GLIDING

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QUARTERLY

2/6

GLIDING

Edited by Alan E. Slater, M.A., F.R.Met.S.
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OFFICIAL ORGAN OF THE BRITISH GLIDING ASSOCIATION

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Cover Photograph.—Slingsby Sky Sailplane soaring over Dunstable Downs, piloted by Geoffrey Stephenson, who will fly this same machine at the International Championships in Spain. *Photo: Pictorial Press.*

All Eyes on Madrid

THIS year's International Championships meeting promises to be the most widely representative ever held, for there are teams from as far afield as Australia, both Americas and both ends of Africa coming to challenge the many and diverse Europeans.

This is the fourth international contest in which a British team has competed. Hitherto our pilots have sometimes come near the top on particular days but not in the final placings, but this year their prospects seem better than ever before. Probably our best chance in the past would have come in 1939, when our position among the nations came third, reckoned by the number of "Silver C" badges held. But at the rather abortive contest held that year, only Poland, Hungary and Yugoslavia were represented.

Apart from this, international contests have always been won by Germans or Swedes in each other's absence; they are now up against each other for the first time. Polish pilots did very well in 1937 and Yugoslavs in 1950, but both will be absent this year; and Russians, who have held many international gliding records in the past fifteen years, have never come to an international contest at all.

But if the world's political and financial state were such that everybody could compete who wanted to, it would be impossible to get them all into the air except by holding the contest in the Land of the Midnight Sun and launching all round the clock.

There is one point we would like to emphasize, that was made also by the Swiss when they organized the contest in 1948. It is that pilots, not countries, take part in these competitions, and that they are not won by nations but by particular individuals who fly sailplanes. No official cognizance is taken of either the total marks earned by each national team, or even of the average marks earned by each national pilot. And fortunately no-one has ever suggested that this should be done.

At every international contest the competitors are presented with a different type of landscape to soar over. This one will be no exception. Maximum daily ground temperatures at Madrid average 89 degrees F. Plotting the average upper air temperatures at the same place, we find that thermals leaving the ground (2,150 ft.) at this temperature should reach 6,000 ft. a.s.l. Although sailplane pilots never fly in an average atmosphere, this gives an idea of what to expect.

Our best wishes for a successful meeting, and those of all our readers, go out to our hosts in Madrid, to all the contestants, and especially, of course, to the members of the British team.

B. G. A. News

Speed Record over Triangular Course

The Flying Committee of the British Gliding Association wishes to point out that there is at present no U.K. National record for speed over a triangular course of 100 km. (62.14 miles). For a record the course must measure at least 100 km. and no side of the triangle may be less than 30 kms. (18.64 miles).

Speed in a Straight Line

The Flying Committee is prepared to consider U.K. Records for speed in a straight line course of 100 km. and 200 km. These records have no International status, but the Committee feels they would be of interest to our members as U.K. Records.

(As we go to press, we learn that Lieut. Comdr. Antony Goodhart flew from Basingstoke to Lympne on the 7th June at an average speed of 27.2 m.p.h., and has sent the required documents to the B.G.A. with a claim for recognition as a U.K. Local speed record over a 100 km. course).

B.G.A. Slide Library

The B.G.A. library of lantern slides, based on Donald Greig's slides is now under way, but to cover the subject fully it is necessary to add to it.

If any member of the movement in the U.K. who is also a photographic enthusiast with the necessary facilities, is prepared to volunteer to make up a few slides (standard 35 mm. size) from negatives or photographs, which will be made available, would he kindly write in to the Secretary, British Gliding Association? A small sum of money is available to cover costs.

Offers of donations of further slides will always be appreciated, and the existence of a really comprehensive central library which will be available for lectures, should prove an asset of great publicity value.

Spring Cover Photo

Since the striking photograph of a New Zealand wave cloud was published on the cover of our last issue, readers have been enquiring whether copies of the original are available. Enlargements of this photograph, size 12 x 10 inches, can now be ordered from the British Gliding Association, price 12s. 6d. each.

B.G.A. Approved Inspectors' Conference

The Technical Committee is considering holding a B.G.A. Approved Inspectors' Conference in October or November this year. There are at present 28 Approved Inspectors, and it is thought that perhaps 20 of these might care to attend, plus other interested persons.

SAILFLYING PRESS NEWS

GLIDING news comes thicker and faster in the summer months of the northern hemisphere, and will, we suppose, continue to do so until our cousins down under begin to outnumber us. We have therefore decided to close up the gap between our Spring, Summer and Autumn issues; our next, Autumn, issue will be out in mid-September. By then we hope to be able to give a properly digested account of the World Championships.

We would like to call our readers' attention to our new board cover, which takes three years' issues of GLIDING, price 15s. post free from the British Gliding Association.

LIST OF RECORDS

A CORRECTION should be made to the list of Gliding Records published in our last issue, pages 32-33. Flt. Lt. Bedford set up the single-seater British records for Gain of Height and for Absolute Altitude on 24.8.50, not 24.7.50.

Since the list was published, two new multi-seater international records have been homologated:—

Duration: A. Carraz and J. Branswyck (France), 53 hrs. 4 mins. at Romanin les Alpilles, on 4-5-6th February, 1952.

Distance: A. Pavlikiewicz with Z. Pakielewicz as passenger (Poland), 154.38 miles on 19th July, 1951, from Lesnica, Wroclaw, to Warez, Sokal.

Preliminary notice has also been received of the exact figures for a new multi-seater record for Absolute Altitude, 47,362 ft., and Gain of Height, 36,598 ft., set up by Larry Edgar and Harold Klieforth (U.S.A.) at Bishop, California, on 29th March, 1952; it awaits homologation.

Reviews

Regulations for Records in Gliding and for the award of **Gliding Badges, and** Regulations for **World Championships** in Gliding. Published by Fédération Aéronautique Internationale.

This little booklet is a "must" for anyone wanting to have a bash at gliding records, national or international, and for any national body which deals out international badges (the Silver, Gold or Diamond C), and controls National or International Gliding Championships.

It summarises in concentrated form the major work of the Gliding Commission of the F.A.I. since the war, and puts the sport of gliding on a much more organised basis than that of powered flying, whose rules are still spread over a number of different documents.

The only criticism we have to make is on the deplorable translation of this English version of the French master text, which is just comprehensible after prolonged re-reading by the average English-speaker. Perhaps when the time comes for a reprint the F.A.I. will permit the B.G.A. to turn it into clear English. In the meantime, the booklet is now available, price 2s., from the British Gliding Association.—C.

Military Aircraft of the U.S.S.R.: by CHARLES W. CAIN and DENYS VOADEN, with Drawings and Silhouettes by BJÖRN KARLSTRÖM, and many photographs. Published by Herbert Jenkins, Ltd., London, 1952. Price 3s. 6d.

Among the aircraft described and depicted in this booklet, are two "cargo gliders," the Yakolev and Tsibin. The authors state that cargo gliders have been developed experimentally over a period of years "to supplement commercial air transport facilities."

The larger of the two, the Yakolev, is an ugly-looking cantilever craft with many angles and few curves. It has a span of 85 ft. 3 ins., a length of close on 60 ft., a maximum towed speed of 173 m.p.h., and a cargo payload of about 1½ tons. Many have been seen towed by twin-engined IL-12 freight-carrying aeroplanes of 104 ft. span.

P. V. Tsibin is described as primarily a sailplane designer, and his cargo glider is a handsome creation, well streamlined, with wings of straight taper and rounded tips, and a pair of single struts. Its span is 80 ft., length 53 ft., and maximum towed speed 144 m.p.h. The rear of the fuselage is believed to hinge to one side, the authors say, whereas the Yakolev opens its nose to receive its cargo.

Björn Karlström, who has done the three-view drawings of each type, has also produced caricatures to aid recognition; that of the Tsibin shows wings like a Rhönadler!

Another aircraft of interest to motorless flyers is a "rotor kite," the Smolensk, which works similarly to that invented by the Germans for towing up behind a submarine. The Russian one, however, is "intended to provide preliminary training for future helicopter pilots, in the same manner as the primary glider is for power-flying." It is towed off behind a jeep, whereupon the relative wind turns the rotor round. M. A. Kupfer designed it.—A.E.S.

INSTRUCTION CAMPS

GLIDING Instruction camps, open to non-members as well as members, are being run by various British gliding clubs on the following dates. Details of these courses can be obtained by writing to the Course Secretary of the appropriate club at the address given.

LONDON GLIDING CLUB: 14th-25th July; 1st-12th September. (Dunstable Downs, Beds.).

BRISTOL GLIDING CLUB: every week from Monday to Saturday inclusive, until 6th September. (6, Longmead Avenue, Bristol, 7).

SCOTTISH GLIDING UNION: 5th-12th July; 19th-26th July; 9th-16th August; 23rd-30th August. (29, Barony Terrace, Edinburgh, 12).

SURREY GLIDING CLUB: 6th-19th September. (Lasham Aerodrome, near Alton, Hants.).

MIDLAND GLIDING CLUB: 5th-13th July; 2nd-10th August. (409, Hagley Road, Edgbaston, Birmingham, 17). This Club's camps are open to non-members with a B certificate or power-flying experience, and to club members of any grade.

The International Championships

THESE championships are being held at the Carabanchal Airfield, near Madrid, approximately from 30th June to 15th July.

Simultaneously there will be a Congress of the OSTIV (International Scientific and Technical Organisation for Soaring Flight). The British delegates to this Congress are: Dr. R. S. Scorer, of the Meteorological Department, Imperial College of Science; Mr. A. H. Yates, of the College of Aeronautics, Cranfield; Dr. A. E. Slater.

Papers by British authors to be read at the Congress are:

R. S. Scorer, "Barostromatic Airflow."

A. H. Yates, "Wave Flights in Great Britain" and "Artificial Horizons and Direction Gyros for Sailplanes."

F. H. Ludlam, "Icing and Hailstone Hazards inside Cumulo-Nimbus."

B. S. Shenstone, "Development of Two-Seat Sailplanes."

A great number of papers has been promised, mostly by authors with international reputations in the gliding world. The Congress will be formally opened on 5th July.

We give below the names of the British team and pilots of other teams, as far as they are known at the time of going to press; a list of further donations in response to the appeal issued by Lord Kemsley, President of the British Gliding Association (the first list of donors was published in our Spring issue, page 2), and a list of those who have generously given and loaned equipment for the British Team.

BRITISH TEAM AND CREWS

R. C. Forbes (pilot), C. J. Herold, W. Brookfield, Cpl. Gough.

G. H. Stephenson (pilot), Mrs. B. Stephenson, H. M. Latto, A. Pratt.

L. Welch (pilot), F. G. Irving, M. Neale, G. Gregory.

P. A. Wills (pilot), Mrs. K. Wills, R. Fender, N. E. J. Haley.

F. Foster (pilot), Mrs. P. Foster, P. A. Lang, D. H. G. Ince.

Team Manager: Mrs. Ann Douglas.

PILOTS OF OTHER TEAMS

Egypt: Kamil.

Sweden: Nilsson, Löf, Magnusson.

Norway: Haydn.

U.S.A.: Johnson, Smith, MacCready, Schweizer, Beuby.

South Africa: Lasch.

Canada: Jeffrey, Brame, Noonan.

France: Lassageas, Bramswyck, Garnier, Pierre, Marbleu.

Belgium: Gildernyn.

Holland: Koek, de Boer Ordelman.

Switzerland: Fahrländer, Gehriger, Schachenmann, Kuhn, Nietelspach.

Finland: Kahra, Koskinen, Tandefelt, Saari.

Germany: Haase, Reitsch, Beck, Kensche, Frowein.

Denmark: Peddersen, Wermouth, Rasmussen.

Portugal: Viana Ribeiro, Alves de Silva, Dos Santos Grancha.

Argentina: Cuadrado, Ortner, Bazet, Garcia, Rossi.

Italy: five pilots.

Spain: five pilots.

Australia: Waghorn, Hoinville, Desmond.

DONATIONS AND LOANS OF EQUIPMENT

Messrs. Slingsby Sailplanes: 4 Sky Aircraft.

Sqn. Ldr. E. J. Furling: 1 Sky Aircraft.

The Kemsley Flying Trust: 3 Trailers.

Sqn. Ldr. E. J. Furlong: 1 Trailer.

Mr. P. A. Wills: 1 Trailer.

The Standard Motor Co.: 5 Standard Vanguards and one Saloon.

Messrs. Pye Ltd.: 5 Air to Ground and Ground to Air Wireless Sets.

Messrs. R. B. Pullin & Co. Ltd.: 5 Turn and Slip Indicators.

Messrs. Firestones: 12 Sets Spanish Maps.

Messrs. Irving Airchutes Ltd.: 2 Glider Parachutes.

Messrs. Ever Ready: Batteries for Wireless.

Messrs. Aero Research: Aerolite Glue for Repairs.

FURTHER DONATIONS TO APPEAL FUND

£	s.	d.	
1,460	6	0	Total to 29th February
10	10	0	"The Aeroplane"
	10	6	Arthur Daughty
3	3	0	Anonymous
10	0	0	Frank Foster
1	0	0	Peter Rivers
108	10	0	J. C. Rice
13	4	6	Surrey Gliding Club
1	0	0	Anonymous
10	10	0	London Gliding Club
3	0	0	Beryl Stephenson
20	0	0	Anonymous
3	0	0	R. Pasold
1	1	0	L. Gilewicz
5	0	0	G. A. J. Goodhart and H. C. N. Goodhart
30	0	0	H. Latto
20	0	0	G. Gregory
10	10	0	Howson F. Devitt & Sons
5	5	0	R. C. Slazenger
30	0	0	Frank Foster
20	0	0	Lorne Welch
	10	0	A. C. Hennessy
20	0	0	P. A. Lang
1	0	0	W. E. Filmer
30	0	0	Anonymous
40	0	0	P. A. Wills
20	0	0	C. J. Herold
5	5	0	B. E. Vigers
20	0	0	Mrs. A. C. Douglas
20	0	0	F. G. Irving
20	0	0	R. Fender
20	0	0	David Ince
20	0	0	R. C. Forbes
20	0	0	W. Brookfield
1	1	0	Slingsby Sailplanes F. C.
	10	0	Pilot Officer Harcourt
5	5	0	Dr. A. E. Slater
30	0	0	Beryl & G. H. Stephenson
10	0	0	Allan Pratt
1	1	0	R. G. Frecheville
1	1	0	E. H. Leschallas
	5	0	R. F. Marsh
10	10	0	Derby & Lancs. G.C.
10	10	0	Professor G. Varley
20	0	0	M. J. Neale
2	2	0	A. J. Lucking
105	0	0	Viscount Kemsley
1	1	0	Blackpool & Fylde G.C.
2	0	0	"Sky" Group at Derby
£2,203	11	0	

The official opening ceremony is fixed for 30th June and flying is expected to begin next day. Before that, many of the teams, including the British, will have put in several days' preliminary practice on the site.

The OSTIV delegates are to be taken on an excursion to Toledo on 6th July and the championship contestants to San Lorenzo del Escorial on 10th July, in each case as guests of the Royal Aero Club of Spain.

The Championships and the OSTIV Congress will together be brought to a close by a celebration and prize-giving party on 13th July.

Pat Foster (right) polishes the wing of her husband's "Sky," assisted by Joan Price. Mrs. Price was a pilot in the British team at the first International Gliding Contest, held on the Wasserkuppe in Germany in 1937. Mrs. Foster, who is also a sailplane pilot, will be a member of Frank Foster's crew in the fourth International Contest. This particular Sky sailplane has been painted red and christened "Carmen."

An Argentine Entry

Courtesy of "The Aeroplane."

The Argentine team is bringing to the Championships two tailless sailplanes of "Horten 15" type, and will pick up two British "Sky" sailplanes in Spain. The type of machine shown in this photograph, sent from the Argentine, is not specified, but readers can have one guess.

