April 28th, 1933. Vol. 4, No. 8.

# THE SAILPLANE & GLIDER

Official Organ of the
British Gliding Association

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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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*The Offices of the* SAILPLANE *viewed from the historic XVIth Century gateway of Lincoln's Inn.*

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**The B.G.A. Competitions.**

We understand that the question of a site, or sites, for the 1933 Gliding and Soaring Competitions, which are to be held throughout the month of June, has been partially settled. The use of an excellent site for southerly winds has been obtained, stretching westwards from Huish, a village four miles S.W. of Marlborough. The ground falls very steeply three or four hundred feet, less steeply another hundred or so, and continues to fall gradually as far as a mile or two out from the hill. In places the outline of the ridge winds about, offering facilities for soaring in winds to either side of south; also, once in the air, a good pilot on a suitable day could fly along for some miles eastwards or westwards of the ground over which permission for launching has been obtained.

The situation of the training slopes (for training is to be carried on all through the meeting) has not yet been decided on, but it is hoped that they may be sufficiently high and steep for soaring to be possible in winds which are unsuitable for the neighbouring Huish site.

In our issue of March 31st an account was given of two pilots who trailed their glider from Detroit to Hollywood, 2,100 miles as the crow flies and 3,100 miles by road. And, a month before, it was described how Mr. Stepanchenok was towed in his glider by air from Moscow to the Crimea Meeting, 1,060 miles as the crow (and Mr. Stepanchenok) flies. How far is your club from Marlborough?

**Meteorology.**

We once heard a power pilot, who had taken up gliding, remark that he couldn't understand why there was all this fuss made about meteorology: "I fly off the top of a hill, and, if there's enough wind to keep me up, I keep up. If there isn't, I don't; and that's all there is to it." And that's all there is to his flying, and all there ever will be. A larger body of people are quite aware that a knowlelge of meteorology is needed for the special sort of performance that a few experts put up, but imagine that the things such pilots know about can only happen in regions of the atmosphere which the ordinary club member can never hope to reach in his humble plodding to and fro along the hillside. This idea should be finally exploded as a result of what happened recently to a member of the London Gliding Club. His extraordinary experience is related in the Club News, by a happy coincidence in the same issue as our final report of Sir Gilbert Walker's lecture.

Many people may have wondered what possible application to soaring there can be in Sir Gilbert Walker's investigations into the tiny ripples and flakes that occur in cirro-cumulus cloud-sheets at a height of four or five miles. But these flakes and ripples, as they are found at lower and lower levels, merge gradually in type into the cloudlets of alto-cumulus, only two or three miles high. Similarly there is no definite boundary-line between alto-cumulus and the great rolls and lumps of strato-cumulus which are found within a mile or so of ground level; in fact, one often cannot say to which type a particular cloud sheet belongs. It is therefore obvious that research work into any one of these types is likely to shed light on the others, too.

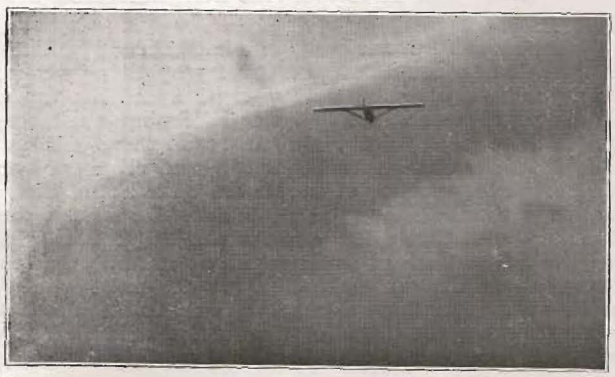
**Long Lines of Lift.**

Now it so happens that, on the day mentioned, the sky was most of the time full of great long rolls of cloud, obviously at quite a low level. Their orientation was not down-wind, nor cross-wind; it was something between the two, but more down than across wind. If Sir Gilbert Walker's contention is true, that the "cells" of which such clouds from the top may reach almost down to the ground, one would expect long lines of lifting air to be passing by, not so very far up, and a pilot, having got into one of these "cells," should be able to continue flying along its length, rising all the way.

This is precisely what happened to Mr. Humphries in the CRESTED WREN. He was soaring at only some 100 feet above the hill-top, when the machine suddenly "joggled" up to 300 feet, and he set off up-wind across almost flat country, rising all the way until he was nearly a mile from the hill. As it happened, he pointed the machine somewhat to the right of the direction from which the wind was blowing, rather than to the left, parallel to the cloud rolls. Perhaps it is significant that he confessed to a feeling that he was "falling off the edge of" the belt of lift all the time. At any rate it is evident that this peculiar phenomenon could have been no mere "thermal bubble," for calculation shows that the belt of rising air must have been at least four miles long in a down-wind direction. We noticed that there was a big gap in the lower clouds while the CRESTED WREN was putting up this amazing performance, so possibly the increased sunshine had something to do with it; it may have been, however, that these long "cells" of rising air were still distributed over the landscape without, at the time, extending up to cloud level.

**The Photograph.**

One of the cloud rolls is shown in the accompanying photograph; it is moving from right to left, and at the same time approaching. A curious feature of these rolls was that, when one looked at those which were receding down-wind, their tops were made up of flattened dome-shaped protruberances such as one sees in cumulus, whereas the upper surface of each roll as it approached from windward appeared to be flat, apart from a certain raggedness. The appearance suggested a vortex motion within the cloud, as if one side of it was moving up and the other side down, just as in the rolls of smoke which Sir Gilbert Walker produced in his laboratory experiments.



**A roll of strato-cumulus. At a higher level, a layer of alto-stratus. At a lower level, D. M. Morland soaring the "Prüfling."**

So in future, if we print anything more that Sir Gilbert Walker has to say, let no one dare to suggest that it has nothing to do with gliding.

**A Correction.**

In last issue's Editorial, for "Laura" read "Leni."

## CLOUD PHOTOGRAPHS ON SHOW.

This month's exhibition at the Royal Photographic Society's premises at 35, Russel Square, W.C.1, includes a display of Cloud Studies by A. C. Banfield, F.R.P.S. The Exhibition is open (you walk up to the inner glass door and ring the bell) until April 29th, from 10 a.m. to 6 p.m. each day.

Mr. Banfield's photographs were mostly taken during a certain period in the autumn of 1923, when a scheme was in operation for the simultaneous photographing of clouds all over Western Europe at pre-arranged intervals, and professionals and amateurs worked at it in harmonious co-operation. (We learn from *Les Ailes* that a similar scheme is in operation in France this year; prizes are offered for the best results, and competitors are required to photograph the sky at stated times on April 12th and 13th, and again on July 12th and 13th.)

There are many examples of cumulus in the collection, but none showing changes in form of the same cloud; the nearest thing to it is a series of three pictures of cumulo-nimbus over London, with the dome of St. Paul's in the foreground. But the exhibitor shows more than one series demonstrating changes of form in the higher clouds; a particularly striking example is a series, taken at one-minute intervals, showing rapid changes in a sheet of cirro-cumulus. We counted no less than four distinct wave and ripple systems superimposed on the same cloud sheet, all of different wave-length and in varying orientations; and we defy even Sir Gilbert Walker to produce anything like it in his laboratory!

## THE I.L.N.: AN INTERESTING NUMBER.

The *Illustrated London News* for April 15th contains a description of some recent tests, carried out in America, of the effect of artificial lighting on large model aircraft, with a view to estimating the risks undergone by occupants of real aircraft in the presence of real lightning. Since sailplanes are the only aircraft whose pilots make a practice of deliberately flying in or near thunderstorms, it is reassuring to note that, as a result of these experiments, the danger of the occupant being struck directly is believed to be remote. The experiments were, however, carried out on metal models of airships and aeroplanes covered with fabric, and it is possible that wooden machines whose metal content is largely in the control cables might tell a different story.

In the same issue of the *I.L.N.* can be found some excellent photographs of spoonbills in flight; some two dozen are all shown in flapping flight together, and, as nearly every bird is caught at a different stage of its flapping cycle, the picture is most instructive.

On another page there is a reproduction of a painting, to be shown at the coming Exhibition at Chicago, of a "reconstruction" of Leonardo da Vinci's 15th-century ornithopter, worked by man power, as it would have appeared in actual flight, and a short description is given of how the thing was supposed to work.

