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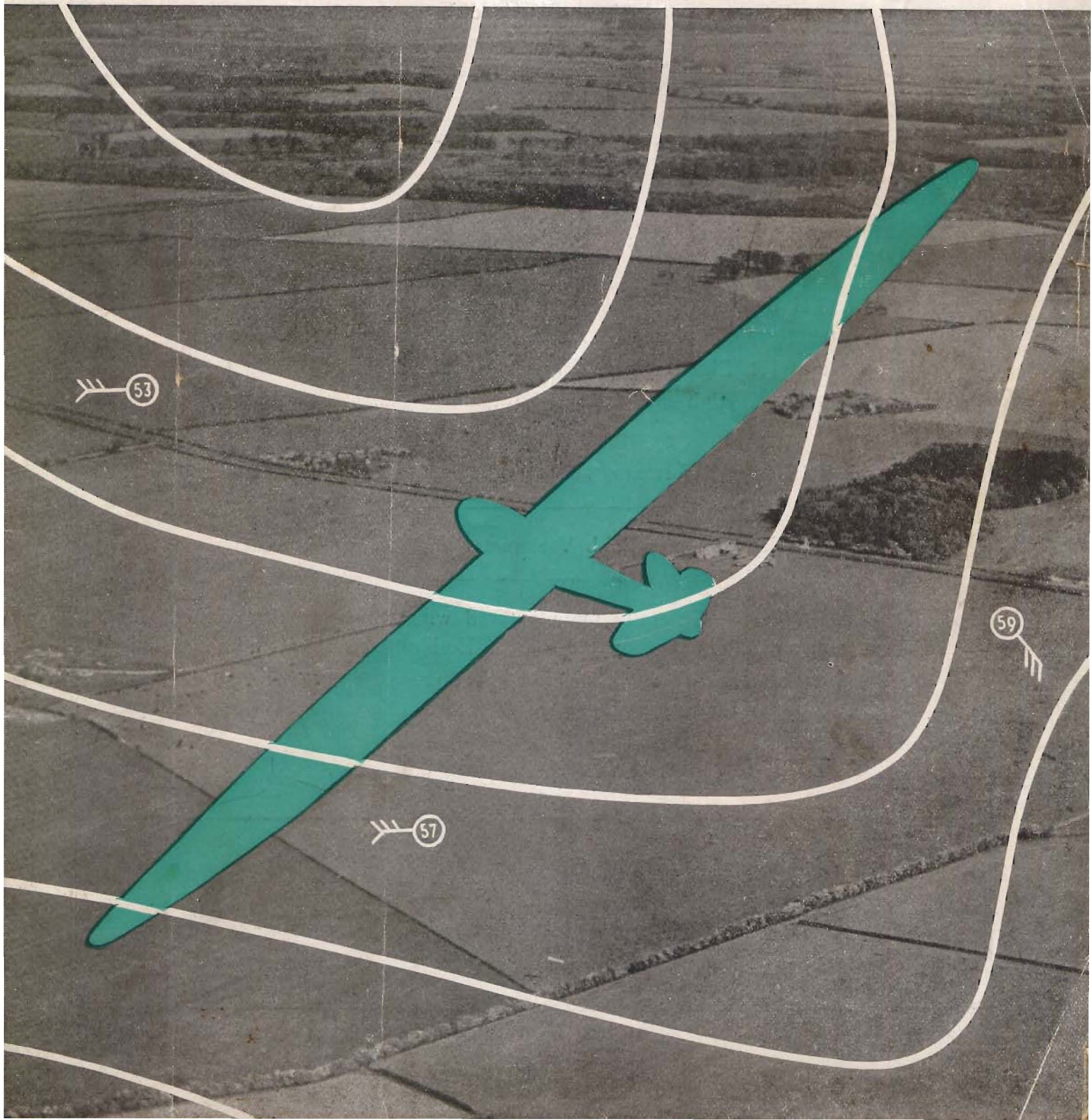
# SAILPLANE AND GLIDER

JANUARY
1938
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*Official Organ of the British Gliding Association*

EDITED BY ALAN E. SLATER



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# THE SAILPLANE *and* GLIDER

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Editorial Offices: 13, VICTORIA STREET, LONDON, S.W.1 Telephone: ABBEY 2615-6-7

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## Fixtures for 1938

INTERNATIONAL meetings, national meetings, club meetings, instruction courses—plans for many of these have already been made, while others have still to be decided upon.

The *Fédération Aéronautique Internationale* have yet to meet and decide where this year's international soaring contest will be held. Poland has been suggested as a likely place. It would, of course, be delightful if a British team could again take part, but at the moment there is, it must be admitted, a lack of suitable machines, as well as of money.

The site of the British national meeting has also not yet been decided, but it is pretty common knowledge that there is a possibility of Dunstable being chosen, in which case the first half of July would be a likely time, and aero-towing would have to be provided for days of no soaring wind. But no decision has been come to yet.

To get down to something more definite, Easter (April 15th to 24th) is the period of the Midland Gliding Club's meeting for advanced pilots and private owners, about which a letter appears on page 17; while the Yorkshire Club is holding a club meeting from April 16th to 19th. A similar club meeting in Yorkshire is to be held on Empire Day week-end (May 29th).

The Yorkshire Club has announced its annual competitions, combined with a high-performance instruction course, including aero-towing, during Whitsun and the week following (June 4th to 12th). The Derbyshire and Lancashire Club have applied to the B.G.A. for dates for the holding of two open meetings: one at Whitsun and the other for the week beginning August 27th; the actual dates will be announced shortly.

The Newcastle Club have announced a "Gipsy Meeting" to take place from June 18th to June 26th inclusive. The idea, we are informed, is to provide pilots with flying on a number of different sites, depending on the daily wind directions, all of which have been used by the club, and which are in reach of their headquarters at Cramlington. Pilots will be quartered at Cramlington, and each day will proceed to the site for the day. On days without soaring winds it is proposed to provide aero-towing. This meeting may appeal to those pilots who look back to the days when one wandered over the country exploring new ground, and flying off new sites does without doubt provide very valuable experience which it is difficult to obtain in any other way. The number of visiting pilots will perforce be limited, perhaps to, say, half a dozen. Those interested are asked to get in touch with P. A. Wills, 3, Chapel Street, Milton Street, London, E.C.2, who is London representative of the club.

There will be many training camps this year. The Derbyshire and Lancashire Club is holding two, from June 6th to 19th and from June 27th to July 8th, while the Yorkshire Club's annual training camp will be from July 30th to August 20th. The London Club, as last year, is holding a training camp every month throughout the spring and summer.

## British Gliding Association

### Important Notice to Manufacturers and Gliding Clubs

The Air Ministry have decided that any new type civil aeroplane for which an application for a certificate of airworthiness is received on or after the date of issue of the relevant amendment to Air Publication 1208 shall be subject to the following requirements:—

"Provision is to be made to render mechanically impossible the assembly of control systems with reversed connections. Any suitable and effective method may be used. The following are possible methods.

"(*a*) Attachment fittings provided with different sizes of pins.

"(*b*) Attachment fittings designed to assemble in one position only.

"(*c*) Lengths of cable and positions of fairleads arranged to make incorrect assembly impossible.

"(*d*) Use of levers and rods instead of cables."

**This requirement will also apply to gliders and sailplanes.**

H. E. PERRIN,
*Secretary.*

# From Here and There

**Gliding for the R.A.F.**—A number of newly commissioned pilots of the Royal Air Force will in all probability, according to *Popular Flying*, take a preliminary course with the London Gliding Club before being passed on to powered machines.

* * *

**Christmas Cards.**—Once again we thank readers for their Christmas cards, which make a fine collection this year. Gliding photographs are greatly in evidence, and original sketches show talent which should not be allowed to lie dormant till next Christmas.

* * *

**Sailing in the Services.**—The Royal Naval Sailing Association, which held its second annual meeting in December, now numbers 1,300 members. A Royal Air Force Soaring Association has not yet been formed. Instead, a R.A.F. Yacht Club has been started, for sailing races with 14 ft. dinghies.

* * *

**An Article to Read.**—An illustrated article on sailplane construction in general, and on the H-17 sailplane in particular, is appearing in the January issue of *Wood*. Copies are obtainable through any newsagent, or from the publishers of *Wood*, at 33, Tothill Street, London, S.W.1; price 1s. post free.

* * *

**Midland Club Dance.**—This event, to which we were invited, was held with great success in the Edgbaston Botanical Gardens on December 17th, and raised a welcome addition to the club's Appeal Fund. A feature of the decorative scheme was a real live H-17 ("The Tiddler") hung from the roof of the dance hall.

* * *

**New Bird Man.**—Manos ("Mickey") Morgan, aged 26, has begun to emulate the late Clem Sohn by jumping from 10,000 feet from an aeroplane over Oakland, California, opening up a pair of "wings" between his arms and body, and "swooping like a giant bird" for 90 seconds before taking to his parachute at 1,400 feet.

* * *

**Southdown Annual Meeting.**—The Southdown Gliding Club's Annual General Meeting, on January 30th, will be followed by a dinner (7.45) and dance and social evening to which members of any gliding clubs are welcomed. Seats for dinner (2s. 6d. inclusive) must be reserved five days beforehand through the Social Secretary, Langford's Hotel, Third Avenue, Hove, Sussex.

* * *

**R.Ae.S. Reception.**—The council of the Royal Aeronautical Society, it is announced in the Press, will hold the annual reception on January 19th in the Science Museum at South Kensington. Special films on aeronautical subjects and the latest type of television apparatus will be shown. Non-members of the society, including ladies, may attend the reception; tickets (5s. each, including buffet) may be obtained of the secretary, 7, Albemarle Street, London, W.1.

**To South Australians.**—Mr. H. M. Hedges, who has had some years' experience in the construction and repair of gliders, and has been a member of the London Gliding Club for the past seven years, is going to spend the next seven years farming in South Australia. Mr. Hedges tells us that he will be very pleased to give advice on gliding matters to anyone in need of it in his part of the world. His new address is: H. M. Hedges, c/o J. Patterson, Green Hills, Wistow, Mount Barker, South Australia.

* * *

**Thunderstorms over Brazil.**—The French aeroplane pilot, Paul Codos, who recently flew from Le Bourget, France, to Santiago, Chile, stated on arrival at Santiago (says *Flight*) that "between Caravellas and Rio de Janeiro he climbed to nearly 17,000 ft. to avoid violent thunderstorms, but found that the higher he went the more disturbed the air became, so he brought the "Farman" down to a lower level. This phenomenon was directly opposite, according to Codos, to what is usually encountered in temperate climates."

# Gliding Certificates

The following gliding certificates, for which qualifying flights were made on the dates shown, were granted by the Royal Aero Club on December 14th.