Fashion in the Field

by Brenda Horsfield

A Surrey Reminiscence from pre-Lasham Days

(From the "Redhill Newsletter").

For some reason everyone is quite ready to agree that there are two sorts of women. The women who appear at Redhill can therefore be very simply divided into two groups, the strictly ornamental and the more or less functional. For the first group almost no advice is necessary—dress up, stay dressed up through thick and thin and above all in the matter of the correct facial expression to wear with gauge 66 nylons, don't look too keen or you will hear much more about gliding than you bargained for.

For flying members the problems are not nearly so simple. Right at the start it is obvious that paying the Club entrance fee confers on you a mild but quite noticeable eccentricity. It is essential to face up to this somewhat embarrassing new possession. The best way to tackle it is to adopt some fanciful and distinctive form of dress which will both be a personal label and a sign that you are not competing on terms of Monday, to-Friday fashions.

We shall begin with the question of hats. Obviously everyone wants a hat that will stay on, look interesting and show up well in bad photographs. Berets look entirely delightful, but beginners and passengers in Daisy will find it just as well to have an arrangement with a retrieving crew on the ground. Scarves too are wonderful, gay, colourful jaunty things, but the stole and fascinator variants often seem just a little wilful in the air.

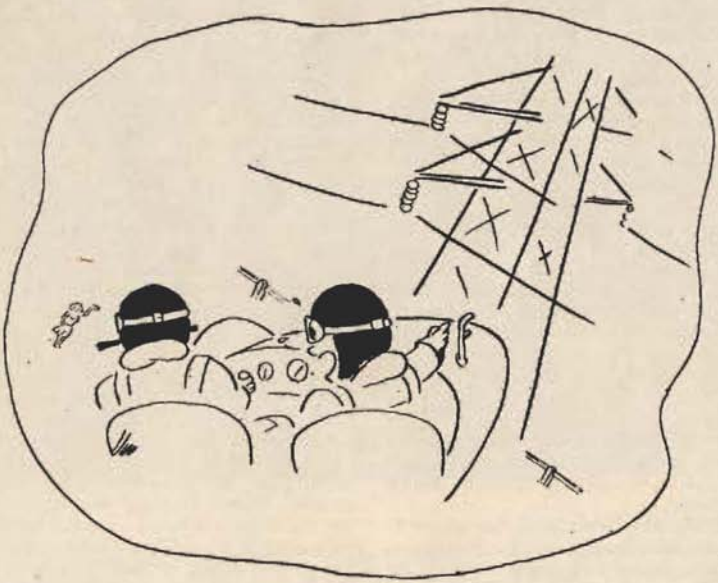
And here of course we come to the basic problem—things you might pick out for yourself from the sports pages of Vogue are just not practical. They come off, they come up, or down, or wind round parts of the machines. Practical clothes, on the other hand, are seldom flattering and may provoke harsh, wounding remarks about bluff bodies.

Continuing at a lower level, we arrive at the case for and against skirts. It has not actually been stated that skirts must not be worn on the aerodrome, but unkind things have been said about them. Extreme turbulence about the lower limbs is not encouraged, and there is a legend that Frank Irving once rounded savagely on a pupil who came ballooning his way. There is a special branch of theory covering the tubular, both-legs-together-or-not-at-all variety, most of the arguments being easily deduced from a quick look at a cockpit: curves are nice, but coming out of a turn is something just as much fun.

Once the basic need for trousers has been recognised, the rest of your wardrobe can be assembled to taste. Make sure, though, that all shirts, sweaters and jackets can be got into and out of without causing alarm to other members. This is a "must"; because the gliding, with its subsidiary hot-and-cold-making sports of glider-pushing and beaverette-riding, takes place in far-flung corners of the aerodrome, where vegetation is sparse and centres of civilisation a good 20 minutes' walk in either direction. Add to all this the established fact that any given day in England demands alternative costumes designed for the Arctic and the sub-tropics; that piercing winds blow as if across the Steppe; that heavy dew can last until midday and that good plain rain causes considerable erosion, and you will begin to see what you are up against in the way of long-term planning.

In case it seems that words are being wasted on this subject, it should be borne in mind that the rather surprised eyes of the glossy magazines are already turned in our direction. The first sign of their threatened attack came late last summer, when a poised and elegant young woman arrived from London to be duly photographed against a background of gliders trundled about by miscellaneous inelegant rustics—in fact, us. Probably this spring will show us what "haute couture" can do to add to the sartorial confusion. In the meantime, we must rely for guidance on trial and error, the error leading to long, hot hours over the stove, on the theory that girls who look "as damn shaggy as all that" will almost certainly know how to cook.

"I don't wish to interfere, Ponsonby, but did you pull the release?"



"Ponsonby-y-y!!"

Drawn by W. TINKER.

Sailplanes are too Big

by F. D. Hoinville

COMING from the owner of the biggest sailplane in Australia, this may seem rather odd, but I have come to the conclusion that the big, heavy sailplane is too cumbersome and expensive for the average pilot. Not only this. but because of its cash value and high landing speed, the big modern sailplane cannot be flown over some types of country without very grave risk, whereas the light baby sailplane can be landed so easily, slowly. and so short, that it can be taken over "dangerous" country without a qualm, and even when landed in rough country, can be retrieved without much trouble, even if it has to be carried; and if minor damage occurs, it can be mended cheaply and quickly.

I have a Schweizer TG-3A, a machine worthy of high praise, and capable of great development, but I would not have been game to take that Schweizer where I recently took a Grunau Baby. In order to get the last mile of distance out of the flight, I had to go 20 miles up a mountainous valley, with little altitude to spare, and a landing imminent at any time. There were no level fields, or large ones either, and the TG-3 would have needed much more altitude before the risk could have been taken. But the Grunau is a small, light machine with a low landing speed; and when I could stay up no longer, it was simple and safe to land by diving slowly down one hill, over a fence, swerving around several horses and trees, and landing smoothly up a fairly steep hill to finish on the short, flat top. What was safe for the Grunau would certainly have wrecked the fast, heavy Schweizer.

In this country gliding receives a microscopic subsidy, which is so small that it would certainly be far better to do without it and stand on our own feet entirely. This could easily be done if we were not all dazzled by visions of beautiful but highly expensive high-performance types, which are no longer pleasure craft, but have become instruments of science, restricted to those very few pilots who are prepared to make heavy sacrifices of time, money, and labour, to realise an ideal.

The vast majority need cheap gliders, and want them for sport, not science. These men must be prepared to accept lower standards, yet it is surprising how much can be done with a cheap glider.

Many years ago, Martin Warner of Sydney designed and built a small glider called the Kite. This machine has done a flight of 105 miles, and is capable of much longer distances, in our good inland conditions. It has a low sinking speed, and could be cleaned up a lot with modern knowledge.

Another cheap, light glider is the Hütter 17, which has quite good penetration but a rather high sinking speed. This machine also could be improved a lot. Either of these designs, while not what we want today, could be re-designed to give a low sinking speed with medium penetration, and low first cost. Such craft could be flown anywhere, landed anywhere, and to that extent would have an advantage over their bigger brothers.

The Grunau Baby is fairly numerous in this country, and is capable of doing all requirements for a Gold C and Diamond height and goal. The smaller types suggested could also do this.

While fully recognising the great value of the RJ-5, I feel that it may discourage many pilots unless they are given the chance to do good flights. I therefore appeal to our designers to develop for us a new design, with performance equal to the Grunau Baby, but smaller, simpler, and cheaper. In order to emphasize this need, I hope to concentrate on Grunau Baby flights while awaiting completion of redesign on the TG-3, and will try to show that the way you fly is more important than what you fly. It is a sad fact that not enough attention is paid to this truth by many pilots. One classic example which I saw recently was given by a pilot in a Grunau. He was making slow time until he began to feel sick. He then flew straight ahead to avoid circling, and was astonished to find that he had doubled his ground speed without losing much height. Ted

Desmond has already demonstrated the possibilities with his great out-and-return flight of 122 miles in the Gliding Club of Victoria's Grunau in fast time.

So don't forget, boys: if you have a Grunau, you have a Gold C and two Diamonds within reach. Study the methods of the world's greatest pilots, and remember that those methods apply just as much to a Grunau as to a Weihe. You don't need a tow-plane; just a car, a trailer, 1,000 feet of wire, eyes that observe and remember, imagination to grasp the possibilities of what you observe, and an unyielding determination to get the last possible mile out of the day's conditions. Without that last, all else is wasted, and you will never be a real pilot.

As an afterthought, I offer a suggestion: why not use a standard small, cheap glider of new design, or even the present Grunau Baby, of which there are many already in most countries, as universal equipment for the annual World Gliding Championships? This would have the double advantage of making large numbers of standard gliders available, and keeping down contest expenses by reducing retrieve distances while allowing distances around the 200-mile mark and almost perfect equality of opportunity for all competitors, just as was intended on a more expensive scale when the Olympia was designed. This would also facilitate recognition by the Olympic Games organisers and would not prevent development of better sailplanes, which would still be built for all record-breaking attempts.

Since this article was first written, the writer has done two Grunau flights, both heavily handicapped, one of 132 miles after a late start at 1.30 p.m., and the other of 91 miles with a very low ceiling.

Air Training Corps News

168 Gliding School

Easter Cadet Training Course

THIS gliding school operates normally at week-ends and is a self-contained unit with its own aircraft and equipment. It is not connected with the Gliding Instructors' School, which also operates at Detling. A Sedbergh and a Prefect were loaned to the school for the purpose of the course, bringing their aircraft strength to two Sedberghs, two Cadet Mk. III (or T-31), a Cadet Mk. II and a Prefect.

The twelve cadets started as ab-initio pupils with no gliding experience and finished the eight-day course with an average of 9 solo circuits each. All qualified for their A and B certificates.

The outstanding cadet on the course was Sergeant A. J. R. Doyle of Epsom College who, after soloing after only 11 launches, completed 18 solo circuits, including a C certificate flight of 14 minutes, during which he climbed to 2,000 feet in the Prefect.

Several other cadets made short soaring flights in the rather patchy soaring conditions, and there can be little doubt that, had the weather become really unstable, several other C certificates would have been obtained.

The average "dual to first solo" works out at 26½ flights per pupil and includes one pupil with 57 flights who would normally have been rejected from training after a few launches. A large proportion of the instruction was carried out by the least experienced two-seater instructors in the school.

There is a lesson to be learned from the results of this course. By restricting the number of pupils on a week's course or camp, even if the weather had been poor, each pupil would have received a worthwhile amount of flying and probably obtained a B certificate. The temptation to take 15 or 20 cadets with a view to obtaining the largest number of certificates was resisted, and as a result each cadet was able to carry out more solo flying and really master the aircraft. The standard of solo flying was exceptional and all twelve of these lucky cadets have made a good start to a flying career, should they decide to continue.

Combined Cadet Force

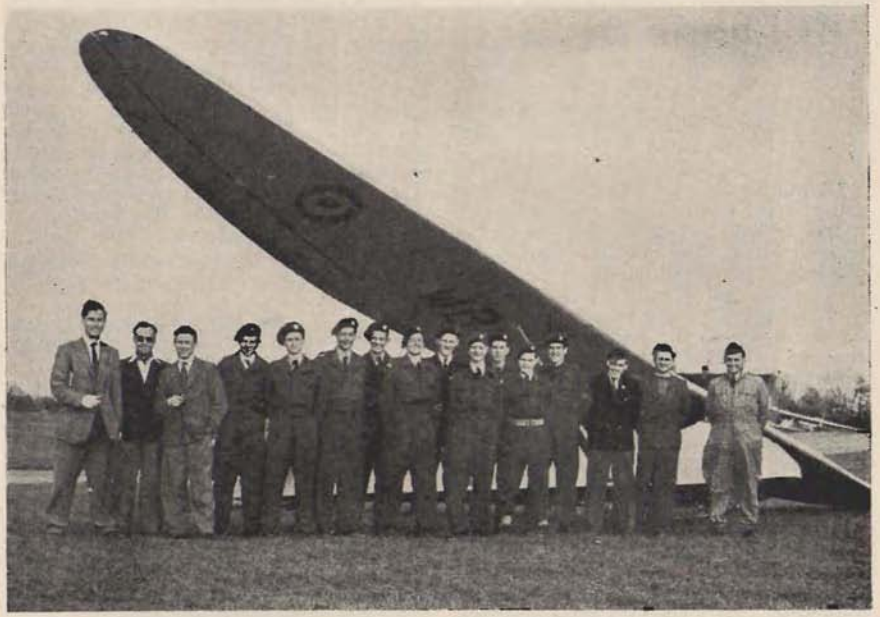
The Home Command Gliding Instructors' School at Detling has run several courses for schoolmasters who will instruct on the primary gliders issued to the R.A.F. Sections of the Combined Cadet Force units at Public and Grammar Schools. Late in April the first B certificate course for some of these masters was completed. The B certificate is one of the required qualifications for operating a primary glider under the scheme.

In six days of perfect training weather all twelve ab initio students obtained B certificates and a further five ex-R.A.F. pilots obtained both B and C certificates. The oldest member of the course, aged 55 years, soloed after 21 dual launches. The average age of the course must have been between 30 and 40. Credit is due to these masters for coming forward to learn to glide during the Easter holidays. They went back sunburnt but happy at having achieved what many of them had considered an almost impossible task at their age.

The average number of launches to solo for all the ab-initio students works out at 18 launches, of which seven were Sedbergh flights and 11 on the Cadet Mk. III (T-31). Each student had previously received between two and four launches in a Sedbergh during the Primary course in January, 1952.

The five ex-pilots had no difficulty in adapting themselves to gliding and their training consisted of dual instruction in the Sedbergh, followed by solo flights in the Prefect. Some flights were also made in the Grunau.

One of the ex-pilots made many flights in the Prefect without finding a thermal, and was eventually launched immediately after a Sedbergh which marked the lift. This "pathfinder" technique may be an answer to making soaring easier for the inexperienced pupils flying the Cadet Mk. II or III solo. Normally, their chances are negligible unless they are launched directly into strong lift.



No. 168 Gliding School, Easter Cadet Course, 1952

Care of Launching Cable

by Squadron Leader E. J. Furlong, M.B.E., D.F.C.

GLIDER launching cable, technically known as "wire rope," usually ranges between 15 and 25 cwts. breaking strain. It varies in section from 7 x 19 (meaning seven strands of 19 wires each) to 6 x 7 with fibre core (meaning 6 strands round a fibre core, each strand of 7 wires). It is usually galvanised but not preformed (preformed means it won't untwist when cut).

The ideal is 6 x 19 with fibre core galvanised and preformed—commercial grade, 3/16 ins. diameter, breaking strain 1.1 tons. Unfortunately, few clubs can obtain or afford this, so they usually use the nearest to it that they are able to obtain at reasonable cost. The 6 x 7 with fibre core will not fray quite as soon as 6 x 19, but it is not quite so flexible.

Commercial grade is much cheaper than high grade and incidentally is better, as it is not so springy. Stainless is out of the question from a price point of view.

Cable can be, and has been, made to give the most fantastic number of launches—one cable did over 14,000 without a break. It is believed that a cable just will not break on an ordinary launch unless it has been strained or ill-treated.

The most common forms of misuse are:

(1) pulling the wire round an undersized roller; every size of cable has a minimum radius around which it may be pulled without strain, i.e. not less than 4 ins. diameter, for normal launching cable.

(2) *pulling out* without a weak link.

(3) having no proper braking mechanism on the winch to prevent the drum overrunning on pulling out.

Re the second of these, it must be clearly understood that if, during a cable retrieve without a weak link, a jam occurs at the winch, resulting in a broken cable, then that cable is *ruined throughout its paid-out length*. Also, if a cable is *once* pulled round a small roller or other small-diameter object with or without load, it is never the same.