## GLIDING IN UNIFORM.

According to *The Times* Berlin correspondent, a German illustrated journal recently published several pictures of "labour volunteers" (men who voluntarily enlist for labour rather than draw a "dole" without working) at a camp at Trebbin devoted to gliding flight. He adds: "The members, who wear a dark uniform similar to that of the Nazi Flying Corps, are, apparently, trained in the handling of machines, and from the pictures look like the nucleus of a future air force, their officers wearing revolvers."

## 75 MILES' DISTANCE FLIGHT.

A report has just come to hand that the German airman, Riedel, has made a soaring flight from Darmstadt, near Frankfurt, to Mimbach, in the Saar Valley.

He had travelled 75 miles in three hours, and had reached an altitude of 3,900 feet.

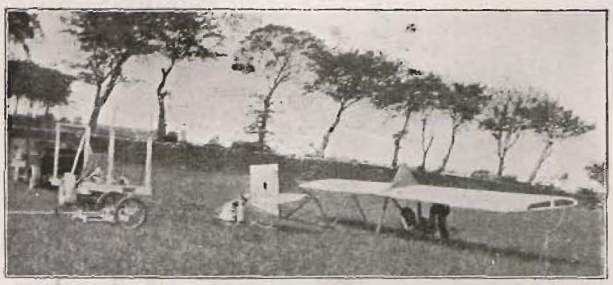
# GLIDING IN IRELAND

*By* C. A. BECK.

As far as can be ascertained, no official records of motorless flight existed in the country until operations were commenced by The Ulster Gliding and Aviation Club. This Club was founded in June, 1930, at Belfast, by four persons whose interests were aroused by Press reports of the Kronfeld Demonstrations in England, together with the rapid growth of the British Gliding Movement.

With the knowledge that good soaring country could be obtained near the city, the first step taken by these pioneers was to investigate the possibilities of arranging a gliding demonstration in the locality, with machines and pilots brought from England, but this proved impossible. Instead, public meetings were arranged in order to estimate what support would be forthcoming, and these meetings resulted in about 100 members being enrolled and the appointment of a committee in October of the same year.

The new committee lost no time in getting to work and, sufficient funds having been collected, a REYNARD primary glider was ordered. Unfortunately, unforeseen difficulties occurred which delayed the arrival of the glider in Belfast until the end of January, 1931, and as it was then thought advisable to have the machine slightly modified, it was not until March 14th that the first flying meeting actually took place. Only one member had previous gliding experience (obtained in England), and this led to his appointment as instructor, but, notwithstanding, several very good first attempts were made, hand-catapulting being employed. No times were taken, but several members reached heights up to 20 feet, which was considered promising. This meeting came to an end at the eleventh flight owing to damage to wing ribs and a broken skid, which somewhat disappointed the many spectators.

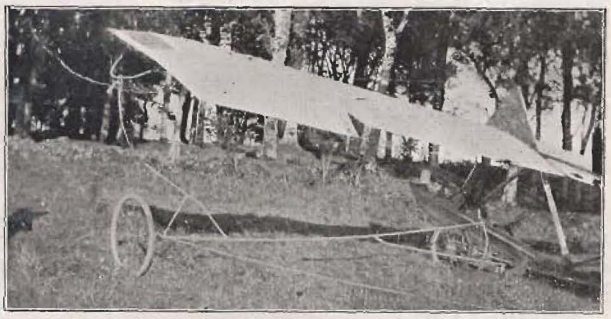


**The "Reynard" being rigged at Holestone, May 31st, 1931, showing also the trailer and retriever.**

From this date flying meetings were carried out practically every week-end with the REYNARD machine until the month of June, minor damage being often sustained, but always repaired willingly and in good time for the next meeting. The first meetings were held on level ground at Comber and at Ballymiscaw, Co. Down, but it soon became obvious that if progress was to be made, a slope would have to be obtained. Subsequently a 15-second slope was found at Clandeboye, Co. Down, and some good practice put in there, but the limitations of the place were quickly realised, with the result that the Club transferred its activities to a field with considerably more slope at Holestone, Doagh, Co. Antrim. The new terrain measured about 300 yards square, was surrounded by trees and also by a stone wall 8 feet in height. In the centre of the field there was an isolated clump of trees, again bounded by a stone wall, from which it is evident that the site was by no means an ideal one for gliding; perhaps the best that could be said for it was that a good "plateau" eventually allowed mechanical launching to be tried out.

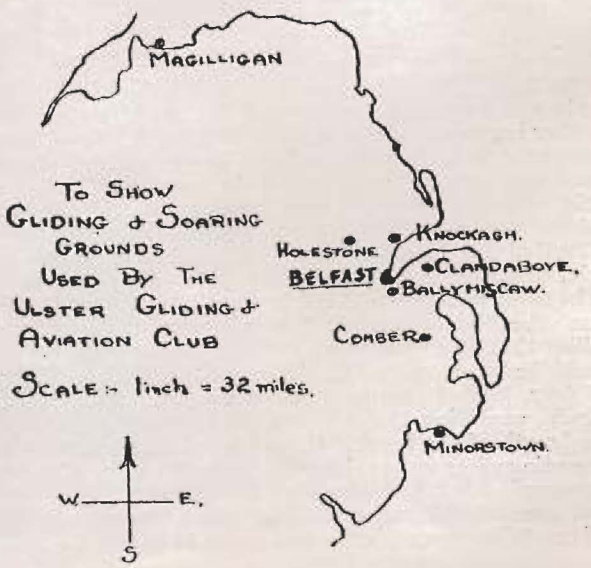
### The First "A" Certificates.

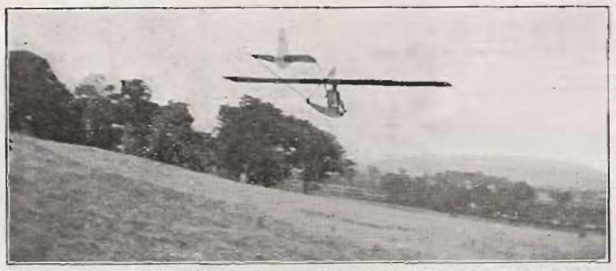
Despite these disadvantages, Holestone produced five "A" certificates, which gave the Club some satisfaction for the arduous work performed by the members, although the repair bill was attaining somewhat large dimensions. The REYNARD was wrecked in June, thus causing a two months' suspension of flying, but meanwhile a group of members were constructing a DAGLING primary from parts supplied by the R.F.D. Company; and this machine took the air for the first time two weeks previous to the REYNARD'S second appearance after rebuilding. The new primary gave very satisfactory results during its trials, but a marked falling-off in the regular attendance of members, who formed the launching teams, was responsible for the introduction of auto-launching with this machine. This auto-launching system was devised by one of the Club members, Mr. J. F. Harris, whose ingenuity and generosity had also provided the Club with an excellent trailer, in addition to a retrieving bogie for coupling to a car—thus saving a great deal of time and labour—and many other useful gadgets. Briefly, the auto-launch outfit consisted of a heavy quality bungy 60 yards long, with starting ring in the centre as for catapulting, both free ends being joined to a single 100-ft. long hemp rope, this passing through a pulley block anchored in the ground and being attached to a motor car driven at right angles to the line of flight of the glider.



**The club-constructed "Dagling," with J. F. Harris's retrieving device. The outrigged wheel is detachable.**

Higher launches now being the order, a flight of 42 seconds' duration was accomplished by the instructor, Mr. H. C. Wynne, this being the record for the Holestone ground. Soon after, however, a cross-wind landing ended with the collapse of skid and cabane joints, but continuity of flying was effected at the next meeting with the REYNARD, improvements having been made when rebuilding this machine. These improvements included a small fairing behind the pilot, which gave the glider a better performance, but the advantage gained only lasted for a few hours, as extensive damage was sustained in a crash through a collision with two of the trees bounding the ground.





**A cross-wind flight in the "Dagling" by J. F. Harris, Holestone, September 9th, 1931.**

After some weeks spent in repairing the R.F.D., flying was resumed again at Holestone, and many successful meetings were held until the season came to an end in October, 1931.

During the winter months, the construction of a KASSEL 20 fuselage and tail unit was commenced by two members with the assistance of one of the ground engineers, the necessary parts having been obtained from Germany together with wings and drawings.

