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FEBRUARY-MARCH 1979 75p



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SAILPLANE & GLIDING

Magazine of the BRITISH GLIDING ASSOCIATION

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Cover: Two DG-100s on a dual taw crossing the Rhine near Germersheim. For the full story behind this photograph by Udo Hans Wölter, see p2.



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Volume XXX No. 1 FEBRUARY-MARCH 1979

Published by British Gliding Association
Kimberley House, Vaughan Way, Leicester. Telephone Leicester 51051

Printed by Creative Packaging, Eli Lilly & Co, Joule Road, Basingstoke, Hants.



DOUBLE TROUBLE

— or, It's Cheaper by Air

Our splendid cover picture started life as part of a calendar published by Maritius Verloz who have kindly given permission for it to be reproduced by S&G. DON AUSTIN, UK agent for Glaser-Dirks, gives the facts behind the picture, explaining how he and Lemmy Tanner came to be making this unconventional flight from Germany in May, 1976, with Mike Costin in the Cessna 180 tug being navigated by Clive Berry, who organised Customs clearance and was buying one of the gliders.

The idea of a dual aerotow was first debated when two DG-100s were due for collection at the same time and the cost of going twice by ferry was added up. What was needed was a powerful tug, pilot and navigator and two slightly hair-brained glider pilots for the twin tow. The tug cruising speed out to the Glaser-Dirks factory at Karlsruhe, a distance of more than 470nm, was 150kt and the return 95kt. This made a total of 11hrs at whatever rate a tug costs and this still came cheaper than by ferry.

The journey out from Coventry Airport was uneventful. There were numerous gliders in the air and even if visibility had been bad, which it wasn't, we were using the navigation beacons so you didn't need to see the ground and our target airfield at Bruchsal turned up on the nose on time.

We were driven to the factory, fitted a temporary set of instruments to each DG-100 and then joined the very happy crowd of glider pilots at the local food and beer house. There was a Regionals competition at the local airfield and we managed an entertaining evening.

Number One Problem

The next day we were ready for take-off when the first problem arose. The wind was exactly at right angles to the airfield, which was the usual narrow strip. A certain amount of discussion developed as to whether it was better to hit the power wires just the other side of the north end of the airfield – they were a little too low to fly under – or to end up in the woods on the south side. My own feelings were that we should take-off towards the south and, if we did get off, turn left into the wind just before the woods. This had the disadvantage that it was a built up area which would have been embarrassing should a rope or something break.

As a way of relieving the tension Lemmy was given an unnecessary tow to see if he could handle the aircraft. The tug went a long way down the airfield and I stopped having any opinion on which way we should go on take-off. The DG designer then informed me that on the basis of the previous tow the dual launch was without risk, and to get going as they wanted to contest launch.

I believed him, having good reason to have faith in his calculations, and when the others were convinced we left at about noon, clearing the woods by nearly 100ft.

The contest organisers had definitely picked the right time for launching. There were blue thermals up to 5000ft and Lemmy and I bounced around like a couple of corks at 96kt. By the time we had reached München Gladbach airfield at 14.00hrs to clear the German Customs the two hour tow in the heat had certainly taken its toll.

We had refreshments and waited until thermal activity had died down before hooking on at the local gliding club's launch point and took-off at 16.00hrs, heading west at 5000ft to cross the Channel at Calais/Dover.

Two more mistakes now became apparent. The towropes had a common short length and every time the rope tightened from one glider it pulled the other aircraft forward and *vice versa*. This caused the whole combination to go slightly unstable every now and then, but nothing like as bad as before when the air was never stable for long enough to notice this defect.

The second mistake, which I as the rear glider began to be plagued with, was that being nearly 80lbs heavier than Lemmy I was at a better wing loading for 95kt and kept climbing out of position. Airbrake was too much, the undercarriage down was too noisy to hear the radio and I finally settled on some rudder which did the job well.

All this time we were heading west into sun and the ground wasn't visible for much of the time. The thermals died altogether before we reached Calais and our driver informed us we were being controlled down to 3000ft for the crossing. This wasn't really very welcome news but I asked him to tell us when we were half way across so there would be no agony of decision on which direction to go should trouble arise. I don't think we got any oscillations at all over the water, which tends to prove something or other, and when told we were half way over I for one felt better.

When we were over the UK we were controlled down

again and the ground began to look very close . . . that is what we could see of it. We were about 1200ft agl and it didn't feel terribly comfortable. We were allowed to climb over the east side of London where there were the last traces of thundery activity in the air and the ground completely disappeared. Concentration on position holding increased and the air, a little rough in places, did its best to upset things.

After what seemed a long time we started to descend to Coventry airport and some ground began to appear in the narrow cone of vision we were permitted. Our driver called 15 miles and I began to relax and look over the side – 5½hrs of aerotowing at speed isn't recommended therapy for grandfathers.

Near Yet So Far

I vaguely saw the rope out of the corner of my eye as it streamed back past my DV panel – too late I corrected and the rings got behind the hook guard plates and back released, my heart sinking to my boots. I told the others over the radio what had happened and said I would 'phone in on landing. I couldn't see much but cropped fields and one grass one with a castle in it below me. I asked for the wind direction and was given the reciprocal. When I got too low to change it became obvious the castle, disused, was on a hill covered by sheep with a lake at the bottom. I was able to sideslip down to the lake and land up the hill, downwind, on the other side, steering between some sheep as I slowed down.

As I sat there, and by now it was about 20.30hrs, kicking myself and counting my blessings, I thought all my mistakes had been made for that day.

I was lucky enough to fall into friendly hands who whisked me off to the 'phone and refreshments and a retrieve crew turned up in a short time. We were just finishing the boxing operations when the local "friendly Panda" car arrived and were chatting to the crew. The police were curious as to how I came to be in a field at that time on a non soaring day, it now being dark. One of the crew kindly explained that after a tow all the way from Germany I was probably tired and, oh dear, suddenly I was under arrest, the castle not being a Customs' recognised airfield.

The solution was apparently simple, only a Customs man could release me. A 'phone call to Coventry airport revealed that the Customs man expecting us had left the papers for me to sign and gone home. No they didn't have his home number. It took 2½hrs for the duty Customs officer to come from Birmingham and like magic I was out, or what was left of me by this time. We went quickly to the airfield and I hitched on to my own car waiting there and at 02.00hrs left for home in York.

Needless to say the rest of Monday went by in a slight haze, very little sympathy coming from my "ever loving" who assumed I had been having a good time in Germany as usual.

An Overwhelming Response by Tug Pilots

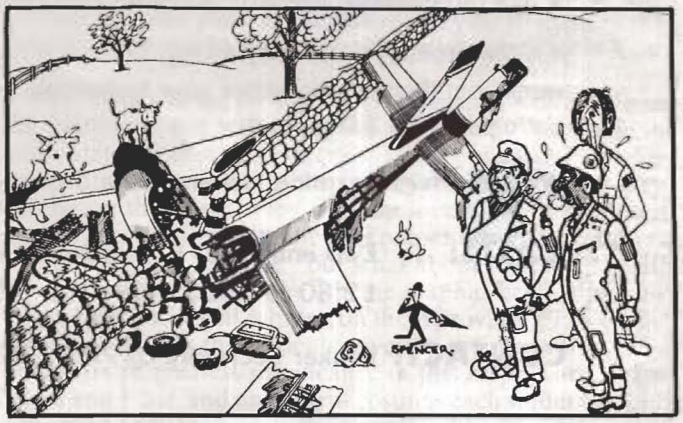
The recent aerotowing accidents coupled with Bill Scull's invitation in the last issue of S&G have brought considerable correspondence on the subject. The volume is such that it is not possible to publish all of it and consequently it has been passed to the Instructors' Committee for analysis and processing. It is most gratifying that so many readers responded and any further correspondence will be passed on to the appropriate member.

It is interesting that most of the points raised by contributors were the same as those brought out in informal discussions between Bill Scull, Vic Carr and Don Hanson and the factors may be said to fall into the following categories:

1 **The Tug/Glider Combination**
   The tug (aircraft serviceable and operated within its limits).
   The rope (not too short and of the correct strength or incorporating a weak link).
   The glider (serviceable and being flown by a competent pilot).
2 **The Weather Factor**)Crosswind, turbulence, rotor, wind strength, etc within sensible limits).
3 **Supervision** (all aspects of operations covering above factors).