A new cable used just once to launch a two-seater with, say, a two-inch roller, will take on a spiral effect which can never be got rid of. The cable has been deformed, and therefore uneven strains set in which eventually cause a break.

Cable with a rope core is more flexible because the strands can position themselves to spread the load evenly when going round a roller or pulley of the correct size. Once a cable has "snagged" or broken and been tied or spliced, it is liable to break in that same place for the rest of its life.

The proper way to treat a cable to obtain the maximum useful life is therefore:

(a) to use a well designed winch with a proper pay-on and with all rollers of a minimum diameter of 4 ins. Remember that however obtuse an angle, it makes little difference. The crucial point is the radius at the actual bend.

(b) at all times avoid kinks, snags and loops.

(c) keep the wire firmly wound on the drum. Avoid any looseness.

(d) use a weak link (it can be composed of one strand of its own wire in the form of a loop) to retrieve by, and if it breaks repeatedly don't increase its strength, but change your retrieving car driver.

(e) use a parachute and rope on the glider end of the wire: they really are worth it, because the parachute prevents the terrific shock the wire and rings etc. receive each time they fall; it also marks the end of the cable on the ground and shows clearly when the glider releases. The rope acts as additional shock-absorber both to the glider *and* the wire; it keeps the parachute at a safe distance from the nose of the machine.

(f) don't allow the winch driver to take up slack with a jerk; it is not only bad for the glider but it does strain the cable.

(g) if and when the cable does break, a reef knot is as good as anything, particularly if you tape the ends down (don't tape the knot itself—you will want to inspect it). A splice, apart from taking a great deal longer, is not much better, because it really wants a much bigger diameter roller.

Finally, remember the ruination of launching cable is overstrain, and overstrain is nearly always caused by bending the cable too sharply, putting most of the load on a few of the individual wires.

Like gliders, cables seldom wear out: they pass out from misuse.

The World's First Soaring Flight

by P. W. Brooks

FORTY years ago what was probably the world's first soaring flight was made by E. C. Gordon England over Amberley Mount near Arundel in Sussex. The date was 27th June, 1909, and the aircraft a Weiss glider. The following details of this little-known bit of history are largely taken from a French book, *L'Histoire du Vol à Voile*, by Eric Nessler, although certain obvious inaccuracies in his account have been corrected.

José Weiss, who designed and built the glider, was born on 21st January, 1859. An Alsatian, he emigrated to England with his parents in 1871 and became a naturalised Englishman in 1894. As he grew up, José took up painting as a career and settled in Sussex. He spent a lot of time out of doors on his painting and gradually became a keen bird-watcher. Early in the new century he began to get interested in the accounts of the early gliding experiments of Le Bris, Mouillard and Lilienthal, and it was not long before he was building and flying model gliders of his own design.

The early Weiss designs were automatically stable, tailless monoplanes with crescent-shaped wings. The characteristic Weiss wing was very thick at the root and tapered sharply in chord and thickness towards the tips, which were markedly swept back and "washed-out."

From 1905 to 1908, Weiss made hundreds of tests with model gliders built to this general layout, either on the western and northern slopes of Amberley Mount or on the flat ground near by. For certain of his later experiments, he launched the models from a wooden tower nearly 100 feet high. Some of the models weighed as much as 85 lbs., with a wing area of 40 square feet.

At the end of 1907 the trials at Amberley had progressed to the stage where a machine large enough to carry a man could be built. This full-sized glider was very similar to the models that preceded it. Its 26-ft. span wings were braced to two pylons and had an area of 108 sq. feet. The fuselage was in the form of a nacelle immediately beneath the wing. There was no tail unit. A single long skid beneath the fuselage and two spring hoops at the wing-tips served for the undercarriage. Empty, it weighed about 100 lbs. Like the models, it was automatically stable. Fore-and-aft control was achieved by moving the pilot's weight backward and forward on a sliding seat. A transverse lever warped the trailing edges of the wing-tips for lateral and directional control. There was no rudder. This glider was flown on brief hops, first by Weiss, then by Gerald Leake, Dr. Alexander Keith and E. C. Gordon England, all three of whom were helping Weiss in his experiments.

Gordon England quickly progressed beyond the stages of short hops. For launching, the glider would be placed, facing the wind, on a crest of the hill and the pilot would then wait for a gust which, aided by a good push from a helper, would lift him into the air. He then usually glided down into the valley. However, on 27th June, 1909, Gordon England, by getting into the slope lift over the western face of Amberley Mount, succeeded in gaining about 40 feet above the launching point and then achieving a glide lasting about a minute and covering half a mile. As far as is known, this was the first soaring flight with a clearly defined gain in height ever made. Lilienthal, the famous German pioneer, probably achieved a brief moment of sustained flight in August, 1893. However, as he does not appear to have gained any height above the launching point, he can hardly be considered to have made anything more than a delayed descent.

Returning to the Weiss experiments: although numerous other glides were made with the same aircraft, none matched this effort of Gordon England's, apparently because the full significance of holding position in the best lift over the hill's crest was not appreciated. The pilot of a Weiss glider, it is true, had little say in the matter, because the machine seems to have been so stable as to be almost uncontrollable. Nevertheless, Gordon England, by a combination of luck and good judgment in launching himself from the right part of the hill top, certainly flew for an appreciable time in the best lift on his historic flight.

Gordon England followed these early

experiments with a distinguished career in aviation as an aircraft designer, manufacturer and test pilot. He also competed in the *Daily Mail* Gliding Competitions of 1922 at Firle Beacon and was Chairman of the British Gliding Association from its formation in 1929 until 1933. He was Managing Director of General Aircraft, Ltd., until 1942.

Weiss continued his experiments until the outbreak of the 1914-1918 war, but did not achieve anything further of lasting interest. Some of Handley Page's early aeroplanes were built broadly to the Weiss formula, although they had tails. Weiss himself began to suffer from ill-health during the war, but he maintained his interest in the possibilities of soaring until his death on 11th December, 1919. He died at his home at the foot of Amberley, the scene of his greatest achievement.

ANOTHER 1909 GLIDER

In the same year as the flight which Mr. Brooks has described, the late Sir Stafford Cripps was also trying to glide. Mr. Thurstan James, in an obituary notice in *The Aeroplane*, writes that Sir Stafford "spent part of his summer holidays in 1909, when he was 20, building a biplane glider which seems from photographs to have been of the Dunne type" (tailless, with swept-back wings). "That was after he had won a chemistry scholarship from Winchester to New College, Oxford."

Cross-Country Technique

Using Best Flying Speeds and Gliding Angles

by A. J. Deane-Drummond

THE best speed to fly a sailplane has always been a hardy annual which never fails to produce a healthy argument. Many a practical pilot has been frightened off trying to apply theoretically best speeds because he is either expected to do mental arithmetic or play around with graphs or special slide rules whilst flying. I will now try and show a more practical approach, which at the same time is reasonably accurate.

The first problem to clear up is what the pilot really wants to know. If he flies at the air speed which gives the best gliding angle, he will go furthest over the ground from a given height. For example, when flying down wind, the air speed for best gliding angle in most sailplanes will be about the same as the air speed for minimum sink in a wind speed of more than, say, 10-15 m.p.h. (This assumes that the sailplane is not in a down-current). I suggest that the only times a pilot will want to apply air speed for best gliding angle will be when below a safety minimum height during a cross-country, or when gliding to a goal at the end of a flight, or possibly when trying to achieve the maximum distance after a wave flight. Some may disagree with applying air speed for best gliding angle when below a safety height (say 50 per cent of cloud base height on any day). It will, however, enable the pilot to sample as many likely sources of thermals from the ground as possible before he has to land.

As the pilot presumably knows the direction he is going before he sets off, and wind speeds will be known, the air speed for best gliding angle can be calculated before take-off, and applied whenever needed in the air.

Air speed for best gliding angle will be used by the pilot when gliding down to a goal at the end of a cross-country flight, but the pilot's real worry is whether he will get there, or should he try and get more height in further thermals? This problem can also be solved by the pilot before take-off by marking on the map the height necessary to reach the goal from, say, 10 or 20 miles when flying at the air speed for best gliding angle.

The second problem, of presenting to the pilot information which will enable him to fly at the maximum achievable cross-country speed under the prevailing

conditions, is much more important when it is realised that an outside time-limit for every flight is set by the sun going down, and more often than not by changing weather conditions. Best cross-country speeds are every pilot's business, and not only for the few that take part in races or record distance attempts.

The pilot who uses best cross-country speeds will always fly faster between thermals than the best-gliding-angle pilot; he will also sample the maximum amount of air (and clouds) possible and thus be able to select the strongest available thermal along his track. Other things being equal he will be back at cloud-base ahead of the best-gliding-angle pilot.

Nick Goodhart's tables (published in Winter GLIDING) and Paul MacCready's paper point the way, but are not suitable for direct application unless the pilot is prepared to do mental arithmetic in the air. Before the pilot can decide on the correct indicated air speed, he must guess his achieved rate of climb in the thermal, make allowance for the pitot head position error, adjust the result for his A.S.I. calibration and finally for the all-up weight of the sailplane and the height at which he is flying. Although each of these adjustments probably only amount to 2 or 3 m.p.h. or less, the final result may easily differ as much as 10 m.p.h. from calculated true airspeeds. Errors of this sort combined with normal pilot error can make a significant difference to the achieved cross-country speed.

Fortunately it is quite simple to recalculate the tables applying these corrections, so that all the pilot has to do is to select the correct table for the apparent indicated rate of climb. Each table must clearly indicate the air speed to fly at between thermals when in air that is stationary in a vertical direction, and also the air speeds to fly at when in upcurrents or downdraughts.

The first correction to apply is that of the achieved rate of climb, and could almost be called the pilot's fumble factor. It will be the difference between the apparent average indicated rate of climb, and the actual rate of climb recorded on the barograph, and may differ with every pilot. I myself find I am able to achieve about 75 per cent of the apparent indicated rate of climb, and have applied this accordingly.

If a Slater-Cobb variometer is used calibrated at the usual 2, 3, 5, 10, and 20 ft. per sec., then the tables should be re-calculated for achieved rates of climb of 1.5, 2.25, 3.75, 7.5 and 15 ft. per sec. Each table must clearly show the normal air speed (and consequent red ball reading) to apply between thermals. Tables for an Olympia come out as follows. An additional table for an indicated 15 ft. per sec. (achieved 11.25 ft. per sec.) is shown for use on good days.

Table for Eon Olympia

True air speeds (m.p.h.) for best cross-country speed. Air speeds for normal inter-thermal air speed are in heavy type.

	Average Green Ball (ft/sec.)					
Red Ball	2	3	5	10	15	20
20	73	74	74	76	77	77
15	70	71	72	74	75	77
10	64	65	67	71	73	75
						73
					71	
				67		
5	55	58	60	65	69	72
		55				
	51					
3	49	52	56	63	67	71
2	43	48	53	61	66	70
1	38	40	49	59	65	69
	1.5	2.25	3.75	7.5	11.25	15
	Achieved Rate of Climb (ft/sec.)					

The next stage is to draw up a new table with air speeds corrected for pitot position error, A.S.I. calibration, all-up weight, and normal flying height. The last two corrections are of negligible importance except in extreme cases and may be omitted by pilots of normal weight, who don't carry oxygen and keep below 10,000 feet.

Many pilots will object to fumbling around with a table in the air and require a more positive indication. Those using a Cobb-Slater variometer can solve this problem by sticking the six columns round a hexagonal pencil which is free to revolve and is mounted on the red-ball side of the variometer. (A similar device was suggested by John Neilan in August, 1947, *Sailplane and Glider* for solving best gliding angles).

Air speeds above normal for each thermal strength can be coloured red, and below normal coloured green, thus indicating whether the air is moving up or down. The horizontal rows of air speeds are, of course, spaced to correspond with the variometer's calibration.

The device is simple to use in the air and requires no brainwork. It was used for the first time at the Easter meeting at Lasham and no snags were apparent. Towards the top of each thermal the pilot decides on the apparent average green ball reading and sets the pencil accordingly, say in this case to 3 ft. per sec. He then sees that he should fly at 55 m.p.h. between thermals (using the uncorrected table above), and the red ball should be just level with this figure at this speed, i.e. 4 feet per sec. down. If the red ball is higher, he must increase air speed as he is in a downdraught, and he will be flying at best speed when the red ball and indicated air speed are the same. The reverse is the case if the red ball is lower than the 55 level, and means that he is in rising air.

A photograph of the Army Gliding Club's Olympia instrument panel is shown with the best-air-speed indicator mounted beside the Cobb-Slater variometer. Those interested in instrument layout will notice that most needles point inwards when flying normally and thus the pilot has the smallest area of panel to watch. The layout was copied from the Sanders-Yates Olympia.

In conclusion there can be little argument that a pilot who uses best flying speeds must go further in a given time than the pilot who uses air speeds for best gliding angles. In practice, however, there is little to choose between the two methods if thermals are weak on days of little or no wind. If thermals are strong or the pilot is flying down wind, then quite astonishing cross-country speeds are possible.

Instrument panel of the Army Gliding Club's Olympia, showing the Best-Air-Speed Indicator as described by Major Deane-Drummond. To the left of it is a bell-push to work the de-icer described by Mr. Blanchard on page 75.

Getting Organised

by The Goodhart Brothers

with Illustrations by the Goodhart Sister

TONY.—It looks like being a good day to-morrow. What about a little "cross-country" to start the season?

NICK.—Good idea! But are we properly organised?

TONY.—Oh, I think so. After all, we were at the end of last year. Everything should be "as was."

NICK.—Maybe, but we'd better check up. Nothing more aggravating than finding we've forgotten some vital link in the chain.

The Sailplane

This has just completed a major overhaul and so should be absolutely 100 per cent. Does everything work properly? Ground check reveals:

(a) The pressure side of the pitot is connected to the variometer and altimeter.

(b) The new artificial horizon runs all right, but its turn needle works backwards. Interesting but unorthodox. However, the Turn and Slip (why will people persist in calling the poor thing Turn and Bank?) works correctly, so all is reasonably well.

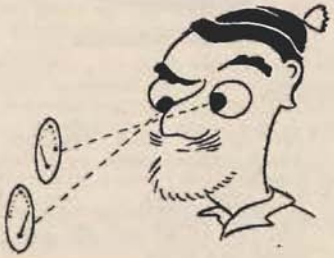
(c) With the wings level, both slip balls show left slip.

(d) The weight empty is much heavier than we thought: 430 lbs. without oxygen on board.

All of these items, except the weight, are easily corrected, though a considerable amount of time is wasted arguing whether it makes any difference if the artificial horizon gyro is running backwards.

And so to the flight test which reveals that the machine is in excellent flying trim, but that the variometer is u/s.

The knew knose pitot is connected to an A.S.I. reading nots (knot kilometres per hour) and several flights are knecessary to calibrate it. The results are so good against the original kilometre meter that we have now removed the old pitot static system and rely entirely on the nose pitot. It has since proved itself by operating continuously in three climbs, through moderate to heavy icing, to over 10,000 feet.



. . . interesting but unorthodox.

The "speed to fly" table must be re-written to read in knots. It might be as well to recalculate it too, in view of the unexpectedly higher weight.

Equipment

PERSONAL

1. Rubber cushion: mend puncture.
2. Parachute: repack.
3. Clothing: mend moth holes (wife and mother please note).
4. Oxygen: recharge.
5. Hot water bottle: liberate from bathroom cupboard.
6. Sustenance: purloin sister's sweet-coupons.

7. Money (English): plenty of sixpences and pennies for telephones and etceteras.

7a. Money (Foreign): apply to Bank of England on Form T2 (or is it T1?) for suitable currencies.

8. Passport: apply to Consulates for visas.

8a. Phrase books: *Ou se trouve le dooblervaysay?*

9. Any other personal panacea.

. . . to save contortions . . .

