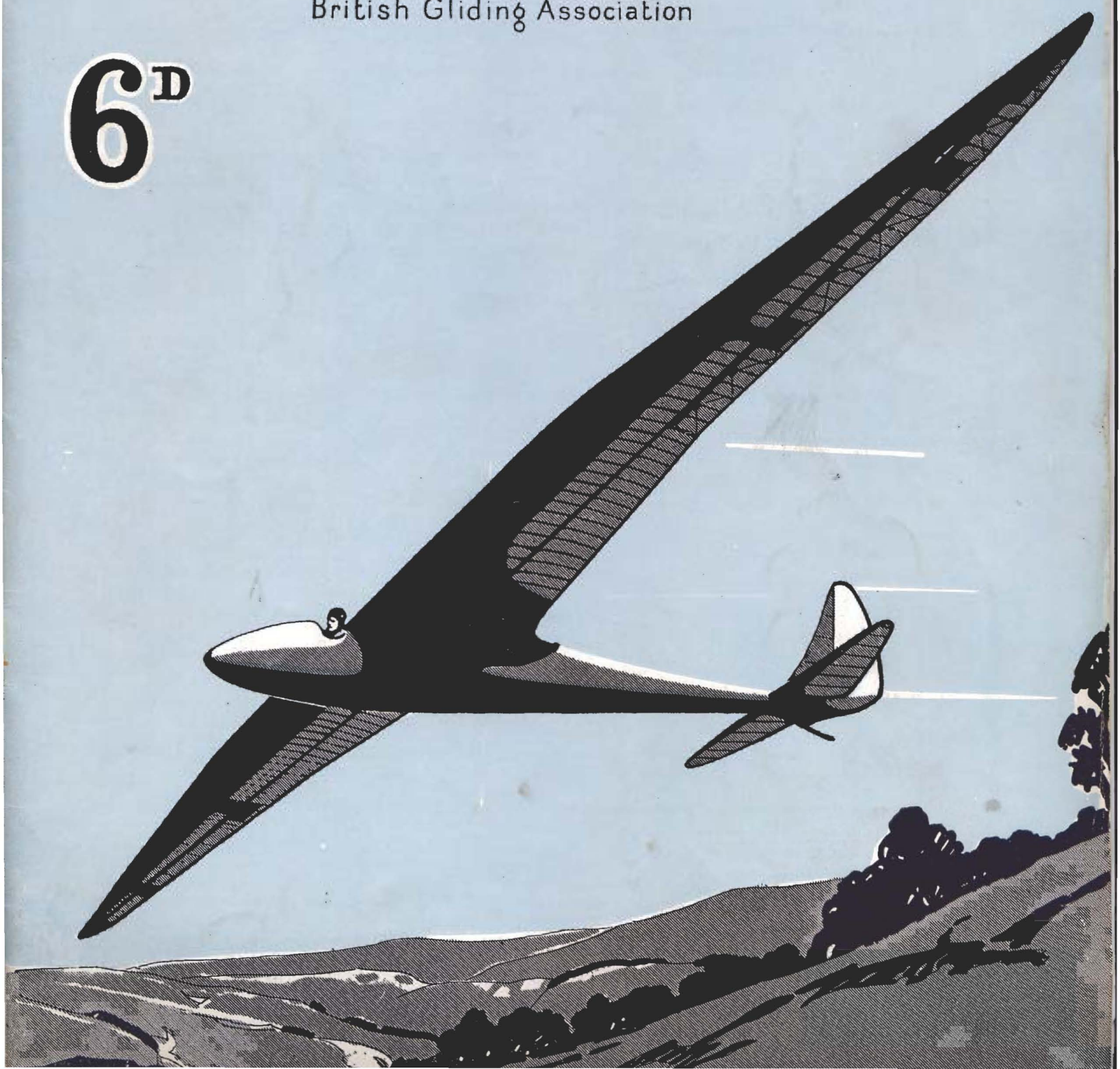
August 26th, 1932 Vol. 3 No. 15

THE SAILPLANE & GLIDER

Official Organ of the
British Gliding Association

6D



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THE SAILPLANE & GLIDER

(*Founded in September,* 1930, *by* THURSTAN JAMES)

The only Journal in the World devoted solely to Motorless Flight.

OFFICIAL ORGAN OF THE BRITISH GLIDING ASSOCIATION.

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A WORD TO THE CLUBS

IN a recent issue of THE SAILPLANE, reference was made to the financial position of the British Gliding Association, and it was pointed out that, unless immediate financial assistance were forthcoming, the position would be serious. Lord Wakefield's generous gift of £250, which headed THE SAILPLANE Fund, and the further no less generous donations which have since been announced, have eased the immediate situation, and will enable the Association, with careful financial supervision, to continue its activities for a further period.

It cannot be emphasized too strongly that the Association exists solely to further the cause of the Gliding Movement, in other words, to assist the various Gliding Clubs throughout the country. It has the welfare of the Clubs at heart, and the vast amount of honorary work which is put in by various people, at considerable self-sacrifice, is done to this end. Is this fact realised by the Clubs, and are they showing practical appreciation of the service which is being rendered them?

First, take THE SAILPLANE Fund. The immediate response was good, but it cannot be called magnificent. Very few people in the Gliding Movement have much money to spare, especially in these days of economic stress, but, surely, everybody can give something, however small. And most of us have friends or acquaintances whom we can interest in the Gliding Movement, and from whom we can obtain donations if we take the trouble to seek them. If each Club member were to make it his own job to obtain donations, he or she would be doing a really great work, and the number of subscriptions that would be received, however small they might be individually, would make a big total. Remember that the Fund is an ambitious one. Its object, as stated in an earlier issue, is not merely to enable the British Gliding Association to pay its way in the immediate future, but to furnish sufficient capital to enable the Association to provide that assistance for Clubs, in which they so sorely stand in need.

Next, take THE SAILPLANE itself. This paper is run by the Movement for the Movement. Apart from the cost of printing and block making, not a penny has to be found from the Association's coffers. Contributions are voluntary, illustrations are voluntary. And yet THE SAILPLANE is not paying its way. Why? One reason is that the Clubs do not give it sufficient support. If every Club member in the country were to become a subscriber, or were to place a regular order for THE SAILPLANE with a bookseller, and if, in addition, an effort were made to advertise the paper locally, the circulation would go up by leaps and bounds. Then, are there not Club members in different parts of the country who are in a position to assist THE SAILPLANE by obtaining advertisements for it? Remember that a liberal commission, which will go to Club funds, will be paid on all advertisements so obtained.

Then take the practical assistance which *every* Club can render to make the paper of greater interest and of wider appeal. Two pages are reserved in every issue for Club News. Yet, how many Clubs send in their news regularly or even occasionally? Also, there are the illustrations, which, we suggest, are always of interest. Let us have them freely, and do not be disgruntled if your special photograph does not appear. The more pictures that are sent in, the easier it is to make a selection that will appeal to the majority of readers. Send in your best efforts for THE SAILPLANE Competition. The reward is not great, but a year's subscription to THE SAILPLANE is not to be despised.

The object of this appeal is to get Club members to realise their responsibility in regard to the Movement. If the British Gliding Association were to find itself in such a position that it had to close down, the whole Movement would suffer. If, as is not outside the bounds of possibility, THE SAILPLANE has to cease publication, the Clubs will lose their journal, which, we like to think, not only contributes to the Movement in the country by keeping Clubs in touch with one another's activities and with

gliding abroad, but also keeps the world informed of the progress in British gliding. Therefore, we ask every Club to *act*, and to do everything in its power to assist.

A final word of advice. Do not refrain from acting because there is something about the Association or its activities of which you do not approve. If you have a real difficulty, by all means ventilate it. If you do not like any particular feature of THE SAILPLANE, write and say so. Every constructive suggestion will be welcomed and carefully considered. But, above all, be honest with yourself and with those with whom you have a quarrel. If only we make our common goal, to the exclusion of all other interests, the furtherance of the British Gliding Movement, our immediate difficulties will soon disappear, and the future of the Movement will be assured. Also there will not be a single individual in the Movement who will not benefit.

THE NATIONAL AVIATION DAY CAMPAIGN

Below we give details of the programme for Sir Alan Cobham's display during the latter part of August and early September.

The display includes daily demonstrations of auto-towed and aeroplane-towed gliding, including passenger flights.

Mr. G. V. Peck, a representative of the British Gliding Association, will supply any information desired with regard to the Gliding Movement.

Clubs are advised to note the date on which the Display will be given in their locality and to take full advantage of the campaign to stimulate local interest in their activities.

