., when Mr. R. J. Parrott, Honours Member, will lecture on the above subject. The meeting will be held at the Engineers' Club, Coventry Street, W. 1, at 6.30 p.m., and any who would like to attend may gain admission by signing the visitors' book on entering the hall. Several lantern slides will be shown in illustration of the lecture, and a discussion will follow in which any who wish to join are invited to do so.

Imperial Airways, Ltd., and November Traffic

DURING the month of November last the total number of miles flown on Imperial Airways, Ltd., was 47,280 (or 21,635 ton-miles). Since April 1—when Imperial Airways came into being—663,550 miles (or 334,436 ton-miles) have been flown.

NOTICES TO AIRMEN

Belgium: Use of Photographic Apparatus on Aircraft.

The following is the substance of regulations promulgated by the Belgian Government:—

(1) The carriage and use of cameras on aircraft are prohibted in the following area:—

The zone of Belgium enclosed by the northern and eastern frontiers and the line consisting of the Scheldt-Meuse canal from Antwerp to Herenthals, thence passing through Gheel, Meerhout and Quaedmechelen, thence by the branch canal as far as Hasselt, thence through Tongres and Liège, and thence along the Ourthe river.

(2) Outside the zone defined above, the use of cameras on aircraft is permitted only in the case of persons holdng a special licence issued by the Ministry of National Defence (Civil Aviation Department). The licence will be issued for a period of three months only in the case of non-Belgian nationals.

(3) The person in charge of the aircraft is responsible that those persons on board the aircraft who have cameras are in possession of this special licence, or that any cameras owned by passengers not holding a licence are stowed away in a place under his supervision.

(No. 127 of 1924.)

Changes in Visibility at Meteorological Stations on Aerial Routes

1. WITH effect from 0001 G.M.T. on January 1, 1925, the code for the transmission of special reports of changes in visibility at stations on aerial routes will be amended as follows:—

(*a*) The word "fog."

(*b*) The name of the station in clear.

(*c*) Four figures indicating the time (G.M.T.) at which the phenomenon was observed.

(*d*) The first group of the abbreviated code for hourly route reports.

2. *Air Pilot*.—Appendix, p. 38A, para. 68A (3), is amended accordingly.

(No. 128 of 1924.)

PERSONALS

Married

Captain H. W. DEACON, D.F.C., R.A., son of Mr. and Mrs. Allan Deacon, of 1, Campden House Chambers, Kensington, was married on December 30, 1924, at St. Mary Abbot's, Kensington, to JESSIE MOIRA, only daughter of the late W. G. GREIG and Mrs. Greig, of 17, Campden Hill Court, Kensington.

HARRY WILFRED HOBBS, R.A.F., was married on December 13, at St. Augustine's Church, Plymouth, by special licence, to HILDA MAY WILTON, of St. Cleer, Cornwall.

To be Married

AN engagement is announced between Flying-Officer Ian A. BERTRAM, R.A.F. (late R.N.), second son of the late Major WILLIAM BERTRAM, of Kersewell, and Nisbet, Lanarkshire, and DOROTHY CECIL, only daughter of Colonel and Mrs. R. H. ELIOTT LOCKHART, of Cleghorn, Lanark, N.B.

The engagement is announced between Flight-Lieut. IAN E. BRODIE (late R.N.), only son of Mr. and Mrs. W. A. Brodie, of La Cima, San Remo, and Heathside, Totland Bay, and MARY, youngest daughter of the late Mr. and Mrs. WILLIAM CORISTINE COATES, of Knockanally, Co. Kildare, and niece of Mrs. Brodie, J.P., of Fernhill, Wootton Bridge.

An engagement is announced between Flying Officer R. M. DAVY, R.A.F., son of the late Samuel H. M. Davy and Mrs. Batty, of Sheffield, and DOROTHY, daughter of the late A. M. STEWART and Mrs. STEWART, of the Hotel Russell, London.

The engagement is announced between Squadron-Leader A. W. F. GLENNY, M.C., D.F.C., R.A.F., only surviving son of J. S. Glenny, Esq., and Mrs. Glenny, of Glenville, Newry, Co. Down, Ireland, and AVICE NOËL, only daughter of the late GEORGE BOYES, formerly Chief Magistrate of Cape Town, and Mrs. Boyes, 39, Cholmley Gardens, West End Green, Hampstead.

Death

The death is announced on December 18 of NATHANIEL FRANCIS BURCH, late Lieutenant of the R.A.F. (Croix de Guerre), youngest son of the late Edward Robert Burch.

Another Practical Bristol "Jupiter" Test

IN the issue of FLIGHT for October 16 last we published a report on a test under actual flying conditions with a Bristol "Jupiter" engine. This engine was fitted in the "Bristol" freight carrier operated by Imperial Airways, Ltd., on their Continental air routes, and flown under most searching conditions for a period totalling 150 hours.

When the first engine was removed for inspection, a second "Jupiter" engine was immediately fitted in order that the aircraft might be maintained in service. Under similar conditions the second engine was run without incident for a period of 157 hours. During 90 hours of this period special observations were made as to petrol and oil consumptions, when the average petrol consumption averaged 23·9 galls. per hour and the oil consumption 7·6 pints. During one single day the freighter was operated continuously for 14 hours on the London-Cologne service, collecting and dropping freight at eight different air ports, and throughout the total period the running of the engine was perfect.

PUBLICATIONS RECEIVED

The Halton Magazine. Vol. I., No. 3. Christmas, 1924. The Halton Magazine, Halton Camp, Bucks. Price 6*d*.

Aeronautical Research Committee, Reports and Memoranda: No. 916 (*Ae.* 142).—Slot Control on an Avro with Standard and Balanced Ailerons. By F. B. Bradfield. May, 1924. Price 1*s*. net. *No.* 923 (*M.* 27).—Cold Work and Fatigue. By L. Aitchison. May, 1924. Price 3*d*. net. H.M. Stationery Office, Kingsway, London, W.C. 2.

Report on the Economic Situation of the Netherland East Indies, to July, 1924. By H. A. N. Bluett. H.M. Stationery Office, Kingsway, London, W.C. 2. Price 2*s*. 6*d*. net.

Department of Overseas Trade. Report on the Financial, Commercial and Economic Conditions of the Argentine Republic. September, 1924. H.M. Stationery Office, Kingsway, London, W.C. Price 2*s*. net.

Catalogue

G.E.C. Wiring Supplies, etc.—The General Electric Co. Ltd., Magnet House, Kingsway, London, W.C.2.

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.

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Published January 8, 1925

20,189. C. TURNER. Aircraft. (225,903.)
20,254. H. LONGTON. Indicators for indicating level of liquid in a tank. (225,904.)
22,750. E. KUNDIG. Aeroplanes. (225,927.)
23,017. A. E. SCHEIN. Aircraft landing-platforms for ships, etc. (204,696.)
28,075. H. G. HAWKER ENGINEERING CO., LTD., and F. SIGRIST. Wing construction. (226,004.)

APPLIED FOR IN 1924

Published January 8, 1925

17,550. V. CESAR and E. FRANCHIMONT. Rotary engines. (226,125.)
28,115. E. KUNDIG. Aeroplanes. (226,139.)

FLIGHT

The Aircraft Engineer and Airships

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