IMPERSONAL

1. Air Maps: check complete set. Argue relative merits of ¼ inch and ½ million.

2. Road Maps: for retrieving directions. The new ESSO ones are good, and cheap (see note).

3. Derigging tools: wing root box spanner; hammer and bullet; pliers and screwdriver.

4. Rigging Tool: magnet, to save contortions when hinge pin is lost.

5. Message bag (see note): equipped with pencil and paper.

6. Barograph: smoke chart, wind, set to ten-hour scale, seal—*and start*!

NOTE ON RETRIEVING SYSTEM.—On landing the pilot advances to the nearest A or B road and ties the message bag onto a convenient object with, in the pocket, some such message as:—

"Half mile down this side turning to Farmer Bloggins' strawberry field. Unrig and load Meise—*then* collect me from the 'Seven Bells' 300 yds. further on."

Next, a brief telephone call consisting only of "A307: four miles east of Crasham" will enable the pilot to retire with an easy conscience to the solace of the "Seven Bells."

The only thing to commend this system is that—*it works*!—though on one occasion it horrified a certain distinguished military gentleman of Ordnance Survey!

Aero-towing

The tow line now has three breaks in it, tied with two reef knots and a granny (who said Lorne?). It had better be renewed.

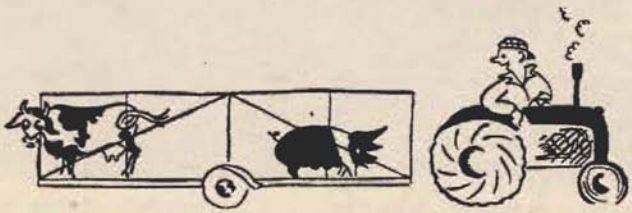
Retrieving

TRAILER.—In accordance with the fashionable aeronautical craze for Utilisation, one might expect the trailer to have been used for "another purpose" during the relatively idle winter months. All is well, however. It hasn't; and only minor attentions are required such as:

(a) The plug for the tail-light connection has been "borrowed." Fit a new one.

(b) Re-arrange the various ties and attachments so that they fit the Meise once more.

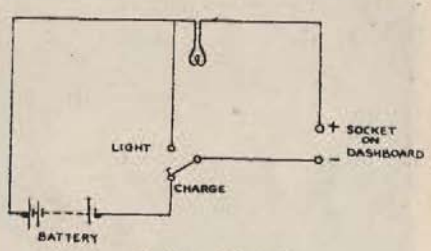
(c) Find the spare wheel.



. . . . "another purpose" . . . .

TOWING VEHICLE.—Equip with the following items:—

1. Road map—the new ESSO ones.
2. Spare bulbs for all lights, not forgetting the trailer rear light.
3. Wing mirror, to see behind trailer.
4. Inspection light on good long lead.
5. Artificial horizon battery charging gear (see below).
6. Wheel trolley for glider.
7. Short length of tow line.



Circuit Diagram

CHARGING ARRANGEMENTS.—It is fairly simple (though it takes time) to rig semi-permanent arrangements so that the artificial horizon battery may be connected up and recharged during the retrieve. This circuit diagram shows a method which allows the battery to charge whether the vehicle is running or not. Being 18 volts of Venner the battery is, in fact, charged in two halves. The two-way switch and a suitable bulb used as a resistance also allows of brilliant vehicle interior illumination when required.

Air Retrieve

1. Set of air maps.
2. Tow line.
3. Glider wheel trolley.
4. To conform with PERSONAL 7a and 8, the following aditional items must be carried:—
   (a) Certificate of Airworthiness.
   (b) Certificate of Registration.
   (c) Journey log book.
   (d) Current Customs Carnet.
   (e) Current Fuel Carnet.
   (f) Private Pilot's Licence.

NICK.—Well, you see what I mean—it's taken jolly nearly three days to get really *organised* and I wouldn't be surprised if we hadn't forgotten something now.

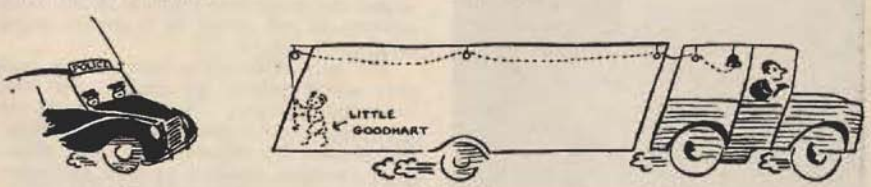
TONY.—Yes. It's fairly obvious that one can't hope to remember every thing every time. We must undoubtedly have a Check List and go through it item by item each time.

NICK.—Quite agree. Just as well last Tuesday wasn't a good day after all. Perhaps tomorrow, Sunday, will be good; and this time we really *will* be ready for it.

P.S.—As a result of our first retrieve this year we feel that there is a definite requirement for a device to be known as the

"Audible Warning of Approach (of police patrol)"

Short title—A.W.A. (pp).
Any design studies will be treated on their merits and may be used as evidence (for or against).



A.W.A. (pp).

Eyebrows

by R. S. Scorer

In these days, when waves are fashionable, one naturally tries waves as the first explanation of a skyfull of eyebrow-shaped clouds. On Easter day there was such a sky, and since waves had not been forecast, the cause must have been something else. Though there probably were some eyebrow or lenticular shaped clouds forming over hills, many of them seemed to be moving with the wind and were not, therefore, due to humps on the ground. Two examples are given, in Plates I and II, of eyebrows over Lasham at about 3,000 ft. at about noon on Easter day, 1952. Plates III and IV, taken at the same time, show clouds at about the same height that did not appear so eyebrow-shaped, though IV probably would have done if viewed from the side (it was almost overhead when photographed).

Plate I (above) and Plate II.

Plate III (above) and Plate IV.
Plates I-IV show clouds over Lasham at about 3,000 ft., noon, 13.4.52.

Lorne Welch enquired over the radio what was the significance of these peculiar shapes. On the grounds that cloud forms when air goes up, I replied that they indicated regions where the air was ascending faster than elsewhere, but when he approached one from the downwind side he seemed to descend very smartly, and he immediately turned away again. One might argue that he was on the downwind side of a wave, but it wasn't a wave, because the air was not moving through the cloud: this is quite certain because it was possible to see the small detail remain in the same position in the cloud as it moved along with the wind.

The best explanation seems to be that they were "pileus" or cloud caps over ascending currents. Some air above an ascending thermal bubble is also ascending, and if there is a moist enough layer, pileus over towering cumulus may be common; on this occasion they seemed to be pileus over dry thermals. If thermals were

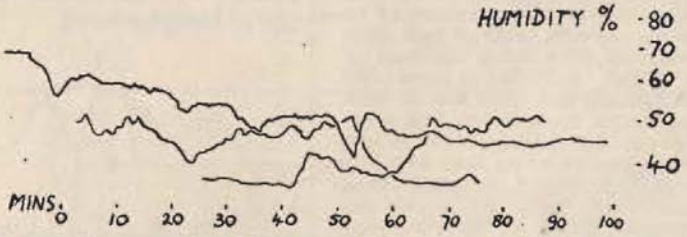
continually coming up from some favoured spot it would also be a place where eyebrows would continually appear, though each eyebrow would move off downwind with its thermal.

Up till this time (noon) Lasham seemed to be an unfavourable place for the production of cumulus, while they were appearing in plenty over the lower ground around. This is not usual, for high ground is the best thermal source unless it is snow-covered, or for some other special reason. The special reason on Easter day was the large shear in the lower layers, which seemed to be greater over the higher ground. This had the effect of wasting the thermals away before they could reach any great height. Plate V shows one of the first "cu" to appear over Lasham, and it is evidently being torn to shreds by the eddies which mixed the thermal air with the surrounding air and evaporated the cloud. When cloud evaporates by mixing into the surroundings, the mixture is usually colder, and a downdraught results—as Lorne found.

Plate V: the first "cu" over Lasham on 13.4.52.

The eyebrow in Plate III is also being destroyed by eddies which, though they may look like breaking waves, have no analogy with them at all. An interesting feature of Plate IV is the reticular (net-like) formation in the middle. This is produced by small convection cells, like those that turn a layer cloud into a cellular pattern; but either the direction of motion is the reverse of usual, or lumps of clear air are penetrating into the cloud from above or below.

Another feature of the cumulus on this day was the variable cloud base. The humidity of the air at the ground was varying enormously, as is evident from the specimen hygrograph trace made at Lasham and shown here. The reason for the large variations is a matter of conjecture, but since the lower layers were rather dry to begin with (the pileus appeared before the Cu.) a great deal of the moisture must have evaporated from the ground which, it is reasonable to suppose under the prevailing weather conditions, was of very variable wetness. The variations in humidity are quite enough to explain a 1,000-ft. variation in cloud base if the clouds were bubbles of air that had ascended from the ground. Frank Foster reported cloud base varying from 3,500 ft. to 4,500 ft., cloud often forming below him and engulfing him when he had been flying below what had up till then been the base.



Parts of a hygrograph trace made at Lasham on 13.4.52 about 5 ft. above the grass. These great variations in humidity were accompanied by great variations in height of cloud base.

Derbyshire "Evening Thermal"

by G. O. Smith

This article was awarded one of the prizes in the Meteorological competition organized by Dr. R. S. Scorer and sponsored by Sir Simon Marks last year. Following it is another prize-winning article by Mr. Fyfe of the Scottish Gliding Union.

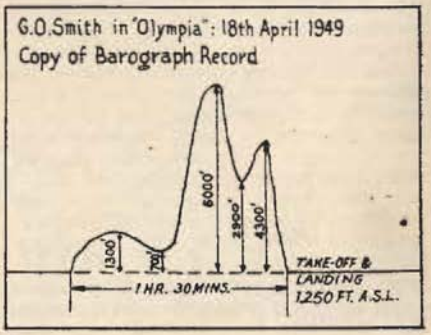
ARGUMENTS are still to be heard as to whether our legendary "Evening Thermal" really is of thermal origin or whether it is in fact a standing wave. Personally I support the latter theory, and have been at some pains to dig up an argument to substantiate my belief.

Looking through my log book, I recall a flight which I made on April 18th, 1949, which I think serves the purpose very well. I am afraid I have no detailed weather data for that day, but according to my log book the wind at Camphill was W.N.W., increasing throughout the day from approximately 25 to 35 m.p.h. There had been a morning wave, in which I had reached 4,400 ft. above take-off and had become completely cut off from the ground by a layer of cloud at about 3,000 ft. Later, the sky cleared, and good thermal conditions developed in the afternoon, good enough for J. S. Armstrong to make a 55 mile cross-country flight to Cranwell in Lincolnshire by normal thermal soaring. At Camphill the wind remained strong enough for hill soaring at a normal height of, say, 1,000 ft. above the hill.

I had thought that my flying for the day was over, when at about 1845 hrs. (B.S.T.) several machines were seen to be climbing rapidly; and at 1915 hrs. I again took off by winch in my Olympia, while at least three other machines were flying overhead at 3,000 to 4,000 ft. I climbed to some 1,300 ft. in hill lift, and then spent half an hour searching in vain for whatever had taken the others up. I had fallen to 700 ft. and was just thinking of giving it up as a bad job and landing, when I contacted better lift over Bradwell village and quickly got into a position giving me 10 ft/sec. rise. This was maintained with incredible smoothness up to 5,000 ft., when the lift began to die off gradually, eventually leaving me at 6,000 ft., still approximately over Bradwell village.

It was by now about 2015 hrs. and getting dusk, and for no particular reason I decided to lose my height by taking a trip out to the Kinder Scout plateau, eight miles up-wind of Camphill. Accordingly I set off, trimmed to 80 m.p.h. airspeed, and reached my objective in approximately 10 minutes with nice height in hand. I then turned and proceeded to fly back down-wind towards home at the normal airspeed of 40 m.p.h.

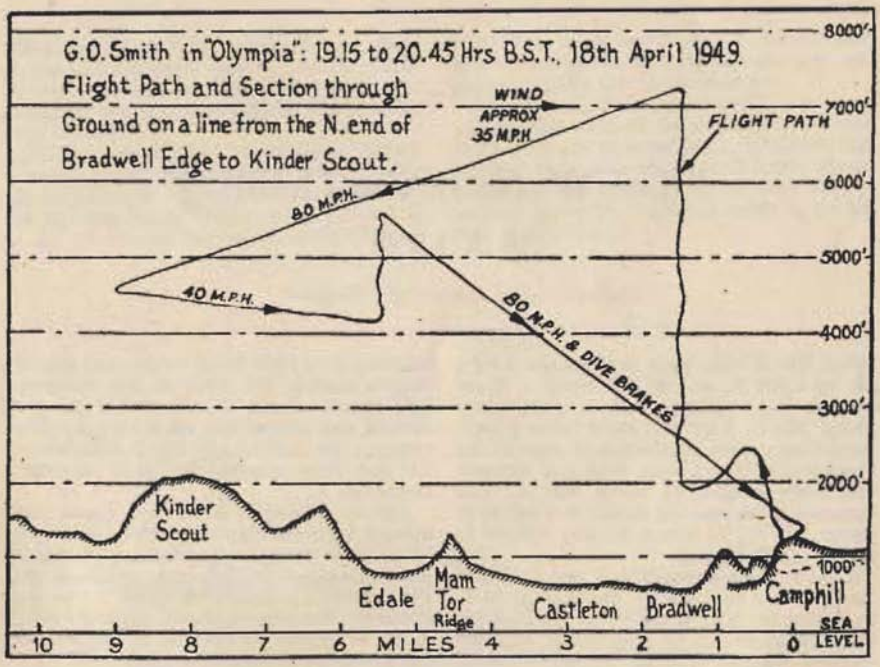
So far nothing really unusual had happened, except that I was having an interesting and amusing ride, but to my astonishment, over Edale (still 5 miles up-wind of Bradwell Edge) I began to rise again at some 3 ft/sec. I immediately turned 180° into wind again and succeeded in gaining 1,400 ft. over Edale at 3 to 4 ft/sec. By now it was getting very dark, and although I was still in slight lift, I was getting worried about the landing, so without any further investigation I turned and dived for home, landing at 2045 hrs. in the middle of a "flap" about putting out cars with headlights.



Throughout the flight there was no visible cloud, although visibility below about 2,000 ft. was poor on account of haze. I had, at that time, a N. & Z. mercury-in-steel transmitting thermometer in my machine, and according to this instrument the air temperature on the ground immediately before take-off was +5°C., while at 6,000 ft. it was —1°C. I was never too sure of the time lag of this instrument, although its calibration was satisfactory. A copy of the barograph record is attached, all heights quoted being above take-off. The take-off was from Camphill, which is 1,250 ft. A.S.L. A diagram is also attached showing the flight path and a section through the ground along a line from the North end of Bradwell edge and the Kinder Scout plateau. This is the line over which the flight was made, and runs, of course, almost up and down wind.

So much for hard facts. My own interpretation of them is that the first proof of the lift being of wave origin was its rock smoothness; the second was the fact that the area of lift remained stationary over the ground despite a 35 m.p.h. wind; and the third and clinching proof (to my mind) was the finding of another similar area of lift in a place fairly remote from the Bradwell valley.

Checking over my figures, I find that 10 minutes at 80 m.p.h. in an Olympia in horizontal air ought to have lost me far more than the 3,000 ft. odd which I did in fact lose during that time. I can only attempt to explain this discrepancy by the fact that I was no longer interested in the variometer at this time, and must have failed to notice that I was not sinking at the normal rate all the time. Probably, although I cannot state this as evidence, I went through an area of considerably reduced sink over Edale on the *outward* journey, but being trimmed to an abnormally high speed, I failed to notice this.