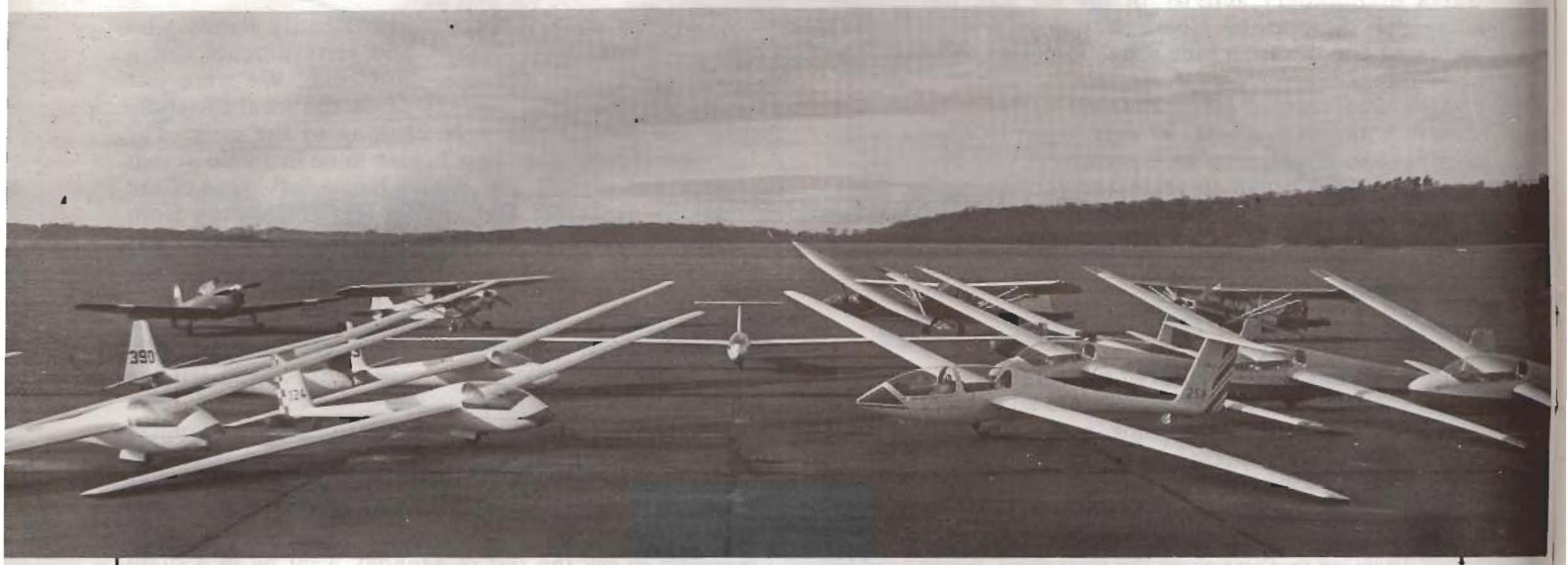
It is evident that there is overwhelming support for the tug pilot's release to be easily accessible preferably in close proximity to the throttle and there is no doubt that this would give the tug pilot more chance in an emergency. Strong support was also given to investigating the possibility of producing a hook for the tug which would release if the glider climbed above an acceptable level. Whilst some correspondents questioned the wisdom of continuing to tow C of G hooked gliders, none of them suggested what could be done to reduce the hazards created by the glider getting too high. It could be argued that a competent glider pilot thoroughly trained in the art of aerotowing should never get into a dangerous situation before releasing. Could it be that there is something lacking in aerotow tuition? Is the trimmer being used properly, and in time? Could it be that the more powerful modern tug with its higher acceleration rate aggravates the tendency for the belly-hooked glider to climb too rapidly catching the glider pilot unawares?

Let us not forget that the glider pilot has a responsibility to the tug pilot every bit as much as the other way round and in an emergency the tug pilot is far worse off than his customer!



"I didn't use the skid as a brake in case it damaged the glider!" By Mike Spencer.

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COMPETITION TRAINING IN THE 1980s

GEORGE LEE, our World Open Class Champion, gives more details of the BGA's plans for a training scheme.

I have often wondered how many potential Reichmanns and Moffats there are at clubs throughout the country – young pilots with considerable natural ability and ambition awaiting "discovery" and the chance to prove themselves. In the past advanced cross-country tuition has been, to say the least, limited and pilots increased their level of skill and knowledge largely by trial and error.

Top competition pilots tended to keep their hard won secrets of success close to their chests and the limited choice of reference books frustrated young pilots hungry for guidance and information. The theoretical element of the problem altered favourably with the general availability of the Soaring Symposia proceedings and latterly with such excellent books as Moffat's **Winning on the Wind** and Reichmann's **Cross-Country Soaring.**

Unfortunately this has not been matched by a corresponding development in cross-country instruction, and the significant increase in the level of competitive ability in this country during the last ten years has been largely due to observation in the air and discussion on the ground.

Of course these factors will always be important but an individual's rate of progress can be considerably enhanced by his being offered the opportunity to observe and discuss techniques and tactics in a two-seater of suitably representative performance. The ensuing boost to morale and self-confidence can only result in improved standards of task and competition flying.

My thinking is hardly revolutionary, so what has been holding things up?

The main problem over the years has been the lack of a suitable two-seater for the instruction of modern competitive techniques. As such aircraft then become available the problems of cost and the effect on general club utilisation predominated. Now, with financial assistance from the Sports Council, it should be possible to largely overcome all three problems. As mentioned in the last issue of S&G (p284), I have been appointed Chairman of a new sub-Committee called "The British Team Training Committee". It is a slightly unfortunate title as the Committee will not be responsible for the coaching of members of the British Team! However, it is difficult to think of an alternative title and anyway it does have a certain relevance in that the ultimate endorsement of the Committee's methods would be the selection of one or more of its ex-students to the ranks of the British Team.

The way that I envisage things happening is that the Sports Council's financial aid will be used to assist in the running of four year training cycles, each cycle overlapping the next by two years, at least initially. Year One of each cycle will be selection year, 1979 being the first year of the first cycle.

I intend casting the selection net as widely as possible and publicity posters and application forms will be sent to all clubs before the start of the next season. Prospective applicants may or may not have flown in a competition and the following selection criteria will apply:

1) A progression from Bronze C to Silver C should have been achieved within a year; however, circumstances vary and an individual should not withold his application because it took him somewhat longer.
2) The completion of two 100km triangles within the previous two years with supporting photographic and documentary evidence from an OO. (The Committee would relate speed achieved to glider type and prevailing weather conditions).
3) Ideally applicants should be under 25 years but applications will be considered up to a maximum age of 30.

Applications will be invited during the autumn of each selection year and nominations will be confirmed by post or in person as the result of a selection panel (depending on the number of applicants). The Committee will be looking for the selection of 15 students plus reserves at the start of each cycle. Competition is the name of the game from the outset, so make the most of the forthcoming season!

National Pilot as Coach

Year Two will see the running of five one week courses at one of the major sites in England. Each course will comprise three students and one coach (Nationals pilot) and will make use of the BGA Twin Astir and two single-seaters of comparable performance (borrowed or hired). The primary aim will be for the group to fly cross-country tasks together, alternating the lead and using radio to derive the maximum benefit.

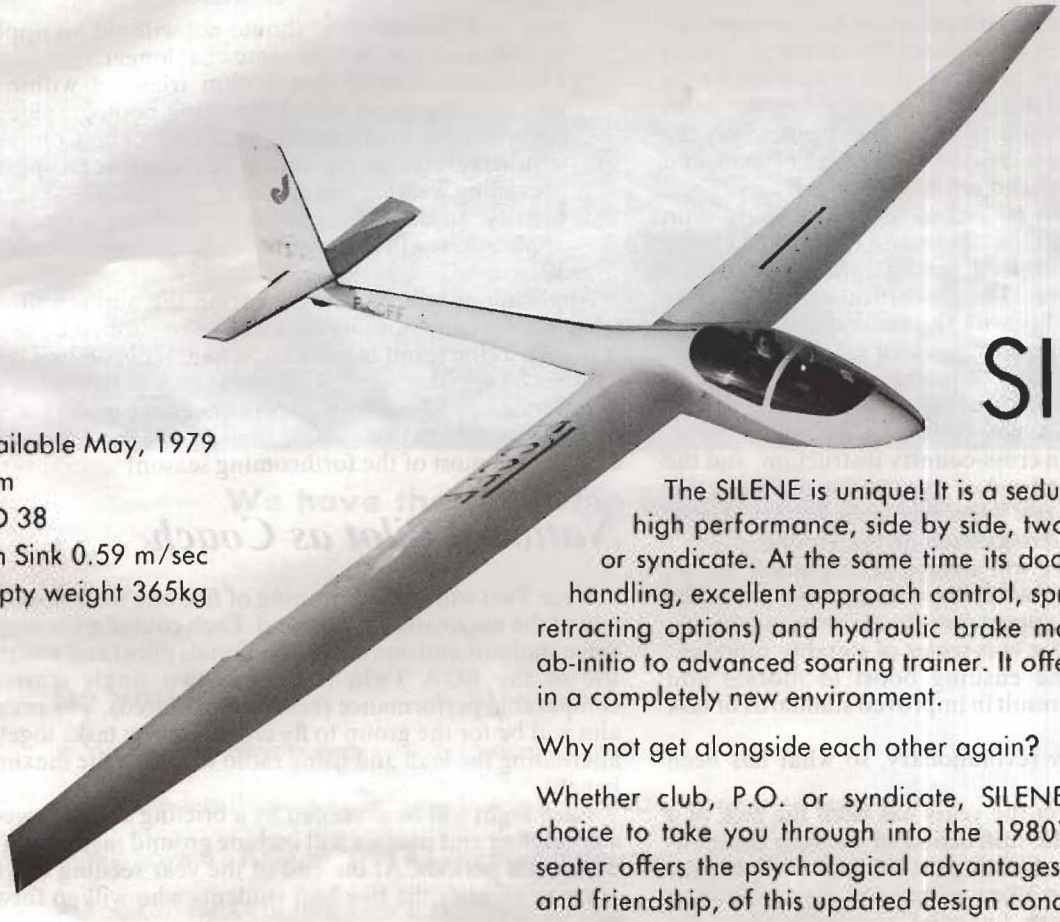
Each flight will be preceded by a briefing and followed by a debriefing and courses will include ground instruction and discussion periods. At the end of the year seeding will take place to identify the five best students who will go forward into Year Three.

Year Three will see each of the five selected pilots entering a Regionals – solo but with a coach in attendance to discuss each task beforehand and to debrief afterwards. The aim will be for the selected students to gain competition experience (and a Nationals rating!) by putting into practice all the training they have been given the year before. There will be a further element of competition involved in that seeding will take place at the end of the year to identify the top two students who will receive financial assistance in Year Four.

Year Four will see the top two pilots flying on their own in the Nationals but with financial assistance. The learning really starts at that stage because there is no substitute for competitive experience at the right level. Even though they will be on their own, they will continue to learn by flying against, and talking with, the top competitors in the country.

"All very well," I hear, "but what about the cost?" Well, the estimate of costs for the scheme that has been approved by the Sports Council is based on them providing 75% of the annual costs with the students covering the remaining 25%. The years of greatest significance in this respect are Years Three and Four, and on present costings each student would pay around £40 for each year (accommodation and retrieves included). It would obviously be advantageous for each

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student to have access to a glider of suitable performance but again the cost estimates for Years Three and Four include a provision for glider hire.

And there you have it for the time being. In conclusion, I feel that this scheme represents a great opportunity for all those young pilots with natural ability who would like to become successful in competition flying, but who have been frustrated from starting for reasons of cost or the lack of suitable training facilities. It is particularly appropriate that the scheme should be launched in this the 50th Anniversary Year of the BGA.