**The Second Season.**

At the commencement of the second season, funds were low owing to a tremendous drop in the regular flying membership, the number being just sufficient to continue the Club actively as a going concern, and it was due to the generosity and self-sacrifice of some of the moving spirits that any gliding at all was carried out in Ulster during 1932. There were many setbacks, but eventually some members had the satisfaction of reaching the soaring stage.

As Holestone was no longer available for gliding it was decided after careful consideration to try auto-towing over level ground, and the excellent sands at Minorstown, Tyrella, Co. Down, were selected as the venue for the new departure in training. These sands are 1½ miles long by ¼-mile broad at low tide and practically free from obstructions, being very firm in general, but with an occasional soft patch. A 14.45 h.p. Talbot car was kindly placed at the Club's disposal by one of the members, Mr. J. P. Mackie, who also supplied the towing cables. Experiments began at Easter with the REYNARD machine further improved by the addition of a quick release which replaced the launching hook, a larger fairing, streamlined fuselage struts, enlarged fin area, metal shoe on skid, and several extra wire bracings which were considered necessary by the ground engineers.

Preliminary launches were made with a hemp cable of ½in. diameter and 150 ft. length which permitted flights to be made of between 15 and 20 seconds' duration. Towing was effected in a straight line into wind if possible, or, failing that, in a cross wind, and after two meetings flights could be made with the glider cable inclined at about 45 degs. behind the car while it was driven at about 35 m.p.h., according to the breeze, for the greater portion of the length of the beach. It may be added that, with the exception of an ex-service pilot, every member who tried auto-towing had had considerable experience of catapult and mechanical launching at Holestone. The average take-off run to become air-borne was about 50 yards, depending on the strength and direction of the wind. All the members were very satisfied with the more gradual rise as compared to the catapult, and the Club are convinced now that the use of the latter was largely responsible for the decrease in flying members owing to the alarming acceleration; also the hard work entailed.

**High Auto-Launches.**

So satisfactary were the results of towing with the short hemp cable that, at the third meeting, a wire cable 5-32in. diameter of 1,000 ft. length was substituted, which enabled flights up to 35 seconds' duration to be made from about 350 feet altitude by the REYNARD at the initial attempts. Some trouble was experienced through the cable breaking several times in the air, but it was found that this was directly due to the grinding action of the sand, and a 5-16in. diameter cable of similar length was tried and proved more suitable. Just before attempting the 45 seconds' flights for the "B" test, the REYNARD sustained damage through being overturned on the ground by a gust of wind, so the R.F.D. primary was now brought forward for auto-towing. The only additions to the latter machine were two extra drag wires, a metal skid shoe, and the quick release taken from the REYNARD.

The performance of the R.F.D. was surprising, heights up to 600 feet being reached with the 1,000ft. cable, and qualifying flights for the "A" and "B" tests became a relatively simple matter. Several of the members acquired sufficient skill to enable flying to be almost continuous, as, after the release had been given, the pilot would turn the glider round and head for the starting point, which was often reached. The cable had a release ring on each end which facilitated retrieving by the car. The best time for the R.F.D. was 115 seconds, made from a great height by Mr. P. Baster, one of the ground engineers, and in all this machine made about 350 auto-towed glides without damage. Soon six "B" tickets were gained, and it was apparent that the soaring stage was approaching, but it was thought that plenty of primary practice was essential, so flying in the DAGLING continued. Several of the turns were made over the sea, provided wind conditions were favourable, otherwise they were effected over the sand dunes, one or two landings being made in shallow water as a result of errors of judgment.

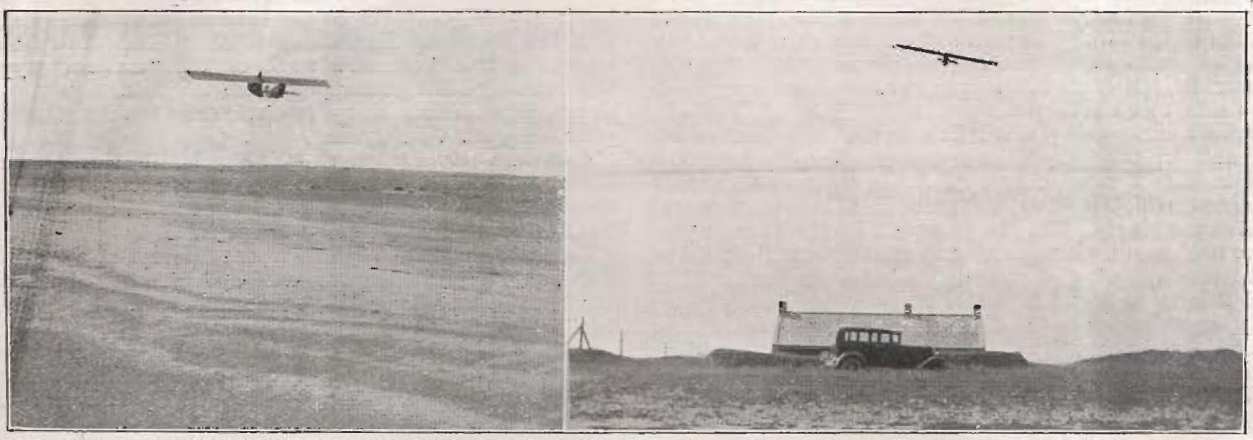


**The "Reynard" at Minorstown in June, 1932. Left: N. P. Metcalfe preparing to start. Right: a near view showing the extra wiring.**

While the REYNARD was undergoing repairs in Mr McFall's workshop, full use was made of the opportunity to build a fabric-covered fairing round the seat in order to cowl in the pilot. The cowling was an ingenious arrangement, and, when tried out, its effect on the performance of the machine was amazing. Many very fine glides were made over the Minorstown sands, the record now being raised to 153 seconds, until a broken wing postponed further attempts.

**The "Kassel 20" Arrives.**

The KASSEL 20 was now ready, and the owners very sportingly placed their machine at the disposal of Club members in possession of "B" certificates, and the auto-towed trials were very satisfactory. It should be mentioned, however, that before flying commenced, a quick release and metal skid shoe were fitted, metal shoes being necessary for wheelless gliders operating over sands. It was found that auto-towed flights could be made over Minorstown sands with the KASSEL 20 of up to 5 minutes'



**The "Reynard" at Minorstown, June 18th, 1932. Left: C limbing rapidly on the 1,000-ft. steel cable. Right: Mrs. Mackie returning to the beach after a long glide over the san dhills.**

duration, using the 1,000ft. cable, and in all about 100 ascents were effected during the latter part of June.

One drawback at Minorstown was the absence of hills suitable for soaring, and therefore a new site was sought for, and eventually found, at Magilligan Strand, Co. Derry. This strand is about 9 miles long by a furlong in width at low tide. For about 1½ miles from the east end, a row of cliffs rise to an average height of 400 feet, the highest and lowest points being 700 and 100 feet respectively. These cliffs eventually connect inshore with Binevenagh Mountain which has an altitude of 1,200 feet above sea level. The repaired REYNARD and the KASSEL 20 were taken on July 11th to this beach, which, by the way, is well known to automobile racing and motor-cycle enthusiasts. This outing was really with a view of trying Magilligan for auto-towing practice, and, when the contingent arrived, a good breeze was blowing in from the sea. After carefully observing the flight of a few gulls below the cliff tops it was decided to commence practice with the REYNARD. A few auto-towed glides in the faired-in primary, the final one of which ended in the sea with damage to a wing, showed that Minorstown was superior for preliminary training.

### First Soaring Flights.

After a brief discussion, the KASSEL 20 was rigged with a view to attempting a soaring flight over the adjoining cliffs, and Mr. N. Metcalfe was towed off from the extreme east end of the strand, which is just under the lowest portion of the ridge. A height of 500 feet was attained in an incredibly short space of time and the cable cast off. To the great surprise of the members present, the sailplane continued its climb at the same rate, reaching an altitude of 900 feet before disappearing behind the highest point of the precipice. The moist wind blowing in from the sea, deflected upwards by the cliff, caused the formation of stratus clouds at about 1,500 feet, and members had a thrill when the sailplane again appeared through the bottom of the largest cloud so formed! The pilot continued flying up and down the ridge for about 20 minutes, momentarily disappearing in clouds, to reappear again in the bright sunlight—before he decided to land. The descent, however, was not as simple as expected owing to the very strong upcurrent which the pilot found existing even as far out as half-a-mile from the ridge. A landing was eventually effected on the sands three-quarters of a mile from the west end of the cliff (total flight duration 25 minutes). Subsequently Mr. Mackie was towed off from the same starting point and reached a height of 2,000 feet, this flight being similar to the previous one, but of greater height and longer duration and perhaps with more cloud encounters. The next flight was made by Mrs. Mackie, who landed on top of an inshore portion of the cliff known as "Hell's Hole"—a very plucky effort, but she had rather bad luck in that some damage was sustained to the nose of the machine.