Note on the weather of 18.4.49

A cold front passed eastwards through Camphill at about 10.00 G.M.T. As it passed the wind at all levels veered to W.N.W. The winds and temperatures at Liverpool at 15.00 G.M.T. and the Downham Market winds and temperatures for 21.00 are given below. The Downham figures are very different in detail and it is not possible to give more than a rough guess of conditions at Camphill at 19.00 G.M.T. It is plain that the wind increased with height, but most significant is the fact, not shown by the ascents, that the air near the ground was steadily becoming more stable as the evening progressed, making conditions much more suitable for waves. The inversion was there all day, waves or no waves, and was not an important influence, being, in both ascents, confined to a thin layer less than 30 mb. thick. These two illustrate how ascents should not be taken too literally. Downham was down-wind of Liverpool in the lower levels where the difference in temperatures was greatest!

R. S. Scorer.

18th April, 1949		Liverpool 15.00			Downham Mkt. 21.00		
mb.	*ft.*	*dir.*	*kts.*	*temp.*	*dir.*	*kts.*	*temp.*
1,000	630	282	15	48	319	21	50
950		287	20	40	309	24	45
900	3,450	286	24	35	303	26	38
850		277	25	29	239	12	38
800	6,530	273	29	25	251	22	42
750		278	34	33	263	27	39
700	10,000	277	40	29	269	34	32
650		278	40	24	268	37	25
600	14,000	281	44	17	262	46	15

Lee-Waves of the Ochils

by A. J. Fyfe

(Reproduced by courtesy of "Weather")

The Ochil hills have an average height of 1,000 ft. and to the north of them lies the Earn valley, which is a flat plain about 200 ft. high and eight miles broad, bordering on the southernmost edge of the Grampians. The Cleish Hills and Benarty Hill have heights of about 800 ft., and between them and the Ochils is a valley at about 400 ft., in which Balado airfield is situated (see Fig. 1).

On 9th December, 1951, I was launched by auto-tow to 1,400 ft. at 14.25 G.M.T. in a Slingsby Kite II sailplane. During the last few moments of launch the airspeed jumped from 42 to 52 kt. With 3-4 ft./sec. lift indicated on the variometer I put the machine into right-hand circles and gained height steadily for four to five minutes. Lift ceased about a mile E.S.E. of the airfield and course was set for the locality between the airfield and the Ochils, where lift had been reported by pilots on other occasions.

Lift of around 4 ft/sec was found and almost immediately the machine was in a 20-25 knot wind blowing from 340°, which wind direction continued throughout the flight until the return to 2,000 ft. on the descent. The sinking speed, about 2 ft/sec., is to be added to the lift to obtain the vertical component of the wind.

Lift began to fail over the hills at between

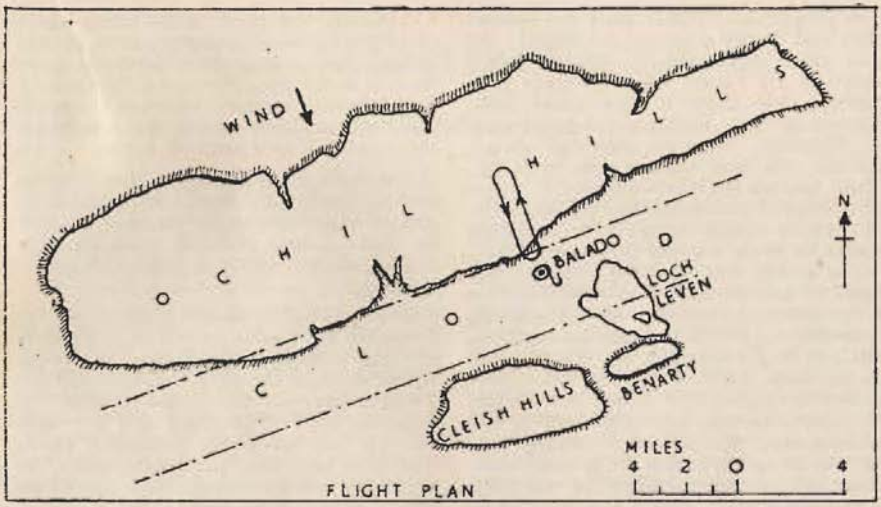


Fig. 1.—Plan view, showing position of flight and cloud in relation to hills.

3,000 and 4,000 ft., so a return was made to the starting point with a loss of height on the downwind leg; on turning back into wind, lift was again contacted in the same area as before.

Having established a pattern which worked, it was persisted in—upwind until lift dwindled to 1 ft/sec. then downwind to the starting point, then upwind again and so on. From the barograph trace (Fig. 2) it appears that about six or seven such beats were made, although height was not always lost on the down-wind leg.

Search was made for better lift a mile or so east and west of the airfield, but it was fairly uniform over the area. Generally the upwind flight was abandoned when about halfway over the hills to the Earn Valley, so that the entire flight was made in the lee half of the Ochils.

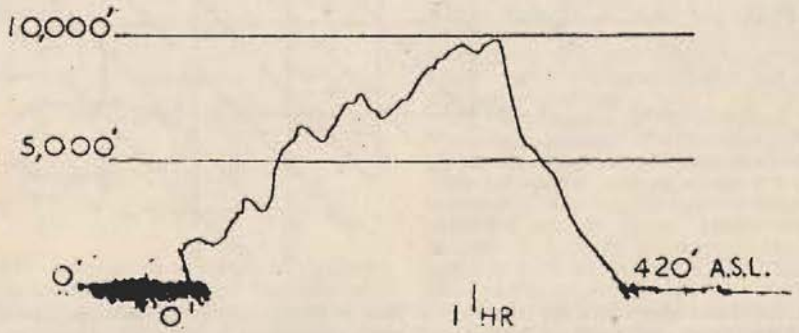


Fig. 2.—Trace of the barograph carried on the flight described.

A strip of cloud 500 ft. thick lay parallel with and to the south of the Ochils. Its base was at about 6,000 ft. and to the west it stretched for twenty miles or more in a narrow strip three to four miles wide. Eastwards it broadened out to obscure most of Fifeshire, where it was less clearly defined. Its base and top were quite flat. There was no lift directly above or below this cloud. Lift existed only upwind of it. No similar cloud existed over the Earn Valley, or to the south of the Cleish Hills.

The climb was continued to the last possible minute and was abandoned at 15.35 hrs. on accouot of approaching darkness. At 10,170 ft. above sea level, the ultimate height attained, the lift was still as vigorous, i.e. 3-4 ft/sec. On a few occasions during the climb it reached 12 ft/sec., lasting each time for a few seconds only. Everywhere it was perfectly snfooth excepting during the descent, when from 2,000 down to 1,000 ft. it was very, very turbulent. Landing was effected at 15.56 hrs.

Visibility was good to the north where the snow-covered Grampians were plainly visible. A large area of the North Sea could be seen to the east. Westward the visibility was not quite so good, whilst to the south the Pentlands were visible, but Edinburgh was obscured by industrial haze.

The flight is remarkable in that it shows that a hill only 800 ft. above the surrounding ground can affect the airflow on its lee side to 10,000 ft. and probably much higher—enough to support a sailplane at those levels.

The radio-sonde data at 15.00 G.M.T. at Leuchars are shown in Fig. 3. There is certainly nothing unusual about either the temperature or the wind structure and the phenomenon is therefore probably a common one. The cloud was probably situated just below the isothermal layer. The wind increased with height, while the static stability decreased: such conditions are well known to be suitable for wave formation.

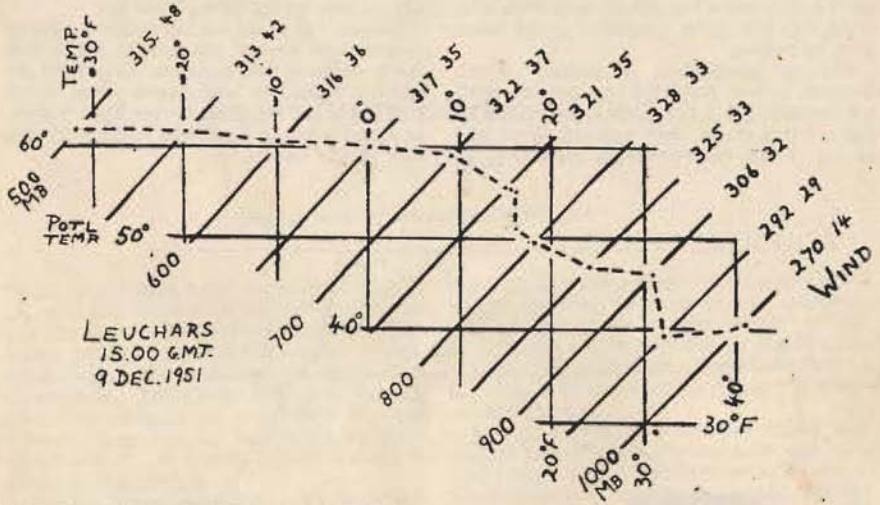


Fig. 3.—Radio-sonde data for Leuchars at time of flight, showing dry-bulb temperatures on a tephigram and winds in degrees and knots. (Leuchars is about 25 miles E.N.E. of Balado airfield, the headquarters of the Scottish Gliding Union).

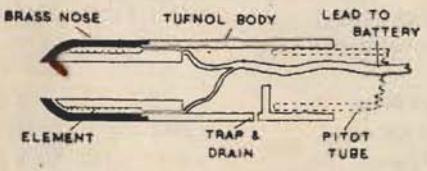
A Pitot Head Heater for Gliders

by Paul Blanchard

ONE solution to the problem of Air Speed Indicator icing is the provision of a heating element in the pitot head. This is the standard R.A.F practice, but the heaters are bulky and take a heavy current.

It was suggested by Lorne Welch that a small version of such a heater could be made for use in gliders. This was found to be practicable, and two members of the British team in the 1950 International Competitions were equipped with prototype heaters. The performance of these appears to be satisfactory, and the design was modified so that heaters could conveniently be fitted to existing pitot heads. A number of Olympias have now been equipped with heaters (kindly made by Mr. A. E. Lee).

The standard heater is 2 ins. long and 9/16 ins. in diameter. It is made a push-fit on the end of the usual sort of pitot tube. The heating element is contained within a rounded brass nosecap ¾in. long which is thermally insulated from the pitot tube by a body of reinforced plastic (Tufnol). This construction enables the power consumption to be kept quite small; 10 watts seems to be ample. The heater can be operated by a 12-volt accumulator, if such is already fitted in the aircraft, or by two or three Type R996 (6-volt) Ever-Ready dry batteries.



The construction of the heater is shown in the figure. The nichrome wire element is wound in a groove cut round the outside of a tube of "Asbestolite." The brass nosecap is fitted over the end of this, using mica insulation. The parts are cemented together.

The inside of the Tufnol body is partly obstructed, as shown, to provide a trap for water, which drains out of a small hole. The obstruction also prevents the heater being pushed too far on to the pitot head. The insulated leads are led down the inside of the metal pitot tube, and emerge via a T-piece in the A.S.I. rubber connection.

It has been found convenient to wait until a certain amount of ice has built up, and then to use the heater only for the short time (normally less than a minute) required to melt this off. In this manner a set of dry batteries can be expected to last several seasons. It is recommended that the heater should be wired in such a way that it cannot inadvertently be left switched on. A bell-push, as fitted in the Cambridge Kranich ("Press to D-ice"), is suitable.

METEOROLOGICAL COMPETITION

READERS are reminded of the Second Meteorological Prize Competition which was announced in our last issue on page 3.

Entries must describe thermal phenomena observed in the United Kingdom or coastal waters between 1st January and 30th August, 1952, and must be sent to R. S. Scorer, Imperial College, London, S.W.7 before 1st October, 1952. Authors must be glider pilots who have themselves observed at least part of the material described while soaring (or sinking).

On the subject of meteorology, Dr. Scorer has addressed a letter to the B.G.A., which the Association has circulated to Club Secretaries, calling attention to the existence of *Weather*, the monthly magazine published by the Royal Meteorological Society. It costs 2s. per copy, or 24s. p.a. post free from the Society at 49, Cromwell Road, London, S.W.7. *Weather* contains articles of a less advanced nature than those in the Society's *Quarterly Journal*, and the Editors would welcome articles about soaring or power flying.

Accident Statistics

These tables give a statistical summary of gliding accidents reported to the British Gliding Association during the three years 1949-1951 *inclusive, and of their cost in money.*

Table A

Summary of Totals

Item	1949	1950	1951
Accidents reported ..	55	60	59
Incidents reported ..	5	2	9
Total cost	£3621	£4418	£4281
Fatal accidents ..	2	1	1
Accidents involving serious injury ..	1	1	3
Aircraft operated by clubs reporting ..	113	120	139
Total launches ..	53151	70061	37685
Total hours	7134	5686	4478
B.G.A. Categorised Instructors	nil	15	29
Launches per accident	970	1165	640
Cost of accidents per launch	s. d. 1 4¼	s. d. 1 1⅜	s. d. 2 3¼

NOTE ON TABLE A.—The 1950 fatality took place when a club-owned sailplane was being flown by a Service pilot for purposes totally unconnected with club operations.

NOTES ON TABLE B.—Although the accidents during the approach and in flight may have ended up with damage resulting from sudden contact with the ground, they include such things as collisions, unintentional spins, and definite failures at the stage of flight referred to.

A majority of the accidents on take-off are due to inability of pilots to cope with sudden loss of power at the winch.

Table B.

Classification by Type of Accident

Type of accident	1949	1950	1951
During hops and slides	14	6	7
Total cost	£318	£96	£414
Average cost ..	£23	£16	£59
When pilot was not in charge	4	7	5
Total cost	£55	£73	£230
Average cost ..	£14	£7	£46
During landing ..	23	24	26
Total cost	£1216	£1643	£1790
Average cost ..	£53	£69	£69
During the approach	7	11	11
Total cost	£481	£1098	£382
Average cost ..	£69	£110	£35
In flight	5	5	2
Total cost	£861	£920	£952
Average cost ..	£172	£184	£476
On take-off	2	7	6
Total cost	£690	£378	£220
Average cost ..	£345	£54	£37

Table C

Classification by Pilot Rating

At the controls	1949	1950	1951
Pilot under training in sole charge ..	29	21	26
Total cost	£972	£1574	£1331
Average cost ..	£33	£75	£51
Qualified pilot in charge	19	19	15
Total cost	£2249	£795	£951
Average cost ..	£131	£42	£63
An "instructor" (not necessarily B.G.A. qualified) in charge..	3	13	14
Total cost	£92	£1975	£1778
Average cost ..	£31	£152	£127

Table D

Classification by Type of Aircraft

Type involved	1949	1950	1951
High performance ..	nil	2	1
Total cost	—	£180	£5
Average cost ..	—	£90	£5
Medium performance	21	29	19
Total cost	£2365	£2945	£2585
Average cost ..	£113	£100	£136
Two-seater trainers..	3	10	9
Total cost	£92	£273	£622
Average cost ..	£31	£27	£69
Single-seater trainers	35	21	31
Total cost	£1164	£1010	£1069
Average cost ..	£33	£48	£34

NOTE ON TABLE C.—The last class includes only accidents in which the pilot concerned is definitely known to have been employed by the club as an instructor. The present accident report form has no space for this information, so that it is possible that the number of instructors involved is actually greater than is shown.

NOTES ON TABLE D.—High performance aircraft are regarded for the purpose as those having 18 metres span or over; e.g. Sky, Weihe, Kranich.

The medium performance class includes sailplanes of less than 18 metres span; e.g. Olympia, Gull IV; also Grunau Baby.

The two-seater trainer class consists of T-21 and T-31 exclusively.

The single-seater trainer class includes the British-built variants of the Grunau Baby, as well as all other single-seater trainers.