In this article I have emphasised youth and natural ability, but the single most important element is motivation - every applicant must be willing to learn and, above all else, possess the will to win. I fully appreciate that competition flying is not for everybody and of course it is a personal decision, but if you are the sort of person who enjoys the challenge of trying to beat fellow club members on a weekend task or even a spot-landing competition, it may be for you.

As in the sport in general, there can be moments of satisfaction such as when a closely judged final glide or a bold decision made *en route* work out as planned. There is also a certain mutual respect and comradeship between competitors at all levels up to, and including, World Championships.

Contrary to popular opinion among non-competitors, competing types do not spend all their time worrying about how to shave a couple of km/h off the National 300km triangle record, or how best to sabotage their arch opponents instrumentation!

THE 1979 COACHING PROGRAMME

BILL SCULL, Senior National Coach.

This year's programme has only one new feature – an advanced course, and a change of emphasis towards more task flying – there are three task weeks. This does not mean, however, that there is any reduction in the number of instructors' courses.

The Advance Course

This is aimed at helping pilots already showing promise who, probably, will have a Silver C and have flown a 100km triangle within two years of starting to glide. Anyone who would like to come on these courses should get the recommendation of his CFI.

If you wonder what the course will include it is our aim to give the help that's required, be it field selection and landing practice, soaring techniques, instrument flying, aerobatics etc. The fee is £20, all other payments (flying time, launch fees and accommodation costs) being paid for separately.

Generally these courses will be held alongside an instructors' course, although you don't have to be an instructor to attend. We hope that anyone attending will bring his own (or a club) glider along and stay for longer than the three days of the course which, incidentally, is from Tuesday to Thursday inclusive in order to keep coaching weekends free. The idea in having your own glider with you is, hopefully, to consolidate the things you learn by flying cross-country as much as possible.

With a limited number of places available it is likely the courses will fill up fairly quickly; if your CFI hasn't told you about them already then contact him as soon as possible if you want to come. The dates and venues are as follows: A1, **Husbands Bosworth,** May 1-3; A2, **Southdown** (five day), May 14-18; A3, **Lasham,** May 22-24; A4, **Lasham,** May 29-31; A5, **Husbands Bosworth,** July 10-12; A6, **Booker,** July 24-26; and provisional, depending on demand, venue not decided - A7, August 14-16; A8, September 4-6, and A9, September 11-13.

The Task Weeks

There are no significant changes to this item of the programme except that we're trying to arrange for better weather. We would like to see a few new faces (not that we don't want to see the old ones) to spread the benefits around a bit, so should you wish to learn more about flying cross-country and spend one week doing only that or if you're fed up with the "instructor treadmill" and long to do some flying of your own, then this is definitely the event for you!

The dates and venues are as follows: **Lasham,** June 9-17; **Husbands Bosworth,** June 30-July 8 and **Dunstable,** August 4-12. The task week fee is £25.

The General Coaching Programme

For the most part the coaching effort is directed towards instructors and details of the programme and courses are sent to CFIs. If you are an instructor already then we will communicate certain details of the Instructor Training programme to you directly.

However if you expect to train as an instructor this year, you might like to note the dates of the briefings for the courses: **Husbands Bosworth,** February 3-4; **Portmoak,** February 10-11; **Sutton Bank,** March 3-4; **Lasham,** March 10-11 and **Booker,** April 21-22. The briefing lasts for about two hours and is given on the Saturday in each case (at lunch time); check with your CFI for any additional details.

If you have already been on a seven-day instructors' course then it is now a requirement to attend a weekend course. The dates and venues for these are the same as for the course briefings given in the paragraph above.

The Instructors' Courses (seven day)

C1, **Lasham,** March 10-16; C2, **Lasham,** March 17-23; C3, **Booker,** March 31-April 6; C4, **Booker,** April 9-15; C5, **Booker,** April 14-20; C6, **Husbands Bosworth,** April 28-May 4; C7, **Husbands Bosworth,** May 5-11; C8, **Lasham,** May 12-18; C9, **Lasham,** May 19-26; C10, **Lasham,** May 28-June 3; C11, **Sutton Bank,** June 18-24; C12, **Husbands Bosworth,** July 7-13; C13. **Portmoak,** August 13-19; C14, **Booker,** August 27-September 2; C15, **Husbands Bosworth,** September 3-9; C16, **Sutton Bank,** September 10-16; C17, **Booker,** September 17-23 and C18, reserve course, venue not decided, September 29-October 5.

Note: you can only secure a place on one of these courses with the recommendation of your CFI. Incidentally, the fee for the course is increased to £45.



TAMING TRAILER SNAKING

RODNEY WITTER

Time after time one hears reports of glider trailers being involved in road accidents, often with expensive consequences to the cargo. We spend much time and money in trying to reduce the possibility of flying accidents but tend to accept happenings on the ground as all part of the game.

A very large number of trailer accidents are simply caused by snaking, which is now a well understood phenomenon. In the caravanning world it is accepted that certain precautions should be taken but how much more important is it in gliding, where a trailer load can easily be valued at £12 000, that we should safeguard ourselves against this risk?

Snaking is simply a lateral (or yawing) oscillation of the trailer which can so build up that the trailer takes charge of the car, resulting, in extreme cases, in a full blooded spin of the whole outfit – if the tyre friction is high enough the outfit will also roll as part of the fun.

Prime Causes of Snaking

The factors which influence snaking are many and varied. Studies have been carried out at the Motor Industry Research Association with practical tests and computer simulations involving no less than 12 variables, including tyre pressures, slip angles, mass ratios, moments of inertia, wheelbase and towbar overhang ratios, draw bar length, etc. From the mass of data and conclusions we can extract the prime causes of snaking and what simple steps can be taken to minimise them.

On the road the situations in which an outfit is most liable to snaking are a) when the car is neither pulling nor pushing the trailer (*ie* trailing throttle) and b) when a gusty side wind is blowing (or more dangerously the "bow wave" from a large lorry which, when passing can set up a large swing by acting first on the rear of the trailer and then on the front). Typical combinations of these circumstances are experienced when descending a long incline in a shielded cutting on a motorway which suddenly gives way to an elevated section exposed to a crosswind. Notorious examples exist on the M5 south of Bristol (southbound) and on the M6 in Lancashire which have claimed many victims.

The driving technique when a snake is felt is firstly to act against the swing with the steering wheel. It is essential however not to overcorrect and the corrections must be suitably timed – unfortunately not a technique which can be easily taught or practised. Secondly longitudinal force should be applied to the trailer to aid correction – an experienced driver in a powerful heavy car will be able to accelerate out of the snake, but a better solution will usually be to decelerate out of trouble.

In preparing an outfit for the road the best precaution against snaking is undoubtedly a powerful heavy car. The higher the ratio of car weight to trailer weight the safer will be the outfit. By law, to drive up to 50mph, the kerbside weight (*ie* unladen but including fuel etc) of the car must be greater than the maximum gross trailer weight. If this ratio is not met then the outfit is rectricted to 40mph. Tyre pressures should obviously be checked as a soft tyre will promote snaking (in this connection I favour cross-ply tyres for stability on trailers). Also the trailer nose weight will affect stability – an unstable outfit sometimes being cured by an increase in noseweight. Care must be taken not to overload the rear of the car however as this will have an adverse steering effect, particularly on front wheel drive vehicles. A further insurance against snaking is the fitment of one of the many yaw dampers, or anti-snake stabilisers available on the market. All these stabilisers seek to restrain the, normally free, rotation in yaw of the trailer at the coupling, by either hydraulic or friction damping. Stabilisers cost between £15 and about £50 and are a well worthwhile extra insurance in relation to the value being towed.

Some recent examples which I have personally witnessed may serve as illustrations of the problem. An unfortunate member of our club was embarrassed to have blocked all three lanes of the M6 with a Ford Escort and Dart 17 trailer on its side whilst descending from Shap where the combination of light car and downslope with no stabiliser fitted enabled the trailer to take charge.

A TR7 with a K-6E on the back was thrown off the M6 and down a steep embankment after a passing bus started a snake. (Relatively light towcar – no stabiliser fitted).

A Marina Estate towing a Blanik with no stabiliser got into difficulties at Competition Enterprise last year, the resulting inversion wrecking trailer and glider (and car!). Quick salvage of the Blanik pieces back to Lasham was arranged by the fortunate borrowing of a handy Speedwell Blanik trailer. *En route* (you guessed it!) the second trailer was rolled – being towed, *sans* stabiliser, by a short wheel base Land Rover (a most unsuitable glider trailer tug due to wheel base/trailer base ratio).

These are just the accidents I have witnessed in a few short years of gliding – they are presumably repeated all over the country at regular intervals. Surely our valuable toys deserve better handling than this?

* * *

In fact a major insurance broker has confirmed that in 1977 over nine per cent by value of all glider claims handled by his firm involved trailer accidents.

Trailer Lore

JUSTIN WILLS and GILLIAN HOWE

We get a lot of fun out of retrieving, which is perhaps just as well since the other day we calculated that our glider spends over 95% of the time in its trailer, during which it travels both further and longer than it does in the medium for which it was designed. Although these figures may represent some unusual migratory urges, nevertheless the dearth of recent articles on trailers belie their continuing importance, especially during such a poor season as 1978!

We regard our trailer as providing three primary functions: hangarage, storage and mobility. Secondary functions include furniture removal, dormitory and according to one indignant old lady in a lay-by, transporting a giraffe with insufficient ventilation. Our observation that any giraffe which had been derigged sufficiently to get it into our trailer would no longer require any ventilation did not mollify her.

Getting down to basic hangarage, there are three commonly used materials for trailer covering; wood, glass-fibre and aluminium. Wood has the advantage of cheapness, lightness and ease of repair. Disadvantages include the need to rub it down and repaint it every two years and also the effect of climatic variations on the joints and the fit of the doors.