## "A" Certificates

| *No.* | *Name* | *Club.* | *Date* |
|---|---|---|---|
| 856 | C. J. E. Kendall | Derby and Lancs. | 21.11.37 |
| 857 | R. T. P. Whipple | London | 18.9.37 |
| 858 | G. W. Pirie | Cambridge Univ. | 18.11.37 |
| 859 | R. S. Woolass | Derby and Lancs. | 21.11.37 |
| 860 | A. J. E. Benton | Derby and Lancs. | 21.11.37 |
| 861 | E. D. Baker | London | 21.11.37 |
| 862 | R. M. Dixon | London | 14.11.37 |
| 863 | J. A. Nathan | Cambridge Univ. | 7.11.37 |

## "B" Certificates

| *No.* | *Name.* | *Club.* | *Date.* |
|---|---|---|---|
| 773 | J. D. Phillips | Derby and Lancs. | 21.11.37 |
| 855 | R. C. R. Savage | Newcastle | 20.11.37 |
| 750 | R. S. Bussey | London | 25.7.37 |
| 740 | J. Hughes | Derby and Lancs. | 7.11.37 |
| 819 | F. Jewitt | Newcastle | 28.11.37 |
| 730 | A. F. Leach | Newcastle | 5.12.37 |

## "C" Certificates

| *No.* | *Name.* | *Club.* | *Date.* |
|---|---|---|---|
| 731 | H. Bowler | Derby and Lancs. | 14.11.37 |
| 601 | L. L. D. Orme | Derby and Lancs. | 20.11.37 |
| 813 | I. G. F. Harris | Derby and Lancs. | 14.11.37 |
| 641 | R. C. H. Pinchin | London | 24.10.37 |
| 804 | D. Campbell | London | 14.11.37 |
| 740 | J. Hughes | Derby and Lancs. | 14.11.37 |
| 682 | R. E. Sellar | London | 5.12.37 |
| 757 | F. C. Mackenzie | London | 5.12.37 |

A good way of dealing with those who, having made a qualifying test flight, do not trouble to get the actual certificate, has been adopted by the Chief Instructor of the London Gliding Club. He has decreed that pilots who have passed their "A" or "B" tests will have to go on flying in open primary machines until they can produce the certificates, and "C" pilots, similarly, must show the actual certificate before they can be transferred to a FALCON.



**Winter soaring as it is done at Bradwell Edge: a fine photograph taken by J. G. Shepard, of the Derbyshire and Lancashire Gliding Club, while flying as a passenger in the club's two-seater "Falcon III."**

# An Unofficial Record!

MR. M. V. LAURIE writes:—

The following account of how the height, duration and distance records were broken about 18 centuries ago may interest your readers. It is an extract from "The True History" of Lucian of Samothrace (125 A.D. to 180 A.D.) as translated by Mr. Francis Hickes (1634):

"On the morrow wee put to sea againe, the winde serving us weakely, but about noone, when wee had lost sight of the Island, upon a suddaine a whirlewinde caught us, which turned our shippe round about, and lifted us some three thousand furlongs into the aire, and suffered us not to settle againe into the sea, but wee hung above ground, and were carried aloft with a mightie wind which filled our sailes strongly. Thus for seven daies space and so many nights, were wee driven along in that manner, and on the eighth day, wee came in view of a great countrie in the aire, like to a shining Island, of a round proportion, curiously glittering with light, and approaching to it, we there arrived, and tooke land."

Not contented with reaching the Moon—for this land was none other—they did a tour round the heavens visiting the "Morning Starre now newly inhabited," the "Zodiacke, passing by the Sunne and leaving it on our right hande," and various other celestial places. The landing on earth was normal from their description: "The third day after, the ocean appeared plainly to us, though wee could see no land, but what was in the aire: . . . the fourth day about noone the wind gently forbearing settled us faire and leasurely into the sea: and as soon as we found our selves upon water, we were surprised with incredible gladnesse, and our joy was unexpressible."

How now, ye that boast of your feeble little flips of fifty or a hundred miles done on a Sunday afternoon? What of it, thou that hast floated for five hours and one minute between the "bowl" and the lions and hast returned to earth full of lamentation for the tenderness of thy bottom? Lucian of Samothrace has set records that remain unbroken to-day after eighteen centuries, and who will gainsay the truth of his account even though he did not have an official observer, for is it not entitled a True History, and would not Zeus himself testify to his passing by?

# Bradwell Edge to Great Driffield

## A 72-MILE GOAL FLIGHT

*By* P. A. WILLS

SEPTEMBER 3RD was the second of the three consecutive phenomenally active days during the 1937 competitions. The wind was south of west, 20–25 m.p.h., and down-wind would take me considerably south of the course of my declared goal-flight to Great Driffield, along the south bank of the Humber towards North Coates. I had flown to North Coates the day before, and went there again the following day. This day, though, I wanted a change, so declared for Driffield.

I took off in HJORDIS at 11.35, and in a few minutes found lift under an approaching cloud-street, under which we fled six miles down-wind to Stannage Edge, which was a bit less crowded than Bradwell. Here, in company with the CAMBRIDGE and Peter Davis in our gallant old SCUD II, we soared up and down for perhaps twenty minutes, surveying the scene of carnage below.

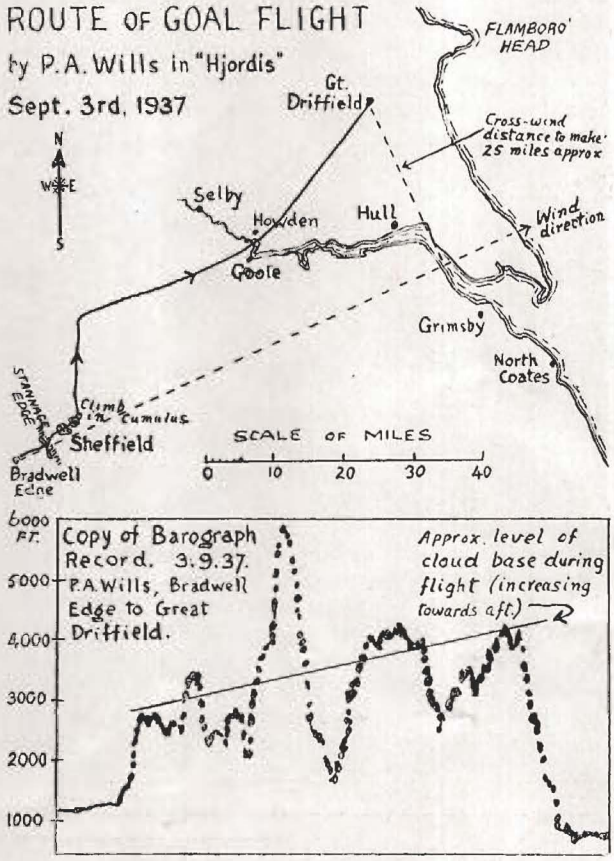
Misled by the truly staggering conditions of the day before, when people left the hill just after breakfast and landed for elevenses at Hull—when shrieking virgins were whistled, impotently struggling, in secondaries up to cloud-base and deposited a short while later dazed but in one piece at the seaside—sundry innocents had, a second time, cut away from the hill straight from their take-offs, and were now to be viewed adorning the rather forbidding scenery at the foot and on the slopes of Stannage Edge, 6 miles from the start.

Now a thermal came along which took us to 2,000 ft., and as the country behind Stannage Edge falls a further 1,500 ft., this was good enough, and I set off for Sheffield. The voluminous smoke from the town was being sucked up in a sort of funnel to a tremendous cumulus cloud over its eastern boundary.

We flew directly over the town and started to climb. It was a large and meaty up-current, and gave me a chance to check my course on the map as I circled up. I found we would have to make a considerable distance cross-wind to reach the goal (actually on the map it measures 25 miles across in 60 to go altogether), so decided to try one bite at the cherry (or bullet) and get an altitude in the cloud above enough to achieve the cross-wind distance in one glide.

We went into the cloud at 3,600 ft. (sea-level heights) and found very strong smooth lift at 12–14 ft. per sec. After about 1,000 ft. a sharp rattle started on the cockpit cover and we entered a region of rain or hail. I noticed from a few drops which came in at the open window and fell on the instrument board that the moisture was a dirty grey. Sheffield's muck was having a high old time a mile above the town.

A second thousand feet, and at 5,900 ft. the machine gave a little shudder, the first since entering the cloud. I was taking no risks of entering turbulent air blind in HJORDIS, so straightened up and steered a compass course due north. There was a bit of racketing as we passed out of the strong up-current into the descending edges of the cloud, then we came out of the side of a vast billowing cliff of dazzling white, miles high.




Personally, I seldom manage to come out of a cloud well above the cloud-base level in a state of mind sufficiently placid to appreciate the scene, but when I do it never fails to take my breath away. Seemingly miles below was the green, brown and grey patchwork of industrial England; in front, across a wide chasm of clear blue air, shone another street of cloud. Like Blondin crossing Niagara on a tightrope, we pushed off from the friendly monster behind and made for the other side, sinking steadily. The air between the clouds at altitudes above the cloudbase seems incredibly smooth and creamy, and even the normal hum of the machine is subdued in awe.

This air is also steadily descending, and our sink was as much as 5 ft. per sec. until we reached the level of the cloud-bases. Here, although we were still in the clear sky, the rate of fall checked for a while, then continued again. Twenty minutes of steady descent seems an age, and we were down to barely 500 ft. above the starting height before we struck more lift; but now Driffield lay nearly down-wind, so from now on course-finding was pretty easy.

We climbed again into the cloud above, and went off down-wind, passing over Goole, where the Humber estuary starts. We left the end of the street, and over the southern boundary of Howden airship field struck trouble.

Ahead had appeared the menacing grey line of a front travelling cross-wind from the north-west; under it heavy rain. We approached it at an angle, and unexpectedly early hit the up-current leading it. There was a loud bang, and my heart leapt into my mouth. The green ball of the Slater-Cobb variometer leapt into its mouth too, and disappeared for good. I banged it and cursed it, but to no avail. It had irrevocably swallowed its false teeth, and the red ball started a simultaneous sympathetic strike. My goal was still over 20 miles ahead, and I had to try and make it by means of the sensitivity of the posterior, a notoriously unreliable instrument.

I went on for a mile or two, but my altimeter failed to flatter my anatomy: we lost height steadily; we were not going to make it. In a pet, I flung my solid map on to the seat beside me. It struck the variometer thermos flask, anchored to the floor just in front of the seat, with a slight crack; simultaneously the green ball dropped miraculously out of the top of its tube, and both green and red sprang to life again.

From being too difficult the flight now became too easy. The advancing front caught us up; we arrived over Driffield aerodrome at 4,000 ft., and started to hurry down before the rain came.

But, try as I might, she wouldn't come down. I dived, slipped, swish-tailed, stalled, still the variometer showed rise or, at the best, no climb. I would have spun, but HJORDIS won't. At last, however, we found a patch of descendng air, and circled tightly down, landing on the aerodrome boundary at 1.55 p.m.

How easy it is to make a spot-landing on the very edge of a mile-long aerodrome, and how impossible to do it when you have to in a small field!

That's Life.

[NOTE.—Photographs of the actual cloud under which this flight started were published in THE SAILPLANE last October, on page 232.—ED.]

# On Private Ownership

IN the absence of special "high-performance" gliding clubs, or h.p. sections of existing gliding clubs with adequately increased charges, the high road to better soaring in this country must continue to lie through the private ownership of h.p. machines. Yet the private ownership of any machine is certainly expensive.

Estimates over long enough periods seem to hover round a cost of two pounds an hour, and would be far more if every advantage of club facilities were not taken. Bad luck inflates the figure to hideous size. Ask any active private owner what his gliding costs him in a year, and he will tell you that he has never dared to work out the answer, not even mentally in the middle of the night.

In the case of an actual machine, which in three years was never badly damaged, the first overhaul cost thirty-four pounds and the second forty-six. Add the cost of excursions, depreciation, insurance, inspection and housing, together with a stream of titivations, and you arrive at the cost of lucky flying as distinct from disastrous. In this case there were none of those crashes which so often seem to mark the end of an otherwise brilliant cross-country flight.

How best can a private owner obtain some kind of value for his money? Is he to reduce his liabilities by choosing a relatively simple and rugged machine and win his results by rendering it as obedient as a familiar bicycle? Or is he to concentrate upon higher things and buy one of the half-dozen best types in the world, considering the extra money to be well spent? Does he buy a GRUNAU BABY or a MINIMOA?