These first Irish soaring flights gave fresh encouragement to the Club, and repairs to the KASSEL 20 were immediately put in hand. The machine was tried out again at Minorstown in October, with several instruments supplementing the original air-speed indicator, including an aneroid, cross-level and clock, these being considered necessary after the cloud incidents at Magilligan.

### At the Knockagh.

A further soaring ground was found—a hill known as The Knockagh, about a mile from the north shore of Belfast Lough. This hill is about 900 feet above sea level and three-quarters of a mile long, the upper 400 feet forming a precipice, the soaring qualities of which were tried out in November with the KASSEL 20 on a day when the wind was blowing directly against the cliff. Several fine flights were made with catapult-launching, as the nature of the ground is unsuited to the auto method. Heights of 600 feet above the summit were attained without difficulty, the average flight being of about 30 minutes' duration with voluntary landing near the starting point.

The final soaring meeting of 1932 was held on The Knockagh in December. On this day the wind was not too good, blowing obliquely on to the cliff, but nevertheless a fine flight of half an hour was made by Mr. Wynne. An excellent flight was also made by Mr. Harris, but owing to failing wind it was not possible to effect another hilltop landing, and, after circling for a number of times.



**The Harris-Mackie "Kassel 20." Left: Ready for an auto-tow (showing release gear). Right: N. P. Metcalfe making the first soaring flight in Ireland, July 11th, 1932.**

over the outskirts of the village of Greenisland, he made a very neat landing in one of the large fields lying at the bottom of the hill. The year's operations closed next day with an auto-towing meeting at Minorstown using the KASSEL 20, but except for one or two fast down-wind landings this was uneventful.

From the foregoing, it will be seen that The Ulster Gliding and Aviation Club has made considerable headway, and to date a total of nine "A," six "B," and six "C" gliding certificates have been gained. It is to be regretted that at the close of 1932 the prospects for the present year were not too promising, owing to financial considerations, but since then a "pay-as-you-fly" scheme has been evolved and it is to be hoped that this will permit the Club—the only organisation of its kind in Ireland—to continue its operations and perhaps also to enlarge the scope of its activities.

*(Photographs by the author and Mrs. J. P. Mackie.)*

**The "Tandem" will live on.**—Mme. Peyret, the widow of Louis Peyret (designer of the tandem monoplane which won the Itford Gliding Competition of 1922), is to continue her late husband's work on the "tandem" type. His recently-built powered tandem monoplane, which is at present at Villacoublay, is now being flown again, the pilot being M. Vercruysse.

**Looping a "Grunau Baby."**—On March 27th, Herr Steiner, instructor at the Grunau Gliding School, looped the loop three times on a GRUNAU BABY. He carried a parachute, but did not find it necessary to use it.

**M. Girod**, a photograph of whose attempt at a "C" at Dunstable appeared in our issue of March 31st, has done it at last at the Beynes-Thiveral ground, where he soared for 13½ minutes in an AVIA XV-A.

**Belgian Glider Meeting.**—A week's training camp is being held at Hébronval, near Vielsalm (30 miles S.E. of Liège, in the Ardennes) from April 15th to 23rd. It is an inter-

# CLOUD FORMATION AND SOARING FLIGHT

*(Continued from Vol. IV., No. 5, p. 55.)*

In our issue of March 17th we gave the first instalment of a report of Sir Gilbert Walker's lecture of February 16th last, in which a description was given of attempts to imitate various types of clouds in the laboratory, in the hope of learning something about the motions in the air which accompany their formation. Liquid or air (as the case may be) was rendered unstable by the warming of its bottom layers and cooling of its top layers; and, in the resulting efforts of these layers to change places, the upward- and downward-moving portions of the fluid were found to be distributed in a more or less *regular pattern*, in close imitation of the patterns to be seen in certain forms of cloud. For instance, the pattern might consist of polygon-shaped "cells" fitting closely together side by side, or, if the fluid was set in horizontal motion and its lower layers retarded by friction, these "cells" would be drawn out into long rolls, each roll possessing a kind of vortex motion within it.

The important questions for those interested in soaring flight are: how large are such "cells" when they exist in the atmosphere? Do they ever extend down to the ground? How are the up- and down-currents distributed in relation to each "cell"; and are such currents capable of supporting a sailplane in flight?

All of these questions Sir Gilbert Walker proceeded to examine.

So far as can be gathered from experiments and theoretical work, the height of a cell should not be more than about a third or a half of its width; so that a cloudlet, if it occupies the top of a cell which reaches down to the ground, will have to subtend an angle of more than 90 degs. to the observer as it passes over his head. Such an angular diameter is practically unknown, but this need not worry us too much, since there is probably a wide difference between the theoretical and what actually happens in nature.

The lecturer brought forward evidence which appeared to show that "cells" such as can be produced in the laboratory actually exist in the atmosphere, and that records of changes in wind speed and direction, taken near the ground, show that these cells do actually extend down to ground level. The particular records used to demonstrate this were taken from "Geophysical Memoir No. 54," published on behalf of the Meteorological Office. (This publication was reviewed in THE SAILPLANE for July 22nd, 1932; it is entitled "The Structure of Wind over Level Country." The work described was carried out at Cardington—its application to problems of airship navigation is obvious. Mr. C. S. Durst, one of the authors, puts forward in it a "cell" theory which differs in some respects from that of Sir Gilbert Walker, and which he described after the lecture.)

These records show two distinct types of disturbances: those of short period are attributed by the authors of the Memoir to turbulance caused by obstructions on the ground; but there are others of larger scale, known as the "gust and lull," which suggest a "cellular" structure in the atmosphere, particularly as they are seen at their best when the air is in an unstable condition. Some examples of this type of disturbance were examined by the lecturer, who claimed that they would be accounted for by the passage past the observer of "cells" such as he had already described—that is, cells of polygonal shape in which the air is rising in the centre and sinking at the boundaries, while along the ground it tends to move inwards from the boundary of the cell towards its centre.

It is easy to guess what will happen to the wind as these cells go by. When the centre of a cell has just passed, there will be a sudden gust, due to the air hurrying on ahead to try and reach the cell's centre. Then, as another cell arrives and its centre approaches, there will be a slowing-up of the wind, owing to a tendency of the air to get drawn back towards the oncoming cell-centre. Supposing the centre of a cell to pass by to the right or left, then there will also be a change of *direction* in the wind, the air being deflected from its course in order to approach the centre of the passing cell. The lecturer pointed out two places where the records seem to show this effect. It may be remarked that his theory supposed that, the nearer the cell-centre, the faster the air flows in towards it. He put the average diameter of such a cell at about 300 yards, though the estimate given in the Memoir was some three to nine times as great.

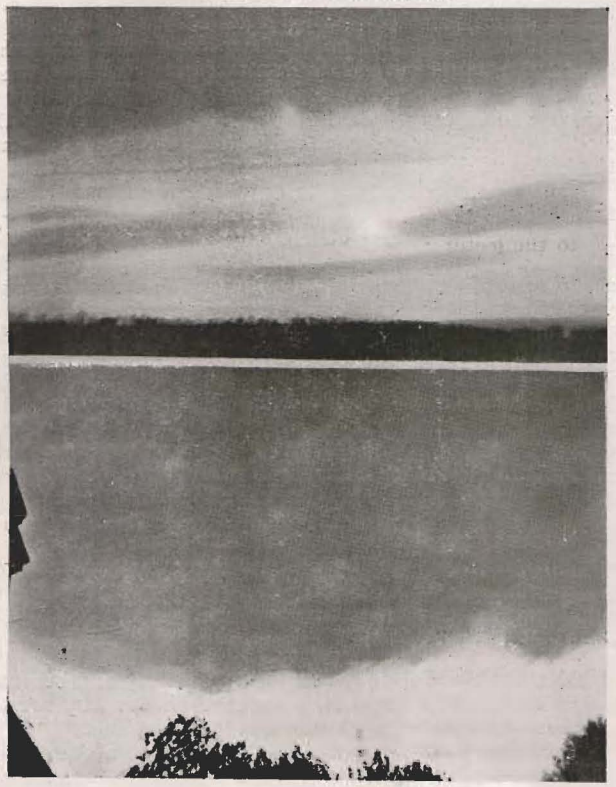
There is yet another type of gust, on an even larger scale, which occurs when the air is so unstable that thunder clouds are present. Its diameter, the Memoir shows, may be anything between four and thirteen miles, and would require ten to thirty minutes for its passage. Owing to the large size of such a gust, the rotation of the earth apparently comes into play in a mild form, and the result is a slight anti-clockwise rotation in the "cell." In consequence of this, the wind blowing past any particular station tends to change its strength and direction

**"CASTELLATUS" CLOUD.**



**Looking like miniature cumulus at a high level: a line of cloud moving from right to left along its length. (New Cross, August 3rd, 1929, 6 p.m. G.M.T., looking E.)**

"MAMMATO" CLOUDS.