Glass-fibre trailers have the advantages of low maintenance and durability and can look very elegant, due to their compact moulded lines. Disadvantages of the continental ones we have seen include their comparatively higher cost and weight, the latter being due to their use of steel sub-chassis and wooden floors.



Aluminium may be rather more expensive than wood and its metal finish may not be to everyone's taste, but it also has the advantages of low maintenance, durability and resistance to damage. A good illustration of this was the occasion when our glider found itself separated from its trailer by a tall dense hedge. Since there was no gate we engaged in a conversation through the hedge as to how we should proceed. The spectacle of a long trailer and a young lady earnestly addressing a hedge was too much for the local householder who approached offering assistance. On grasping the situation he suggested turning the trailer in his apple tree lined driveway. From the glider side of the hedge it became clear that there wasn't much room, as shouts of "left hand down a bit" and "steady" began to come through the hedge thick and fast. Suddenly there was a tremendous clang followed by the sound of falling timber. A short silence ensued while the trailer was inspected for damage. This was broken by a human wail which caused great relief on the glider side, for the voice was that of a male indicating that in the case of trailer *v* Granny Smith the latter had lost!

Good fittings an excellent investment

The key to proper storage of the glider within its trailer lies in the internal fittings. It never ceases to amaze us how some people who take tremendous pride in the condition of their aircraft are content to use cheap second rate fittings. Admittedly, good fittings are expensive if made professionally and can cost three quarters as much as the basic box itself, yet they are an excellent investment. Fittings must not only support the aircraft correctly, but also remain secure during the roughest usage. For the fuselage, belly trolley and nose cones, with a roof fitting for the fin and a tailwheel chock are now almost universal and a great improvement on the previous highly stressed tri-pod arrangements. Tailplanes can well be stored flat under the roof (it can prove an expensive mistake to have to lay bits on the grass whilst the rest of the aircraft is extracted from its trailer).

Wings are the item most often mis-stored. When we first visited Glasflügel in 1969 Hänle would let us put his precious Libelle into our trailer until we had convinced him that there was a support for the leading edge at the inboard end of the aileron and that we did not intend to drive off with the wings suspended solely between the root and tip fittings.

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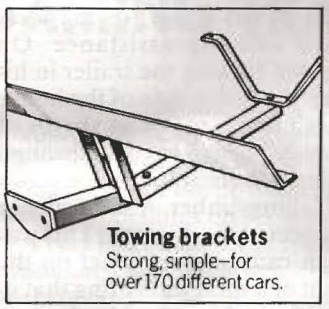
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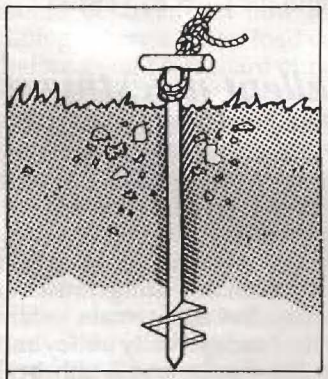
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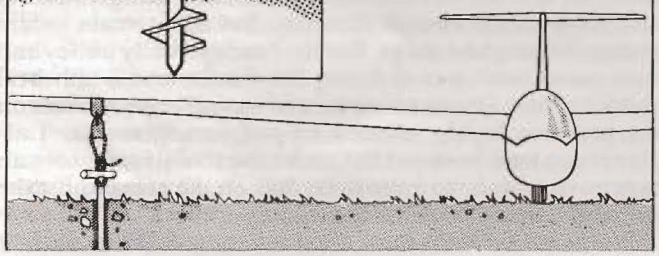
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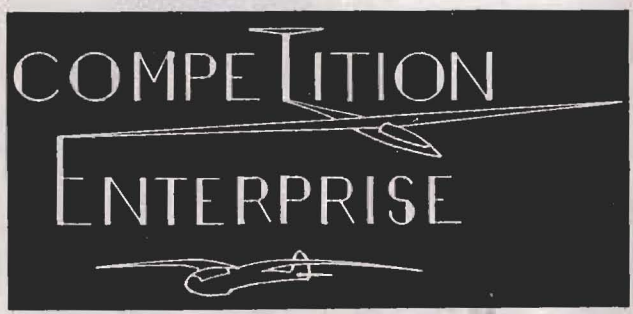
(We have since developed similar phobias about sitting on leading edge D noses and pulling on wingtips.) Several less obvious aspects are also often overlooked: ventilation is important (pace giraffes), preferably by grills in the floor and outlets in the roof. A spare wheel fitting mounted on the front of the nose cone together with a retaining system for carrying waterballast tanks are useful.

We have found mobility is determined by three main considerations: weight, profile and tyres. If the car/trailer weight ratio is less than 3:2 the combination is very unlikely to tow well. Your only hope may be to resort to some of the anti-snake devices now available. Ideally, the ratio should be 2:1 or better. Less important is the power/weight ratio of the combination, but ideally this should exceed 70bhp per ton. As far as trailer balance is concerned we like the trailer axle mounted aft of centre and a 20lbs download at the tow-hitch with the glider both in and out. The heaviest of the glider's components should be supported as near to the axle as possible. Very heavy downloads on the towbar should be avoided, both for the crew's sake and because some car towbars have proved surprisingly weak in shear.

Cross-ply tyres seem better than radials (they have less flexible walls) and are cheaper. Provided the tracking is correct the life of trailer tyres will almost certainly be determined by the condition of the tyre walls, not the tread. Tyre pressures are absolutely vital and should be kept high, 35-40lbs/sq in. Likewise, inflating the car rear tyre pressures by an extra 4-6lbs/sq in can transform towing characteristics.

A lowline trailer, or at least one with a sloping front bringing it below the car's roofline, improves mobility, especially in terms of fuel consumption. Tail fins should be kept as small as possible, since they give side winds a lot of

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leverage. A level or even slightly nose down towing attitude seems the best, the latter coupled with large diameter wheels gives useful ground clearance at the rear, but three short lengths of 1in square steel tube mounted longitudinally on the underside of the rear of the trailer as rubbing strips still prove a good investment.

Further miscellaneous observations: one of the most vital features of any glider trailer should be a safety cable. This should be a rope, chain, or wire with a breaking strain of at least 2½ tons, attached to the main chassis of the trailer quite independently of the towbar, linking up with a similarly attached safety cable on the car. If both safety cables are made in the form of large loops they can be quickly connected by a strong spring loaded Karabinier. In the event of towbar failure a safety cable preserves not only the precious glider, but also saves the lives of other road users at the maximum price of a few dents in the back of the car. We are amazed it is not a legal requirement.

Towbars are appearing increasingly in forms to enable one to tilt the trailer without unhitching. However good these may be we would still strongly recommend the inclusion of a clamp/leg arrangement for use both when the trailer is parked on its own and for those inevitable occasions when the trailer has to be manhandled into and out of a field. The method of fitting mudguards depends on whether one is a dove or a hawk: either they should be attached lightly so that on striking a gatepost they fall off without causing further damage; alternatively they can be attached by two triangulated steel tubes which will deflect and even destroy the gatepost. Over-ride brakes can be improved by fitting a rod drive instead of cable, which seems to need constant re-tensioning.

Some lessons we have learnt the hard way. A high speed trailer requires good wing mirrors and a young lady driver who is very much more able to win the forgiveness of the "fuzz" than her male counterpart, especially if she responds favourably to the invitation "come and see my Vascar". Remember that trailers are not allowed in the outside lane of three lane motorways. Corrections of snaking tendencies are instinctive for the experienced driver but cannot be taught quickly and those who have not yet learned the technique should be firmly instructed to simply hold the wheel steady and slow down gradually without using the brakes. We were once present when all these rules were broken, the whole combination got wildly out of phase and the final result was noisy, expensive and undignified. About the only thing it achieved was the perfect reproduction of those impossible looking skid marks displayed on French road signs warning of slippery surfaces.

Reversing trailers is much easier than it looks, particularly if the driver leans well out when reversing in a straight line. Cornering presents very few problems while driving along at 30mph or more, but remember that at lower speeds you may inadvertently take corners very much more sharply and then you must make the necessary sweep to allow for the inside wheel cutting in and the tail swinging out. After a long continental trip we returned home unscathed only to assault the kerb and almost an oncoming bus as we turned into our own drive.

Finally, we hasten to point out that everything we have written is based on our own experiences and may be at considerable variation with both the theory and practice of others. Therefore apologies in advance to those who tow their three ton armour plated trailer at 100mph behind a Deux Chevaux – it's just that you overtook us so fast we didn't get the chance to see you again! Happy trailing.

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GLASFLÜGEL

TUG AIRCRAFT DESIGN FEATURES

TERRY McMULLIN

Tug operating costs in the busy club represent a large slice of the annual budget, the situation today being notably different from that of bygone years; violent increases in capital costs, fuel and maintenance have resulted in a much more rapid inflation in tugging expenses than in most other areas. Cost effectiveness of aircraft in the tugging rôle should, therefore, be given close attention by any club operating a seven day week schedule. My aim in these notes is to point the way to objective assessment of aircraft design features and their impact on cost effectiveness.

1.1 **Aircraft Construction.** A simple, rugged airframe is essential for long life and low maintenance: the structure should be free from corrosion and fatigue problems; all hinges, pivots, etc should be capable of refurbishing as wear takes place. (Appendix 1).

1.2 **Airframe Configuration.** A good wide field of vision is most desirable for busy fields and a low wing, bubble canopy aircraft must score here. Method of operation is important, however, and if proper square circuits are flown with adequate look out before entering turns - and during a turn - there need be no significant increase in collision hazard when operating high wing aircraft.

My technique in using my Super Cub is to raise the inner wing frequently in turns when towing: when descending, to make a point of doing steep turns enabling adequate vision through the top of the canopy.

1.3 **Undercarriage Configuration.** Tricycle undercarriages should be avoided. They are heavier, are likely to require more maintenance, will put heavier loads into the airframe on rough ground, give minimal propeller clearance from the ground and result in propeller and engine destruction in the event of nose wheel failure. Moreover, accident statistics show frequent failure cases.

Their virtues are, improved forward visibility when taxying and easier handling for learners and in crosswinds. None of these should be very relevant to tugging operations.