As flown by Eric Collins, the despised G.B. is good enough for anybody who is not determined to seek "the bubble Reputation even in the cannon's mouth." In a G.B., Collins beat the Hornberg altitude record, climbing through thick clouds without instruments, circling with buzzards, and descending as in an air-circus. But since every reputable club in this country now owns one or several of this type, it hardly seems justifiable to incur the relatively huge extra expense of privately owning the same type. Mere pride of ownership is not enough.

You might, on this line of argument, decide to buy a machine which no ordinary club could be expected to supply, though the club is aided by subsidy and you certainly are not. You will obtain unlimited happiness if you can consistently land the machine without breakage, but never again will you enjoy the simpler pleasures of ridge-soaring a club hack-machine, the two-seater will now seem to be a despicable form of motor-lorry, and on Sundays of meteorological stability you will spend the day in bed with a newspaper. At the same time it is not to be assumed that every high-performance machine is a joy to fly; it is reasonable to suspect that some are excellent from the viewpoint of a learned society rather than from that of an ignorant pilot, in which case your enlightenment is going to be abominably expensive.

But there is an obvious compromise. With the help of half a dozen friends and of the subsidy, buy a good machine as an outright present for the club, and then patiently take your turn to fly it with all other qualified club-pilots. It will not do you any harm, and will probably do the club some substantial good.

If you insist on private ownership, you will need a partner if only to fetch the machine home, and yourself, after cross-country flights. Your partner will be drawn from one of the following five groups:—

1. The Ideal. If found, secure by every bond known to humanity, including if possible the bonds of matrimony: so rare is this type.

2. The Reckless. Inspiring but expensive and sometimes annoying.

3. The Incompetent. "A gust overtook me from behind." "Sorry, the wind changed." "Somebody walked in front just as I was going to turn in to land." "I never dreamt it would blow over." "It must be in my other jacket at home."

4. The Pathetically Penniless. Has an honest open face and the eyes of a spaniel. A worthy pilot and good

at small repairs. But cannot pay for a big crash; then sobs quietly. To be avoided.

5. The Ruthlessly Selfish. Not too bad when candid, but a terror when, as is often the case, in clever disguise. Has a partner for retrieving purposes only. The candid type only needs beating over the head; the subtle type calls for rat-poison.

No written agreement will save the situation entirely if you should choose the wrong type of partner. But it is worth noting that some of the best groups have taken the trouble to evolve a legal agreement which in one case even covered the liability of a deceased partner's executors.

One thing is certain; it cannot be laid down too clearly that each partner is liable for the cost of his own crashes. It has happened too often that a partner has found himself unable to pay for the results of bad luck; all he could do was to relinquish his share in the machine in the pious hope that its value would be adequate, which is rarely the case. Mere apologies can be nothing more than infuriating.

How many partnerships would never materialise if each pilot, before flying the machine for the first time, had to deposit, say, two-thirds of the machine's value in a central fund? How many partnerships could weather a long run of bad luck?

In pre-subsidy days when no club could afford to run good machines I have heard all these arguments against private ownership recited, and then ignored out of necessity. I have heard club officers claim that private groups tend to disintegrate a club. I have heard an inveterate private owner express the wish that he were back again in the arms of his club, and finished with a dreary, if not unhappy, partnership.

Is this craving for private ownership already dying out? Is it already a "creed outworn," now that the subsidy is enabling clubs to improve the quality of their craft?

Are we in fact about to see a revival of what might be called club-solidity?

Already, one club, at least, can provide for the trained member a RHÖNBUSSARD, winch-launching, aero-towing, six-days-a-week flying, and recognised charges for cross-country adventures, mainly thanks to the subsidy as well as to private benefactions and stout-hearted club-work. Don't these things already tend to undermine the extravagant idea of playing in the corner by yourself? I think so. S.H.

# Arthur Martens



Arthur Martens.

WHEN Arthur Martens became the first man in the world to keep a glider up for an hour, in the year 1922, no one knew the degree of risk involved in the practice of soaring flight. But a new art, a new science and a new sport were thereby established for the benefit of those that came after, and the risk was worth taking. The only safe method of heavier-than-air flight known at that time was power flying; yet it was in an aeroplane that Martens lost his life, for he was one of the victims of the air liner crash at Ostend on November 16th last.

Previous to 1922, the world's longest soaring flights had been one by Orville Wright in 1911, lasting about 11 minutes, and one by Harth in 1921. The present series of gliding meetings in the Rhön Mountains was inaugurated in 1920, and in the following year Martens came with a number of other Hanover students, bringing the VAMPYR, a cantilever monoplane glider of 41 ft. 3 ins. span. But only descending glides were achieved that year, and it was after the meeting was over that Harth raised the world's soaring duration record to 21 minutes.

The year 1922 saw great achievements. The VAMPYR was brought again from Hanover. On August 18th Martens took off in it at 5.39 p.m. for the last flight of the day, into a west wind of about 18 miles an hour. Then, flying to and fro between the Wasserkuppe and Pferdskopf, he gradually rose 100 metres. By the end of 24 minutes nearly all this height had been lost again, for the wind had dropped to only 7 or 8 miles an hour. But it suddenly picked up, and he was comfortably high when a figure "40," made by his friends lying on the ground, told him that he had won the great prize of 100,000 marks. Martens finally flew out over the valley, landing 6 miles away, 1,650 feet below the starting-point. He had been in the air 1 hour 6 minutes, during which he was at one time 355 feet above the start.



The "Vampyr."

Next day his fellow-student, Hentzen, soared the VAMPYR for 2 hours 10 seconds, capping this on August 24th with 3 hours 6 minutes.

Martens never held any world's records again, but he continued to attend gliding meetings and to make what were notable flights in their day. In 1924 he went to a meeting at Rossitten in East Prussia, and soared for 6 miles along the sand dunes till he reached the Lithuanian frontier and had to land. In the same year he went with a party of gliding men to Italy. He also flew a "little engine" machine called "Max," with a 5 h.p. motor which would just maintain it in level flight.

Next to his hour's duration record, the most notable pioneer work of Martens was the founding of a gliding school in 1925 on the Wasserkuppe; it was said to include a research institute. Since 1926, however, he had taken no further part in gliding meetings, and was earning his living as an engineer.

# Development of Sailplanes

THE lecture with this title, given before the Royal Aeronautical Society on December 16th by Squadron-Leader G. M. Buxton, R.A.F., was well attended by the gliding fraternity, and the large audience also included several members of the Royal Aeronautical Society. Perhaps the disparity in numbers of the two groups was less than appeared during the preliminary light refreshments; nevertheless, our own impression is confirmed by "Indicator," of *Flight*, who reported: "Sailplane enthusiasts came from all over the country. Power-aeroplane designers and experts were conspicuous by their absence. Maybe," he added, "they know all there is to be known."

Mr. Buxton took a leading part some years ago in getting the present British gliding movement under way, and for the first few years of its existence was the only pilot to show any real aptitude for high-performance soaring. He designed the HJORDIS sailplane and had a share in the design of the KING KITE. Lord Sempill, who took the chair at the meeting, paid a fitting tribute to him before the lecture began.

The lecturer had prepared a long paper, but only read part of it owing to shortage of time. It will, however, appear in full in the Society's *Journal*, together with a report of the subsequent discussion.

The paper, he said, was "an attempt to provide a general view of soaring, including the views of the pilot, the meteorologist, the engineer, and the club. If this can be done, it will be easier for each specialist to recognise how he can best contribute to the advance of the pastime."

### Dynamic Soaring.

As long ago as 1908 Dr. Lanchester described, in his book "Aerodonetics," what he considered the bird does in order to soar, and gave descriptions of hill-soaring, soaring in thermal up-currents, and dynamic soaring. As to dynamic soaring, it can be shown that to get maximum energy from the wind, the sailplane must act on it in such a way as to reduce the variations, or rather to eliminate them so that the wind speed becomes uniform. Unfortunately the most perturbed air with the greatest amount of available energy is near the ground, and as the manœuvres for dynamic flight are alarming, this method of flight is not likely to become popular.

Dr. Lanchester discussed the case of soaring near an obstacle such as a house, and in Fig. 143 of his "Aerodonetics" showed the path of a bird which gains energy from the air by entering the dead air in the lee of the house while flying down-wind, turning while in the dead air, and leaving it while flying up-wind.

A similar effect, said Mr. Buxton, is produced at the north end of the London Gliding Club's ground at Dunstable, where a projection from the west-facing ridge forms a bowl which faces south. "When the conditions are very smooth, and there is a southerly wind blowing into the bowl, the air speed rises as one crosses over the lip of the bowl. This happens if one flies low down-wind over the lip of any cliff, although one is usually too busy to notice it in such conditions. However, at Dunstable it is possible to turn and fly out over the plain, and if one turns rather sharply coming out over the plain when pointing up-wind, the air speed will be seen to increase again as the fresh wind is met. In smooth conditions when it is possible to fly over the crest of the hill at a low height, it is possible to make continuous circles over the bowl, using this effect to reinforce the hill lift."

### Club Development.

Mr. Buxton next turned to the history of soaring flight, particularly its development in England since 1930. In that year a large number of gliding clubs were formed, but the majority of them found that the problem of running a small club was an insoluble one, as is made clear by comparing their income with the capital needed to provide the necessary equipment. The London Gliding Club, he thought, was the first to realise that a subscription of one guinea was inadequate. The fact that it survived its early struggles he attributed mostly to the obstinacy of the members. During that strenuous time a large proportion of the hardest workers were members who lived near the club, which was fortunate, for a few extremely keen and able members can do more than a number of keen members who are not able to make a continuous effort. But the strongest factor in the survival of the club was, in his opinion, the efficient conduct of flying instruction.

### Some Sailplanes.

A number of sailplanes typifying various changes in design were described by the lecturer, who showed lantern slides to illustrate them. He began with the VAMPYR of 1922, which had an enclosed fuselage and cantilever wing with single spar, and was in fact the first example of the modern sailplane.

The ROEMRYKE BERGE of 1924 had an oval section fuselage, and a cantilever wing with a thin section and trailing edge flaps.

Mr. Buxton did not think there had been any advance in plain performance since 1930; since then the progress has been made by increasing the stability and manœuvrability of sailplanes, and in a great advance of piloting technique and meteorological knowledge, while the requirements of cloud flying have brought a demand for stability and strength.

Among the machines being flown at that date were the WIEN, KAKADU and FAFNIR I. The WIEN, a development of the PROFESSOR, had for its wing section Göttingen 549 with slightly increased centre line curvature near the root. The wing was strutted, and the designer, Dr. Lippisch, had explained that this enabled the wing section to be thinner than that required for a cantilever wing. Yet this same wing section is used in his REIHER of 1937, which has a cantilever wing. Whether it is necessary to use so thin a section in a cantilever wing may still be a question, said Mr. Buxton, but that it is possible is no longer in doubt.

The KAKADU, with a span of 62 ft., was remarkable for its low structure weight of 320 lbs. This was achieved by carrying the bending stress in the ply skin of the wing; there was no spar as such, the shear loads being carried by a ply web.

The FAFNIR had a somewhat similar wing construction, with three shear webs at the root, two of which ran out and one continued to the wing tip. The machine is now in a museum in Berlin.

Discussing the design of the SCUD II, whose wing has a taper ratio of 0.33, Mr. Buxton said:

"When calculating the load distribution, it became apparent that the loading at the tip was greater than the loading at the root, that is to say, that the lift coefficient at the tip was greater than at the root.

"Those who are acquainted with the ordinary calculations on a tapered twisted wing will remember that the mathematical device by which it is calculated is to assume that the lift coefficient is proportional to the incidence and then to calculate the state of affairs for incidences at which the designer sees that this will be substantially true. The calculation does not show what happens at the stall, nevertheless it is fairly clear that if the wing tip is working at a higher lift coefficient than the wing root, the wing tip will be likely to stall first. We did not want to test this point, and Mr. Baynes (designer of the SCUD) selected a twist to the wing, decreasing the incidence towards the tip, such that the lift coefficient decreased towards the tip. The effect of this was satisfactory, and the SCUD had nice characteristics in roll even when the incidence was near the stall."