Aug.	24.	—Taunton: Musgrove Farm, Wellington Road.
,,	25.	—Weston-super-Mare: Woodspring Priory, Sand Bay.
,,	26.	—Evesham: Pershore Racecourse, Pershore.
,,	27.	—Abergavenny: Racecourse Farm, Llanfoist.
,,	28.	—Swansea: Vennaway Lane, near Fourwood Common, Penard.
,,	29.	—Haverfordwest: The Racecourse.
,,	30.	—Aberayron: Morfa Mawr.
,,	31.	—Shrewsbury: The Flying Ground, Harlescott.
Sept.	1.	—Bangor: Tynewydd Farm, Capel Curig Road.
,,	2.	—Rhyl: Aberkinsey Farm, Dyserth Road.
,,	3.	—Crewe: Merril's Bridge.
,,	4.	—Warrington: Chester Road Flying Ground.
,,	5.	—St. Anne's: Squire's Gate Aerodrome.
,,	6.	—Wigton: Low Houses Farm.
,,	7.	—Dumfries: Tinwald Downs.
,,	8.	—Peebles: Sherriff Muir, Easter Happrew.
,,	9.	—Kelso: Teviot Bridge.
,,	10-11.	—Edinburgh: Silverknowes, Davidsons Mains.

CAPTAIN NEEDHAM.

While on holiday at Lugano, Switzerland, recently, Captain Needham effected a plucky rescue. While watching swimmers in the lake, he saw one of them disappear. He at once dived in and, after considerable difficulty, seized the man and got him ashore. With assistance he applied artificial respiration, which proved successful. The rescued man proved to be another Englishman, named Norris.

Captain Needham, who is well known as the indefatigable Chairman of the Technical Committee of the British Gliding Association, already holds the bronze and silver medals of the Royal Life Saving Society.

REFLECTIONS ON THE PERSONNEL OF THE CLUB

(With special reference to these new members we are supposed to attract for the sake of furthering the activities of the Gliding Movement.)

When the club at first was formed,
Members to the meetings swarmed;
Now, the flame so brightly kindled,
Has considerably dwindled.
Some at first by work were scared,
Others found that being " aired "
Didn't suit them, and so they
Tried to find some other way
Of getting thrills, viz., catching bloaters,
And driving silly little motors.
Then, as soon as crashes came,
Most of them that did remain
Now displayed the whited feather,
Faded out, returnèd never,
Not for them the jading toils
Of mending crumpled aerofoils,
Not for them to heal the damage,
To the misaligned empennage.
But some there be that still delight
To ply the chisel in the night,
And to drive the wayward screw,
And splice the spars with powder glue;
Content that the results of toil
Will pay the price of midnight oil—
Contending that to woo the breeze
Is better than a life of ease,
Or sporting in the woodland glade,
In the cool and peaceful shade
With the gentle Amaryllis,
And/or the chaste and charming Phyllis.—
These ones then, are all that be,
A paltry ten, a dozen maybe,
These together are the hub,
And the kernel, of the Club.
(And other members are a lever
'Gainst the Official Receiver!)
Our Secretary often mumbles
'Mongst Committee-Meeting grumbles,
Re the scarcity of members,
Seeing on his lists, the embers
Of the fire that once did burn;
We, who've sweated long to earn
The little skill we now possess,
Why should *we* repair the mess
These careless pupils always make
Of good machines, who take
For granted that th' instructor's time
(When not engaged in writing rhyme),
Is always willingly bestowed
On those who wish to take the road
To airy fame, to heights unknown
Of aeronautical renown,
But never get beyond the stages
Of blundering through the local hedges?
No, No, *we* should be free
To fly the noble secondary,
To soar the spreading sailplane—
Dammit, shouldn't we?

H. C. W.

HANGARS For SAILPLANES and GLIDERS
(AS SUPPLIED TO THE LONDON GLIDING CLUB)
In complete sections for easy erection or removal.
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1932 B.G.A. OPEN GLIDING AND SOARING COMPETITIONS

Arrangements for what promises to be the most successful gliding meeting ever held in this country are now nearing completion. Last year the competition was held at Balsdean, but this year the northern clubs are the more favoured, for, as announced in the last issue of THE SAILPLANE, the meeting is to be held at the Furness Club's site at Askam, near Barrow. Nevertheless, it is hoped that there will be a good representation from the south.

The Competition opens officially on Saturday, August 27th, but competitors may arrive as early as the 24th. Arrangements will be made, during the few days preceding the Competition, for observing qualifying flights for certificates, and also for Clubs to carry out preliminary training flights.

The Rules and Regulations for the Competition were published in the last issue of THE SAILPLANE. Below we give the details of events, classes of machines and particulars of other arrangements which have been made for the convenience of competitors and visitors.

CLASSES.

Class 1.—Primary Machines ("A" Pilots).

(1) Aggregate number of Flights.
(2) Distance Contest.
(3) Duration Contest.
(4) Ladies' Contest.

Class 2.—Same as Class I ("B" Pilots).

Class 3.—Secondary Machines ("B" Pilots).

(1) Aggregate number of Flights.
(2) Distance Contest—with return.
(3) Distance Contest—without return.
(4) Duration Contest.
(5) Ladies' Contest.

Class 4.—Same as Class 3 ("C" Pilots).

Class 5.—Sailplanes ("C" Pilots).

(1) Aggregate number of Flights.
(2) Distance Contest—with return.
(3) Distance Contest—without return.
(4) Duration Contest.
(5) Altitude Contest.

Class 6.—Two-Seaters ("C" Pilots).

(1) Distance Contest—with return carrying passenger.
(2) Distance Contest—without return carrying passenger.
(3) Duration Contest—carrying passenger.

Note.—Only British entries accepted for, and British pilots allowed to compete in, the events limited to Classes 1, 2 and 6.

DETAILS OF EVENTS.

Aggregate Number of Flights.

Classes 1, 2, 3, 4, and 5.—The winner shall be the machine making the highest aggregate flying time.

There shall be no limit to the number of flights the machines may make.

Distance Contest.

Classes 1 and 2.—The winner shall be the machine which flies the longest distance in a straight line, in any one flight.

More than one attempt may be made.

Distance Contest—with Return.

Classes 3, 4, 5 and 6.—On each day of the contests a coloured flag will be placed at the spot around which competing machines must pass, and return to within 150 yards of the start-point.

Each machine will score one point daily.

The winner shall be the machine scoring the highest number of points.

More than one attempt may be made.

Distance Contest—without Return.

Classes 3, 4, 5 and 6.—The winner shall be the machine which is flown the farthest in any one flight.

Barographs and log sheets to be carried.

Where the machine lands out of sight of the official observer, the pilot must obtain the signatures of three witnesses.

The machine must not be moved except if it is in a dangerous position or by the request of a landowner, until the observer has checked in.

Duration Contest.

Classes 1, 2, 3, 4, 5 and 6.—The winner shall be the machine which remains air-borne the longest in any one flight.

More than one attempt may be made.

Altitude Contest.

Class 5.—The winner shall be the machine which reaches the greatest height registered by barograph.

More than one attempt may be made.

Ladies' Contest.

Classes 1, 2, 3 and 4.—The winner shall be in Classes 1 and 2, the machine which is flown the farthest in a straight line, in any one flight, and in Classes 3 and 4, the machine which remains air-borne the longest in any one flight.

In both classes more than one attempt may be made.

Accommodation.

The following details regarding accommodation near the site are given for the convenience of intending competitors and visitors:—

Hotels:

Springfield Hotel, Ulverstone: 9/6 per day; bed breakfast, light tea, free garage. 12/- per day full board.

Furness Abbey Hotel (4 miles): 10/6 per day; bed and breakfast. 4 to 5 guineas per week full board.

Victoria Park Hotel, Barrow (5½ miles): 9/- per day; bed and breakfast. 4½ guineas per week full board.

Imperial Hotel, Barrow (6 miles): 7/6 per day; bed and breakfast. 11/6 full board per day. 3½ guineas per week full board.

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Boarding Houses:

At the farm, on the site, there is available accommodation for five people in three bedrooms:—

Two in one double bed; two single beds in one room; one single bed in one room; with four meals per day; 30s. each person per week.

Camp:

A Camp will be formed at the site.

Camp charges as follow:—

Hire of tents (for one or more persons, supply own equipment), £1.

Four meals per day at farm, with use of hot and cold water, toilet, etc., per week, per person, £1 5s.

Hot and cold water, use of toilet, per week, per person, 2s. 6d.

Ground fee if providing own tent or canvas, 5s.

A map showing the location of the site and approaches is reproduced on the inside back cover.