1.4 **Undercarriage Construction.** Simplicity and ruggedness are not necessarily associated with the most comfortable riding qualities. They are, however, essential for cost effectiveness. The steel spring, cantilever type is virtually a no maintenance item - corrosion excepted - but it is heavy: rubber shock cord suspensions are low in maintenance and light in weight: rubber blocks, as in the Chipmunk, can be good and rugged: pneumatic-oleo systems can only be described as a totally unnecessary luxury. They are heavy, more expensive in first cost and much more expensive in maintenance than older types. (Appendix 2).

1.5 **Airframe Drag.** Towing speeds are so slow that parasitic drag is not a very significant factor in climb performance. It does, however, have a powerful effect on achievable rates of descent. Thus, a fast touring aircraft is at a disadvantage in this respect compared with such types as Pawnees and Super Cubs. (Appendix 3).

1.6 **Noise.** Two noise sources are propeller and engine exhaust. Mufflers will reduce the latter but near supersonic propeller tips must be avoided. Since modern aero engines run at comparatively high rpm and since the higher engine powers use larger diameter propellers to absorb the power, there seems to be an upper limit for ungeared engines beyond which propeller noise becomes unacceptable. Thus, engines of 220hp upwards seem to suffer here. Three bladed propellers would improve this (at reduced efficiency) by being smaller in diameter. (Appendix 4).

1.7 **Engine Cooling.** Glider towing speeds are low compared with most other aircraft operations. Hence, aircraft intended for fast touring will almost certainly suffer overheating: rapid heating/cooling cycles must spell early death to an engine and engine management by pilots is closely related to this. Kindness to engines pays dividends; throttle reduction at the top of the climb should be very, very gradual and a high rpm figure maintained right down to final approach. Gone should be the days of slamming shut and spinning down. A possible worthwhile modification could be automatic gills.

1.8 **Propeller Pitch.** Fine pitch propellers enable engines to run at high rpm in the climb and hence feed more into the air. Shaft horse-power in fixed pitch operation is approximately proportional to $(rpm)^3$ and hence a nominal 150hp engine at 2700rpm, full throttle, only delivers 126hp at 2550rpm which is representative of the Super Cub in the climb at full throttle.

Thus, fitting a finer pitch propeller than the standard 56in pitch would give more power but also more noise and a shorter engine life. Over-speeding would become a problem and cross-country speeds would be very low.

Variable pitch/constant speed propellers should be avoided. Their virtue does, of course, lie in enabling high cruise speeds as well as best climb performance but the former is not very relevant to glider tugging. Their vices are twofold - weight and cost. Units are lifed and this alone adds at least £1/hour to operating costs. Experience shows, however, that scheduled life is not necessarily achieved and the actual cost penalty is therefore higher.

2 PERFORMANCE

2.1 **Stall Speed.** Stall speed is important in relation to lift off/touch down speed having not only a powerful effect on short field performance but also being significant in its effect on undercarriage wear and tear. Thus, assuming constant acceleration, a decrease from 45 to 40kt will reduce the ground run by 21% and since this occurs at the high speed end of the run, wear and tear must be reduced by a much larger factor. (Appendix 5).

2.2 **Power Available for the Climb.** Power for the climb is that surplus power available after deducting the power required to maintain level flight. There are two or more ways of determining the latter and an example for the Super Cub is given below:

(i) The Super Cub flight manual figure for the *en route* glide is a gradient of .118 at 58mph giving a rate of descent of 10ft/sec. Hence, at an operating weight of 1300lbs, the horsepower required for level flight is:

$$\frac{1300 \times 10}{550} = 23.5\text{hp}$$

It is to be noted, however, that the 10ft/sec figure is with a windmilling propeller and without the drag due to this, the rate of descent would be lower as also the power required, calculated.

(ii) Experimental determination shows level flight maintained with 1650rpm on the engine. Further, the engine is rated at 150hp at 2700 rpm. Hence, at 1650rpm is:

$$150 \times \left(\frac{1650}{2700}\right)^3 = 34\text{hp}$$

But the tractive efficiency of the propeller is unlikely to be more than 60% under these conditions and, for this value, the power delivered to the air would be 20hp.

Now the $(rpm)^3$ law is strictly true only if the forward speed is itself proportional to rpm and this is not exactly true in this case. Nevertheless a figure of 20hp is supported reasonably well by both calculations and is considered accurate enough for purposes of the present investigation.

Similar calculations for two gliders, taking manufacturers sink rate figures, give:

K-13 - 1000lbs wt and 3ft/sec sink rate = 5.5hp

K-18 - 660lbs wt and 3ft/sec sink rate = 3.6hp

Now the Super Cub manual quotes a climb rate of 1300ft/min at 1300lbs equivalent to a horsepower of:

$$\frac{1300 \times 1300}{33000} = 51.2\text{hp}$$

and if we add to this the power required to maintain level flight we have 71.2hp fed to the air. But the shaft horsepower is 126 at 2550rpm, whence the tractive efficiency, overall, is 56.5% in this case. Expected rates of climb may then be calculated as under:

(a) K-18, single-seater, 660lbs AUW, 3.6hp for level flight:

$$\text{Rate of climb} = \frac{(71.2 - 20 - 3.6) \times 33000}{(1300 + 660)} = 800\text{ft/min}$$

(b) K-13, two-seater, 1000lbs AUW, 5.5hp for level flight:

$$\text{Rate of climb} = \frac{(71.2 - 20 - 5) \times 33000}{(1300 + 1000)} = 655\text{ft/min}$$

These figures agree reasonably well with experience and the calculation

therefore appears realistic. If now, one works out the effect of changing the engine to 180hp we get:

Shaft hp at 2550rpm = 151.6 and hp to the air at 56% efficiency = 85.6.

(c) K-18 gives 1027ft/min

(d) K-13 gives 846ft/min

Hence, we get around 28% improvement in rate of climb for a 20% increase in engine power.

If we now turn our attention to aircraft weight instead of power we can compare the expected performance of, say, the Super Cub, with the Chipmunk. Thus, the operating weight of the Chipmunk is approximately 1750lbs being 1500 basic, 150lbs for the pilot and 100lbs of fuel. The engine is rated at 145hp at 2400rpm giving 115hp at 2225rpm and this will produce 68.5hp to the air assuming the same tractive efficiency as above.

The flight manual figure for the *en route* glide is the same as that for the Super Cub but the increased weight of the aircraft implies more hp needed for level flight. A figure of 25hp is taken in the calculations giving:

(e) K-18, expected rate of climb $\frac{(68.5 - 28.6) \times 33000}{1750 + 660}$ = 545ft/min

(f) K-13 ..... 455ft/min

Carrying the reasoning further, the effect of increasing the engine size in the Chipmunk to 180hp would give a climb figure:

(g) K-13 ..... 640ft/min

Hence, the 180hp Chipmunk seems almost to approximate to the 150hp Super Cub; but saving 100lbs weight by removing unnecessary wiring, etc would improve the climb to around 665ft/min.

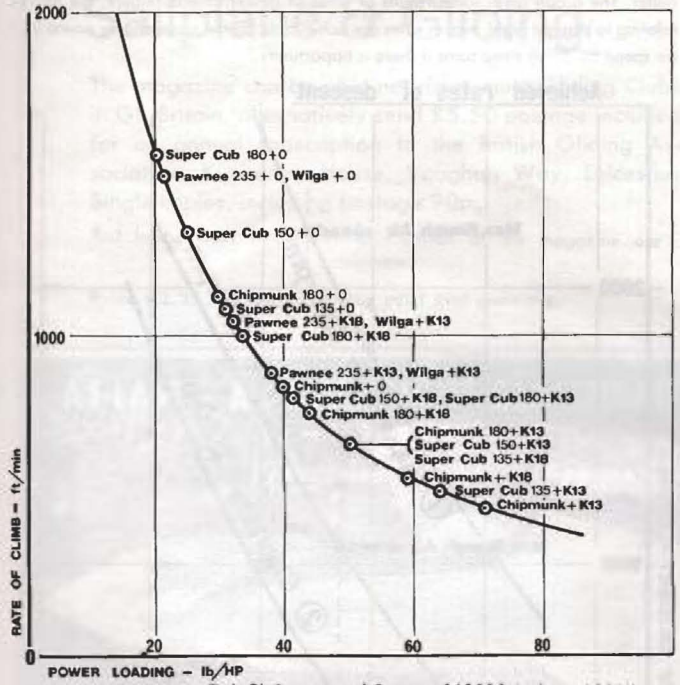
2.3 **Power Loading.** Power Loading is here defined as the ratio

$$\frac{\text{Wt of aircraft + wt of glider}}{\text{Available horsepower}}$$

and the available horsepower is that delivered to the air after subtracting that required for level flight of tug and glider, *ie* it is the power available for the climb. Clearly, increasing the weight of tug or glider will reduce climb rate whilst increasing the available power will increase it. More precisely, climb rate will be proportional to available horsepower and inversely proportional to weight. Hence, it should be possible to plot a universal curve of the form:

Rate of climb x power loading = a constant.

This can then be used to give a figure for the climb performance of any glider/tug combination (with some exceptions).



If we use the Super Cub flight manual figure of 1300ft/min at 1300lbs wt we get a value for the constant of 2.95 x 10^{-5}, and similarly the Chipmunk figure of 900ft/min at 1750lbs wt gives a value of 2.8 x 10^{-5}, indicating reasonable agreement. The graph showing rate of climb versus power loading is plotted using a value of 3 x 10^{-5} and superimposed on it are points worked out as in the previous section for different cases. Exceptions, where use of this approach would not give consistent results, are those cases where glider drag goes up very rapidly with airspeed as, for example, the T-21.

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2.4 **Fuel Used in the climb.** Figures below are calculated from climb rates to determine a time to 2000ft plus an allowance for take-off and acceleration to climb speed. This has been taken to be .15min for the Pawnee and Super Cub 180, .20min for the Super Cub 150 and Chipmunk 180 and .25min for the Chipmunk 145 and Super Cub 135.