The AUSTRIA I, which was first flown in 1931, was next described. It had a span of 98 ft., wing area of 376 sq. ft., empty weight of 865 lbs., wing loading of 2.75 lbs. per sq. ft., and span loading of 0.106 lb. per sq. ft. It was, perhaps, the most remarkable sailplane that has yet been built.

Its fuselage was merely a form of tail boom, whereas in the usual form of sailplane the fuselage weight is caused more by the need for a reasonably robust structure for handling on the ground than by the needs of strength when flying.

### The "Hjordis."

The HJORDIS, being the lecturer's own design, was described at length. His chief considerations in designing the machine have already been published in THE SAILPLANE (September, 1934, p. 131), also a description of the finished machine (August, 1935, p. 117), and general arrangement drawing (March, 1936, p. 40).

In his lecture he gave further information about the wing, which has a taper ratio of 4 to 1 and a total twist of 6°: "The wing section at the root is Göttingen 652, at the middle of the semi-span it is a calculated section similar to this, but thinner and calculated to give the aerodynamic twist that was needed without a change of rigger's incidence. The wing section at the tip is R.A.F. 32, which also gives the right amount of twist without any change of the rigger's incidence. Thus the wing has considerable aerodynamic twist and at the same time all the ribs would touch a flat bench in two places, and so it is fairly easy to construct and yet has good stability near the stall and good lateral control."

He gave it a strong "neck" so as to be suitable for the English private owner: "For this strength I used the strength of the main spar of the wing. The centre main fitting is bolted on to a spar which runs down the neck to the skid and is calculated to withstand a side load of twice the total weight, that is to say, of about half a ton, at the skid. This prevents the fuselage from rolling from under the wing, and it is then necessary to prevent the fuselage twisting off the wing by wringing the neck. For this there is another spar in the fuselage taking off the rear wing spar. If the wing tries to twist off the fuselage, a thrust in the wing rear spar tries to bend this fuselage spar and thus puts a torque in that part of the fuselage between the two fuselage spars. All these parts are built to take the stresses caused by a load applied backwards at the wing tip of 110 lbs."

After describing this machine, the lecturer gave a lengthy account of the different kinds of advanced soaring, covering ground that is already familiar to readers of THE SAILPLANE, though highly instructive, we hope, to members of the Aeronautical Society. Included in this account was a description of the various kinds of variometer, and a discussion of possible methods of countering ice formation on sailplanes.

Then the KING KITE was described, Mr. Buxton leading up to it by saying: "The needs of cloud flying have caused some evolution in the design of sailplanes between 1931 and 1937. The chief changes are an increase in strength and an increase in the stability of a sailplane to make it easier to fly blind. Also the need for a good performance has caused all cockpits to be closed with a streamline cover."

### Future Developments.

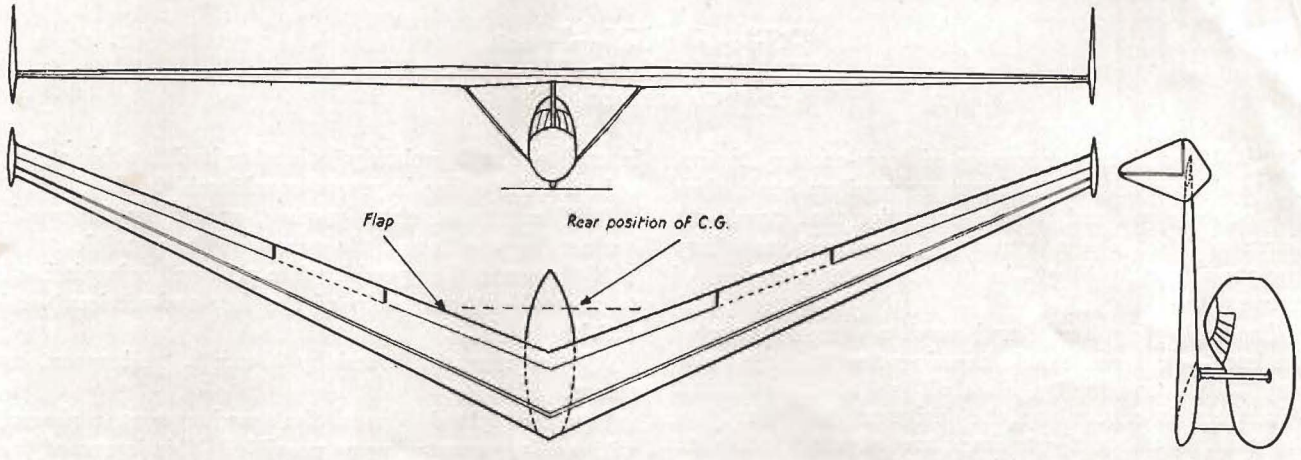
The lecturer closed his discourse with a look into the future, from which we reproduce the following remarks:—

"I think that the wing loading of a future machine should be somewhat reduced, although as there are stronger winds in England than in Germany, and as the pilot will more often want to work across wind owing to the nearness of the sea, I expect that the best machine for English conditions will be faster than the best machine for German conditions."

"The design of sailplanes in England has suffered because the market is not large enough to support a design staff, and there has been no continuous development of good designs. There have been several machines which have been promising and efficient, and we would be well off if improved successors to them were available to-day. For example, the CLOUDCRAFT PHANTOM, the TERN, the SCUD, and perhaps I may add the HJORDIS and the KING KITE, were designed by men who are not still available to work on improvements. I think that it is probable that if a standing design staff could be arranged to work continuously on the design, testing and improvement of sailplanes, the breed of sailplanes would be better than it is at present.

"Another difficulty of the small production in England at present is the lack of practical information. It is possible for the designer to make a performance estimate and a weight estimate for a sailplane with the data that are available from aeroplanes. It is not possible for him to make a performance estimate with the data from British sailplanes, for I do not know of anyone whose performance has been tested. Still less is it possible for a costing staff to make a price estimate from the information that is available."

Mr. Buxton showed on the screen general arrangement sketches of three suggested machines: one rather similar to Kurt Schmidt's ATALANTE, one a high-performance sailplane developed from the KING KITE, and one a tail-less machine in which the weight and resistance of the conventional fuselage are avoided.




**Squadron-Leader G. M. Buxton's design for a tailless sailplane which he showed at his lecture.**

*[Courtesy of "Flight."*

## The Discussion.

Professor G. D. R. Hill began the discussion by recalling his first glide, made just over 25 years ago. The machine, which had been built in a bedroom, was launched off a rail, and the first launch took place in darkness, so long did it take to get things working.

Turning to the problems facing designers, he thought that glider designers were far in front of aeroplane designers in appreciating the importance of smoothness of surface. Stiffness in bending of wings, he said, does not matter, for calculations show that a wing of low bending stiffness is probably less liable to flutter than if it were stiff in bending.

Mr. W. O. Manning (chairman of Technical Committee of B.G.A.) was not convinced that sailplane performance has improved in the last few years, for the pilots' skill and the sailplanes' properties have never been tested separately. Big aspect ratio, he thought, was rather a fetish, for the L/D curve begins to flatten out after the ratio has passed 16 or 17, and there was no need to go higher than a ratio of 1 to 25.

Mr. B. S. Shenstone, who formerly worked with Herr Lippisch for some years, said that the skin-friction drag of a sailplane is of major concern. At Darmstadt the performance of a sailplane is found by gliding it, with recording instruments, in the stable conditions of early morning. On the basis of these tests, the SAO PAULO was found to have a L/D of 26 at an air speed of 40 m.p.h., suggesting a "skin-drag efficiency" of 85%. The figure for the RHÖNSPERBER was 77%. It is 64% for that highly efficient aeroplane, the "Heinkel 70."

Probably a large proportion of drag over a sailplane wing is laminar drag; if it were in the transition stage the given figure of 85% would reduce to 75%. An efficiency figure of 85% at sea level would become 75% at 10,000 ft.

When the dust was blown off a piece of glass exposed in an aeroplane factory, what remained was only 1/2,000 inch thick; but only 3/1,000 inch matters if the air flow over a surface is turbulent. Dust of 1/2,000 inch diameter, however, *can* break down laminar flow into turbulent.

Professor D. Brunt (Chairman of B.G.A.), referring to the International Competitions, said that we were behind some other countries in experience, rather than skill, of the pilots. More competition flying was needed, for this would encourage pilots to go up in all sorts of conditions and obtain experience which would not otherwise have been obtained.

Mr. Robert Kronfeld, after describing the AUSTRIA I, expressed his conviction that a sailplane with a sinking speed of 30 cm. per sec. could soar on 75% of days, and in any direction. He revealed that the AUSTRIA III had been bought three weeks before by the Belgian Aero Club.

Mr. P. A. Wills, after discussing safety factors, asked the lecturer how one should recover from an inverted position after emerging in this attitude from a cloud, and received the answer that one should refrain from coming out of a cloud in such a position!

Mr. L. E. Baynes, explaining why he had been inactive in the gliding movement for so long, said that he had spent most of the time trying to reduce his own sinking speed. Discussing sinking speeds of sailplanes, he said they were much increased by increasing spans, owing to greater parasite drag and skin friction. His ideal machine was a "flying body" rather than a "flying wing"; its body should be fashioned out of the wing, and in fact be a part of the wing. Thus, the wing could be considered as being quite suddenly increased in chord at the centre line, with its incidence in this place reduced in proportion to the increase of chord. The lift distribution would therefore remain unaltered; the extra drag of the body would only be that due to skin friction, and parasite drag would be almost eliminated except for the tail surfaces.

Mr. A. G. Pugsley, who had been responsible for testing the KING KITE at Farnborough, closed the discussion. With regard to these tests, Mr. Buxton had revealed that they had shown that aileron reversal developed in the wing at a speed of 140 m.p.h. Mr. Pugsley said that the machine's wing density and axis positions were similar to those of high-speed fighters. He suggested that the structure mass of the wing should be brought well forward, as in a bird's wing, which is practically mass-balanced.

Squadron-Leader Buxton, in the course of his reply to the discussion, explained how he had used a stethoscope (the Editor's) to detect the change from laminar to turbulent flow over a hole in the wing of the SCUD during flight.

# Blind Flying

*By* "GAMEFEATHER"

I HAVE read many accounts of cross-country flights, and have talked to a great many pilots about their experiences, and there is one thing that stands out above all else, like a towering cumulo-nimbus: very few chaps can fly blind—in the instrumental sense, of course.

One feels very lonely and small as one approaches the base of a large cloud, knowing that it is going to play American Rugby Football with the machine. When one is cheered by the designer's assertion that the craft is about eight times too strong, and when there is an array of useful instruments on the panel, and a parachute on one's back, it doesn't need quite so much courage to have a stab at that cloud.

It is a regrettable fact that very few sailplane pilots can fly safely in clouds. Their performances would be so much better if they could fly by instruments; it would be well worth their while to do their utmost to gain a little experience. The difficulties are that there are few club machines fitted with full blind-flying equipment, parachutes are essential but expensive, and there are very few people qualified to instruct in blind flying.

One realises that a great deal of club instruction is given by people who have discovered for themselves how to fly, and are passing on their knowledge (and probably quite a few of their faults) to other poor innocents, but it seems to work satisfactorily so it continues.

Here I would like to stress the fact that a person who has discovered how to fly by instruments is *not* a suitable instructor, because there is too much psychology tied up in the business to allow of any unorthodox instruction being successful. The ideal way to set about cloud-flying would be to make friends with somebody who runs a Link Trainer (free advert., but it is a good device). It is the only thing I know of, besides an aeroplane, on which one can learn how to fly properly by instruments.