Table E

Classification by Cost

Type of accident	1949	1950	1951
Involving complete write-off	4	3	4
Total cost	£1850	£1650	£1570
Average cost ..	£465	£550	£392
Other than complete write-off, costing over £250	nil	2	3
Total cost	—	£600	£1015
Average cost ..	—	£300	£338
Other than the above, costing over £100 ..	4	3	2
Total cost	£620	£450	£260
Average cost ..	£155	£150	£130
Below £100 and over £50	9	12	8
Total cost	£650	£1180	£591
Costing £50 or less ..	40	41	44
Total cost	£500	£538	£845

The Total Energy Variometer

by F. G. Irving, M.Eng., D.I.C.

BEFORE dealing with the total energy variometer, it is convenient to consider the ordinary type of instrument in order to investigate its errors and limitations.

Consider a vessel connected to atmosphere via a small leak or orifice. Then the mass of air in the capacity, M_c, is given by:

$$M_c = \rho_c V_c \quad \ldots\ldots \quad (1)$$

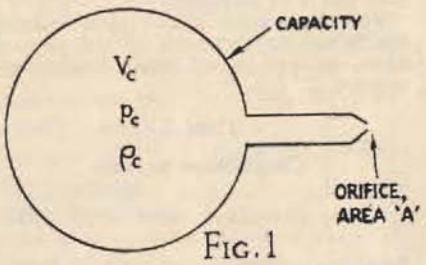


FIG. 1

Let us now suppose that the initial capacity pressure was p_o and that subsequent changes of pressure and density, although not necessarily adiabatic, follow a law.

$$p_c = const., \times \rho_c^n \quad \ldots\ldots \quad (2)$$

Then from equations (1) and (2)

$$M_c = V_c \rho_o \left(\frac{p_c}{p_o}\right)^{\frac{1}{n}} \quad \ldots\ldots \quad (3)$$

Now if the area of the orifice is "A," "A" not necessarily being constant, then it may be assumed that the rate of discharge of air through the orifice is given by:

$$\frac{dm_c}{dt} = KA \rho_c \sqrt{p_c - p} \quad \ldots\ldots \quad (4)$$

Where "K" is a constant corresponding to the "coefficient of discharge" used in hydraulics. In general "K" will be a function of the Reynolds number based on a characteristic dimension of the orifice. For the present purposes we will neglect the effect of the changes in kinematic viscosity and suppose "K" to be a function of "A" and the "head" $(p_c - p)$ only. On the assumption that the instrument is calibrated to read true rate of climb or descent at sea level, we wish to determine what true rate of climb or descent corresponds to a given indication at altitude.

Fundamentally there are two types of variometer:

(a) Constant-area leak. Here the indicator is a sensitive pressure gauge which measures $(p_c - p)$. Hence "A" is always constant, and at a given indication, $(p_c - p)$ is fixed. On the basis of our assumptions (i.e. neglecting changes in the kinematic viscosity of the air) K will also be fixed.

Hence from equation (4), at a given indication, $\left(\frac{1}{\rho c}\frac{dm_c}{dt}\right)$ is fixed at all altitudes.

(b) Constant pressure-difference type. Here the instrument is arranged so that the size of the orifice adjusts itself so as to keep $(p_c - p)$ constant. The indicator is, in effect, the orifice itself (e.g. the orifice may be the clearance between a pellet and the walls of a tapered vertical tube. The position of the pellet is observed against a scale, and is a function of the orifice area). Hence $(p_c - p)$ is always constant and at a given indication "A" and K are fixed.

Hence again, at a given indication $\left(\frac{1}{\rho c}\frac{dm_c}{dt}\right)$ will be fixed at all altitudes.

The ordinary aircraft rate of climb indicator corresponds to type (a), the "Cosim" glider variometer to type (b) and the German "Horn" glider variometer combines both principles of operation. In

all cases, however, the instrument reading will be a function of $\left(\frac{1}{\rho_c}\frac{dm_c}{dt}\right)$.

From equation (3)

$$\frac{1}{\rho_c}\frac{dm_c}{dt} = V_c\frac{\rho_o}{\rho_c}\left[\frac{1}{n}\left(\frac{p_c}{p_o}\right)^{\frac{1}{n}-1}\right]\frac{d}{dt}\left(\frac{p_c}{p_o}\right)$$

$$= \frac{V_c}{n}\cdot\frac{p_o}{p_c}\frac{d}{dt}\left(\frac{p_c}{p_o}\right)$$

Hence the instrument reading will be a function of $\frac{1}{p_c}\frac{dp_c}{dt}$, and if the pressure difference across the orifice is very small compared with p_c (as is usually the case), this becomes very nearly $\frac{1}{p}\frac{dp}{dt}$

$$\text{Now } \frac{1}{p}\frac{dp}{dt} = \frac{1}{p}\frac{dp}{dh}\cdot\frac{dh}{dt}$$

$$= -g\frac{\rho}{p}\cdot\frac{dh}{dt}$$

$$= -\frac{g}{RT}\cdot\frac{dh}{dt} \quad \ldots\ldots\ldots (5)$$

Hence the relationship between the actual rate of climb or sink and the indicated figure at a height "h" feet in the ICAN troposphere is given by:

$$\frac{\left(\frac{dh}{dt}\right)_h}{\left(\frac{dh}{dt}\right)_o} = \frac{T}{To} = \frac{288 - 0.00198\,h}{288}$$

$$= 1 - 0.00688\left(\frac{h}{1000}\right) \quad (6)$$

It will be observed that the instrument reading is greater than the true quantity by about 0.7 per cent per 1,000 ft. For most purposes in gliders it may therefore be assumed to give the true figure.

The "total energy" variometer.

It has been shown (equation (5)) that the variometer reading is a function of $\left(\frac{1}{p}\frac{dp}{dt}\right)$ i.e., $\left(\frac{1}{T}\frac{dh}{dt}\right)$. Since $W\frac{dh}{dt}$ is the rate of change of potential energy of the aircraft, the readings of the variometer are a direct measure of this quantity, subject to the previous corrections.

Suppose now that the instrument is connected to a venturi supplying a pressure $p - \frac{1}{2}\rho V^2$. The variometer reading will now be a function of

$$\left(\frac{1}{p - \frac{1}{2}\rho V^2}\right)\frac{d}{dt}\left(p - \tfrac{1}{2}\rho V^2\right)$$

and if $\frac{1}{2}\rho V^2$ is small compared with p, this may be written

$$-\left(\frac{g\rho}{p}\right)\left(\frac{dh}{dt} + \frac{d}{dt}\cdot\frac{V^2}{2g} + \frac{V^2}{2g}\cdot\frac{1}{\rho}\cdot\frac{d\rho}{dt}\right)$$

i.e.

$$-\left(\frac{g}{RT}\right)\left[\frac{d}{dt}\left(h + \frac{V^2}{2g}\right) + \frac{V^2}{2g}\cdot\frac{1}{\rho}\cdot\frac{d\rho}{dt}\right]$$

Consider the order of magnitude of the last term

$$\text{Now } \frac{1}{\rho}\frac{d\rho}{dt} = -g\frac{d\rho}{dp}\cdot\frac{dh}{dt}$$

and it may be shown that in the ICAN troposphere $\frac{d\rho}{dp} = \frac{1.134}{a^2}$, where "$a$" is the local speed of sound.

$$\text{So the last term becomes } -\frac{1{\cdot}134}{2}M^2\frac{dh}{dt}$$

where M is the Mach Number of the aircraft. Now in supposing that the venturi always supplies $(p - \frac{1}{2}\rho V^2)$ it is implied that the flow may be regarded as incompressible, i.e. that the Mach Number is very small, so that this term is negligible compared with $\frac{dh}{dt}$. (For a glider it will be about 0.5 per cent of $\frac{dh}{dt}$). The variometer reading, under these circumstances may be regarded as a measure of $W\frac{d}{dt}\left(h + \frac{V^2}{2g}\right)$, the rate of change of "total energy" of the aircraft. The variometer reading now becomes "rate of change of energy height" instead of "rate of change of true height," using the phraseology of R. & M. 2557. This reading is, of course, subject to the same altitude errors as the ordinary variometer.

Symbols

p : pressure.
ρ : density.
T : temperature.
Vc : volume of capacity.
R : the constant in the equation of state $p = R\rho T$.
m : mass of air.
n : index of expansion.
a : speed of sound.
A : area of orifice.
K : coefficient of discharge.
g : gravitational constant.
M : Mach number V/a.
V : aircraft true forward speed.
h : height, feet.
W : aircraft weight.

Suffices

o : refers to ICAN sea-level conditions.
c : refers to conditions in the "capacity."
Symbols without suffix refer to local atmospheric conditions.

The Venturi.

The author has recently developed a small venturi to supply ($p - \frac{1}{2}\rho V^2$) which is very insensitive to yaw. Whilst this device looks less elegant than Mr. Kendall's "blisters," it has the advantage that it can be adjusted in a wind tunnel and fitted to any glider without further calibration. Initial practical tests seem to be very satisfactory, and it is hoped to describe it in a later issue.

Goal Flight to Celle

by J. J. Parker

It was a fine Monday morning and I was feeling very tired after a late night. (A party of us had arrived back at Scharfoldendorf from the Wasserkuppe meeting at 3 a.m. after driving most of the night).

Cross-country flying seemed to be very promising: there was a 20-knot wind from the S.W. and high cumulus was building up even at breakfast time. It was not certain who would attempt their distance legs that day; I had had my chance when I reached Brullsen, 23 kilometres away. To console myself I had a long talk about the possibilities with Sepp Niederstadt, formerly by turns O.C. Scharfoldendorf, in charge of all gliding schools in Lower Saxony, and Chief Inspector of Accidents for the N.S.F.K., and now the winch-driver. He favoured staying on the ridge until cloudbase was reached; thermals would be very weak and most lift would be found about 200 metres below cloudbase. At that time tops were around 2,500 metres, so that the possibility of Gold C height seemed remote and I ruled out this hope. I was later to regret this.

My chance to fly came when the Minimoa, S-41, became free and available for a cross-country. I won the toss between an instructor and myself. All preparations had been made and the barograph was ticking. As only one map was available, excluding the area East of longitude 10° 10'E, I chose Celle as a goal. My original one was to have been Fassburg (but this was only an unspoken hope).

I was launched to 50 metres at 11.19 a.m. and immediately turned right, along the ridge. I waited at the Big Hill, climbing slowly in the ridge lift. Further north was a Grunau, launched three-quarters of an hour previously and also trying for a cross-country.

For the first half-hour thermals seemed to be very elusive, and although twice I reached cloudbase I could get no further. The Kranich and another Grunau joined me at times. By 11.45 I was beginning to get impatient; I had tried several clouds but they were almost dead and very turbulent.

After one unsuccessful attempt to "escape" I found myself near Wallensen. Half a mile ahead was what seemed to be a promising cloud and I made for it. I found lift; it was raining; the time was 12.05. Three minutes later I entered cloud over Wallensen at 600 metres. I was "away." At first it was exceptionally gusty: at 1,000 metres the A.S.I. registered 0 and then 140 km.p.h. in the space of about two seconds. It has to be experienced to be believed. Lift was now a steady 2 metres per second and I was very happy. It was still raining.

There was a possibility of the A.S.I. becoming unserviceable so that I now began to concentrate only on sound for airspeed with an occasional glance, for reference, at the A.S.I.

Eventually, at 1,800 metres indicated, the A.S.I. did ice up completely. The lift had increased to 3 metres per second and the hard rain was beginning to freeze. At 2,000 metres the lift was steady at 3 metres per second, the rain turned to hail and the noise of these particles hitting the aircraft was quite frightening.

At 2,500 metres snow, hail and rain were falling around the aircraft and clear ice began to form on the leading edge, the canopy and the pitot head. Inside the aircraft it was quite warm, although I was only wearing thin flannels, a cotton shirt and my flying suit. This kept me dry from the melting snow and hail which came into the cockpit.

Soon 2,800 metres was showing on the altimeter and the variometer indicated 5 metres per second "up," which was soon to go off the clock. By this time I had collected ¾ inch of ice on the leading edge; the pitot head had a four-inch "straw" and the turn-and-slip venturi was becoming blocked. I decided that it would be foolhardy to stay in the cloud even though I had a parachute.

I set a magnetic course 310° on the compass and endeavoured to maintain it. Lift was still "off the clock" and seemed to extend over a large area. Before I began to sink, the altimeter was reading 3,200 metres: this was found to be 3,020 metres on the barograph.

The icing problem had now become more serious. There was 1½ inches of ice on the leading edge and I feared that before I got out of cloud the turn-and-slip might cease to function correctly.

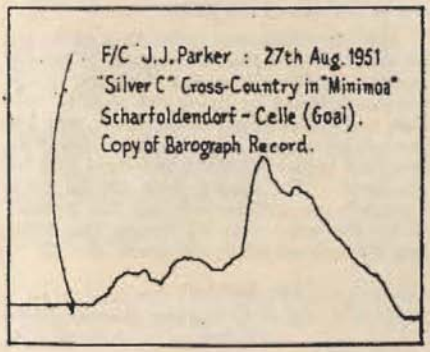
Soon I hit the expected down and was shortly at 2,700 metres, helped by a down-draught of more than 5 metres per second. This suddenly ceased and was replaced by an upcurrent of 5 m.p.s., which took me up to 3,000 metres again. From this time until I emerged from cloud at 2,500 metres there was a steady sink of 2 m.p.s. The ice was now two inches thick and quite a problem.

I came out of cloud at 2,500 metres but above a cloud layer. Five minutes later I recognised Hanover and estimated my position to be eight miles S.S.E. of the town. I continued on my present course which was giving me a resulting track of about 330°. This meant I would clear Hanover, in case of emergency. I passed its western edge at 2,000 metres. From here I followed the railway to Celle.

As there was plenty of height in hand (2,000 metres plus 400 metres—to bring the height to that above Celle airfield) I did not circle in the small thermals on the way.

I arrived over the airfield at 12.50 p.m. having covered the 40 nautical miles in three-quarters of an hour. Although I got a 3 m.p.s. thermal I ignored it and did aerobatics down to circuit height. Touch-down was at 1 p.m. in front of the control tower.

After reporting to Air Traffic Control, who were most surprised to find a glider outside since they had not seen me come in, I went to the Officers' Mess for lunch. Moral: always choose a landing point where you can get help and food; a fitting end to a very successful flight.



NOTE.—Since this article was written the barograph has been calibrated. Unfortunately it was over-reading. True maximum altitude was 2,900 metres.

Correspondence

THE LOW TOW

Dear Sir,

Re "The Low Tow" (GLIDING, Autumn 1951): I was the tow-pilot in most of the tests described by Allan Ash and can add more information.

I am almost in complete agreement with the views expressed by Captain Ralph Barnaby (Winter 1951-2, p. 183). One difference is that I prefer, when being towed, to stay low during the take-off, and assume the low position throughout, irrespective of the type of sailplane, but only advise this method for pilots who are experienced in aero-tows.

While agreeing that there is a real risk of a released rope falling back on the sailplane, our Hinkler Soaring Club has not had this happen in the many tows we have done during the past two years since adopting the low method. During the first part of the take-off, the danger does not exist as the relative heights are not very different and the rope falls below the sailplane. We have not had a rope come off, and I think that with reasonable inspection and service on the tow gear, and with a competent tow-pilot, the risk is negligible.

We have conducted experiments at a safe altitude and find that the best position is barely below the slipstream; also that the sailplane has little effect on the trim of the tow-plane even when it gets extremely low. On the other hand, a sailplane in the high tow position exerts a very great influence on the trim and can prevent the tow-plane from climbing or even send it into a dive.

Mr. Free (p. 184) is correct in guessing that we have an exceptionally good tug. It is greatly superior to a normal Tiger Moth, due to the use of a Fairey Reed metal propeller of larger diameter and smaller pitch than standard. The rate of climb is well above normal.