**In each of these photographs the downward bulges show dark against a bright background. Above: formed in a high sheet of "false cirrus" derived from the anvil of a shower, or cumulo-nimbus cloud. (Dunstable, March 19th, 1933, looking S.W. into the wind.) Below: formed in a low cloud sheet on the right side of a large cumulo-nimbus. (New Cross, June 6th, 1927, 12.45 p.m. G.M.T., looking E. Wind S.W.)**

together, so that a gust is associated with veering (i.e., a change of wind direction to the right).

As regards the actual strength of the up-current in cells of smaller type, only a very rough estimate could be made, and the lecturer, reasoning from the anemometer records, estimated the average rise, in a cell of 1,000 feet diameter, to be something like three or four feet per second at a height of 200 feet, and probably greater further up.

The conclusion would seem to be that a useful up-current exists over a fairly large area underneath each cloudlet of strato-cumulus, where the "cell" that produces it extends down to the ground. Therefore, the lecturer suggested, when such cloudlets are passing overhead, a pilot would attempt to use them for climbing as if they were cumulus clouds. He also stated that, if the strato-cumulus took the form of long rolls, the pilot "must remember that it is in the long lines between alternate pairs that up-currents exist."

Sir Gilbert Walker also suggested a very useful criterion, based on the Cardington records, by which the pilot may know whether the cells and their associated up-currents extend downwards to near the ground: "With a mean wind of 15 to 20 miles an hour the passage of a cell produces variations of three to five miles an hour above and below the mean wind; but if the effect of the cells does not extend to the ground the oscillations are merely those of fictional eddies and probably do not exceed 1½ miles an hour above and below the mean." In cases where, although cells are present, there are no clouds to show where they are, the centre of a cell can be located by its arrival just after a lull and before a gust.

Since the purpose of the lecture was to draw attention to all clouds of non-cumulus type which might be of interest in the study of soaring flight, two other cloud types were mentioned.

The first of these, "castellatus," is also known as "turret cloud"; it has the appearance of miniature cumulus, rather high up, and is usually to be observed when thundery weather is to be expected. A power machine, with engine cut off, has experienced an up-current of at least 25 feet per second, due to such clouds. This is greater than the up-currents usually to be expected under strato-cumulus, which, according to Höhndorf, are of the same order of magnitude as under cumulus clouds, and are to be found below the level of the cloud—at cloud level the up-current is materially less.

Another type, "mammato-cumulus," is usually attributed to the presence of down-currents, since it occurs in the form of downward protruberances with rounded outlines.

"Finally," said the lecturer, "I would like to make it perfectly clear that the evidence on behalf of all that I have said upon the velocity of the air in connection with cells is incomplete, and that some of the conclusions reached can scarcely be regarded as more than plausible suggestions. I hope that at gliding meetings it may become an established routine that reliable anemometers shall be carefully watched; or if recording instruments are available that their records shall be examined. Only then shall we learn to make reliable inferences regarding cells from the gustiness of the wind; and in this way knowledge will be gained that will be of value to meteorological science as well as to motorless flight, knowledge which will knit still more closely the inevitable bond between them."

[*The foregoing account has been compiled from the lecture in its printed form, as we were not able to be present. For the report of the Discussion which followed, we are indebted to Mr. G. P. Hebden, of the Imperial College Gliding Club, and to Captain F. Entwistle for additional notes.*]

## DISCUSSION.

THE CHAIRMAN (Mr. E. C. Gordon-England) remarked that the closing passage of the lecture was most encouraging to all those engaged in the development of motorless flying, and was the justification of gliding for scientific research.

MR. DURST, in opening the discussion, showed some diagrams to illustrate an alternative theory to that developed by the lecturer. He considered that gust fronts at the surface assumed a horseshoe formation, in place of Sir Gilbert Walker's polygonal cells. The horns of the horseshoe pointed downwind, and the outline of the shoe marked the boundary between the up- and down-currents: the up-currents being inside and the down-currents outside the shoe. Thus the region of maximum lift would be immediately inside the bend of the horseshoe, with the greatest down-currents following very close behind. If a sailplane pilot were soaring in an up-current and passed directly up-wind he would meet the greatest down-current. If, however, he moved across wind, by skilful manœuvring he might be able to pass from one up-current to another without encountering the worst of the down-currents.

MR. C. H. LOWE-WYLDE called attention to the fact that whereas Germany had an organisation which was continually researching into cloud formations and their effect upon gliding, no such organisation existed in England for carrying out this very important work. He appealed to the Air Ministry to devote some of its money to such research.

CAPT. ENTWISTLE said it would probably come as a surprise to many people to learn that appreciable up-currents could be experienced under clouds other than those of the cumulus and thunderstorm type. At the same time he doubted whether the up-currents associated with strato-cumulus cloud were of the same order as those under a cumulus; the eddy motion in the former case was on a much smaller scale. The lecturer's description of the use of an anemograph to detect the passage of turbulent areas sounded very simple, but he doubted whether glider pilots would find it so in actual practice. The pilot depended more on what he could see, and this led the speaker to ask Sir Gilbert whether there was anything in the formation of the cloud which would indicate whether the

cell extended right down to the ground or not. He also asked what was the nature of the motion in cloud formed by the amalgamation of two neighbouring rolls of cloud which consisted of vortices rotating in opposite directions.

MR. DEWSBERY: Did cells have a definite life like a cumulus cloud, and did the ground temperature affect the up-current in the same way?

MR. BATEMAN quoted Hirth's bubble theory and asked the lecturer's opinion of it.

MR. SIMMONS said that the changes in the vertical plane were similar to those in the horizontal plane. At the N.P.L. they had been experimenting with a hot-wire instrument and had discovered an eddy 40 ft. in diameter which was rotating about a horizontal and a vertical axis.

SIR GILBERT WALKER: Mr. Durst's horseshoe effect was easy to produce in the laboratory in liquids, but notoriously difficult to produce in air. He had never seen horseshoe shapes in the sky, or photographs of them. His own slides were merely a selection from a large number, all of which showed formations similar to those he had produced in the laboratory. In addition, the effect of up- and down-currents very close together, on which Mr. Durst had laid stress, was impossible to produce experimentally without special precautions, and did not occur in Nature, as far as could be discovered. His own theory was founded on experimental evidence which was confirmed by observation of actual clouds.

Replying to Capt. Entwistle, he agreed it was surprising to find up-currents in strato-cumulus, but Kronfeld mentioned it repeatedly in his book. As to the possibility of judging the strength of the up-current by looking at the cloud, he could only say that if the latter were clean-cut, the cell would not extend far below it.

The life of a cell might be anything from four seconds to half an hour.

The clouds were not affected by any local heating, as they travel with the wind. Hirth's bubble theory described in rather picturesque language the conditions on a very hot summer afternoon.

THE MASTER OF SEMPILL, in proposing a vote of thanks to the lecturer, said he agreed with Mr. Lowe-Wylde that it was a great pity there was no money for research. But he felt that what we wanted was pilots who would help, whether they were power pilots or only glider pilots. [Why "only"?—ED.] Information was particularly needed about the height it was necessary to attain before the up-current of the cell was great enough to take the machine up into the cloud.

# CORRESPONDENCE

## THE B.G.A. STRENGTH FACTOR REQUIREMENTS.

Sir,

There are a few points I should like to make regarding the B.G.A. strength factor requirements as given in the Official Notice published in THE SAILPLANE of the 17th March.