If clubs bought a complete set of blind-flying instruments, and arranged the panels so that these instruments could be installed in any machine in a few minutes, and charged a little extra for their use, they would soon recover their outlay and they would be doing sailflying a great service. Pilots could then use clouds, and borrowed parachutes, to the fullest advantage, and there would be an enormous improvement in the length of flights.

To those pilots who cannot wangle some instruction in blind-flying the following system might be of some use, but it is a poor second-best method:—

Fit a hood or some other device that makes it difficult to see out of the cockpit. With the hood open,

(1) Fly as high as possible, and practise keeping straight by the turn indicator. The needle will swing from side to side, but reference to the horizon will show that the amount of turn is not great, so long as the needle swings evenly from side to side.

(2) Gradually bring into use the air-speed indicator and the fore-and-aft level as a check.

The period spent at this practice varies, but it should not be less that an hour of honest hard work. The lateral trim will probably look after itself at this stage, unless the machine is yawed considerably.

(3) Start the machine yawing, and bring the needle back to zero with as little overswing as possible.

(4) Increase the speed by 5 m.p.h. and bring it back to normal with the help of the fore-and-aft level and A.S.I.

(5) Decrease the speed by 5 m.p.h. and repeat as before.

Practise (4) and (5) until the speed returns to normal with as little overswing as possible. This is one of the more important practices, because under blind-flying conditions it is difficult to tell where thermals are, if the A.S.I. is wandering about.

(6) Keep the machine straight, fly at a constant air-speed, and bank slowly from side to side. Return to level flight with as little overswing as possible. Practices (3) to (6) may well take several hours, but if they are performed thoroughly they will amply repay the trouble taken.

By this time the pilot should be able to go through the practices with the cockpit closed.

(7) Turns present a really difficult problem. One knows that the steeper the turn the faster the climb because the machine is nearer the core of the thermal. Fortunately thermals spread out a bit in clouds and a 30° bank usually suffices. The problem arises when the nose of the machine is allowed to drop during a steep turn. The speed increases, and a pull on the stick will increase the rate of turn and the amount of bank, but it will only raise the nose slowly. Hence the stress laid on practice (5) above.

In a rough cloud the air increases and decreases speed laterally as well as going up and down. This makes the fore-and-aft level an important instrument because it is not so affected as the A.S.I. by changes of wind-speed.

Gusts and lulls can be heard quite easily, and it is difficult not to pull the stick back during a gust and to push it forward during a lull. I am now convinced that the best course is an attempt at level flight or steady turns, checked by the fore-and-aft level.

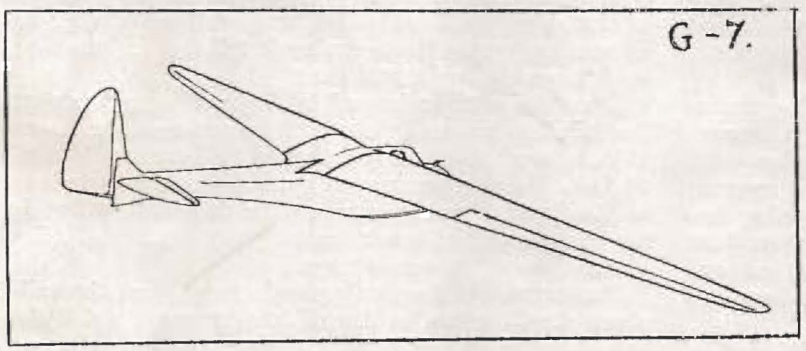
Turns should first be practised with open cockpit until the machine can be put smoothly into the required rate of turn, held there at constant air speed, and brought out to level flight with as little overswing as possible on any of the instruments. The method should be to use the rudder to the required rate of turn, holding off a little bank, and holding the stick back slightly, allowing the A.S.I. to increase by 3 or 4 m.p.h. This slightly skidded turn should be held the whole time, because a pull on the stick will raise the nose quickly and will not tend to increase the bank so much as it does in a correct turn.

To recover from the turn, put on opposite rudder and return the stick to normal, centralise the rudder when the turn needle is at zero. Time the movements so that top and bottom needles of the indicator arrive at zero simultaneously. Then close the cockpit and repeat the practices.

There is a whole heap more to be said on the subject of blind-flying, but I feel that, owing to the difficulties, it will be many years before it is taken up seriously, and my aim is merely to set people thinking and talking about it.

## Some Russian Sailplanes

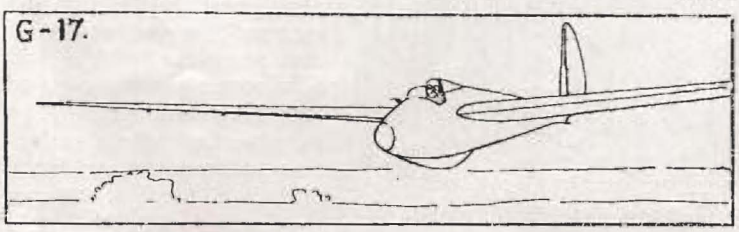
HERE are three interesting sailplane designs from among the large number now in use in Russia. The drawings have been made by Mr. J. S. Sproule from pictures in *Samolet*, and Mr. A. Ivanoff has translated the particulars.

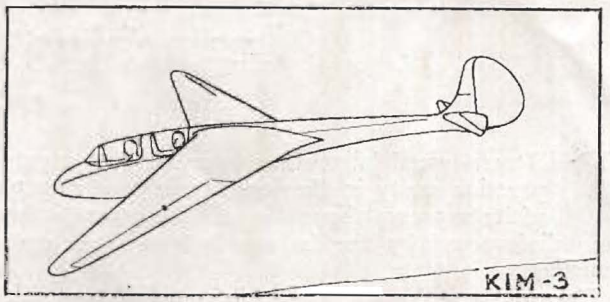



First, the G–7, which is the machine in which the pilot Rastorguyev made the cross-country flights of 335, 374 and 405 miles which were described in THE SAILPLANE last November. The designer is Groshev, who describes it as a cantilever "gull-type" single-seater. The span is 16.8 m. (55 ft. 1 in.); area, 12.8 sq. m. (138 sq. ft.); aspect ratio, 22; wing section, modified Göttingen 549; empty weight, 200 kg. (441 lbs.); wing loading, 23.8 kg. per sq. m. (4.87 lbs. per sq. ft.); 80 kg. (176 lbs.) additional weight is allowed for.

The G–17 was one of the machines taking part in the 12th Russian annual soaring meeting, which was held last year near Moscow instead of, as formerly, in the Crimea. (It will be described in THE SAILPLANE shortly.)

More complete particulars are given of the G–17, which has a span of 15.6 m. (51 ft. 2 ins.); area, 13 sq. m. (140 sq. ft.); aspect ratio, 18.8; wing section, R.II, aileron area, 1.54 sq. m. (16.6 sq. ft.); empty weight, 126 kg. (278 lbs.); flying weight, 216 kg. (476 lbs.); wing loading, 15.85 kg. per sq. m. (3.25 lbs. per sq. ft.); span loading, 0.85 kg. per sq. m. (0.174 lb. per sq. ft.); minimum sinking speed, 0.63 m. (24.8 ins.) per second.




Finally, the unconventional KIM–3, with swept-forward wings; it is the machine with which the pilot Ilchenko set up a two-seater distance record of 282 miles, as described also last November.

## B.G.A. Meeting

The Annual General Meeting of the British Gliding Association is to be held (as announced last month) at the Royal Aero Club, 119, Piccadilly, London, W.1, on Friday, February 25th, 1938, at 6 p.m.

## On Catching Thermals

Several years ago the idea of catching thermals as they came up was studied in Germany and successfully carried out to great advantage. It is time that clubs in this country started making a scientific study of this question too. At the Wasserkuppe one may often see men watching the trees below in the valley through field glasses or telescopes to see when a breeze is suddenly started up by a thermal breaking loose. Breezes in opposite directions converging on one spot have often been noticed in the same valley at the same time, making visible the exact position of the thermal's origin.

Not long ago, when having a picnic lunch by a corn field on a practically windless day, I was interested to find that a strong breeze would suddenly spring up at intervals and almost flatten down the corn. This happened in varying degrees of strength at intervals of between six and eleven minutes.

On another occasion, on the Mendips in the west of England, when there was little or no wind, you would suddenly hear a rustling in the tree leaves down below, and then a breeze would come up to meet you. This happened at similar intervals to the example mentioned above. One interesting thing on this occasion was that a flock of rooks sat there quietly on the rocks until one of these rustling breezes came along, and then the whole lot of them—about 500—took off, and they all circled together in the same thermal, gaining several hundred feet.

If stupid old rooks can catch thermals as easily as that, it is certainly time that we learnt how to do it too. J.S.F.

# Launching by Aero-Tow

*By* CORUNUS

THE aero-towed launch has been hitherto a comparative rarity in England, mainly on account of its expense, though in small measure it has been disfavoured by the feeling that it is not quite sporting.

There is something to be said for this latter point of view by purists, because the aero-tow in fact entirely does away with the preliminary problem of getting away from the start on a cross-country, which is often the most difficult part of the flight. The answer is that in fact this difficulty is sufficiently great to keep the amount of yearly cross-country flying down to a minimum, and until aero-towing facilities are provided on a more comprehensive scale the supply of advanced sailplane pilots will be much restricted.

In other respects the aero-towed launch is superior to any other. Compared to winch launching, it imposes smaller stresses on the glider and requires less skill from its pilot; compared to bungy launches it removes the danger of stall or collision whilst struggling low down in weak hill-lift. There is no doubt that, from now on, increased use will be made of this method, and the following tips are given for those who have not yet seen it in use.

If the take-off ground is large enough, 300 feet of wire cable should be used. Since the snatch which is inevitable in winch-launching does not occur in the aero-tow, a weak-link can be put in the cable, and a 5-cwt. one should suffice for all but the heaviest machines, which latter should in any case preferably use some sort of detachable wheel undercart for the take off. Otherwise the acceleration from the start may be slow, and between the time when the wing-tip runner has to let go and the arrival of aileron control there may be some nervous moments.

The sailplane naturally leaves the ground some time before the aeroplane, and the sailplane pilot must then ease his stick forward to prevent his machine climbing. If this occurs, he may succeed in pulling up the tail of the aeroplane sufficiently high to put the tips of its propeller into the ground. This will not foster the necessary spirit of *cameraderie* which should exist between the two pilots. He should therefore ease his stick firmly forward and keep his machine level at about 6 feet above the ground until the aeroplane takes off. He now puts his machine in the position where the connecting wire is exactly *horizontal* at the tail-skid of the aeroplane, i.e., when he is neither tending to lift nor to depress the aeroplane's tail, but is imposing on it a purely horizontal drag.

Since the wire is bowed in flight, this means that the sailplane has to fly *above* the aeroplane; this extra altitude works out in practice to be between 20 and 30 feet. I am assuming, of course, that the aeroplane is fitted with towing gear on the tail-skid, which is the cheapest and most satisfactory method. (See illustrations on opposite page.)