Specific Fuel Consumption is taken to be the same for all the engines. This is felt to be slightly optimistic for the Chipmunk 145 since the compression ratio of the Gipsy engine is lower than that of the others considered.

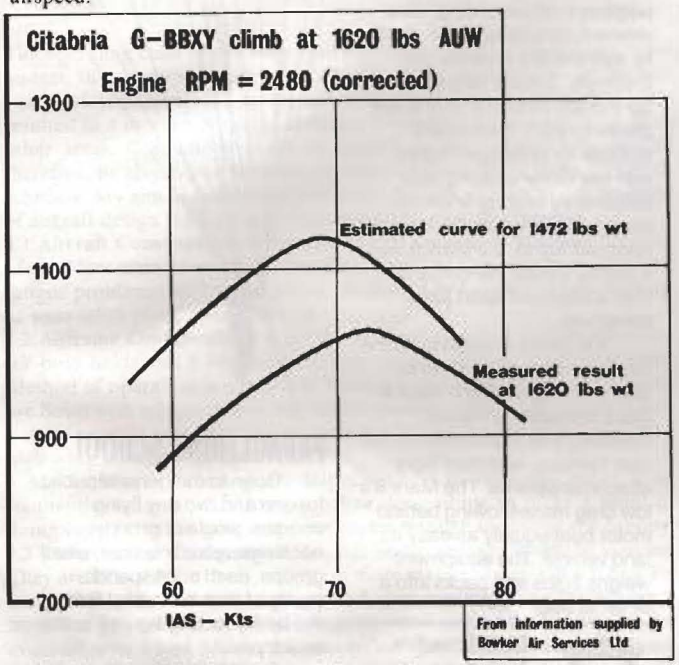
Tug	*Glider*	*Fuel to 2000ft galls*	*Relative consumption*
Super Cub 135	K-18	.468	1.18
Super Cub 135	K-13	.583	1.18
Super Cub 150	K-18	.427	1.07
Super Cub 150	K-13	.54	1.09
Super Cub 180	K-18	.396	1
Super Cub 180	K-13	.491	1
Pawnee	K-18	.515	1.3
Pawnee	K-13	.609	1.24
Chipmunk 145	K-18	.565	1.43
Chipmunk 145	K-13	.69	1.4
Commodare	K-18	-	-
Citabria	K-18	.455	1.15
Wilga	K-18	.65	1.32

Increased fuel consumption in the climb attributable to carrying a passenger (150lbs) in the tug amounts to around 8% for the Super Cub when towing a K 18. A like penalty results from operating the Super Cub with full tanks instead of half full. (Thirty gallons of fuel weigh 216lbs).

2.5 **Optimum Climb Speeds.** Achieved rate of climb will reach a maximum at an airspeed which presents the wing to the airstream at the optimum angle (around 4° incidence). Departure from this optimum angle will incur a penalty in climb performance. Hence, the fast touring aircraft with high

wing loading will probably be notably down in climb performance when operated at the usual glider towing speeds.

Flight manual figures for optimum climb rate are usually quoted for Max all up weight; translation to lower weights can reasonably be done by multiplying the Max AUW figure for airspeed by the square root of the ratio of the weights. Appendix 6 quotes various aircraft cases at typical operating weights. The curve given illustrates dependence of climb rate on airspeed.



3. **Conclusions.** The foregoing outlines various considerations in logical selection of an optimum tug aircraft. For the busy club, logical first choice would seem to be the Super Cub – in spite of high first cost. Choice for the less busy club, however, might well be different depending upon utilisation. Thus, higher fuel and maintenance charges might well be a preferred trade off for lower capital investment. One aspect which must be emphasised, however, is the environmental responsibility of clubs. Aircraft which are likely to cause neighbour annoyance must be avoided.

APPENDIX 1. AIRFRAME CONSTRUCTION.

1. Super Cub, Pawnee and Citabria. Fuselage is steel tube, fabric covered and the surfaces are also fabric covered. Later aircraft have synthetic fabric giving longer life. Neither corrosion nor fatigue are significant life limiting factors. All bearing bushes are easily replaceable.

2. Chipmunk. Stressed skin monocoque fuselage. Surfaces are part fabric covered and are not synthetic unless recovered after release from the RAF. The aircraft has no significant life limiting items if the mainspar modification is done. Corrosion could eventually become a problem in some areas. Most surfaces are hinged on ball races so wear should not take place.

3. Commodore. Stressed skin construction. Corrosion problems may be expected, particularly at spot welded areas but other parts may also be troublesome. Flap and slat tracks are subject to wear and expensive to replace. Fuel tanks are inclined to develop leaks.

APPENDIX 2. UNDERCARRIAGES

. Super Cub and Pawnee. Undercarriages are of tubular steel with bushed hinges and shock cord suspension. Movement is restricted in the event of shock cord failure preventing damage to engine and propeller. Operation of Super Cub on Dunstable airfield over 700hrs has not required shock cord replacement. Hinges were rebushed after 1000hrs total time.

Suspension is undamped and unforgiving. Tailwheel units are satisfactory but require regular checking and fairly frequent replacement of leaf springs and attachment bolts.

Super Cub brakes are drum type and hence not so effective as disc. Operations off flat fields or runways will imply the need for regular brake maintenance but operation at Dunstable has not worn out brake shoes in 700hrs. Reservoirs seem to need topping up about twice a year.

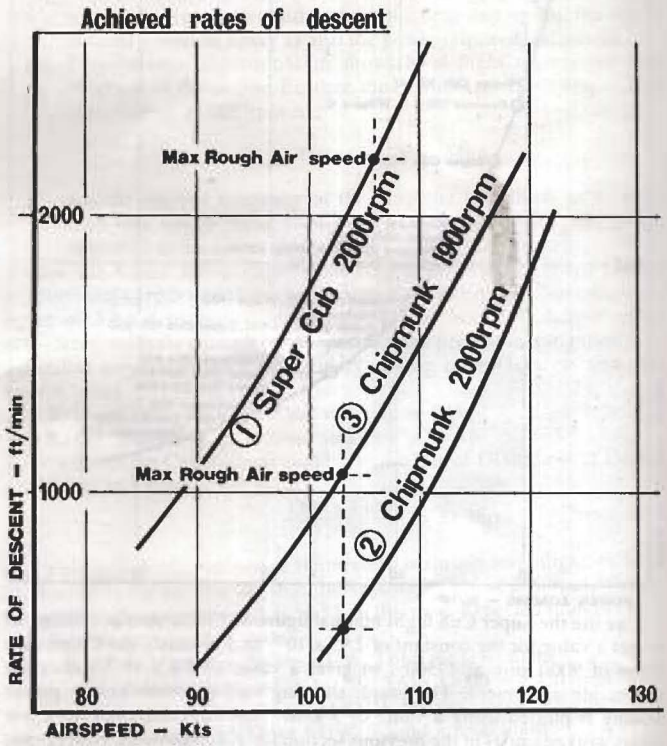
2. Chipmunk. Rubber blocks in legs provide a good ride and good damping. There are no significant wear problems, torque links are bushed. Rubber blocks need long term replacement as they sag with age. Brakes are excellent. The tail wheel unit suffers from shimmy troubles if the anti-shimmy dampers get worn but this is a relatively minor matter.

3. Commodore. The pneumatic-oleo system requires special high pressure pump up equipment: corrosion can be a problem. The ride is good with excellent damping but there have been a number of nose wheel failures.

4. Citabria. Undercarriage is solid steel cantilever springs. Failure of a single bolt on early aircraft caused collapse but a restraining strap modification now incorporated eliminates this hazard. Suspension is even less damped than that of the Super Cub and provides a smooth ride but with generous rebounds. Brakes are good.

APPENDIX 3. ACHIEVABLE RATES OF DESCENT

I contend that descent from tow should be conducted with a reasonable amount of power from the engine in order to avoid rapid cooling problems and piston ring flutter. The graph gives some results of rates of descent measurement, the figures relating to straight flight: higher rates are achievable for the same engine power and air speed by doing steep turns if there is opportunity.



APPENDIX 4. NOISE

1 Exhaust. The Super Cub, Pawnee, Citabria and Commodore are all fitted with

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mufflers though the degree of silencing from these might be improved. The Chipmunk has no muffler as standard..

2. Propeller Noise. Some indication of likely noise problems can be gained from propeller tip speeds. These are as under:

i	Super Cub 150	74in dia prop at 2550rpm	.744 Mach
ii	Super Cub 180	76in ,, ,, ,, ,,	.76 ,,
iii	Pawnee 235	84in ,, ,, ,, 2400	.80 ,,
iv	Chipmunk 145	81in ,, ,, ,, 2225	.72 ,,
v	Chipmunk 180*	81in ,, ,, ,, 2500	.80 ,,
vi	Commodore 180	76in ,, ,, ,, 2600	.78 ,,
vii	Wilga	112in ,, ,, ,, 2050	.88 ,,
viii	Agcat	108in ,, ,, ,, 2000	.86 ,,

*This case is for fine pitch prop. Use of smaller dia voorser pitch results in less noise.

Experience shows that tip speeds above about .76 Mach cause neighbour complaints.

APPENDIX 5. POWER OFF STALL SPEEDS.

	lbs	Kt IAS
Super Cub	1300	32
Chipmunk	1750	39
Pawnee	1700	40
Commodore	1550	41
Citabria	1515	33

It is to be noted that the TAS for these cases will be higher due to position error of the pilot. Further, the error will not be the same in all cases.

APPENDIX 6. OPTIMUM AIRSPEEDS

	lbs	Kt
Super Cub	1300	56
Citabria	1515	59
Chipmunk	1750	57
Commodore	1550	62*
Pawnee	1700	55

*Flight manual wording is "Best angle 64-67kt, exceptional climb to be used for short time." Hence, engine cooling problems might well be expected.