HOW TO GET YOUR "SAILPLANE" FREE.

It has been decided that in order to encourage members of the Association and subscribers in obtaining new subscribers to THE SAILPLANE, free issue of the journal will be awarded as follows until further notice:—

To Members of the Association.

Free issue for six months to a member obtaining one new yearly subscriber.

Free issue for one year to a member obtaining two new yearly subscribers.

Free issue for one year and renewal of membership of the Association on obtaining four new yearly subscribers.

To Subscribers.

Free issue for one year on obtaining two new yearly subscribers.

RULES AND REGULATIONS.

1. The Competition shall be called "The 1932 B.G.A. Open Gliding and Soaring Competition (under the Rules and Regulations of the F.A.I. and the Royal Aero Club, and the Open Competition Rules of the British Gliding Association, Ltd.)."

2. The Competition is organised by the Contest Committee of the British Gliding Association, Ltd.

3. The Committee's office is at 19, Berkeley Street, London, W.1.

4. The Competition will take place from August 27th to September 4th, 1932, at Barrow-in-Furness.

5. There will be two major contests—Distance and Durations—in each class, and the types of gliders shall be specified as Primaries, Secondaries, Sailplanes, and Two-seaters.

6. Prizes shall take the form of trophies or prizes in kind, and there shall be certain money prizes.

7. Machines, not pilots, shall be entered for the Competition and the trophies, prizes in kind, or money prizes shall be handed to the entrant.

8. Not more than one prize may be won on any one flight.

9. Entries, which may be received from any club, individual or group, are to be made in writing, on the proper form issued by the Contest Committee, which shall state, *inter alia*, the name and address of the entrant and the pilot's registered number. Entry forms may be obtained from the Secretary, 19, Berkeley Street, W.1. Any entry which is not accompanied by the necessary fee, or which does not comply with the particulars required, or which is received too late, shall be null and void.

10. Entry fee shall be 10s. for all events in any one class, or 5s. per event in any one class.

11. Entries shall close on August 20th, 1932.

12. All foreign entries shall conform to the regulations as set out herein.

13. In all events, an entry may be refused or permission for an aircraft to start may be refused if the pilot, or the aircraft, does not satisfy the conditions laid down in THE SAILPLANE, pages 159-60, of August 12th.

THE NATIONAL SOARING CONTEST AT ELMIRA, N.Y.

OFFICIAL RESULTS.

In the last issue of THE SAILPLANE we published a short account of the National Soaring Contest at Elmira, N.Y., which was brought to a successful conclusion on July 24th. Martin Schempp, to whom we were indebted for the article, has now supplied the following details of the official results of the Contest:—

SAILPLANES.

Duration:—

J. O'Meara, Sailplane CHANUTE, 8 hr. 18 min.
W. Eaton, Sailplane HALLER-HAWK, 7 hr. 33 min.
M. Schempp, Sailplane SCHLOSS MAINBERG, 6 hr.

Distance:—

J. O'Meara, Sailplane CHANUTE, 66.6 miles.
M. Schempp, Sailplane SCHLOSS MAINBERG, 63.7 miles.
W. Eaton, Sailplane HALLER-HAWK, 14.5 miles.

Altitude:—

M. Schempp, Sailplane SCHLOSS MAINBERG, 5,370 feet.
J. OMeara, Sailplane CHANUTE, 4,790 feet.
W. Eaton, Sailplane HALLER-HAWK, 3,000 feet.

UTILITY GLIDERS.

Duration:—

S. V. Smith, FRANKLIN Glider, 8 hr. 8 min.
E. U. Barton, FRANKLIN Glider, 7 hr. 43 min.
Y. Sekella, FRANKLIN Glider, 5 hr. 30 min.

Distance:—

Robert Eaton, FRANKLIN Glider, 29.5 miles.
W. Gunter, FRANKLIN Glider, 8.0 miles.
S. Smith, FRANKLIN Glider, 6.9 miles.

Altitude:—

Robert Eaton, FRANKLIN Glider, 3,415 feet.
R. Franklin, FRANKLIN Glider, 3,190 feet.
A. Santilli, FRANKLIN Glider, 2,585 feet.

TWO-SEAT GLIDERS.

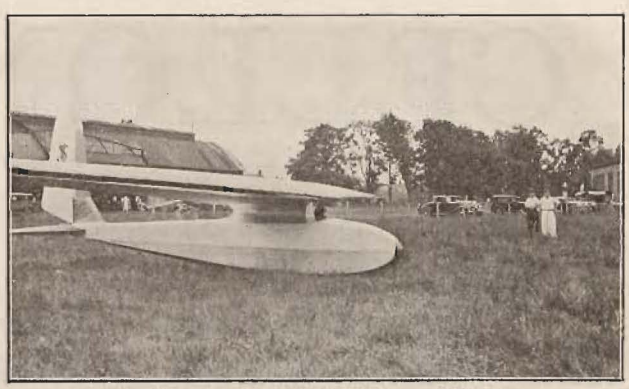
Duration:—

Pratt Jones, GROSS Two-Seater, 7 hr. 31 min.
J. Funk, GROSS Two-Seater, 7 hr. 3 min.
R. Barnaby, ALFARO Glider, 2 hr. 1 min.

Altitude:—

R. Barnaby, ALFARO Glider, 2,130 feet.
Pratt Jones, GROSS Two-Seater, 1,100 feet.
J. Funk, GROSS Two-Seater, 1,020 feet.

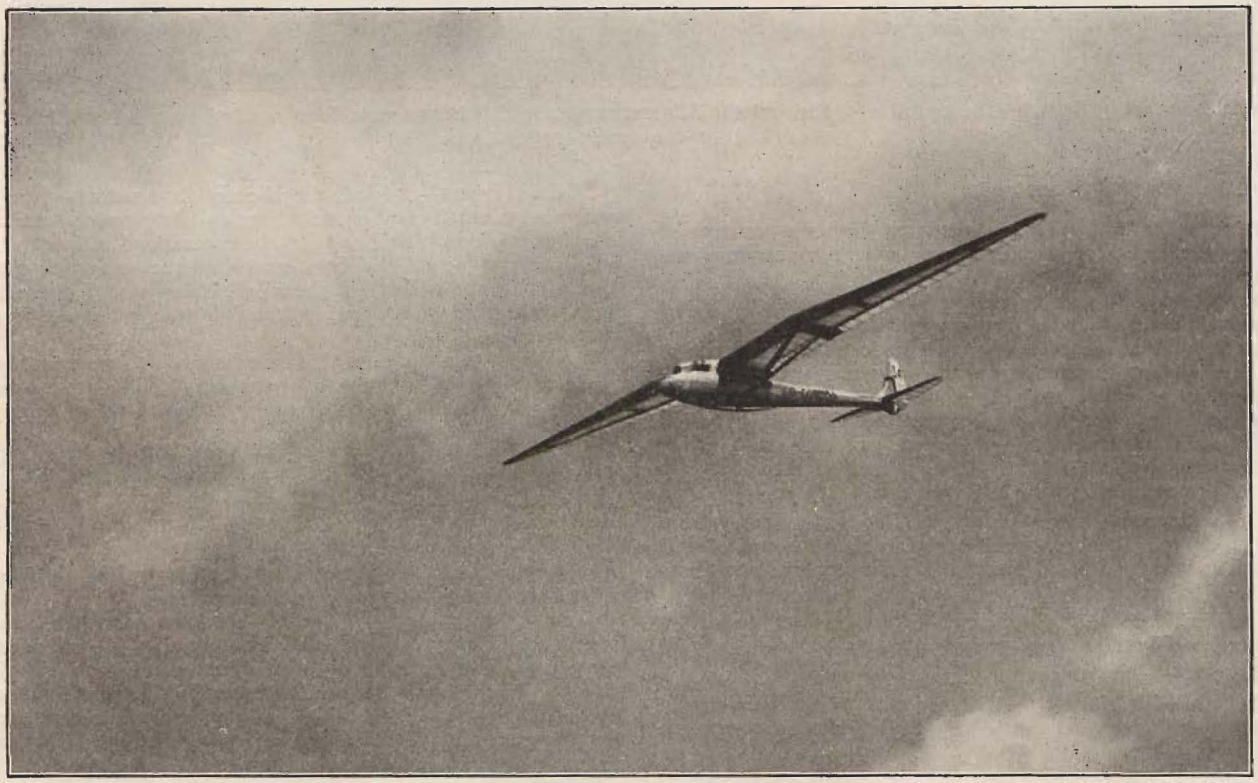
The distances taken on the maps, during the contest of the two flights of Pilot Jack O'Meara with sailplane CHANUTE, and Martin Schempp with sailplane SCHLOSS MAINBERG, were exactly the same with 68 miles. An exact survey, however, after the contest, showed that the maps were inaccurate, and that Jack O'Meara is holding first place in distance, with 3 miles ahead of Martin Schempp.