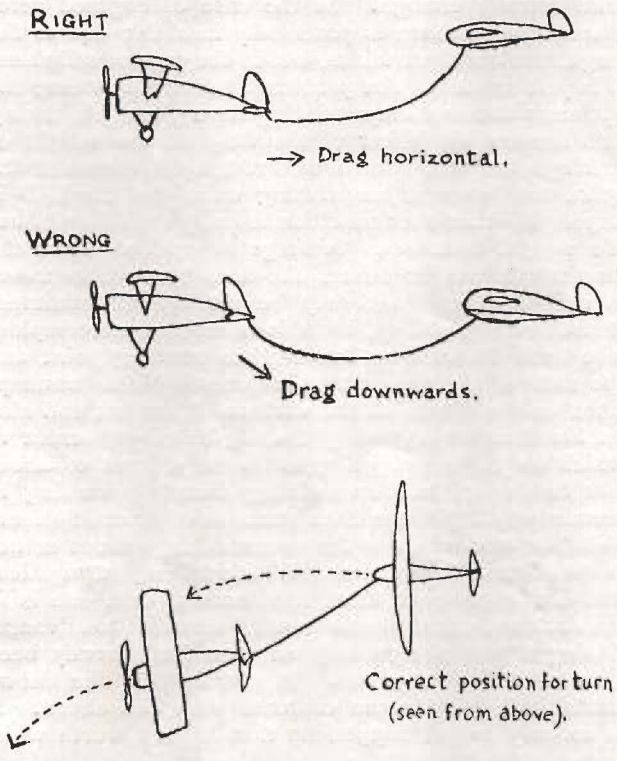
The aeroplane does only gentle turns, and the sailplane should follow in flat skidding turns, *outside* the aeroplane's path. When the towing machine meets an up-current, it naturally enters it before the glider, and the glider pilot sees it balloon up ahead of him. At the same time the wire goes slack. The glider pilot must on no account try to take up the slack by pulling back on his stick. If he does this his machine will climb, but his speed will fall off so drastically that the aeroplane will take up the slack with a bang sometimes sufficient to snap the weak link. The glider pilot must therefore continue to fly level at a constant speed, even though the aeroplane has climbed considerably above him, and let the aeroplane take up the slack itself, when he can then adjust his height as may be necessary.

Incidentally if the sailplane has reached a reasonable height when this happens, the moment to release is when the wire is slack, as clearly the machine is then on the edge of a thermal.

The dangers attached to aero-towing are of two sorts. Firstly, snatching the cable by injudicious piloting in bumpy weather; secondly, and much more serious, dangers arising from the extremely boring nature of the aeroplane pilot's job. Few power pilots can go on launching sailplane after sailplane in endless succession without getting bored stiff, and in this state of mind can do fearful things.



J. E. Simpson being aero-towed in the "Cambridge I" at Fenny Stratford; photographed from the towing aeroplane by F. T. Gardiner.




He can tow the unfortunate sailplane pilot into a cloud, as the quickest way to get rid of him. If the latter's quick release now jams, the odds are there will be a death. If it doesn't, he dies a hundred mental deaths waiting, after he has pulled his release, for the bang which will signal that it has failed to work. He cannot *see* if the wire has dropped away; he can only wait about a hundred years until, at last, he dares allow himself to think that he is safe.

A second error of the bored towing pilot is not to make quite sure that the sailplane has released before diving away to earth. This occurred last year, I believe, to a well-known lady pilot on the Continent. Her quick-release failed to work at the enormous tension which developed in the wire, and both machines went into a vertical dive. The upward drag of the sailplane on the aeroplane's tail made it impossible for the aeroplane pilot to pull out from this dive until they were down to a few hundred feet.

However, such methods of training conscientious towing pilots are generally considered too drastic, and a little earnest persuasion at the beginning of each day's flying is to be preferred.

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NOTE.—As far as we are aware, there is at present only one fitting for aero-towing on the market which has a certificate of airworthiness; this is the one manufactured by Messrs. Airwork, Ltd., of Heston Airport, Middlesex. We understand that the cost of fitting this to the tail of a light aeroplane works out at between £30 and £40. This fitting is used on the "Avro" used by Captain Phillips for aero-towing at the London Gliding Club and elsewhere.

# Reviews

**Sailplanes: Their Construction and Pilotage.** By C. H. LATIMER NEEDHAM. Chapman and Hall, 6/-.

THIS is the cheap edition of the book published five years ago. No changes have been made in the text. As a result the book is rather dated, but nevertheless remains a practical handbook on the construction of sailplanes. Naturally there is much more information available now than there was five years ago, but although one will not get the latest information from this book, it will not very often give anyone wrong information.

There are three parts: Design, Construction, and Pilotage. The Design part is concerned with the general layout and loadings, whereas the Construction part deals with details and methods. The Design part consists of straightforward standard stuff which is very simply portrayed with useful remarks on the special applicability to sailplanes. The Constructional part is of greater interest, particularly for the beginner, as here can be seen what has been done in detail, and by studying this part a lot of bother can be saved. A sailplane often lives or dies on its detail and fittings, and it is impossible to take too much care in this part of the design.

Thus this book tells one mainly how to stress a sailplane and how to design the details. The more fundamental ideas behind sailplane design are hardly touched. That is the book's main failing. A sailplane is largely an aerodynamic exercise in which the balance between weight and drag and the problems of control and stability are all closely related. Before any stressing is done at all the performance of the sailplane is fixed, although not necessarily known by the designer. That part of the performance which has to do with controllability is too often neglected or the fundamentals misunderstood. Such matters are not touched by the book under review. In the chapter on design layout there are several points that should be mentioned and which to a certain extent illustrate the above remarks.

Under "choice of an aerofoil" the author points out the necessity for a good depth of section, but does not state that any section can be thickened up or thinned down to fit requirements without affecting anything but drag. He gives the impression that one must accept sections just as tested. No mention is made of what thickness limits are considered reasonable. If he had said that root thicknesses of 16% to 18% were normal, but that limits of roughly 15% and 20% might be practicable, it would have been useful. Tips between 6% and 12% have also been used and some comment on the effects of tip thickness is vital. The remarks on centre of pressure movement are, in the opinion of the reviewer, a little misleading, for it is well known that sections with very large C.P. travels have been successful on sailplanes, particularly near the wing root. A further point which is worth mentioning here and which has come to the fore since the book being considered was first published, is that not only the Reynold's Numbers but also the turbulences of wind tunnels must be put on the same basis when selecting sections from different sources.

The remarks on tapered wings need revision. The standard fallacy that "the ideal shape for a wing is elliptical" is repeated in this book. The elliptical wing is, in fact, only best *for a given span.* In sailplane design the span is hardly ever initially fixed, so the elliptical wing has no practical importance. In practice the best shape is one with a sharper taper than the ellipse, the amount varying in each individual case. To explain this as simply as possible; consider an elliptical wing of any given span and area. If it is made more tapered, but the span and area kept constant, the induced drag is increased, but the wing weight is decreased due to the more favourable distribution of loading. Thus for the *same* weight as the original wing the span and aspect ratio may be increased for the highly tapered wing. This increase in span decreases the induced drag. In fact it has been found possible to decrease it below that of the original elliptical wing for the same wing weight. The original ellipse has thus no advantage. (Basing the argument on a given wing weight is a point of vital practical importance, for the consideration of weight is the basis of any aeroplane design.)

Since "Sailplanes" was written, much has been learned about taper, although even at that time more ought to have been said. Taper up to 4:1 can be used as stated, but there must be considerable washout to counteract tip stalling or wing dropping. The author states that lateral stability is not difficult to obtain in sailplanes, but with this the reviewer cannot agree, as lateral stability at slow speeds is still a source of trouble to many designers of monoplanes with or without engines. To-date it has been the practice to use considerable wing wash-out toward the tips on sailplanes to improve lateral stability and control. Away back in 1930 FAFNIR had about 12° of wash-out, and newer types with rather less taper use about 9°. They need it all for their steep turns at low speeds. Oddly enough such wash-out need not reduce the efficiency of a sailplane. If it were to fly at high speeds and low incidences such as used by powered aeroplanes, the efficiency would be reduced, but for a sailplane which uses but a small proportion of its available speed range, twist may be so applied that control may be improved without increasing the induced drag at the main operating attitude. This is not always easy to do, but it may be worth doing. Regarding ailerons much remains to be learned, but a study of the recent NACA Report No. 570[1] will be found very useful in laying out a design.

The author has the right idea when he points out that the wing should be designed in conjunction with the fuselage and not just tacked on a standard shape. More recent work such as Muttray's interference work[2], which was done specially for sailplanes, and the NACA Reports No. 540 and No. 575[3], are invaluable additions to wing-fuselage interference work.

It is too bad that no simple method is outlined in this book for determining the static longitudinal stability of a sailplane. Such a calculation is not very difficult, quite reliable and far better than guessing by means of "volumes."

The important but rather involved question of the interaction of weight and drag has not been dealt with broadly enough. In the case of engined aeroplanes this problem is practically insoluble due to the large number of variables, but in the case of sailplanes it is just soluble. The problem amounts to finding the optimum size and shape of wing for a given job, taking into account the effect of the wing on the weight of fuselage and tail. Considered roughly, the greater the span, the lower is the sinking speed (or the L/D is improved, whichever condition is being considered), but the weight increases. A stage is reached when the increase in weight offsets the aero-dynamic improvement. Another limit may be set by the minimum desired rolling ability, but this is much more complex. The limit depends on the original starting point and the skill of the designer as expressed in his assumptions on the effects of the various alterations and also on his decision regarding the degree of refinement to which he dares go. Kupper found a limit of about 100 feet span, and on building found it wanting in certain ways. Others have come to other conclusions. Whether one builds to the optimum dimensions or not is not of great importance. What matters is that unless one has a grasp of these fundamental data one is in the dark and cannot know in what direction to advance. Basing a new design only on what has already been done is leading nowhere. In this field, if one knows one's position, one can estimate what lies ahead. It is so easy to get tripped up that it isn't worth while launching out blindly.

In conclusion it may be said that as far as this book goes it does its job very well. Too bad it didn't go a little further. If it could be rewritten now it could go a great deal further. But since nobody has tackled the job, it remains the best effort we have and a very useful one at that.

B. S. S.

References:—

1. NACA Rep. 570: Effect of Lateral Controls in producing Motion of an Airplane as computed from Wind Tunnel Data.

2. *Luftfahrtforschung:* Band 11, No. 5, p. 131 (25-10-34).

3. NACA Rep. 540: Interference of wing and fuselage from tests of 209 combinations in the NACA variable density wind tunnel.

NACA Rep. 575: Interference of wing and fuselage from tests of 28 combinations in the NACA variable density wind tunnel.

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**Pilots Only.** By ANN COURTENAY EDMONDS. H. W. Robinson & Sons, Printers, Bedford. Price 2s. 6d. (2s. 8d. post free).

Half a dollar could be spent in worse ways than on this tasteful little book of Fun on the Flying Field. One could be even more tellingly alliterative with pleasantries about "perspective and punctuation"; but after dinner we feel merely pleasant. We like those funny men with little hands and big feet, and the idea of machines "breakupping"—one supposes they do "if the old crate breaksup," as we read it does. Or perhaps it's a misprint. But that reminds us that the book is too presentable for that to be so—it has nice print that's easy on the eyes, with comely jacketing.

Definitely to go on the club bookshelf for the awful person who will foist his chuckles on to you with a "Have you seen this one?"

Ann Edmonds has odd little side issues of fun which you don't see the first time.

G.L.B.

# Correspondence

## "Silver C" Facilities

SIR,

Your leading article in the December issue calls, I think, for comment from those who have the responsibility of providing club facilities in this country, for I detect therein that laudable but dangerous practice of attempting to run before we can properly walk.

Whilst all will agree with the ultimate aim of providing full "Silver C" facilities by the leading clubs, yet at the present time the great and crying need is for more and yet more "C's," both from the point of view of club finance, club operation and club supplies.

In my opinion the number of "C's" in this country —335—is a totally inadequate structure on which to commence to build an expensive superstructure, which the "Silver C" facility undoubtedly is. I submit that a minimum of 1,000 to 1,500 "C's" are necessary before that stage is reached, or before the movement can be called healthy and well established.