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Photo: Mike Butcher

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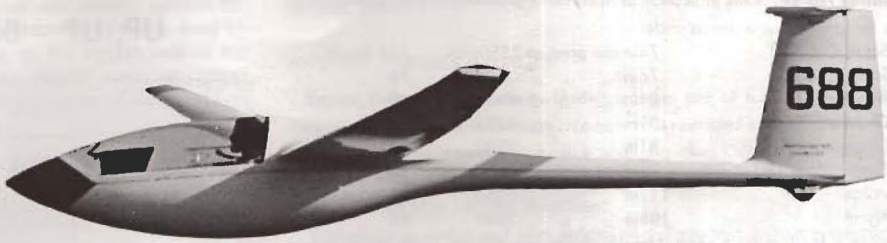


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(EUROGLIDE 1978)



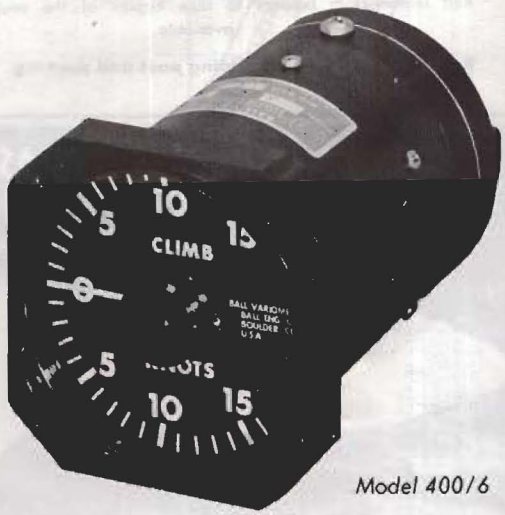
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H. D. entertaining his crew at a nearby lake.

After 13 consecutive years of the International Mountain Gliding Competitions at Vinon, the authorities have decided that in future the Competitions will be held at a different aerodrome each year. This is sad news for many of the regulars, but no doubt an aerodrome in a valley amongst the Alps will be, perhaps, even more interesting.

The number of entries last year was a record, 80 contestants divided into three Classes, Open, Course (15m with flaps and water) and Standard. The weather was, as always, mostly very good indeed. Owing to the 1978 World Competitions being held at Chateauroux, our Competitions were held a month later, which meant shorter days, and therefore a little less flying.

In the three weeks that we were there I flew nearly every day to total about 70hrs and 3500 cross-country kilometres. Since I am very apprehensive about landing out I make long detours to remain within gliding distance of aerodromes or good landing areas, so I did not score very well. However, it should not go without mention that my Mosquito was not de-rigged until it was time to go home. Of three outlandings, they were all at aerodromes where I was able to get an aerotow to 30 miles or more away from home to glide the rest of the way. Vinon is 30 miles away from where the mountains start, along an alluvial valley up to two miles wide to the St Auban aerodrome in the North. Often on a triangle or quadrilateral task I failed to attempt the last turning point and returned to Vinon in order to avoid the possibility of landing in a field.

The task setters took advice from the three senior pilots of each Class and on the penultimate day the longest task was set, over 500km out-and-return. Of the 80 competitors, only three completed the task and as 60 had not returned on the final day it was not possible to set a competition.

To glide in the French Alps is the ultimate for all glider pilots.

The aerodrome at Gap Tallard would make an ideal site for the next competition. Every day can be expected to be as good as or better than the best British summer day. When there is wind there is wave because the aerodrome is surrounded by distant mountains of many different types. Normally the visibility is 50 to 100 miles. When there is little or no wind, then the sun facing slopes have anabatic upcurrents. On the larger mountains these anabatic winds often go roaring up through the inversion level, and the glider pilot is the only one who can experience the magnificence of the sudden view of the distant mountains, valleys, ranges and snow capped peaks, all of which can be approached from a few feet away.

Soaring along a succession of mountain ranges is an exhilarating flight. Stay close to the mountain is the order of the day. Gushes of warm air make reference to the variometer merely an academic matter, the pilot can see the steep mountain slope falling away. By staying close, I mean really close, 25ft is the optimum, 100ft is too far away. Twenty or 30kt above stalling speed is necessary to ensure plenty of aileron control to bank away when the occassional downdraught is encountered. Once the art is mastered, if the girl friend were to be on a first flight in a two-seater she would probably be squirming with anguish at the apparent suicidal intention of the pilot. When the spine has been reached the upcurrent is stronger and one can circle in the ensuing thermals while deciding on the next ridge to tackle. An alternative is to go dashing between slender granite spikes reaching for the sky to a gaggle of gliders marking another upcurrent. All this and more can be accomplished within gliding range of one of several aerodromes, all of which cater for gliders.

Glider pilots are more privileged than any other mortals. When the holiday is over it is an anticlimax to be gliding back at home – but still an enjoyable pastime. The freedom of the Alps is emancipation, liberation and glorification that no mere verbalisation can describe.

More on Solar Charging

As many pilots will know, I was the first to fit solar cells to my glider so that the battery could be charged whilst in flight. My original panel was rated at 0.65amps and was found to be capable of overcharging my 14v battery. This was in the cold weather in the spring of this year. I therefore changed it for a smaller panel rated at 0.42amps. Neither panel gave the rated output at any time, and this was assumed to be because some of the power of the rays from the sun is lost in the perspex canopy and some more in the polythene which I put over the cells to enable the dust to be cleaned easily. In France the temperature in the shade is often above 90°F, and in the open the temperature in the cockpit is very much hotter. The panel was too hot to touch, and the charging current dropped to 0.05amps. When flying, the ventilation air cooled the panel until at 7000ft QFE it gave 0.02amps, which is the discharge through my radio. Since cloudflying is forbidden, and in any case dangerous, and 7000ft is the normal lower operational height, the radio was switched off when over 60 miles away, so the battery remained charged. At 20 000ft the charge rate was a maximum of 0.3amps. At home in August as an experiment I connected the 14v panel to the 12v terminal of the battery and the charge rate at 2000ft in bright noonday sun was only 0.03amps.

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BOOK REVIEW

Jane's All The World's Aircraft 1978-79 edited by John W. R. Taylor. Published by Macdonald and Jane's Publishers Ltd at £31.

Yes, it is again more expensive – an increase of £3.50 on last year – but the 69th issue with 760 pages of text is as excellent as ever. In fact this annual record of aviation development and progress is a magnificent publication every pilot hankers to own and in terms of content and presentation it comes cheap.

Gliding is well represented and even the UK claims a page. A welcome innovation is the table at the end of this section which gives all the technical data of aircraft mentioned, again under the various countries, so instant comparison is possible. This accounts for eight absorbing pages of beautifully arranged text.

GILLIAN BRYCE-SMITH

AN ELECTRIC UNDERCARRIAGE ALARM

IAN ROBERTSON



Fig 1. Ouch . . . Photo: Angus Mincher.

A perfect flare-out and the exposed underbelly of the glider sinks defencelessly towards the tar. Lower still, the truth dawns on the pilot that he forgot to lower the wheel. A slithering touch and then a grinding, tail-high stop, leaving a white trail of hot gelcoat. Grinning but sympathetic faces and it's happened to another pilot who thought it never would (Fig 1).

This relatively harmful accident is common among low-hour pilots converting to glass but it is not unknown among high-hour pilots, CFI's, and even a competitor in the Smirnoff Derby! Some incident seems to throw their routine while on circuit. A few pilots have even **retracted** the gear before landing. Most of us admit that even we could make a mistake one day so a cheap electric alarm system gives us a second chance to get the wheel down and save public embarrassment. This system is wired to the undercarriage lever and airbrakes (landing flaps). If the brakes are operated with the undercarriage in any position but fully down and locked, the alarm is activated by two micro-switches wired in series. One switch is ON if the brakes are not in-and-locked and the other switch is ON if the undercarriage is not down-and-locked. It's an old idea, but the alarm system is new to suit modern instrumentation.

DESIGN

While a bell, buzzer or horn could be used, these are likely to cause palpitations on final approach, when they are least needed. An urgent, distinctive, electronic sound is more effective and less frightening.

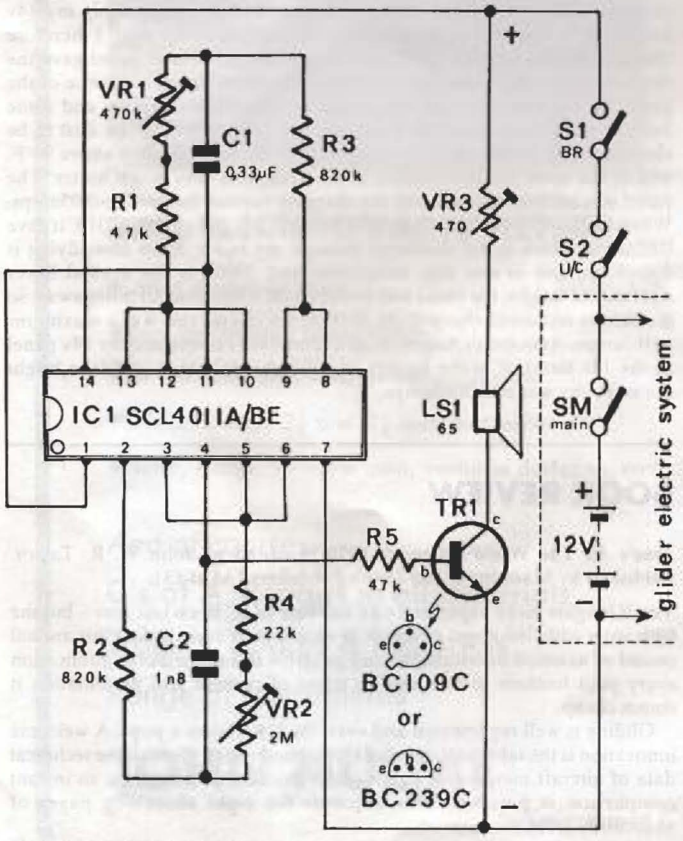


Fig 2. Circuit diagram of alarm system. All resistors 0.25 watt, capacitors of polyester.