The Stevens Institute Entry at Elmira.

SOME IMPRESSIONS OF A VISIT TO THE WASSERKUPPE

By A. B. GIBBONS.



[Photo by Dr. A. E. Slater.

The "Condor"—designed, constructed and flown by the brothers Dittmar. The body is an exact replica of the "Fafnir."

I flew out in my KLEMM POBJOY—five hours from London. Very comfortable landing ground in the lee of hill 2,900 feet up.

On arrival I conveyed to Herr Lippisch and Herr Ursinus a message of sympathy from the B.G.A., about the death of Herr Groenhoff.

This regrettable accident is described elsewhere.

Groenhoff's death is a great loss, not only to Sailplaning, but to many other German aircraft interests. In particular, he was the only fully experienced test pilot for tailless machines with or without power.

His death is a serious setback to Herr Lippisch's progress with the DELTA type, and will probably make it impossible for the two Lippisch POBJOY tailless machines to be entered for the Rundflug.

This is particularly unfortunate, since the tailless type has shown great promise and is definitely more efficient than the fuselage type, although in certain cases it requires special flying technique.

Kronfeld's Accident.

I had a discussion with Herr Kronfeld which was most illuminating. He was soaring in rather violent weather, inside a cloud, with turn indicator and compass. He points out that a turn indicator is a fairly satisfactory instrument for a power pilot, who is merely attempting to fly a course and do occasional turns, but for sailplaning, when the pilot must make circles and S-turns continually in cloud, the turn indicator causes mental confusion after a time. Just as the time during which one can fly blind on compass alone, in cloud, is limited, so also is that of blind soaring flight, on turn indicator.

An unusually violent gust of wind put the machine into a steep dive. The lines of the AUSTRIA being very clean, acceleration was rapid, and the air-speed indicator gave 180 km./hr. before the pilot fully realised the situation. At that speed he hesitated to pull the machine out, owing to risk of structure failure, as it was stressed for about 150 km./hr.

Just as he emerged from the cloud, one wing came off, about six metres out and the other about three metres. The machine turned on its back, and Herr Kronfeld released and came down about 2,000 feet quite comfortably. The machine was wrecked.

Herr Kronfeld is particularly interesting on the accident, as it indicated that a soaring pilot must spend a lot of time on the turn indicator of a power machine to gain experience. He also feels that some better and less confusing form of indicator is required for blind soaring.

Competitors.

In comparison with the 1931 meeting, the outstanding feature was the large number of high-efficiency machines—a total of 82.

Despite this large number, the organisation was remarkable. One was greatly impressed by the speed with which competing machines were got into the air, in rapid succession, whenever conditions became favourable.

Activities began about 5.30 a.m. as a rule, and the machines were rigged and man-handled to the starting hill, where they were lined up and were then launched from right to left along the row.

During the period of gaining height to cloud level, the machines were compelled to pass left wing to left wing to avoid collision. This entailed those on starboard tack flying far out from the hill and those on port tack coming well in. There were frequently eight machines over the same area.

It was unfortunate that the bad weather during the early part of the meeting caused crashes with some of the better machines, as this prevented any great advance in long-distance results. But there have been great advances in meteorological knowledge, flying technique and trend of design.



Left: the start. Centre: line squall approaching the Wasserkuppe. Right: two machines soaring over a distant hill conforming to the traffic regulations.

(1) Meteorological Knowledge.

In 1931 the principal long-distance flights were carried out on the fronts of thunderstorms, where tremendous up-currents gave ample lift.

During 1932 it was appreciated that a technique which depended upon thunderstorms could rarely be put into practice, and a deeper study was made on the subject of the less violent thermic currents, particularly those which showed up as small cumulus clouds.

In order to demonstrate to me the life history of a cumulus, Herr Ursinus, jun., came up with me in my KLEMM, and we studied their development on the spot.

The theory is briefly as follows:—

An up-current—the product of hot air arising from cornfields (or under different conditions, from trees, etc.) —is listed somewhat to leeward by the general wind and its apex is revealed by a small cumulus cloud.

The life history of that cloud—which varies between a quarter and half an hour—is as follows:—

Stage 1.—Filmy mist.

Stage 2.—Closely-knit ball, gradually taking pyramid form; at this stage the up-draught beneath its centre is probably at its best.

Stage 3.—The pyramid becomes very extended and starts breaking up from above.

By this time the cloud has probably been blown to leeward of the up-draught, and during the period of breaking up strong down-draughts are experienced. Meanwhile (unless general conditions have altered) new small cumuli will be forming in the original position.

Tests under suitable clouds showed that the up-draught during the best period was capable of sustaining the KLEMM in soaring flight with two up.

(2) Flying Technique.

To take advantage of the above conditions, the pilot, having made cloud contact, must rise in small circles and turns during the growth of the cloud and must then move off quickly to a new young cloud at the moment when the breaking up of the first one commences.

Cruising to leeward by this technique, combined with others, has supplanted mere duration flights over hills, as a criterion in sailplaning, and has brought with it a new trend of design.

INTERESTING MACHINES.

(1) "Falke."

While this machine is well known to your readers, it might be well to point out its advantages as described by Herr Hubert—one of the School instructors—purely from the point of view of its safety and low upkeep under school conditions. It has been their standard trainer.

The advantage of the back-sweep of the wings of this machine is that it enables the pilot to be located immediately under the wing, rather than in the more exposed position ahead.

I was shown a number of crashed machines wherein the whole of the nose or the whole of the tail had been ripped off, but the pilot's seat had remained intact and no injury to the pilot had resulted.

The machine has a high degree of lateral stability and the sections used near the tips allow good lateral control.

She is virtually free from spinning.

(2) "Obs."

This machine is developed for meteorological observation work. It is a two-seater of exceptional size.

The "Gull" type—Dihedral—provides strength and lateral stability. Special aileron control is provided. There are three ailerons on each wing covering the whole span. They operate in succession from the single wheel joystick; wing-tips first; middle aileron second; centre section last, as the joystick displacement increases. Vertical air-brake fins are provided on wing-tips.

Cabin accommodation, two-seater tandem, all enclosed.

The observer sits in the rear, with a good-sized table for maps and writing material between him and the pilot's back.

This machine has not yet been used extensively.

(3) "Thermikus."

This is another machine of wide span. Its special feature is the new form of wing warping, eliminating aileron.

The warping control is provided by rear strut, which is extended or retracted telescopically, by the joystick, providing an adjustment of the angle of incidence to that part of the wing lying outside the strut attachments.

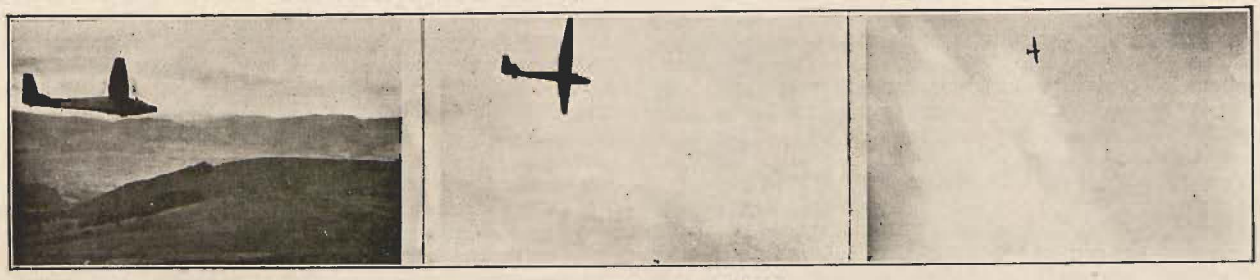
Claims made are to clean design and reduction of risk of stalling the inner wing in turn, owing to the reduction of angle of incidence.

(4) Power Glider.