I quite agree with Mr. Free that it is dangerous to be feeling about through the slipstream while crossing the boundary, but I prefer a different solution, because, as stated before, I believe it is safest to stay low all the time. Tests have shown that the boundary is crossed at a greater height in the low position because of reduced drag and greater climb. The problem of watching the ground is simply solved. It isn't necessary. My invariable method, which has paid off several times in turbulent conditions, is to start turning before reaching the boundary. A very gentle turn is all that is needed and presents no problem to a sailplane pilot, and by circling the field always within gliding distance the latter knows that the field is at all times on his left and within reach. It is possible that this method might not be safe on some small airfields, and I wish to make it clear that the two pilots should always assess local conditions and agree on the method to be used.

I do not agree that tows to 2,000 feet do not make the low tow worthwhile. We have almost halved our tow costs, and rarely tow higher than 2,000. The saving is most with the heavy machines and least with our Grunau, but is well worth while with all.

The tug still serves as a thermal indicator. I do not understand why that point was questioned.

Towing procedure, etc., needs a special long article. I agree that the tow-pilot must always be responsible for briefing the glider pilot.

One essential point is that the tow-pilot must always drop the rope if a take-off fails in any way, and if possible should get out of the way of the glider.

Another emergency point that needs to be well known is that if the rope cannot be released by the glider, the pilot can signal his predicament by flying out wide to one side and high enough to be easily seen by the tow-pilot, who can then take him over the field before releasing the front end of the rope. The glider pilot should then approach the airfield steep and fast enough to lift the rope over all fences, etc., then hug the ground while the speed dies off.

FRED HOINVILLE,
C.F.I., Hinkler Soaring Club.
(Gold C).

Clubs & Associations

Army Gliding Club

THE new soaring season opened well with 935 launches and 300 miles of cross-country flying by club members during April alone. Paid-up club membership for 1952 now stands at nearly 200 and flying takes place every possible day at Lasham, there being a large local contingent who come up every evening and keep John Free working till 10 p.m.

The last 18 months have shown a gradual improvement in results. First priority was put on instructional methods, based on the Silver C as a target for all members to achieve, and the club fleet of a T-21, two Grunau Babies and an Olympia. Our experience has been that the majority of ab-initio pilots get their C's in thermals very soon after going solo. Our priority for this season is to improve our mechanical efficiency, which caused us loss of launches and cost us a lot in frustration and money last season. A two-drum winch is being constructed which we plan to use in conjunction with auto-towing, so that a launching line is always available at the launch point.

Our hard-working secretary-treasurer, Pat Smallman, has just made an analysis of our costs last year (1st April, 1951-31st March, 1952) and if all costs are charged up on a per-launch basis it comes out as follows:

	Cost per launch s. d.
Petrol, oil	10
Vehicle expenses	1 2
Cable and wire	4
Total direct operating cost ..	2 4
C's of A, repairs and insurance ..	1 8
Depreciation	1 0
Wages and overheads	2 10
Total cost of launch	7 10

As we did 4,035 launches in the period, we believe the analysis to be fair, and may be interesting to other clubs.

A.J.D-D.

Royal Air Force Gliding and Soaring Association

The above map, reproduced by courtesy of *Flight*, shows the seven Area Clubs which have been selected by the R.A.F. Gliding & Soaring Association, as a result of its recent reorganisation, as clubs which R.A.F. units in the vicinity will be encouraged to join. Their names are shown underlined; also that of Farnborough, which is classed as an Associate Club as it is restricted to personnel at the Royal Aircraft Establishment.

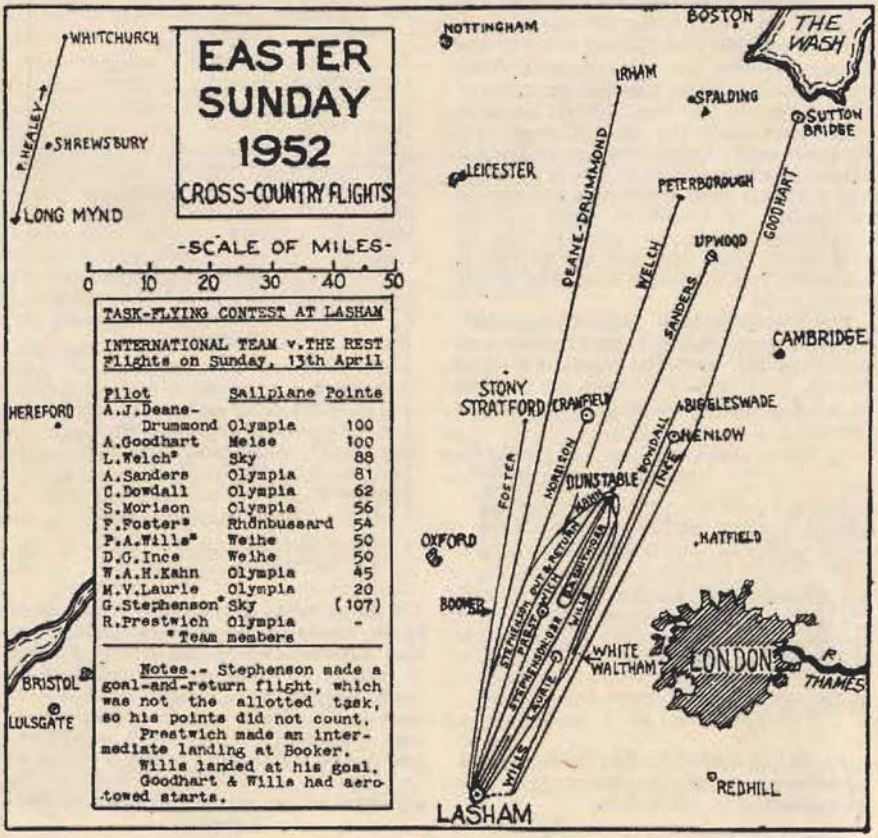
Surrey Gliding Club

LASHAM is now operating at full pressure with the C.F.I. Paul Blanchard working like a black. Philip Wills is a regular visitor and on Sunday, 25th May, he brought over his blue Sky. The Polish Air Force keep their Prefect at Lasham and the Southdown Olympia has been with us for Whitsun and the two previous week-ends, and we think the thermal-popping properties of Lasham justifies their visit.

Of our own members, Marianne Smith achieved her C one Sunday and her Silver C height the next, and on the same day Tony Oram also got his height. Nick Goodhart and Jack Karran have both reached 13,500 ft. recently from Lasham and Tony Goodhart got to 12,000 ft. Lorne Welch has been practising in his Sky for Spain and his retrieving crew getting their hand in on the Vanguard. Don Campbell, the Gliding Doctor, is now at Lasham working on a Kite which will eventually fly with the Deeside Club. We have recently lost Don Brown, who has gone "down under," but in exchange we have gained three Australian members.

Our living and sleeping quarters are all that a gliding club could desire, and with two winches functioning we hope the weather will co-operate in making this a really good season

The big meeting at Easter, when members and visitors flew against the International Team, is depicted below.



TASK-FLYING CONTEST AT LASHAM

INTERNATIONAL TEAM v. THE REST
Flights on Sunday, 13th April

Pilot	Sailplane	Points
A.J.Deane-Drummond	Olympia	100
A.Goodhart	Meise	100
L.Welch*	Sky	88
A.Sanders	Olympia	81
C.Dowdall	Olympia	62
S.Morison	Olympia	56
F.Foster*	Rhönbussard	54
P.A.Wills*	Weihe	50
D.G.Ince	Weihe	50
W.A.H.Kahn	Olympia	45
M.V.Laurie	Olympia	20
G.Stephenson*	Sky	(107)
R.Prestwich	Olympia	-

*Team members

Notes.- Stephenson made a goal-and-return flight, which was not the allotted task, so his points did not count.

Prestwich made an intermediate landing at Booker.

Wills landed at his goal.

Goodhart & Wills had aero-towed starts.

First lady pilot to get a B certificate at the Egyptian Gliding School. Chief Instructor is R. H. Swinn, formerly of London, Army and Yorkshire Gliding Clubs.

London Gliding Club

FLYING statistics for the first five months of the year are:—

	Launches	*hrs.*	*mins.*
January	205	71	17
February	423	118	30
March	417	112	0
April	765	169	42
May	631	125	1

Cross-country flying began on Easter Sunday, 13th April, when Dan Smith made an out-and-return of 36 miles to High Wycombe and back, during which he was encountered by other club members flying from Lasham. Of the latter, G. H. Stephenson made an out-and-return of 104 miles from Lasham to Dunstable and back, Philip Wills made a goal flight to Dunstable late in the day, and Frank Foster passed by Dunstable to reach Stony Stratford, 63 miles.

The following week-end brought another spate of cross countries. On the Saturday, Stephenson reached 14,000 ft. on a round trip via Luton and Aylesbury; he found cloud base at 6,000 ft. difficult to reach, but after that lift was easy to find. Scarborough also made a round trip, via Luton, Leighton Buzzard, Cheddington, and back, 30 miles.

Next day, Pat Foster went to Luton, Pragnell to Letchworth, Ramsden 42 miles to Cambridge and 8 miles of the way back, and Tony Pragnell took the Scud II on a goal flight to Cambridge. This particular Scud II is some 18 years old: it has done 200 hours flying since the present owners bought it two years ago, and 212 miles across country in the past twelve months. Eric Collins began building it in 1933 for David Dent: it was completed by Slingsby, and has changed owners many times. Two of the present owners, Jeffries and Wynter, have completed all their Silver C tests in it.

On 10th May, Travell reached Cardington in the Prefect and Rivers reached Cranfield, after catching thermals off the winch in an unstable south wind. An equally unstable N.W. wind on the 29th took Travell three times as far—86 miles to South Benfleet.

On 25th May, Foster climbed to 8,000 ft., and Stephenson, trying out his radio, contacted Lorne Welch's 46 miles away. Each was practising in the Sky sailplane he will fly at the International Contests.

Certificates from January to April inclusive are:—4 A, 3 B, 7 C, and 3 Silver C legs.

In the room available to the club at the Horse and Dolphin, Leicester Square, Stephenson gave a most informative lecture on cross-country technique on 27th March.

Scottish Gliding Union

Now that the weather is lending encouragement, log books are coming to the light of day again and the sky is anxiously scanned for signs of thermals. The fine-weather fans are, of course, always welcome but much work has to be done by the regulars to prepare for their coming—work which can only be carried out when flying is not going on. Organisers are busy preparing plans to absorb any amount of free labour, so come and help at Balado or Bishop Hill whenever you can, regardless of weather. Some time the reward will come with an unexpected lift from our old friend, the Balado Standing Wave.

Lift is on tap during 200 days out of the 365 days at our own Bishop Hill, all we require is an efficient pipe-line laid on. The road up is already getting surfaced in parts and other sections are now well worn by truck, car and tractor wheels. The landing strip is still adorned with some unwanted boulders, so come and do something to make history.

Lt. Comdr. Tony Goodhart has recently appeared at Balado, albeit wearing a disguise. His words of wisdom are heard floating down from the T-31 (R.A.F. Gliding and Soaring Assn.).

Secretary David Hendry will soon be sailing back from America. The tremendous amount of work he has done in the past for the Scottish Gliding Union has been all the more appreciated by his absence.

The blue Olympia has done its first 400 miles under S.G.U. ownership, from Lasham to Kinross (by road!) The wise ones with the know-how are considering whether they should have a check on the parachute and they are reluctant to leave the ground unaccompanied by a barograph. Tephigrams are chicken feed to them.

Summer courses are filling up and we shall be having a special Camp in August for the Air Rangers.

Our Andrew Thorburn has abundant plans for progress and continues to give a surprising amount of service to the Club, considering his many other commitments.

Of the results obtained from our stand at the Annual Festival of Sport in Edinburgh, while it is difficult to assess exactly the benefits derived from the publicity point of view, we think it was definitely a worth-while effort. We hope that the Cups and Trophies loaned by the B.G.A. for the occasion will help some of our members to decide to enter the National Competitions.

Royal Naval Gliding and Soaring Association

Our big news this quarter is that the first Naval Gold C has been achieved. Lieut. Comdr. (E) H. C. N. Goodhart ("Nick") got his height after four aero-tows on 23rd April. He had done his distance in France last year and made it a goal flight, so that he scores a Diamond as well. From the first tow he reached 11,000 ft., which was about 500 feet short of the 3,000-metre gain of height required; the second and third tows resulted in nothing but rapid descents; but the fourth, after much scraping around, took Nick to over 13,000 feet in cu-nimb with such heavy icing that he arrived back at Lasham with 1½ inches of it still on the leading edge.

Summer Camps

As a result of discussion at the Association's Annual General Meeting in March, it was decided to organise as an experiment two camps, one for ab-initios and the other as an introduction to soaring. It was agreed that the Association could not run these courses itself, and the Hon. Sec. was authorised to make arrangements with a suitable club.

At the time of going to press both courses are considerably over-subscribed—so much so that it seems likely that at least one additional course may be organised. The first two are to be held at the Long Mynd site of the Midland Gliding Club during the latter part of July.

Branch Clubs

The following branch clubs will be active during the 1952 Season:

Gliding Club	*Instruction Method*	*R.N. Air Station*
Portsmouth Naval	Dual	Gosport (& Lasham)
Heron	Dual	Yeovilton
Condor	Solo	Arbroath
Fulmar	Solo	Lossiemouth
Gannet	Dual	Eglinton

As the result of its Chairman and Chief Instructor, Tony Goodhart, being posted to Scotland, it was feared that the Portsmouth Naval Club, by far the largest in the R.N.G. & S.A., might have to close down. However, a submarine officer, Martin Seth-Smith, has come forward to act as Deputy Chairman, and a few weeks ago a most successful opening week-end was held during which over 100 two-seater flights were given to prospective members.

The other four clubs are struggling hard to keep going, and there are already signs that the total number of flights this year will be a great improvement on last year's figure.

Midland Gliding Club

We made a "cracking" start for the thermal season on Saturday, 22nd March. Wind was N.W. 30 knots, with about 5/8 cu. based at 5,500 ft. a.s.l. all day.

Steve Wiltshire, of Cambridge University Gliding Club, flew their Olympia to Halton, 104 miles, in just two hours. Bob Neill, the M.G.C. vice-chairman, took our Olympia to Defford, 43 miles, to complete his Silver C badge.

This day, not content with providing these unusually good conditions, produced in the early afternoon a standing wave on which R. H. Prestwich with a pupil in Bluebell (Cambridge Club's T-21b two-seater) climbed to 13,000 ft. a.s.l.—an unofficial British two-seat record. The visitors' Prefect on a five-hour flight reached 10,800 ft. a.s.l.; the pilot did not realise he needed only the odd hundred or so feet to reach Gold C height—no comment.

Easter produced thermal conditions on most of its days and two short cross-countries were done by visiting Southdown Club members in their Olympia. Sunday, 20th April, was an ordinary west wind day which produced an unexpected cross-country by Tony Adams, who flew the Blue Olympia to near his home at Stafford, 38 miles.

On Sunday, 11th May, Tony again set off in the direction of Stafford at the late hour of 16.30 B.S.T., although this time under a picture-book sky of cumulus. He reached Tollerton airfield, near Nottingham, 78 miles, landing at 19.00 hrs. B.S.T.

Sunday, 18th May, produced excellent thermal and cloud convection under calm conditions. A. A. J. Sanders, after several fruitless attempts in smaller clouds, eventually reached 16,000 ft. a.s.l. in a growing cu-nimb just off the south tip of the Long Mynd. John Hickling, who was launched earlier and was in the process of doing an extended local tour, ran into this cloud quite inadvertently by climbing in a small cu. which grew into the main mass of the cu-nimb; he reached 7,400 ft. a.s.l.

Our July camp should be under way when this report is read, but vacancies for several people on the August and September camps are available. Syndicates and private owners are very welcome at any time.

J.H.H.

Cambridge University Gliding Club

The club started the academic year with a rather larger intake of new members than in recent years. As we were no longer able to use Bourn, training was restricted to Marshall's; but, despite the wet weather, flying continued more or less uninterrupted throughout the winter. A training camp at the Mynd in December only managed 7 hours' flying, but was none the less very much enjoyed.