These factors appear to have been taken at random from the Air Ministry Publication A.P. 970, without due regard to the different conditions under which sailplanes and aeroplanes operate.

For instance, I am surprised to see that a C.P. back factor of 4 is still called for when, as I pointed out two years ago, no such case can exist with a glider. The C.P. back case for aeroplanes is defined in A.P. 970 as the factor required with the C.P. in the position corresponding to the top speed in horizontal flight of the aircraft with engine on. A sailplane obviously has no maximum horizontal flight speed, engine on; its maximum speed is its terminal velocity. Only the three cases as defined for aircraft can exist—C.P. forward, Nose-dive, and Inverted. A C.P. back factor can only be called for if a definite speed between stalling and the terminal velocity is specified.

I should propose, therefore, that, as the terminal velocity of a sailplane can be as much as 200 miles an hour—a speed not likely to be realised in practice—the nose-dive factor of 1 and the C.P. back factor of 4 should be replaced by a factor of 2.5 at three times stalling speed, or, alternatively, the German method of a maximum loading on tail surfaces, which automatically covers the torsion loads at all speeds. I think either alternative is a better criterion for the C.P. back loads on sailplanes than a nose-dive factor, as accurate data of pitching moment characteristics in the region of no lift is usually lacking with the wing sections commonly used on sailplanes. Consequently it is difficult to estimate the terminal dive loads with any degree of accuracy.

So much for C.P.B.

The C.P. forward factor of 6 I would suggest is increased for the following reasons:—

It is realised, of course, that a load factor of 6 does not mean a factor of safety of 6, or anything like it. The C.P. forward load factors for normal and aerobatic aeroplanes are 5.5 and 7.5 respectively. These factors are supposed to give a factor of safety of 2, that is to say, correspond to loads about twice as great as the aeroplane will experience under the worst conditions. In other words, it is expected that accelerations of 5.5/2 and 7.5/2 or 2.75 G. and 3.75 G. are likely to arise with normal and aerobatic aeroplanes respectively. If a normal category aeroplane is subjected to aerobatic loads, such as is probable when cloud flying, this factor of safety of 2 becomes 5.5/3.75 = 1.47; a very small margin. This is why normal category aeroplanes sometimes break in clouds.

Assuming a sailplane will be subjected to accelerations at least as great as an aerobatic aeroplane—as, for instance, when cloud flying—the real factor of safety will then only be 6./3.75 or 1.6. I think it can be shown, however, that this small margin could be further reduced or even eliminated when cloud flying. It has been found, for instance, that vertical up and down gusts in the region of clouds when reduced to corresponding effective gust velocities—on the assumption that the transition from undisturbed air to the vertical gust is instantaneous—can be as high as 30 feet a second, the full force of which is developed before the attitude or speed of the machine is changed. Assume a sailplane, with its speed forced up to 60 m.p.h.—as it might well be in a cloud—encounters such a gust. The resultant incidence is temporarily increased beyond the stall and the resultant air speed to about 2.5 times stalling speed. This would give an acceleration of over 6.g.; sufficient with the present factors to cause wing failure. Also, if the gust were vertically down instead of up, which is just as probable, the real factor of safety—assuming the machine had the B.G.A. inverted load factor of 3—would be 3/5, which means, of course, failure has already occurred at a lower speed than 60 miles an hour. I would suggest, therefore, that, from these considerations alone, the C.P. forward factor should be increased from 6 to 8, and Inverted from 3 to 7. This still gives us a factor of only 1.33 under the worst loads obtaining in the example given above.

When the real factors of safety allowed in aeroplane structures are compared with those found in other branches of engineering it must be admitted we are skating on very thin ice. I suggest that it has only been possible to do this with reasonably few structure failures by insisting on a very elaborate and thorough inspection system for materials, construction and maintenance. The construction and maintenance of gliders does not have the advantage of this inspection system. It is impossible for the B.G.A. to provide really thorough inspection, and unless inspection is absolutely thorough, from the materials to the finished machine, and afterwards maintained when the machine is in service, it is worse than useless; it only shifts the responsibility and a false sense of security prevails.

Realising this, we use, in the construction of SCUD sailplanes, only Air Ministry approved materials for vital parts, combined with careful inspection and ruthless rejection of anything that is not up to scratch. This, of course, increases cost, but can we afford to do otherwise



**The "Scud II.," designed by Mr. L. E. Baynes, soaring at Dunstable.**

as things are?

Aeroplanes have not yet developed to the stage when there is anything to give away, consequently factors are kept to the minimum in order that the structure weight is sufficiently low to enable the machine to take off with something more than the pilot and a pint of petrol!

Careful nursing by the Air Ministry with all its vast resources is therefore necessary to make sure of this small margin of safety. We have not this safeguard with gliders and I consider that a further small addition should be made to factors—possibly quite inadequate—to give us a bit more in hand on this account. The final factors I propose would then be:—

| Present Factors. | | Proposed Factors. | |
|---|---|---|---|
| C.P. forward ..... | 6 | C.P. forward ..... | 9 |
| C.P. aft ..... | 4 | C.P. at 3 x V. min... | 3 |
| Nose dive ..... | 1 | | |
| Inverted ..... | 3 | Inverted ..... | 8 |

This will, of course, increase structure weight quite considerably, but the net effect on sinking speed with a typical sailplane would be an increase of about 6 or 7 per cent., say, from 2.2 feet a second to 2.35 feet a second.

We must get this back with increased aerodynamic efficiency if possible, and, in any case, surely this is better than finding one's sinking speed suddenly increased to 400 feet a second, the terminal velocity of a machine without wings.

As these proposals cannot, of course, apply to existing types, I would suggest that revised factors should be decided on as soon as possible, and it be made known that they will apply to all C. of A. applications for new type machines after, say, January 1st, 1934. In the meantime, parachutes for pilots when cloud flying should be the rule.

There are other alterations and additions that appear to one as being necessary, but I hope the above is sufficient to show that—apart from the importance of carrying parachutes—the strength requirements of sailplanes differ from aeroplanes in many ways and the load factors should be revised accordingly.

L. E. Baynes.

## "C" CERTIFICATE HOLDERS.

Sir,

The list of holders of "C" certificates, as given in Vol. IV., No. 7, of The Sailplane, is interesting but not quite correct.

For example, in the list of certificates ascribed to the Surrey Club there is one numbered 68 and dated 6.8.32. But the fact is that the Surrey Club was wound up in June, 1931, when it amalgamated with the Southern Soarers' Club, and entered on a new lease of life with the Southern Counties' Soaring Club. The pilot referred to was not a member of this Club at that date and is believed to have gained his "C" under the London Club.

However, there is *one* certificate ascribed to the Southern Counties Club, whereas there should be *five*, as taken from the names given in your list, and one other is omitted altogether—M. M. Thomson. Two others, Stratton and Reffell, were also members of the Club before it was so named, and gained their "C's" upon its site; so that eight "C" certificates in all may justly be claimed up to the end of 1932 by this Club, which has now become known as the Southdown Gliding Club, Ltd.

The complete and corrected list, then, is as follows:

| | | | |
|---|---|---|---|
| 27. | A. N. Stratton | (Surrey & Southern Soarers) | 7. 3.31 |
| 29. | A. H. Reffell | (Surrey & Southern Soarers) | 12. 4.31 |
| 28. | A. F. McGlashan | (Southern Counties) ... | 2. 8.31 |
| 37. | G. A. Little | (Southern Counties) ... | 30. 8.31 |
| — | M. M. Thomson | (Southern Counties) ... | 30. 8.31 |
| 89. | A. K. Bindloss | (Southern Counties) ... | 25.10.31 |
| 83. | E. K. Robins | (Southern Counties) ... | 25.10.31 |
| 227. | N. Cave | (Southern Counties) ... | 25.10.31 |

All these certificates were obtained by the pilots named, as members of the club as given, and upon my site at Balsdean (which I have since given up).

The result is top position of provincial clubs, for this club, up to the end of 1932. And it might prove a healthy inter-club stimulus to publish lists of certificates gained monthly, with quarterly and annual totals, of "A," "B" and "C" classes.

A. York Bramble,
Secretary, Southdown G.C., Ltd.

[We are glad to have these corrections, and congratulate the Club on their good showing. The list from which we obtained the particulars gives only the club where the "A" was obtained, though the necessary alteration was made where we knew the "C" to have been obtained on a different club's ground.—Ed.]