I can tell you quite frankly that our club finances are groaning under the present strain they are having to bear, and unless we can substantially increase our flying membership and our numbers of active "C's" we shall have to consider *curtailing* our present facilities, leave alone *adding* to them.

As far as my own personal experience goes, I do not believe that any club can afford to provide a *proper* ground staff and facilities until its membership passes the 200 "C" mark, and then only by careful management, and this opinion is confirmed, I think, by the experience of the three larger provincial clubs this year.

Further than this, the management of the clubs is being hard put to it to cope with and properly employ the new assets, partly supplied by subsidy and partly by their own efforts, and that the numbers of members able to give this valuable but necessary time are diminishing, for no man, I think you will agree, is justified in taking on in his spare time more than he can do efficiently and well.

So, in the words of "Young Albert's" father, "Go a bit steady, young man !" with the "Silver C" business at this juncture.

C. ESPIN HARDWICK,
*President, Midland Gliding Club.*

## An Advanced Soaring Camp

SIR,

With reference to the Midland Gliding Club Advanced Easter Camp from April 15th to 24th, announced in your last month's issue, the following particulars may be of interest.

The camp will be held with a minimum of 10 pilots and a maximum of 40; it is chiefly intended for advanced and owner pilots, who either desire to qualify for their "Silver C," or wish to do distance or altitude flights. The maximum distance of the Mynd from the sea in a south-easterly direction is approximately 190 miles. The organisers will be unable to provide retrieving facilities and these arrangements must be made individually by the participants themselves.

It has been ascertained that the likelihood of lenticular or "Moazagotl" air formation over the Mynd should occur in the spring and autumn, and it is hoped that this camp may coincide with this phenomenon, first noticed during the autumn camp last September. Great heights should be possible if it occurs at "book" time.

Accommodation will be either in caravans or tents, as the new building will not be available by then owing to the disappointing results, so far, of the Appeal.

Applicants will greatly assist the organisers if they will notify me as soon as possible of their intention of attending this camp. There will be no primary training unless there is a written demand for it made not less than a month before the opening date; that will follow in later camps to be announced.

R. B. DUROSE, *Camp Secretary,*
1, Newhall Street, Birmingham, 3
('Phone: Central 7586).

## A Way of Escape

SIR,

At Sqn. Ldr. Buxton's lecture to the Royal Aëronautical Society the question was asked what one should do if, on coming out of a cloud, one found oneself inverted; and the lecturer's reply was that one simply ought not to come out inverted.

May I (as one who cannot be certain of obeying this injunction) make a suggestion? Urge the nose of the sailplane to that side of the horizon on which the sky is, and hold it there until the speed falls away, then stick in stomach and leave the sailplane to do the rest— as, in fact, at that critical instant at the top of a badly-flown loop when, in the windless silence, a click is heard as the mouse-refuse in the wings falls from one surface to the other.

The resulting drop need not produce much excess speed, and is, furthermore, a very pleasant experience.

KEITH W. TURNER.

## Thermic Activity Inside Clouds

SIR,

I was very interested in Mr. Fox's article on "Thermic Activity Inside Clouds," but was struck by what appears to be a contradiction in his argument. With the aid of Air Ministry figures, which nobody can at present dispute, he argues, firstly, that "more heat is liberated by condensation on a hot day than on a cold day," and, secondly, that "the lower the cloud base happens to be, the greater will be the amount of latent heat of condensation liberated." He goes on to say, quite logically, that a combination of *both* these conditions, i.e., condensation starting low down on a hot day, may cause considerable liberation of heat and consequently a very favourable lapse rate inside the cloud.

So far, so good; but later in the article he says: "Every good thermal day I have recently encountered has been a day of low relative humidity."

We now have three conditions necessary for "super" lift:—

(1) a hot day,
(2) a low cloud base, and
(3) a low relative humidity—

which is absurd, because if it is a hot day *and* the cloud base is low it is impossible to have a low relative

humidity at ground level; and similarly if it is a hot day *and* the relative humidity at ground level is low, then it is impossible to have a low cloud base.

So it appears to me that Mr. Fox is wrong on one count out of the three. Personally, I am inclined to quarrel with the low cloud base, chiefly because I believe the other two; but further elucidation of the subject would be very welcome.

GERARD O. SMITH.

## Mr. Fox Replies

Mr. Smith's letter is an interesting one, and I am glad to find that other people also are interested in the relation between thermals and humidity. So far meteorologists have not attempted to make any connection between the two because they had very little knowledge on the subject of thermals. Gliding has now adequately demonstrated that, on good soaring days, the clouds are formed by moist ground-level air rising to condensation point; and the Cloud-base Chart published in the July SAILPLANE, p. 158, is possibly the first attempt which has been made to link together, in anything like a practical form, the two interdependent subjects in question.

The first article, in the July issue of THE SAILPLANE, on the behaviour of a thermal up as far as cloud base (dry-adiabatic lapse rate) must not be confused with the second article on the behaviour *inside* clouds (wet-adiabatic lapse rate). This is, I think, perhaps where Mr. Smith has found an apparent contradiction.

Firstly, referring to what in Germany is known as the *Warmgewitter*, or thunderstorm caused by heat, as opposed to the action of a front: it is every-day knowledge that these occur on extra hot, damp and sultry days. Such lift is created *inside the cloud itself* to a very large extent, through much condensation, and is what is generally termed *cloud lift*. It is formed on a hot damp day, with condensation starting low down: these are the conditions of Mr. Smith's (1) and (2).

Secondly, on a comparatively dry summer's day of low relative humidity, there will be little cloud condensation, therefore much sunshine. Also the air will be comparatively clear and the sun's rays will have good heating power to create the necessary uneven heating of the ground, hence good thermals will be produced in the majority of cases, and cloud base will also be conveniently high. This is the condition of Mr. Smith's No. (3), which applies *only* to pure thermals and has nothing to do with *cloud lift* or with any subsequent action which may begin to take place once condensation has started.

So it might be less misleading to say that all the good thermal days are generally days of low relative humidity, *but* that very strong cloud lift can be produced on hot damp days.

One man's meat, of course, can be another man's poison; and whereas some he-men may revel in flying up inside a large low-based thunder cloud, it doesn't just suit everybody. Although I have learnt to do an occasional little bit of very timid cloud-flying, I am probably less experienced at it than Mr. Smith, and I still persist in saying that, for me, the best thermal days are days of low relative humidity.

J. S. FOX.

# News from the Clubs

## London Gliding Club

**Sunday, December 5th.**—A stiff soaring wind which gradually lessened. Three "C" certificates were taken, and Miss Ann Edmonds did five hours towards the "Silver C" in a GRUNAU. Hiscox gave the KASSEL 25 its first soaring flight since it was made airworthy; he found the elevator to be less sensitive than on a normal sailplane. Both the last-named flights ended with wiped-off skids, but a normal landing is not required for the "Silver C."

Some good heights were got for the time of the year, Grant and others reaching 700 feet, and the two-seater 1,000 feet, evidently with the help of cloud lift.

**Sunday, December 12th.**—Another good soaring day, with a stiff wind in which Ingo Pasold, by hovering over the Zoo, gradually rose to 1,300 feet in his own RHÖNBUSSARD. What sort of lift could this have been? It was too high for hill lift, and lasted too long for cloud lift.

A new FALCON arrived (the club's second) and was test-flown by Lacey. Another arrival, though not necessarily for the purpose of becoming club property, was a new taper-wing KADET from Slingsby. Wills took it up for a test flight.

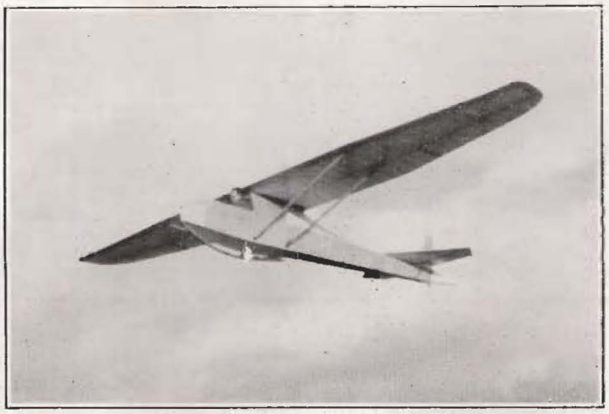
Three more "C's" were taken. Miss Paddon, whose attempt last week ended in a down-wind up-hill landing just below the top, this time hovered well above the ground in dignified style and landed after six minutes. Another "C" was done by what looked like dynamic soaring, albatross fashion, each turn being made by an almost vertical bank combined with an almost terminal dive, followed by a 100-foot zoom up into wind.

There were at times eight machines soaring together, with an aeroplane overhead to comp'ete the picture. One pilot, identity undiscovered, flew the KADET (ordinary wing) in such masterly



**The professional instructor of a well-known gliding club. We are assured that he was off duty when this photo was taken, and was, in fact, attending a "Tramp's Ball" at his club. In normal life he is known as a steady-going fellow.**

*[Photo by Lawrence Wright.*



**One of the new "Taper-wing Kadets" being taken for a test flight by P. A. Wills at Dunstable Downs. The wing has a slightly greater span than that of the ordinary "Kadet" produced by Slingsby Sailplanes.**

fashion that he was well above one GRUNAU BABY and level with the other two. He certainly eased the congestion at lower levels. Over 39 hours were put in, this total including a five-hour flight by Greig, in his grey KITE, towards a "Silver C."

**Tramps' Ball.**—A dance with this title was held on December 4th. Those who arrived too respectably dressed and washed were made to undergo suitable changes before taking part. The prize for "coloured handkerchief with the most interesting contents" was won by the Editor. Miss Ann Edmonds and J. Gurney Grice won the prizes for the best costumes.

H. M. Hedges, one of the earliest members of the club, is, we are sorry to say, leaving us to return to his native Australia to take up farming. He joined in 1931, when he was with the Vauxhall motor works, got his "C," joined Dart Aircraft, and finally launched out on his own as a glider constructor and repairer, and was about to put up a workshop adjoining the club ground. With his mechanical ability he has been a most useful member, one of his most notable feats being the building of the club's first winch for hauling machines up the hill, which made a tremendous difference to the amount of flying.

The club was closed during the Christmas holidays to give the hard-worked staff a rest.

**Overheard.**—Visitor to Dunstable, after watching half an hour's flying and three hours' work on retrieving cars: "I don't know about gliding providing recruits for the Air Force, but it must be a wonderful training for the Tank Corps."

### Summary of Flying.

| Date. | Ground-hops. | Winch launches. | Hilltop launches. | Flying Time h. | m. | s. |
|---|---|---|---|---|---|---|
| Nov. 27, Saturday ... | 21 | — | — | — | — | — |
| ,, 28, Sunday ... | 49 | 24 | 18 | 1 | 12 | 0 |
| Dec. 1, Wednesday | 35 | — | — | — | — | — |
| ,, 5, Sunday ... | 20 | 23 | 20 | 22 | 47 | 0 |
| Dec. 11, Saturday ... | 32 | 3 | — | — | 57 | 0 |
| ,, 12, Sunday ... | 30 | 34 | 24 | 39 | 14 | 0 |
| Dec. 18, Saturday ... | — | 6 | 6 | — | 19 | 0 |
| ,, 19, Sunday ... | 7 | 6 | — | — | 12 | 0 |

#### Certificate Flights.

December 5th.—Sellar, "C"; Mackenzie, "C"; Anson, "C"; Miss Edmonds, part "Silver C" (duration).

December 12th.—Ratcliffe "C"; E. Smith, "C"; Miss Paddon, "C"; Greig, part "Silver C" (duration).