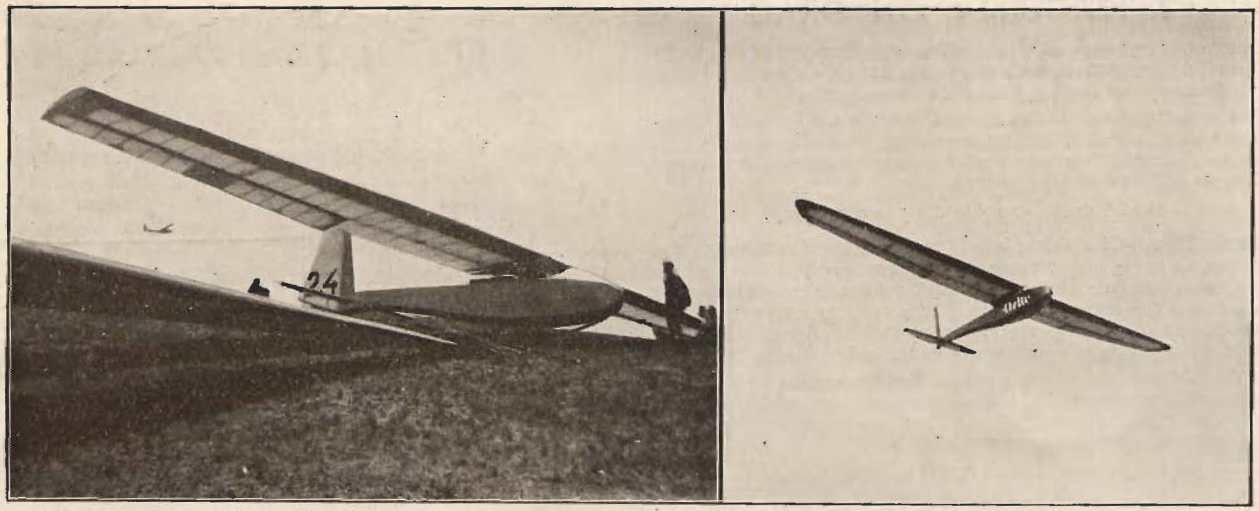
An interesting attempt to provide accelerated soaring training and cheap power flying training.

This machine is a high-wing sailplane, somewhat on the lines of the FALKE, but provided with undercarriage and strengthened by the use of steel struts and attachments. A nine-horse, water-cooled D.W.K. car engine (two-cylinder two-stroke) is installed in the nose. The propeller is driven through D.W.K. standard reduction gear.

The engine was chosen for its low prime cost—about £25 —and simplicity of upkeep.



Three stages of a cloud flight.



The " Alexander der Kleine." Left: the production model (span 14 metres). Right: Machine with rounded wing-tips and tail surfaces (span 16 metres).

Water cooling is necessary owing to the inefficiency of the two-stroke principle when air-cooled.

This machine is not yet flying.

(5) Tailless Gliders.

These apparently have not yet reached the high efficiency phase of design, but the performance of the STORK demonstrates its superiority over the fuselage machines of similar class.

Lateral and longitudinal stability are satisfactory.



The tailless " Storch VIII " on a test flight.

It calls for experience in flying, as the short length provides a very low moment of inertia in the looping plane.

One noticed that, when flown by a pilot less experienced than Groenhoff, the machine underwent rapid oscillation fore and aft. It is also slightly more difficult to launch and land.

Undoubtedly, however, the saving in weight and reduction of drag are attractive advantages.

Foreign Competitors.

There were three Polish machines of normal design and average performance.

Herr Lippisch and Herr Ursinus sent messages of regret that no English team had been able to enter.

It does seem a great pity, as it would provide such an opportunity to experience cross-country flying.

Starting from 2,900 feet at Wasserkuppe makes cloud-contact possible on three days out of five. Such conditions occur so rarely at Dunstable and when they do there seems a tendency to restrain pilots from taking the small stock of aircraft far afield!

SOARING IN THE TROPICS.

Up to the present very little research has been carried out into the effect of thermal currents in tropical countries from the point of view of soaring flight. In a lecture given before the Scientific Conference on Sailing Flight, which was held at Gersfeld at the conclusion of the Rhön Competitions, Sir Gilbert Walker emphasised the importance of this subject. He pointed out that, in India, vultures make use of these currents, often rising to a height of 2,000 feet and remaining aloft for hours.

It is understood that Herr Kronfeld, the well-known soaring pilot, has prepared a scheme for carrying out a series of flights in India, and has submitted it to the Director of Civil Aviation. If the authorities in India agree with Herr Kronfeld's suggestions, much valuable data should be obtained regarding the meteorological conditions in hot countries, from the point of view of soaring flight.

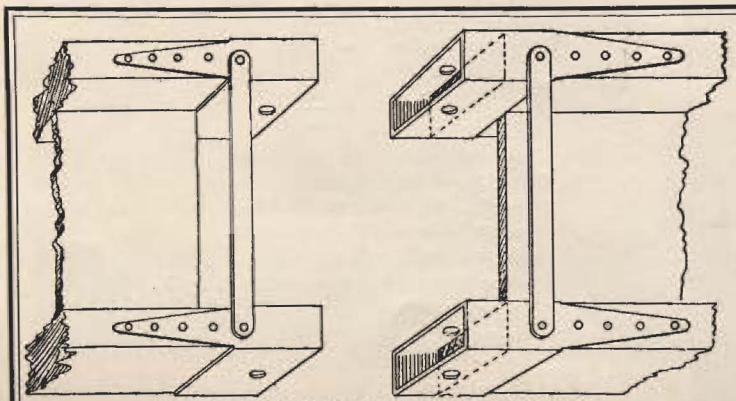


FIG. 44—DARMSTADT SPAR JOINT FITTINGS

SAILPLANES

THEIR DESIGN, CONSTRUCTION & PILOTAGE

By C. H. LATIMER NEEDHAM, M.Sc. (Eng.) Lond., F.R.Ae.S.

PART II—CONSTRUCTION

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Appendices include Curves for Sailplane Aerofoils; Materials; Strength and other Tables; Inspector's Report on Construction, etc., etc.

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"KENTIGERN" ON DRAG

I have not yet seen an explanation of induced drag or profile drag in THE SAILPLANE, so I write this article to try to explain the orthodox view hoping that I do so correctly.

The resistance to motion caused by the air is called drag. In the case of a glider, bird or aeroplane, it can be divided into two kinds, induced drag (or aerodynamic resistance as Lanchester prefers to call it) and profile drag.

Induced drag + profile drag = total drag.

Profile Drag.—If a thin plate is moved edgewise through the air, it experiences a resistance due to viscosity. A layer of air sticks to the surface of the plate and a force is needed to slide this air past the surrounding air. It is easy to understand this if one thinks of moving a safety razor blade edgewise through treacle. This type of resistance is often called "skin friction."

If the plate is moved squarely, a force is needed to move it, and eddies are caused which dissipate the work which is being done in moving the plate. The eddies can be seen if the razor blade is moved in water near the surface.

Skin friction + eddy drag = profile drag.

This drag is nearly proportional to the area of the body (A), the density of the air (ρ), and the square of the velocity, so that these figures are also multiplied by a constant k_{Dp} to give the actual value of the drag.

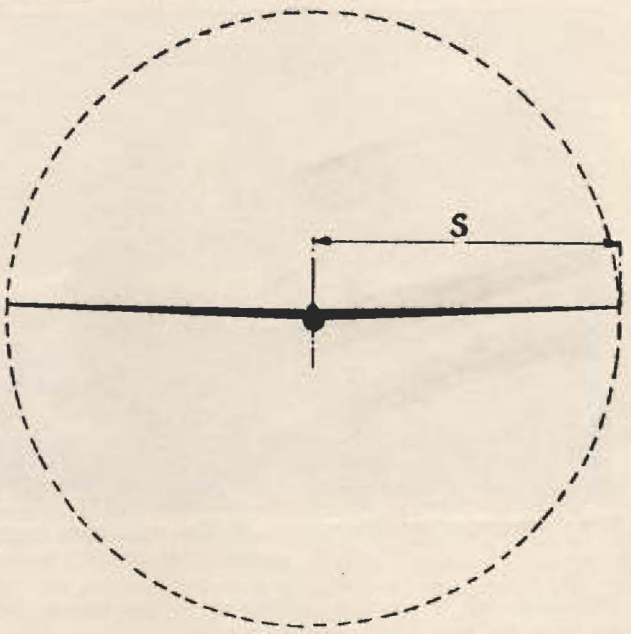
i.e., profile drag $= k_{Dp} \times \rho \times A \times v^2$.

(The value of k_{Dp} depends on the shape of the body.)

A perfect streamline body sets up no eddies. The resistance of the best shapes known is hardly greater than the resistance due to skin friction, as the flow round them is very nearly streamline. The resistance to a bad shape, such as a motor car body, or a man's head, is much larger and consists chiefly of eddy drag. For the same frontal area, the resistance of a flat plate, at right angles to the wind, may be ten times that of a well-shaped body.