## THE ENSER RESEARCH SAILPLANE.

Sir,

I feel sure that this photograph and report re the "Enser Research Sailplane" will be of interest to readers of The Sailplane. This machine was designed and built to carry out full-scale tests with aerofoil sections at slow speeds.

Dimensions are as follows: Wing span 25 ft., chord 3 ft. 4½ ins., length overall 13 ft. 6 ins., weight (approx.) 100 lbs.

Data collected to date give a flying speed of approximately 30 m.p.h., gliding angle 1 in 20, stalling at approximately 25 m.p.h. Response to controls is excellent; the machine is remarkably stable, showing no signs of undesirable tendencies in any direction.

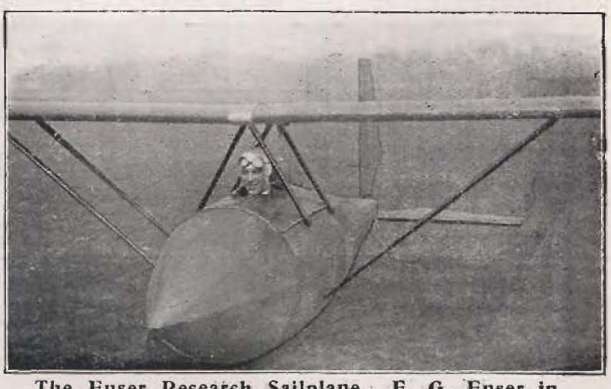
At first, in various try-outs, we found that the pilot invariably flew the machine much faster than was necessary, mainly, I believe, to a natural fear that with such a small machine a stall would be inevitable.

Mr. F. G. Enser, the designer of this machine, holds an "A" glider pilot's licence, and eventually decided to pilot her personally in all future tests, and after various modifications, a try-out was staged on the Great West Aerodrome on April 2nd. This is, of course, a flat ground.

Using shock cord auto-launch with one man holding the tail, Enser took off into a wind of 25 m.p.h., climbing to 120 feet, when he flattened out and took a semi-circular course to the right, veering gradually across, then down wind, finishing with a left-hand turn into wind and landing. Duration of flight, checked at 27 secs., and distance from point of take-off carefully paced out, proved to be 460 paces (length of pace 37½ ins.). Eight members of the Thames Valley Gliding Club were present, and the flight checked by E. S. Camps.

We hope soon to be able to go to a soaring site, results of which are certain to be of value.

C. Redman.



**The Enser Research Sailplane. F. G. Enser in cockpit.**

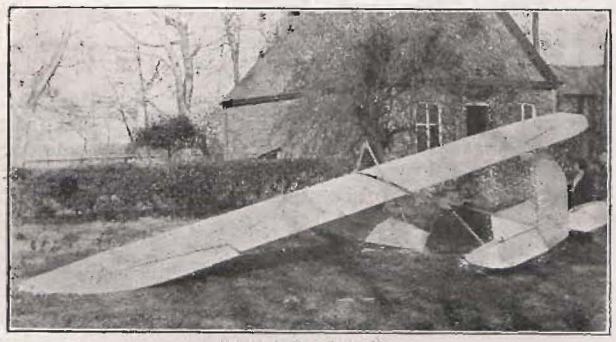
# NEWS FROM THE CLUBS.



**J. E. Raddings photographs himself climbing in the "Radlock Trainer" during an auto-tour at Hedon Aerodrome, Hull.**

[NOTE.—*All Easter News has had to be held over till next issue.*]

### A LIGHT WIND SAILPLANE.



**The "Zephyr."**

The sailplane ZEPHYR, which has been designed and built by Mr. E. T. W. Addyman, of the Aircraft Club, Harrogate, is shown here parked in front of the clubroom. The experience of the Club has been that winds are not often strong enough for the usual type of sailplane, and it is expected that the ZEPHYR will be suitable for the most frequent wind strength.

The particulars are as follows:—

Span 41 ft. 9 ins., length 20 ft. 8 ins., chord 4 ft. 8 ins., area 195 sq. ft., aspect ratio 9.5, weight 185 lbs.

### BRADFORD AND COUNTY GLIDING CLUB.

**Saturday, April 8th.**—Wind S.W., 18 m.p.h. A party set off early this morning for Manchester, to collect the CLOUDCRAFT PHANTOM from Mr. P. H. Michelson. It was a glorious ride over the Pennines in the clear air and warm sunshine. On the way back we found that the town of Littleborough is famous for steak-puddings. A forced landing near there would be quite worth while.

At "home," Stedman celebrated his recovery by two successive flights, both of 1 min. 5 secs. duration, on DICKSON Intermediate.

**Sunday, April 9th.**—Wind S.W., 25 m.p.h. Most of the time to-day was spent in maintenance work in readiness for our Easter Camp which opens next Friday. The "sliding gang" sat for hours, in turn, on REYNARD out on the moor doing balancing practice, the wind being too strong for elementary launching.

### FURNESS GLIDING CLUB.

**March 25th.**—Wind E.; very light. Training was continued at Ireleth. Auto-launching was tried for the more advanced members, and proved very successful, flights of over 1 minute being made on the East side.

**March 26th.**—Wind S.W.; very light. The car again proved very successful, both in launching and recovery. The wind getting round to N.W. put a stop to operations after 16 good flights.

**April 1st.**—Strong wind from the S.W. resulted in work being done in the clubroom on our new trailer.

**April 2nd.**—Wind S.W.; 25 m.p.h. The R.F.D. was rigged, and Stevens launched from the "Knob." He was unable to soar and landed on the top after 1 min. 50 secs. The wind grew stronger and operations were suspended in the hope of better conditions later. These failed to arrive, and the machine was put away without further flying.

**April 8th-9th.**—Weather hopeless. Work progressed accordingly on the trailer.

### LONDON GLIDING CLUB.

**April 8th and 9th.**—Another debauch, this time with only one machine damaged, a visiting PRÜFLING. Machines soared were: Miss Lippens's PROFESSOR, the CRESTED WREN (for over six hours), and two PRÜFLINGS; the POPPENAUSEN two-seater delayed her descents perceptibly, and the Watson-R.F.D. leaped and pranced, but descended irrevocably, having no nacelle.

On Saturday afternoon the breeze blew almost squarely up the hill at about 15 m.p.h, though full of modest gusts sufficient to keep the controls wagging—especially the rudder. Thomas and Hedges soared the Club PRÜFLING


# CELLON DOPE

**FOR**

## SAILPLANES and GLIDERS

Cellon Ltd., Upper Ham Road, Kingston-on-Thames

'Phone No.: KINGSTON 6061. Telegrams: "AJAWB, PHONE, KINGSTON-ON-THAMES."

for about half-an-hour each, having a charming time in the sunshine. Later the wind failed, and Grimston and Miss Churchill found the lift insufficient. The machine was also ground-hopped. The R.F.D. flew six times from the top, Eisenstädter obtaining a "45" towards his "B." The older R.F.D. ground-hopped. Meanwhile the WREN pottered about from the Bowl to the Zoo until the failing lift confined her to the home-ridge and finally, after 1 hour 47 mins., brought her down. Such are the extra joys of syndicate-ownership when only one shareholder is about.

It is impossible to give Sunday in detail. A S.W. wind, about 20 m.p.h., blew obliquely to the ridge, putting up a barrage of down-currents between the launching-point and the Zoo. Miss Lippens's PROFESSOR, in good hands, made short work of this barrage, Major Petre, Dewsbery, Thomas, Buxton, Robertson, and Collins reaching vast and dignified heights everywhere, Robertson making the original test-flight.

The air grew thick with PRÜFLINGS soared by Hedges, Slingsby, Grimston, and many others. The R.F.D. careered downwards over and over again. Mr. A. N. Other made a stalled landing, bounced loudly, leapt out of the machine, and then pulled her down out of the sky as she started to sail away empty. Ground-hoppers politely asked for ground-hops, but received none, all resources of man-power being employed in hurling machines off the top. I have lost my voluminous notes, but remember a glorious side-slip to earth by Collins in the PROFESSOR, Grimston's amazing height in the PRÜFLING, several horrific take-offs, the readiness of spectators to launch the (to them) gladiators, the POPPENAUSEN'S gingerly descents, some cart-wheel turns and terminal-velocity dives, the FOX-MOTH owner's unique PRÜFLING landings on assorted and highly unusual parts of the landscape. One draws a veil over the PRÜFLING crash. Vaulting ambition o'erleapt itself, but the pilot was not hurt physically. This week our own machines emerged intact.