#### Totals.

| *Week enaing* | *Launches* | *Flying Time* | *Certificates* |
|---|---|---|---|
| November 28th ... | 112 | 1 hr. 12 mins. | – |
| December 5th ... | 98 | 22 hrs. 47 mins. | 3 |
| December 12th ... | 123 | 40 hrs. 11 mins. | 3 |
| December 19th ... | 25 | 31 mins. | – |

There was no flying between December 20th and 31st inclusive.

**Totals for Year.**—From January 1st to December 31st, 1937, there were 11,486 launches, with 1,094 hrs. 51 mins. flying time.

## Furness Gliding Club

**October 3rd.**—F. Charles, acting as instructor, put several members, including two ladies, through about 30 sedate auto-launches in the primary machine.

**October 10th.**—Fitful west wind, yet Charles, Stevens, Smith, and Redshaw enjoyed about six hours' soaring between them, and Redshaw was delighted with his experience of the KIRBY KITE, having done all previous flying in a KADET.

**October 24th.**—A very slight east wind tempted Charles and his retinue to set out on an expedition of exploration to "Tow Top," a breast some 25 miles from our home site. On arrival the breeze was not strong enough to extinguish a lighted match; yet over this tree-clad slope Charles continued to soar at about 15 feet above the tree tops for a period of twenty minutes. Crossing a gap in the range to a slope not clothed in trees proved to be the end of a very interesting flight, and Charles glided in to a nice landing in a meadow below. We are going to this place again.

**November 7th.**—More primary work. Even the old stagers were induced to have a flutter, with disastrous results to the rudder post. Flights, 25.

**November 13th.**—A good start made with the laying of a concrete floor in the hangar, and we intend to suspend all club flying until completed. It is going to be a great asset this winter. Charles has been road making and superintending an extensive drainage scheme, not to mention removals of gates and the building of "Wailing Walls," etc. His enterprise has aroused admiration and interest amongst older members whose interest was on the wane.

**November 14th.**—A day of almost continuous "Line Squalls," Charles was too late on each occasion to catch the full breast of the front and about all he caught was a good drenching. We believe that, further inland, pilots had better luck.

**November 21st and 28th.**—More navvying, hangar floor looking well, almost complete. Now if Santa Claus will only provide a FALCON III we can enjoy our Christmas dinner.

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## North Lindsey Gliding Club

It is now just over one year since the North Lindsey Gliding Club was formed. Unfortunately, the founder and secretary of the club, Mr. Orme, left the district for Scotland, where we understand he is an active member of the Scottish Gliding Union. Before he left, however, he had instilled enough enthusiasm in the members for them to build a primary machine, a DAGLING. In the spring this machine was flying regularly four times a week.

Up to August all launching was by hand bungy, ten or a dozen of the twenty-five members always turning out. Owing to the very flat nature of the country in North Lincolnshire the length of flights was very limited, and so car-towing was adopted. This greatly increased the number of flights and the efficiency of the pilots.

In September it was decided that, as the machine had had some very heavy bumps, the fabric should be removed and the machine overhauled. This was done, only to find there was practically nothing to repair, albeit earlier the tail main spar had been successfully spliced after being cut in two by a flying bungy rope.

While this work proceeded, with only two flying Sundays lost, a De Soto had been acquired and fitted up as a winch with 1,100 feet of wire. With the winch, and confidence regained from the overhaul, performances improved rapidly. The better show attracted a few new members, but also had the unfortunate (or was it fortunate?) effect of seeding out the earlier members. However, the club has bought a new elastic rope (the old having been ruined by car-towing) and are reserving it for new members and hand launches.

The more enthusiastic all-weather members have spent their recent Saturday afternoons and some moonlight evenings erecting a hangar to hold the primary fully rigged. This has enabled full benefit of the now far too short winter Sundays to be taken. The club is quite confident that, notwithstanding the flat country and therefore the difficulty of training, it will soon be able to be sure of "A" certificate flights from the winch for its more apt members.

The club is holding a dance at the Crosby Hotel, Scunthorpe, on Friday, February 25th, and will be pleased to see anyone interested in gliding in the North Lincolnshire district at that time.

The Hon. Secretary is S. L. Putnam, 68, Oswald Road, Scunthorpe, North Lincolnshire.



**Ho-heave-ho! Members of the Derbyshire and Lancashire Gliding Club find they can get a better grip on the snow than the wheels of their towing car.**

*[Photo by J. G. Shepard.*

## Derbyshire and Lancashire Gliding Club

**December.**—Winter descended upon us in earnest this month in the form of several heavy snowstorms followed by keen frost, which covered our site with a hard carpet of snow, eight to twelve inches deep, and rather slowed up operations during three week-ends. This was followed by fog and low cloud, which accounts for the small amount of flying done.

Early in the month a strong N.W. wind arrived on Sunday morning, and the snow being too deep for retrieving cars or winches to operate, machines had to be towed out by hand and bungied off the north-west slope. Despite the shortness of the days 9½ hours' soaring was put in, and up to 2,200 feet in height attained without any thermal aid.

The note on prevailing winds in the December issue of THE SAILPLANE has not damped our spirits. Even if a period of new prevailing winds starts immediately, a winch launch to 1,000 feet at Camphill will enable most sailplanes to reach a new north wind site at Shatton Edge, or the already well-known east wind slopes of Mam Tor.

Godfrey Slater and Duncan Swale, both 14 years of age, the sons of two of our instructors, have just received their fathers' permission to learn to fly. Is it too much to hope that Germany may not always possess the youngest "Silver C"? Anyway, we wish them the best of luck.

**Saturday, December 4th.**—Wind 15 m.p.h., S.W. Snowing hard all the afternoon; visibility 300 feet. Winch-bungied the NACELLE.

Next day thick fog and more snow. Miss Thring and Rattray paid us a visit, accompanied by Eustace Thomas. On the following Saturday, with snowstorms and bad visibility, one training flight only.

**Sunday, December 12th.**—Wind 30 m.p.h., N.W., dropping later. Cloudless sky. A foot of snow on the ground meant that all machines were best handled by man-power, which kept everyone warm. Smooth lift, no thermals; greatest height attained was 2,200 feet, where it was necessary to fly at 40 m.p.h. to keep stationary over the ground. The KADET reached 1,200 feet. Taylor took his camera up in the FALCON III with Smith as pilot and secured some excellent snapshots of the Edge and the club grounds under snow.

The NACELLE couldn't quite stay up, and Cuss on a "C" attempt was the unlucky one to go to the bottom; however, retrieving in the hard snow and brilliant moonlight was, for once, quite a pleasure. 9 hours 50 minutes flying.

**Saturday, December 18th.**—Wind 5 m.p.h., W. Training, but not quite soarable.

**Sunday, December 19th.**—Wind 5 m.p.h., N.E. Training under delightful conditions, with a bright warm sun and six inches of hard frozen snow under foot. Kendal completed his "B," and Langley obtained his "A," both in the NACELLE.

Low cloud and drizzle prevented any flying during the Christmas holidays with the exception of a little primary training.

**Summary of Flying during December.**—Bungy launches, 51; Winch launches, 30; flying time, 9 hours 50 minutes.

Certificates: 1 "A," 1 "B," 1 "C."

## Newcastle Gliding Club

**Sunday, December 5th.**—There were 6 inches of snow, the temperature was below freezing point all day. While John Allan was repairing the damage he had done to the GRUNAU BABY, Leach took his "B" with a flight of 62 seconds, and Clark his "A" in 31 seconds, both in the open primary. So "dead" was the air that it was impossible to winch the nacelled DAGLING to more than 300 feet.

**Sunday, December 12th.**—Ground covered with firm snow, the result of a blizzard yesterday. Unfortunately this provided two unexpected difficulties: starting the retrieving car, and stopping the retrieved machines.

Chaimsonas, a Lithuanian, took a very good "A," being the first *ab initio* King's Collegian to do so. This young man set a fine example in regularity of attendance to the other new men, but has already joined the cross-country fliers with a flight beyond the aerodrome hedge.

**Saturday, December 18th.**—Another day of primary training in which Miss Rowan's extraordinary progress was demonstrated. Wills, who is now our London representative, arrived after dusk and expressed surprise at finding us still flying; he expressed none when we lost the starting handle, burst the starter motor, and snapped the cable on the winch, all inside one minute.

The pie-and-pea supper was a real success. (Thank you, George and Kitty!) General surprise was felt at Wills's opinion that the club was still at the "push like the devil or we're beaten" stage. Had he but seen us two years ago! It was with real regret that we said *au revoir* to him and Mrs. Wills.

**Sunday, December 19th.**—A good training day in which Angus got his "B," and Miss Rowan her "A." As first lady member of the club to get a certificate, Miss Rowan earned the club some much-needed publicity in the local Press. Unfortunately Lucas had the misfortune to scrape the wing tip of the nacelled DAGLING in the snow after a particularly low launch.

**Sunday, December 26th.**—More primary training, during which Welsh got his "B." Retrieving entirely by hand was found to be tremendously heavy work after the retrieving car had died. It was reminiscent of the old days, and quite likely to eliminate some of the new members who look upon flag-wagging as laborious. The first trial flight of the GRUNAU BABY was held since its crash.

**Monday, December 27th.**—The finest day in months. The first real trial of the new winch with its 3,000 feet of ultra-fine cable was a marked success, both the DAGLING and the GRUNAU BABY attaining 800 feet in a dead calm. By floating over the neighbouring wood the GRUNAU kept up for nearly five minutes. We are now eagerly waiting for a breeze to give us that magic 1,000 feet, and a few thermals to let us improve on it.

Certificates during December:—

"A": Clark, Chaimsonas, Miss Rowan.

"B": Leach, Welsh, Angus.

## List of Gliding Clubs

The following corrections and additions should be made to the list published last month:—

**Midland Gliding Club.**—A telephone is now installed at the club house on the Long Mynd; number: Linley 34.

**Yorkshire Gliding Club.**—The present secretary is: L. A. Alderson, 32, Wensley Green, Chapel Allerton, Leeds, 7.

**London Gliding Club.**—The entrance fee for flying and country members, and the subscription for associate members, are to be raised to £2 2s. Thus the new rates will be:—

Flying member: entrance fee, £2 2s.; annual sub., £3 3s.

Country member: entrance fee, £2 2s.; annual sub., £2 2s.

Associate member: no entrance fee; annual sub., £2 2s.

These rates will take effect as from February 1st, 1938. Present members, and those who join before February 1st, will continue to pay the old rates.

**Norfolk and Norwich Aero Club.**—It is reported this club is to add gliding to its activities, and that a committee for the purpose has been set up under the chairmanship of Mr. Alan Colman, who has presented the club with a KESTREL. This is the machine which appeared recently at Dunstable, and it was transported by road to North Walsham Aerodrome just before Christmas. We hear that aero-towing is to be done with it. Mr. Firmin, recently of the London Gliding Club, is to act as honorary instructor, and the subscription is tentatively fixed at one guinea for the period January 1st to May 1st, with an additional charge of 1s. per "lesson."

**Oxford University Gliding Club.**—At a meeting held at Christ Church College on December 2nd it was decided to form a University and City Gliding Club, subject to the University authorities granting permission. Dr. R. R. Marrett (Rector of Exeter College) was in the chair, supported by Professor A. F. Lindemann and Mr. G. Ryle (Junior Proctor). Captain R. S. Rattray gave an address.


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RICHARD C. DUPONT, U.S.A., became again American champion for 1937 flying his **MINIMOA** (also first place in altitude).

ERWIN KRAFT, Hornberg, won the B.Z. Prize in the goal flight contest Wasserkuppe-Berlin with a **MINIMOA.**

WOLFGANG SPÄTE, Darmstadt, flying his **MINIMOA** in the 1937 international contest won third place competing against special built sailplanes.

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*With acknowledgments to* SAILPLANE, *Dec., 1937:—*

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