Induced Drag.—The jet of a fire-hose recoils, due to the rate of change of momentum of the water. If a mass of water per second m is given a velocity v, the force on the jet is mv and the kinetic energy lost (in the water) per second is $\frac{1}{2}mv^2$.

A glider supports itself by accelerating air downwards. The most efficient type of wing gives a constant downward velocity to the air across the span, and in this case the air enclosed in a circle in a vertical plane with the span as diameter is equivalent to the air affected (see "Aerodynamics" by Lanchester or "Hydrodynamics" by Lamb) (see diagram).



Considering this air, if the glider is travelling at a velocity v, the volume of air acted on per second $= \pi s^2 v$ and mass of air per second $= m = \pi s^2 v \rho$ ... ... (1)

where $s = \frac{1}{2}$ span,

ρ = density.

Therefore, to support the weight of the glider w, the air must be given a velocity vertically downwards u, so that (by Newton's law)—

$$w = mu \text{ or } u = \frac{w}{m} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (2)$$



Flying-Officer Mole's Flight. The Launch.

The kinetic energy given to the air at the same time must be $\frac{1}{2}mu^2$ per second,

which is the rate of working of the glider, so that

(resistance) $\times v = \frac{1}{2}mu^2$, or

$$\text{Resistance} = \frac{mu^2}{2v} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (3)$$

Substituting for m and u from equations (1) and (2), and cancelling,

$$\text{Resistance} = \frac{1}{2\pi\rho} \times \frac{w^2}{s^2} \times \frac{1}{v^2}$$

or if $b = 2s$ = span

$$= \frac{2}{\pi\rho} \cdot \frac{w^2}{b^2} \cdot \frac{1}{v^2}$$

which is, of course, the induced drag.

From this formula it is clear that this drag is reduced by increase of span or flying speed and increased by increase of weight.

Now profile drag $= k_{Dp}\rho A v^2$;

thus total drag $= \frac{2}{\pi\rho} \times \frac{w^2}{b^2} \times \frac{1}{v^2} + k_{Dp}\rho A v^2$,

which we desire to be as small as possible.

One can see that the two halves of the equation often conflict, so that the baffled designer wonders how to increase the span while decreasing the area and the weight, and what velocity to choose.

Note.

$$\text{Induced drag coefficient } k_{Di} = \frac{\text{induced drag}}{\rho A v^2} = \frac{2 \times w^2}{\pi b^2 \rho^2 v^4 A}$$

$$w = k_L \rho S v^2$$

$$\text{Aspect ratio } t = \frac{b^2}{A}$$

$$\therefore \; k_{Di} = \frac{2k_L^2}{\pi t}$$

Symbols :—

k_L = lift coefficient.
k_{Dp} = profile drag coefficient.
k_{Di} = induced drag coefficient.
ρ = density of air.
A = area (sometimes denoted by S).
v = velocity.
m = mass.
u = downward velocity.
$b = 2s$ = span.
π = 3·14159.
t = aspect ratio (sometimes denoted by A).

LONDON GLIDING CLUB

GLIDING AND SOARING COURSE.

Saturday, September 17th, to Sunday, September 25th.

In response to many requests from persons who live too far away from Dunstable to take advantage of the regular week-end instruction available to members, it has been decided to organise another special gliding course at an inclusive fee. This will entitle the pupil to temporary membership of the London Gliding Club for the period booked, use of club machines, first-class instruction, and sleeping accommodation on the site.

The course will commence on Saturday, September 17th, and will continue until Sunday, September 25th, inclusive. It will take place at the London Gliding Club ground at Dunstable, which has definitely proved itself to be one of the finest gliding sites in the country, and usually has excellent soaring winds at this season. In addition to primary and secondary training machines, intermediate and high-efficiency soaring machines will be available, and every effort will be made to enable pupils to progress with the greatest possible rapidity. Fully qualified instructors with considerable soaring experience will be available, and a special staff will be engaged to ensure first-class maintenance and quick repair work if necessary.

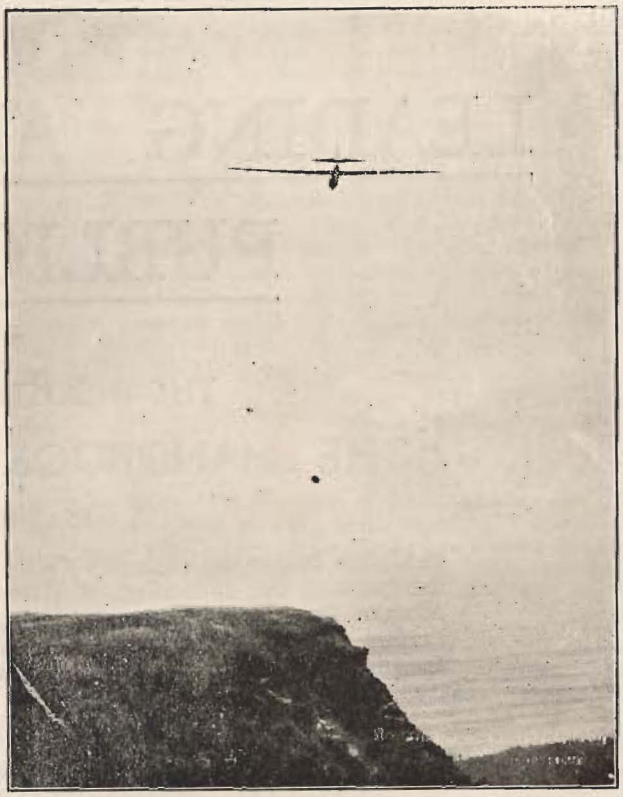
Sleeping accommodation will be provided on the site in tents (not more than four persons per tent), and all meals will be available at strictly reasonable prices in the club-house, which is also equipped with a licensed bar. Official observers will be available to time tests for the Royal Aero Club Glider Pilot's Certificate throughout the course. Pupils are expected to provide their own bedding and camp-beds, if required. The use of tents, lamps, and washing accommodation is included in the fees.

Inclusive Fees.

9 days, £4 0s. 0d. 8 days, £3 15s. 0d. 7 days, £3 10s. 0d.
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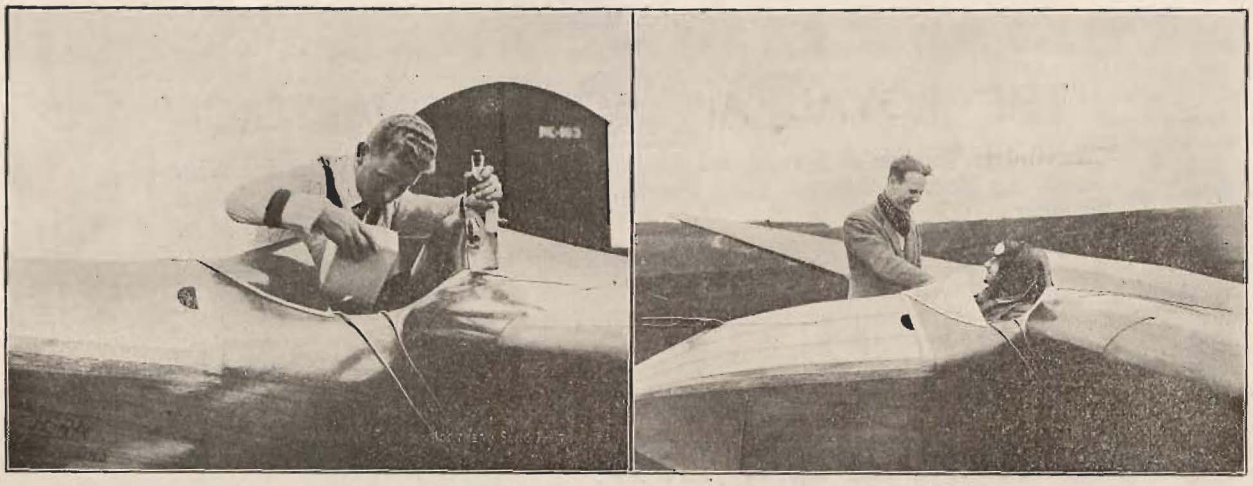
Groups of four persons may share a tent by booking together. **All fees are payable at the time of booking, and owing to the cost of advance organisation no money can be returned under any circumstances whatsoever.** The Club accepts full responsibility for damage to machines whilst being flown in accordance with its normal flying rules and regulations, also for damage to third party, but accepts no responsibility for damage or injury to pupils or pupils' personal property.

For obvious reasons, the number of pupils who can be accepted under these arrangements is strictly limited, and applications will be accepted in the order of receipt (with remittance).