In the WREN the syndicate and Collins and Thomas soared all day. She had some trouble in butting her way through to the Zoo, but reached the ultimate pine-clump, which is the end of everything, with 60 feet showing on the aneroid. She reached home with about 120 feet in hand. Then she hit another volcano, as last week, and joggled her way promptly up to 300 feet. Thereupon the pilot pushed off up-wind, *gaining* height to 500 feet until one mile out from the hill. At this juncture she was mistaken for a PUSS-MOTH in transit. The ecstatic pilot then tried to round Totternhoe Church (1¼ miles), out of pure light-heartedness, but, when within a couple of hundred yards, noted that the aneroid was beginning to fall fast. So, with 230 feet in hand (all these heights are relative to the launching point), he legged it for home and came in with about minus 150 feet.



**Soaring at Dunstable on April 9th: two successive photographs. Left to right: Thomas in "Crested Wren," Collins in "Professor," Grimstone in "Prüfling."**

This volcanic phenomenon, which also happened twice to the same machine and pilot on the previous Sunday, is at present a mystery. The sky shows no sign, and the conformation of the ground seems to have nothing to do with it. It does not seem to be a "thermal," at any rate in the normal sense of the word. All that happens is that something explodes under the machine, the air is turbulent, the aneroid goes mad, and the pilot has the thrill of a lifetime. Without an aneroid he would probably fail to observe the commencement and would fail to hang on to the proper spot in the air. On all three occasions this minor miracle has happened at the same place, opposite the *promontory* (not gully, mark you) by the launching point, thus proving Major Petre's dictum, that promontories are to be preferred to gullies.

Slingsby suggests that the extra lift may be caused by the main air-flow driving up over a jumble of air temporarily jammed against the hill. The amazing part of it is the ferocity and the extent of the extra lift.

It is worth spending hours in the air trawling for these volcanoes if only to experience the emotion of rising higher and higher without the remotest apparent reason, and then to *climb* away over flat-fields for ten minutes on end! Away from that dratted ridge at last!

The next move is, obviously, to circle away *down*-wind. But, for this, two main features are necessary: a sign in the sky, and a height of at least plus one thousand feet. Rate-of-climb indicator if you like, but a good aneroid seems to be almost enough in actual practice.

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Having thoroughly tried out our latest soaring site, Steep Down, Lancing, we are now able to say from experience that the prospects from the preliminary survey are more than realised. The principal and most useful aspect is that of a shallow arc of steep, smooth hillside, average 250 feet in height, looking N.E. upon some 900 acres of unbroken grassy plain, with a very large and useful barn as a hangar right in the midst of the site. Experience of some years of gliding has shown that in this part of the country the principal winds of utility are S.W. and N.E.; and while the former blow more frequently than the latter, yet many of them are un-usable owing to gales and rain. So that the N.E. winds, which are invariably dry and steady, are just as useful as the suitable S.W. winds, that is, from the point of view of a site.

**Sunday, March 26th.**—The B.A.C. two-seater was operating all day, and much useful instructional work was carried out under dual-control. The utility of the flat plain in conjunction with the adjacent mile-and-a-half ridge was amply demonstrated when the wind failed and flights of two minutes and over were made from auto-towed starts. These were carried out with clock-like regularity.

### ULSTER GLIDING AND AVIATION CLUB.

If the somewhat provoking remarks in the last two issues of THE SAILPLANE, anent the activities of the above Club, were intended to produce a batch of news, then the notes submitted below may be considered to be the result of the plot, though actually they were being compiled when the said remarks appeared. Perhaps we ourselves are in part to blame for THE SAILPLANE'S having to fish for its copy from the columns of provincial newspapers, which are notorious for inaccuracy and hyperbole. We would qualify our contrition by remarking that newspapers are produced for the public, not the public for newspapers, and thus the plebian cravings must be satisfied. We are no more responsible for the gullibility of the Irish canaille, and hence for what goes into the Irish newspapers to please it, than the Editor of THE SAILPLANE is responsible for the mentality of those who patronise the *Daily Mail*.

The privately-owned KASSEL 20 continues to be our main strength and stay, and our R.F.D. primary is being overhauled for a small contingent who are anxious to make a fresh start.

**March 11th and 12th.**—Auto-towing at Tyrella, Co. Down. Machine, KASSEL 20; total flights, 27.

**March 25th.**—Five members made excellent soaring flights in the KASSEL in a strong S.S.E. breeze (blowing Beaufort force 6 at times) at Knockagh, above Carrickfergus. Our sixth "C" certificate was obtained by Baster, our ground engineer, on this day. Average duration of flights, 20 minutes; number of flights, 7; maximum height reached, 1,100 feet above the summit. The KASSEL is now fitted with an altimeter reading to 3,000 feet; we can report this instrument as very satisfactory, especially as regards lag, which is small. The last flight ended in a field near Greenisland railway station, about three-quarters of a mile out from the face of the ridge and 650 feet below. The length of the steep part of the ridge is one mile, and at the highest part there is a sheer drop of 400 feet. Launching is carried out some 50 yards back from the cliff face, with no trouble at all.



**The Ulster Club's "Kassel 20" on the Knockagh, Co. Antrim. Above: Preparing to launch. Below: Landing on top, 150 yards back from the face.**

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**The G.A.P.A.N. Civil Air Display.**—This display, which is organised on behalf of the funds of the Guild of Air Pilots and Air Navigators, will be held this year on May 20th at Brooklands.

**Among the Alps.**—Willy Farner, who was recently towed in a sailplane across the Alps from Zurich to Milan, has carried out another test flight; starting from Zurich, he was towed behind an aeroplane, and landed on the frozen lake at Arosa, 5,900 feet above sea level.


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# OFFICIAL NOTICE

**ENTER NOW FOR THE B.G.A. COMPETITION.**

As is announced on another page, the B.G.A. Competitions will be held not far from Newbury; there are only one or two final details to be settled before we can give definite information regarding the training site—the soaring site has been settled.

All entries for the Competitions must reach the B.G.A. at the earliest possible moment. Will those who intend to take part in the soaring competitions and attend the training camp send in their names at once. Address: 19, Berkeley Street, London, W.1.

The B.G.A., by undertaking to provide facilities for gliding and soaring for a whole month, has launched upon the biggest and most ambitious scheme it has ever attempted, and it should receive everybody's support.

Read through the Rules and Regulations for this Competition as published in the last issue of THE SAILPLANE, and make sure that you—whether club or individual—have carried out the instructions. If there is any point which is not quite clear, ask for a ruling at once, but, once again, if you have not sent in your names, *please do so at once.*


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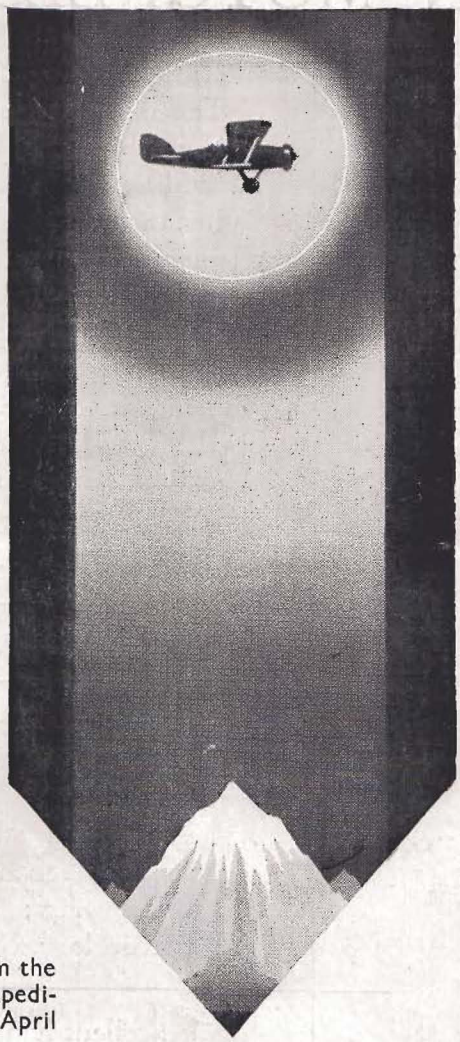
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A cable from the Everest Expedition dated April 3rd—

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