Our March camp at the Mynd put in 90 hours' flying, gaining 9 C's and 4 five-hour Silver C legs. On 22nd March, R. H. Prestwich and Dr. W. Rizk took our T-21 "Bluebell" to 11,500 feet above the Mynd, comfortably exceeding the British two-seater height record, but without a barograph. A. McDougall climbed 9,100 feet in the Prefect and M. C. Harries reached 6,200 feet in Pons, both during their five-hour flights. Simultaneously with these climbs in the wave, S. R. Wiltshire was using cloud streets for a 104-mile flight in the Olympia to Halton (Bucks), on which he averaged 48 m.p.h. This trip completed his Silver C and won one of the prizes for the extended Kemsley competition.

This term two more Silver C's have been completed. R. Rutherford did an out-and-return to Dunstable on 24th April, and on 7th May, A. Back, who only started gliding at the end of January and whose previous flying was limited to a few hours on Tiger Moths, flew the Prefect 48 miles to East Raynham (Norfolk), climbing to 6,400 feet on the way. Recently two pilots have failed by less than half an hour to complete five-hour flights in thermals over Cambridge.

It is hoped to hold a June camp either at Camphill or at the Wiltshire sites.

S.R.W.

Gloucestershire Gliding Club

We hear that this club has decided to suspend operations this year and is selling its fleet of three aircraft. It will re-open next spring if a sufficient number of new members can be enrolled. Meanwhile W. T. Fisher and F. C. Worley, chairman and secretary, have bought a Kite II from Slingsby, modified the wings, and will be flying it this summer.

FOR SALE & WANTED

Classified advertisements can now be accepted for this Magazine. Rates on application to The Trade Press Association Ltd., 57-61 Mortimer Street, W.1.

Tutor—with current C. of A.—wheel—very efficient screen—ASI and sensitive altimeter. £160. Cadet—current C. of A.—wheel—fitted with stick limiting quadrant. £90. Hereford Gliding Club, 20/21, Newmarket Street, Hereford.

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MIDLAND GLIDING CLUB

Summer Camps will be held as follows:

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Oxford Gliding Club

SINCE the commencement of flying in November last, things have moved apace. Membership, which stood at 20 when we got our first machine, is rising steadily and is now 50. Flying takes place at Kidlington aerodrome each week-end, thanks to the co-operation of the Goodhew Aviation Company.

The Eon Primary has proved very satisfactory, but eventually suffered a heavy landing which cracked the fuselage and kept it out of action for a while. In the meantime the club obtained a second-hand Cadet, but a considerable amount of work had to be done on it before it was air-worthy. Then within a few days of our first flights in it there was a further disaster, when it was found that an aileron was severely damaged, presumably by someone entering the hangar in the dead of night.

In addition to the two club machines, and the instructors' Olympia, a new syndicate has been formed: Stow, Herbert and Roberts have bought the Grunau which was given to the B.G.A. by Jack Rice. This machine gets magnificent launches, and in stable conditions winch flights average 6 minutes duration.

Thermal flying has been possible on several occasions. On 23rd and 24th February, the Olympia soared from winch launches for various periods up to 52 minutes, but the absence of other instructors (or other reasons which seemed compelling at the time) prevented any attempt across country.

The next chance came on 22nd March, when Varley tried to use cloud streets, and reached lift on the second winch launch and flew 67 miles to Redhill. This completed his Silver badge qualifications, and also won him £10 in the Kemsley Winter Prize. The first C gained within the club was by Stow, who took an aero-tow on 18th May, and when down to a height he could well have reached on a winch launch, he met a thermal and made a flight of 57 minutes, with a height gain of 2,000 ft. Other certificates gained to date include 8 A and 8 B certificates.

An inaugural General Meeting was held under the chairmanship of Mr. Lawrence Wingfield, who outlined the history of the club from the days when it flourished under Kronfeld's inspiring leadership, through the post-war struggles up to its rebirth late in 1951. Ray Stafford-Allen was elected chairman of the technical committee, and Varley that of the Flying committee.

Derbyshire and Lancashire Gliding Club

GLIDING activities during the winter and early spring are always difficult to report as the period includes the worst gliding weather of the year. However, compared statistically with the corresponding period of 1951—which ultimately was regarded as a fairly satisfactory year—our position at the end of April was sound, with 853 launches (9 per cent up on '51) and 292 hours flying (45 per cent up on '51).

Up to March we were behind 1951, but we have had a good April this year, including an excellent Easter when visitors from London and Farnborough descended upon us, considerably increasing our flying times, our bar profits and our enjoyment of gliding in general.

Dual training launches and times are each 14 per cent down on the corresponding period of last year, although we have actually obtained more certificates of every sort. No special significance claimed—just a temporarily greater proportion of new members with "previous experience" of some kind, ranging from SG-38s to Canberras.

Cross-country attempts seem to be on the increase—a welcome feature with us. So far this year nine deliberate "away landings" have been made, averaging 39 miles and including two excellent flights of almost 60 miles each to complete the youngest Male and Female Silver C's in the country—Mick Kaye, aged 15½, and Betty Gayes, aged 24.

Looking at the other side of the picture, we have so far had to send two reports to the Accident Panel. Under "Injuries to Aircrew," however, we were fortunate in being able to say "None" and "Minor cuts and bruises," so the situation here may be said to be reasonably satisfactory.

So we stand on the threshold of the real soaring season, and it is hoped that by the next issue of GLIDING, the matter of the present report will seem very small beer.

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Bristol Gliding Club

THERMALS at Lulsgate this Spring have not been of the full-blooded variety which delights the heart of the cross-country pilot, but some half-baked ones have appeared on sufficient occasions to enable some of the Tutor and newly-promoted Grunau pilots to get their C's. Between Easter and Whitsun, eight pilots won C Certificates, while others got soaring experience in the two-seater.

The Easter Camp at Roundway was marred by the loss of the Club Olympia, spun-in after its pilot had foolishly attempted a circuit at low altitude. The best flight of the camp was by Mickey Gilbert in a Surrey Club Olympia: she reached 3,700 ft. The long-awaited extra field has not yet materialised, and the prospect of 300-ft. winch launches produces a marked lack of enthusiasm on the part of most pilots, so no flying has taken place at Roundway since Easter.

Even the Whitsun Camp is to be held at Lulsgate this year, so we are hoping our meagre stock of piano-wire for auto-towing will last out: the steel shortage is making replacement rather a headache. Aero-towing is becoming increasingly popular, however, and we now tow whenever we can persuade someone to bring the Tiger Moth over from Whitchurch.

The club Olympia has now been replaced by "Bluebird," a luxuriously-appointed Olympia formerly owned by a syndicate led by Rex Young. "Bluebird," together with its trailer and much valuable equipment, was offered to the Club on very generous terms. It is painful to report that within a few weeks of its acquisition, the skid of this machine was wiped off by a pilot previously credited with a high degree of competence.

One of our chief worries at the moment is a dire shortage of experienced instructors. Business commitments, the cares of married life, and the above-mentioned Olympia write-off, have reduced the number of active dual instructors to three. The rota of duty and assistant instructors looks pretty thin also, and this has contributed to the current neglect of Roundway.

Financially we seem to be in a very strong position, with every prospect of remaining so. The surplus on last year's working was over £500, which we used to pay off some of our loan commitments, and to buy ourselves a fine shooting-brake for retrieving our sailplanes from the cross-countries we hope to do this year!

J.M.H.

Southdown Gliding Club

THE soaring at Friston has not been so good, only having done 82 hours this year so far, as compared with 100½ hours in the same period last year. But launches are up by over 100 to 568. The number of certificates is also very satisfactory, 5 C's, 3 B's and 3 A's.

March proved rather a disappointing month after a very promising start. Ray Brigden went to Beachy Head in both the Tutor and T-21b on Sunday, 2nd March, but the wind soon veered and so soaring was then confined to the usual three of the Seven Sisters. At one period machines were at 1,200 ft. Weidman, of the Portsmouth Naval Gliding Club, did his five hours' duration in their Grunau Baby; after he landed, two of their members got C certificates. Total flying for the day: 23 hours for 32 launches.

On Sunday 6th April, Alan Simmonds was launched in the Tutor at 06.15 hours for a 5 hours' duration attempt and Lieutenant Hunter followed in the Portsmouth Naval Grunau Baby. Rain soon started and the wind increased to gale force, so the Tutor came in to land, but Lt. Hunter completed the 5 hours under very difficult conditions.

The Olympia went to Long Mynd at Easter. Peter Healey flew 30 miles to Tilstock on the Sunday and Jo Hahn 25 miles on the following Tuesday. The others had soaring flights over the hill on Good Friday. Flying at Friston was confined to circuits, but the Tutor was taken to Firle on Easter Monday; this meant that we were operating aircraft at three sites. George Constable had the first flight at Firle and after half an hour was still only at 50 feet, but he managed to land on top. Then Johnny Billeness went to the bottom.

At about 2.30 p.m. on Sunday, 20th April, the wind backed and freshened, the cliffs then became soarable. Ken Pirelli

was sent off and got his C Certificate in the Tutor. Later in the afternoon all aircraft were soaring when a layer of cloud formed over the field. The T-21b came through it to land, but the Olympia and two Tutors remained in front of the cloud until it cleared for a while about an hour later.

Mrs. Douglas visited us on the 26th and 27th April to categorise the instructors. When the formalities are completed, we shall have six qualified B2 instructors. This week-end the sea breeze played havoc with the winch launches, the wind being from the south-west on the ground and east above about 300 feet.

Sunday, 11th May, was the best day so far this year. There was a fresh southerly wind, so the Olympia was launched at 8.30 a.m., soon followed by the Tutor and the T-21b; all were able to get to Beachy Head and there reached heights of between 1,200 and 1,600 feet. After noon the wind veered, making the lift over the cliff along to the Head unreliable. Soaring continued over the Seven Sisters until we had flown all the members present out of money, 20½ hours having been achieved.

At the time of writing, the Olympia is stationed at Lasham, and will remain there until after Whitsun. Groups of pilots are going there with a view to cross-country flying, so we all hope they get the right weather. The Olympia will be taken to another Club's site for two weeks during the summer, but which one has not been decided yet.

A.R.S.

Newcastle Gliding Club

We learnt on 24th May that the Newcastle Airport Committee have now agreed to our tenancy at the Municipal Airport, Woolsington, which will mean a restart of our training activities after twelve months suspension, due to the loss of Morpeth Airfield to the Ministry of Agriculture. Our aircraft will now be reassembled for C. of A. and a re-muster of trainees is taking place. This now means that dual control ab-initio instruction is again offered to residents of the North-east.

It can also be reported that we have confirmed the renewal of our flying agreement with the Yorkshire Gliding Club, in which the members of both clubs may fly club aircraft at either club, at respective club rates.

At our recent Annual General Meeting the following officials were elected for the current year:—

President: Viscount Runciman. Vice-Presidents: Viscount Ridley, Lord Westwood, The Hon. Denis Berry, Sir Claude D. Gibb, and Wm. Cochran-Carr. Chairman: Arthur C. J. Burningham. Vice-Chairman: Alfred P. Miller. Hon. Secretary: J. E. Anderson. Assistant Secretary: Miss Anne Gray. Treasurer: H. Lambert. C.F.I.: Andrew Coulson. Maintenance Engineer: Kurt Anderlicek. Flight and Maintenance Secretary: K. Lion. B.G.A. Council Representative: P. A. Wills.

The Registered Office of this Club has been altered to our City Headquarters and Club House at 11, Lovaine Place, Newcastle upon Tyne, 1.

College of Aeronautics Gliding Club

The Club's ab-initio training for the past three years has been done using an Eon Primary, and in this period we had only one minor accident. The Club has now acquired, with generous aid from the Kemsley Trust, a T-31B, and the change-over to two-seater training is being completed. Instruction is in the capable hands of C.F.I. Mike Henney and Alan Yates.

As we consistently obtain launches of 700 to 900 ft. in the two-seater, we are teaching a "45° plane" circuit as standard. The use of instruments as a reference is to be taught early in the training, with pre-solo checks with instruments covered before conversion to the Tutor.

At present we use winch-launching, but experiments with auto-tow have recently been carried out, and if this method becomes standard, we hope for an increase in the number of launches. The possibility of aero-towing the Grunau behind one of the College Tiger Moths is being looked into.

We are organising a Summer Camp at the Mynd through the hospitality of the Midland Gliding Club, to enable members to obtain their C's and Silver C legs.

Handley Page Gliding Club

SINCE the last notes in this journal we have tried auto-towing to the full and found it much more efficient than winching. The winch has, in fact, now that our second Dagling has been bent "beyond economical repair," been sold to Surrey Club.

Auto-towing and a belly-hook on the Cadet now gives us regular 1,300-ft. launch on a 1,500-ft. wire, which is about as good as one could expect until sin 90° becomes greater than 1.0!

Our two-seater Cadet conversion, after a lot of design work, finally slowed down to a dead stop. The last straw was the lack of width in the fuselage to enable the aft pilot to get his feet round the beam of the bloke in front. Anyone with even ample breadth to his hindquarters who has sat for any length of time in the front seat of a T-31 will appreciate that even the widening of the fuselage and the "boxes" in the front seat don't go all the way to solving the problem.

However, we have now raised the necessary to buy a brand new T-31B, which we collected from Kirbymoorside at the beginning of April. With this and a pair of Tutor wings for the Cadet—our old Tutor having been sold to Aberdeen to help pay for the two-seater—we are now embarking on a full-scale training programme with the most important item of new equipment —new members.

Since the acquisition of the two-seater, Geoff. Wass, our Secretary, has been exploiting its possibilities to the full and his efforts have resulted in at least a doubling of our membership. To this end we held a Symposium recently at which our instructors and ground engineers each gave short talks on the various facets of the gliding game and at which two films were shown—our own colour film taken at Radlett and Dunstable in 1949 and 1950, and "Wings for Pauline" which knocked home the points we had been trying to make in a more effective way than anything else could have done.

Only two further things are now needed to make us the most efficient training organisation in the country (we think). First, full B.G.A. approval for our Instructors' Panel which should be forthcoming shortly. Secondly the exchange of our Bussard for a more suitable intermediate type. At present only three members can use it. So we are after a G.B. (with wheel and airbrake) or a Prefect—very cheap—and have for sale a Bussard which is of course a superlative machine in "as new" condition.

On 25th May we did our first aero-tow from Radlett in the T-31, when it was towed to 4,000 ft. over St. Albans by a Lycoming-powered Auster from Denham—two up. It is probably a little futile towing a large chunk of parasite drag to great height at great expense, except for aero-tow training, but we have found that the T-31 possesses the ability to stay up for fairly long periods during minor thermal activity, and although the return flight was a pure toboggan run there is little doubt that we should be able to get C's at Radlett now, without buying Dunstable's hill!

K.R.O.

Blackpool and Fylde Gliding Club

WE bought our first glider, a Nacelle Dagling, and commenced ground slides early in November, 1951. The first "course" consisted of six men and one girl—and none had any previous flying experience. Six of those members have qualified for their A and are progressing towards the B. There is a second "course" who are more or less ready for conversion to the Kirby Cadet, which was purchased last January.

We use auto-towing and find it much more economical than winch launching, and we intend to continue with this method for training up to the B stage with "S" turns, not L.H. and R.H. circuits, for which the site is not always suitable.

The cost of gliding is kept very low indeed on account of the useful financial assistance given by our very successful social side of the Club, where the ordinary members meet often during the week. We christened the building "The Kite," and it is known by this name to nearly all the 375 members.

Gliding types visiting Blackpool will be welcomed at our Club.

J.S.A.

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Hon. Secretary
Newcastle Gliding Club
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Hon. Secretary
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Miss Sue Parke
Norlands, Middlecave Road
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