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Left: "Fuelling" before the flight. Right: Flying-Officer E. O. Wanliss, the official observer, and Flying-Officer Mole just before the launch. The photographs on this and the opposite page were taken during Flying-Officer Mole's second attempt at Sutton Bank. They are reproduced by courtesy of the "Northern Echo," Darlington.

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CORRESPONDENCE

"HOLS DER TEUFEL."

SIR,—I have read "Kentigern's" remarks on the HOLS DER TEUFEL type of sailplane in the last issue of THE SAILPLANE AND GLIDER with much interest, but cannot quite agree with him on certain points. He asserts that despite the large induced drag, the parasite drag of the machine has been kept sufficiently low to make the machine a good soarer. With this I cannot agree. The machine has obviously a very large parasite drag due to the long struts, the open-work boom tail and the numerous bracing wires, not to mention the very crude streamlining of the "gondola." But, as "Kentigern" says, the machine has actually a very low sinking speed. This is, however, due only to the very light wing loading, little or no attention having been paid to drag in the design. On examining the fundamental expression for the sinking speed of any glider,

$$V_s = \sqrt{\frac{W}{\rho S\left(\frac{k_L^3}{k_D^2}\right)}} = \sqrt{\frac{W}{\rho S}} \quad \frac{k_D}{k_L^{3/2}}$$

where V_s is the vertical sinking speed in feet per second, W the all-up weight of the machine in pounds, S the wing area in square feet, ρ is 0.002373 slug per cubic foot, k_L the lift coefficient and k_D the drag coefficient for the machine; it may seem that there are two methods of achieving a low sinking speed. Disregarding lift and drag coefficients, the wing area should be as large as possible, and the weight of the aircraft as small as possible. In other words, the wing loading should be as low as possible to achieve a low sinking speed. If, in addition to the low wing loading, the section used has a high value of k_L maximum, the sinking speed may be lowered considerably without bothering about drag. That is what was done in designing the HOLS DER TEUFEL.

On the other hand, a low sinking speed may be achieved by concentrating on the last factor alone. That is, the drag may be cut down as much as possible and a very high lift section be used. This may be done by increasing span and cutting out as much of the bracing as possible. This is the idea followed in the design of high performance sailplanes.

Both these design methods have their limits. In the first case excessively large area makes the speed of flight low, and although this enables a longer time to be spent in a given up-current field, as "Kentigern" points out, it also makes the machine very slow on the controls, and therefore, unmanœuverable. The slow speed alone makes the machine a local sailer, as it is not fast enough to get through large down-current fields.

As far as the other method is concerned, there comes a limit to the span which may be used, since beyond a certain span the weight increases faster than the drag decreases, there being then no resultant lowering of the sinking speed. However, the gliding angle will still be improved, and certain types have been built with spans greater than the optimum, just in order to obtain a flat glide. The AUSTRIA was a notable example. With excessive span there appears the same fault occurring in the case of the low-wing loading, i.e., lack of manœuverability, although obviously not for the same reason, but because of the intertia of the heavy wing.

"Kentigern" remarks that an increase of span might improve the HOLS DER TEUFEL. It would probably improve the gliding angle, but not necessarily the sinking speed. Some years ago Alexander Lippisch calculated that for machines with such high drags, and where weight saving was of prime importance, the induced drag becoming a smaller proportion of the whole than in cleaner types, the optimum aspect ratio usually lay between 5 and 6. This may seem odd at first glance, but on thinking it over it will be seen that when span is increased, considerable weight is added, which results in only a very small percentage reduction in the overall drag coefficient. The original HOLS DER TEUFEL had, with a span of 34.5 feet, an aspect ratio of 5.5. The newer model developed by Schleicher, has, I think, a span of 42 feet, giving an aspect ratio of almost 8. The areas in both cases are the same, viz.: 215 square feet. Thus, if it be assumed that Lippisch's calculations are almost right (the assumptions on which such calculations are based are always open to correction), the present model of the HOLS DER TEUFEL appears to have an aspect ratio slightly over its optimum. Thus an increase of span would be unlikely to better the soaring abilities of the machine.

B. S. SHENSTONE.

THE "LARK" SAILPLANE.

SIR,—I beg to offer the following comments regarding the policy advocated by Mr. Shackleton, of keeping the machine low down, in order to obtain the longest glide.

(1) The energy imparted to the rope by the towing team (or car) may be utilised in either of two ways:—

(a) By lifting the machine a short distance above the ground and accelerating it to a speed considerably in excess of its normal (and most efficient) flying speed. (This is apparently Mr. Shackleton's method.)

(b) By lifting the machine to a much greater height and only accelerating it to a speed corresponding to that at which its L/D ratio is a maximum, i.e., the most efficient flying speed. This type of launch may be approximated to by holding the stick back suitably while on the launching-rope.

(2) After a launch of the (a) type, the glide will consist of a steady loss of speed at constant height, and in the (b) type of flight the glide consists of a steady loss of height at constant speed.

It is clear that in the (a) type of glide the machine is not operating at its maximum efficiency until it has slowed down to its efficient flying speed. The remainder of the flight is a loss of height at this constant speed.

In the (b) type of glide the machine is operating at its most efficient flying speed during the whole flight and therefore the flight will be longer.

Last year, in the Ulster Gliding Club, we operated two primary machines in a large field with a slight slope. We invariably found that those pilots who took all the height they could get obtained the longest durations, on account of the reasons above enumerated. It must be remembered that the shape of the hook has a considerable bearing on the amount of energy obtainable from the rope. The rope can drop off the hook for two reasons:—

(i) When the rope has no tension, i.e., as soon as the machine overtakes the rope.

(ii) When the rope is pulling obliquely on the hook and consequently slips off before the tension is zero. If the policy of obtaining maximum height is pursued, the hook must be suitably inclined back from the vertical, in order to avoid this premature slipping of the rope.

The elastic method of launching, except for hill-soaring, is a slow method for training on level ground, and the flying time is usually only a small percentage of the total operating time. In this club we found that with everything mechanised, i.e., auto-extension of elastic with car and pulley, and towing the machine back to start on another car with trailer having an outrigged wheel, to avoid man-handling on the wing-tips, we were never able to do better than about six flights per hour, averaging, say, 30-second flights.

PATENTS.

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Consequently we have now turned to auto-towing and are having fewer crashes and wasting less time. At Macgilligan Strand, which is a long stretch of sand backed by a ridge of cliffs and hills, we have already had soaring flights up to 40 min. (with voluntary landing) after auto-towed starts to a few hundred feet.

HUBERT C. WYNNE.

THE NYBORG SAILPLANE.

SIR,—In the last paragraph of his article appearing in THE SAILPLANE of July 8th, Captain C. H. Latimer Needham pays me a very great compliment in his statement that my glider may be the forerunner of a new era in sailplane design.

Replying to his criticism that my rudder volume is too small, may I refer him to Warner's "Airplane Design," page 444, where it is stated that the rudder moment divided by the span × wing area × (m.p.h.)² should have the value .000025, although .000015 is barely attained in some present-day types. This authority also gives the load co-efficient for rudder and fin as .0008 to .0015 (average .0012) per lb. per sq. ft. and m.p.h.

As the rudder area is 4 sq. ft. and the moment arm 7.25 ft., and assuming the average value at .0012 as the rudder load constant, we have for a velocity V:

$$\frac{\text{Rudder Moment}}{\text{Yawing Moment}} = \frac{0{\cdot}0012 \times 4 \times 7.25 \times v^2}{32 \times 45 \times v^2} = 0{\cdot}0000242$$

As I have provided additional rudder effect at the wing-tips to compensate for yawing moment due to the body itself, it would appear that the glider should be well under control.

However, from the experience gained in my experimental flight attempts, though, unfortunately, neither Mr. Green nor myself is an experienced pilot, I have come to the conclusion that there are other factors which must be considered, and I think we may experience a surprise on this point as the glider behaves more like a bicycle than a tricycle, if I may use such a simile.

At present I am fitting an oversized rudder-fin to see what effect it will have, but I do not believe this to be the correct solution to the problem.

Regarding the minimum speed of 50 m.p.h. upon which you seem to agree with Mr. Scott Hall and Air Commodore Chamier, I can only say that, in practice, this speed is far in excess of that necessary to cause the glider to rise from the ground.

T. G. NYBORG.

A CRITICISM.

SIR,—I know that, as Editor of THE SAILPLANE, you will not mind a little gentle criticism of your excellent journal.

No doubt you are fully aware that of the twelve pages of reading matter in the current issue more than half of the space is taken up with advertisements and pictures. I know that advertising means money, but a photograph of the Wright Challenge Cup, for instance, does not interest me, though I should be very loath to say that every reader does not want to see a picture of the Secretary of the B.G.A. at work! However, sir, I would suggest that a little more space be given to reading matter. After all, there are only two issues in a month, and surely there must be enough persons interested in gliding to furnish you with ample material of an interesting character.

A HOPEFUL READER.

[Constructive criticism and suggestions for improving THE SAILPLANE are always welcome. We have always understood, however, that most readers desire more, rather than fewer, pictures. We would point out, however, that, had our correspondent made certain of his facts, he would have discovered that little over one-quarter of the available space in No. 13, Vol. 3, was devoted to illustrations and advertisements, surely not an unreasonable proportion.—ED.]

NEWS FROM THE CLUBS

DORSET GLIDING CLUB.

Tuesday, August 16th.

Flying was carried out at both Maiden Newton and Weymouth, in turn, during last week-end. On Saturday afternoon, wind conditions being favourable for the White Horse, operations were transferred thence, from Maiden Newton, at short notice. Soaring flights of 9 min. 30 sec. and 21 min. 30 sec. were accomplished with the DORSLING secondary machine, which flew splendidly and was at times 50 to 100 feet above the starting point. The machine alighted on the top at the conclusion of these flights, which are notable as having been made in a light wind of about 8 m.p.h. only, but blowing on to the ridge almost at right angles, indicating that wind direction, in relation to the available slopes, is of more importance than strength for producing soaring currents.

A third flight was commenced, but terminated at 3 min. 40 sec., with a landing at the bottom on account of the wind dying away to practically zero.

A party of Brownie Guides were keenly interested spectators of the exhibition of motorless flying, and pilot and machine were greeted with an enthusiastic cheer on coming in after the 21 min. flight.

On Sunday, the wind having gone to N.E., an unsuitable quarter for the White Horse site, flying was resumed at Maiden Newton, where useful training was accomplished on the DAGLING, with glides of 40 to 50 sec. duration.

The mid-week meeting at Maiden Newton is being discontinued from now on, now that the evenings are shorter, and meetings will take place at week-ends only (at Maiden Newton, unless otherwise specially arranged), on Saturdays at 2 p.m., and Sundays at 12 noon onwards.

LONDON GLIDING CLUB.

Saturday, August 13th.

Hot day, practically calm. The R.F.D.II used the hill until night-fall; KASSEL 20 tottered once as far as the bowl, but later had to content herself with aerial curvettings.

Sunday, August 14th.

Northerly breeze, overcast. The POPPENHAUSEN DOPPELSITZER with passengers, and the R.F.D.II were auto-launched all day from a foot-hill. A steady stream of flights was kept up by using two cars, the Dodge did the launching and the retrieving of the gear; the smaller Citroen retrieved the machines. This sounds extravagant, but the quantity of petrol per flight is actually brought to a minimum. While one machine is flying, the other is being towed back. By the time the latter is ready for launching, the launching gear is back in position. The total number of launches in the day was unrecorded, but enormous. Eventually one arrives at the incredible state of affairs, where everybody has had enough.

It is best to run the launching rope through a fixed pulley, if only because the car can then be run at an angle to the line of flight, thus allowing the driver to watch and dodge a mesmerized "pilot" (sic.). The driver's mate, being in charge of the quick-release, should be reasonably nimble-minded.

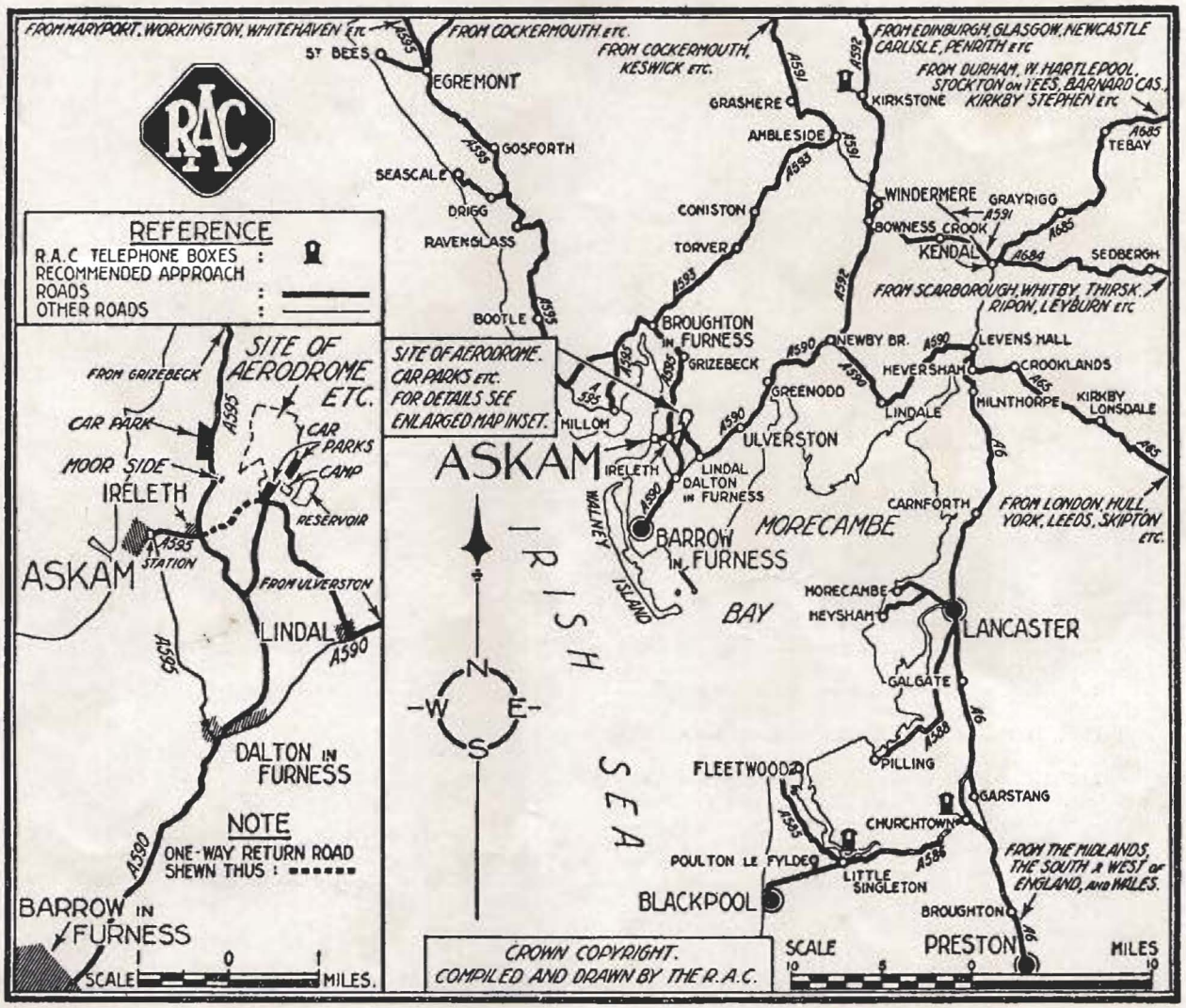
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HOW TO GET TO THE COMPETITION



There are two free car parks, one situated inside the enclosure, the other situated off the Broughton Road. As the above map shows, the Broughton Road car park commands an excellent view of the western slopes of the gliding site.

ADMISSION :

ADULTS 1/-. CHILDREN 6d.

SEASON TICKETS . . 3/6.

TIME and TIES



There are few conferences at which we are not represented. We may be uncertain as to whether a customer is famous for his knowledge of economics or his elocution, but we always know how he feels about ties.

The other day we had an urgent order from a customer about to travel to Switzerland to speak at an important conference. It appeared that he liked to wear a special sort of tie when making his pronouncements, and by some dreadful mischance he had on this occasion mislaid his entire stock.

His ideal tie had to be made to special design from a certain material and had to be delivered at his hotel the following morning. Even in our vast stock of ties we had nothing that struck the exact note, so we promised to search London and to deliver the tie before twelve next day if we were successful.

It was a most exciting race against time, and unfortunately time won. Our messenger arrived at the hotel with the tie but very little breath, ten minutes after our customer had gone.

By this time, however, we were quite worried about our customer's speech, and we began to make rapid inquiries for the address of the hotel in Switzerland to which he was going. We knew that he was travelling by boat and train, so we realised that his tie could catch an air liner and reach Switzerland before him. It did—and the speech was a great success.



We would not like to assert that if all delegates to all future conferences wore Austin Reed ties the results would be Utopian, but in view of this little experience we feel that it might be worth trying. Anyway, we present the idea to the nation.

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