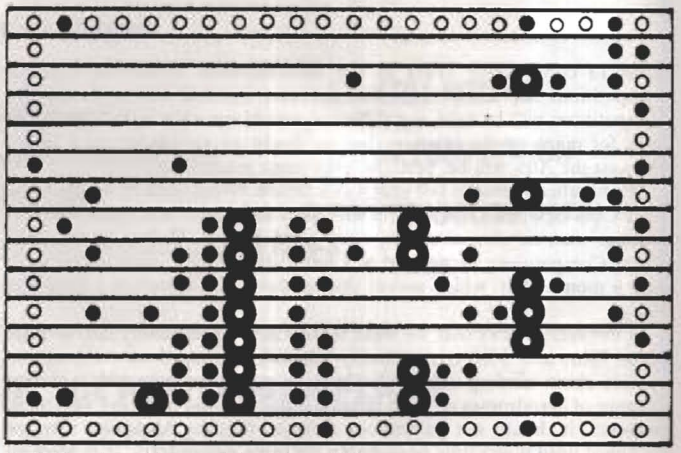


Fig 3. Verroboard layout of circuit base. 0.1in matric.

The alarm was designed to produce a pulsed square wave tone which would easily over-ride other audio instruments. The tone, pulse and volume of the alarm may be preset to suit the aircraft and contrast with the instrumentation. It can be built easily by anyone who can use a small soldering iron, read a circuit and requires no test instruments to adjust.

The alarm (Fig 2) is designed around a Quad 2-Input NAND gate. This modern, integrated circuit (IC) looks like a black, silver-legged caterpillar and is cheap and readily available. It allows the use of sophisticated circuitry without complex wiring (or understanding). For those who are curious, each pair of gates forms a square wave oscillator, the first generating a pulse which switches the second or tone oscillator. The output is boosted by a small transistor and issues melodically from a miniature speaker. Adjustment of VR1 varies the pulse from about two per second upward to a fast warbelling sound. VR2 varies the tone over a very wide range and VR3 varies the volume which is adequate for the noisiest cockpit.

CONSTRUCTION

The alarm can be built on a match-box sized piece of verroboard, with a layout as in Fig 3 and 4. The SCL 4011A/BE made by Solid State Scientific or equivalent, is a reliable IC, and is best fitted to its own plug in

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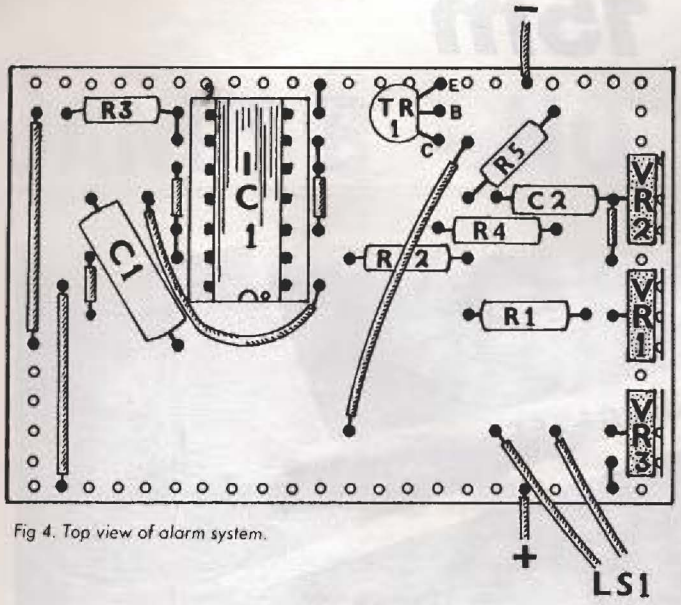


Fig 4. Top view of alarm system.

the verroboard. Either transistor is satisfactory. The speaker should be of high impedance (approx 65ohm). This can be a little difficult to obtain but it is the best and cheapest component. An excellent substitute is a high impedance telephone earpiece such as the 9042A marketed by Standard Telephones and Cables (STC). This component was used on the prototype but it is expensive and effectively doubles the cost of the unit. If only a low impedance speaker (8ohm) can be obtained then a miniature matching transformer must be used. Anything, it's not critical, up to 200:8ohms produces little loss of efficiency. Using the 8ohm speaker directly strains the transistor, uses too much current and produces a weak output. When the alarm is complete ensure the channels between the copper strips of the verroboard are clean of solder and burrs before testing. Observe polarity - reverse polarity will destroy the IC. Preset VR1, VR2, and VR3 so as to contrast with any audio instruments and to give adequate volume.

The alarm can be placed anywhere the pilot can hear it and need not take up sparse panel space. It should be wired directly into the aircraft's 12v supply **without** its own on-off switch. A main switch (SM, Fig 2) or circuit breaker should be added to govern the whole aircraft's electrical system and will prevent accidental activation of the alarm or radio while the aircraft is idle or in the trailer. When flying, the alarm would be switched on automatically with the rest of the electrical system. It would allow the alarm to be switched off if a deliberate, wheels-up, off field landing is necessary. The micro-switches (S1, S2) can be either mounted below the seat pan, where they are out of the way, or above in contact with the brake and undercarriage levers. While 12v is optimum for the alarm, it runs efficiently from 8-15v. The unit draws about 50-70mA but should not be heard very often. The cost should be comparable to an aerotow.

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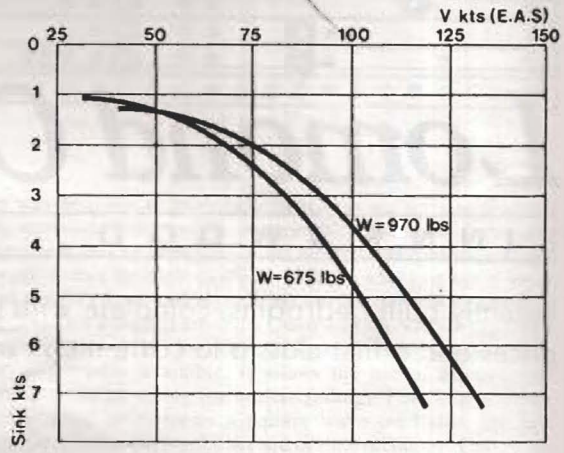
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JANUS B – NO LONGER A MYTH

Taken from an article by Bernd Malzbender in *Aerokurier* and translated by Rika Harwood.

Improving is not the right expression for the alterations incorporated in the Janus B, Schempp-Hirth's two-seater flag ship. Over 80 of these gliders have now been built and it has never been suggested that its handling is difficult in any way. What has been difficult to believe is that the excellent performance is combined with obviously harmless flying characteristics. Ever since the prototype flew in the 1974 Hahnweide contest, piloted by its designer Klaus Holighaus, when it "twitched" the opposition, it has been the subject of a peculiar myth – that it is a high-performance glider not really suited for the average pilot, and quite unsuitable for club use.

After thorough flight tests which I was able to carry out during the fine days of October at Hahnweide I am convinced of one thing only. The Janus is a high-performance glider but its potential is not wasted on the average pilot. This, coupled with its docility and ease of handling, makes one wonder why the Janus has not yet taken the place it really is entitled to – within the clubs and the myth exposed.

From Janus to Janus B

The Janus B, which recently started to come off the production line at Nabern-Teck, differs essentially from its predecessor in three ways.

1. A fixed tailplane with elevators so that the aircraft is a little less sensitive at high speed. The effect really shows itself on the winch launch where the previous noticeable tendency to "buck" has completely disappeared. The winch launch is now similar to that of the K-13. With the flap setting at +8° the aircraft has a short ground run and behaves faultlessly on the climb. The increase of lift from the flaps compensates for the relatively high weight and allows a normal launch height to be reached. After the launch, 0° flap is selected. This setting can be maintained for the rest of the flight. Of course the winch launch can be carried out with 0° flap, but this means a rather longer ground run and slightly less height on the launch.

Back rest at better angle

2. The rear seat has been re-arranged and is now similar to the front seat. The top of the back rest has been moved back by about 7cm. This has been achieved by cranking the mounting tube for the front wing spigots. Thus the rear back rest which was very upright now has a better angle. It is more comfortable and it has increased the already generous seating allowance. Vision from the rear seat remains satisfactory, although when looking over one's shoulder the occupant has to strain his neck a little. However, all round vision from a mid-wing glider, such as the Janus, is basically good, especially in circling flight where it helps in keeping a good look out.
3. The previous perhaps confusing flap selection lay-out has been changed on the Janus B. It is now clear and has been reduced to unmistakable positions. Pilots who are not used to flaps, who feel unsure or cannot make the right choice of setting and then get confused, can always use 0° flap setting throughout the flight. The available flap settings are: for thermalling (+8°), for high speed (–4°) and for very high speed such as final glides (–7°). Position "L" (+18°) is for landing only. It is important to note that one cannot easily get it wrong. Obviously flap settings other than "L" can be used for landing but the touchdown speed will be significantly higher. This shouldn't cause any problems in normal circumstances.

Brief description

The Janus B is a mid-wing two-seater of glass-fibre construction. From the spring of 1979 there will be an option of a carbon-fibre wing which will save about 30-35kgs against a "glass" wing. The wing skin is GRP/polyurethane/foam/GRP sandwich and each wing has a waterballast tank of approximately 120 litres. The springs which hold the water dump valves closed are situated on the inner face of the root rib and can be easily adjusted.

All the control mechanisms, *ie* Schempp-Hirth brakes (top surface only), ailerons and flaps, are internal. A vent tube for the waterballast tank lies right along the wing with its exit at the outer end of the ailerons. The 18.2m span wing is set with a slight negative incidence. The slim fuselage with a single right-hand hinged canopy has a strong undercarriage with a braked wheel. This has been hung in a tubular steel framework which absorbs the wing and undercarriage loads and distributes them into the fuselage.

It has a fixed T-tail with moving elevators as opposed to the all-moving tailplane fitted to the previous model. The aircraft weighs a bare 370kgs and its large wheel makes for easy ground handling.

Cloud Flying and Simple Aerobatics

Apart from when landing flap is selected, the Janus is permitted to fly at speeds up to 220km/h in all weathers. The maximum speed with landing flap set is 140km/h. Cloud flying and simple aerobatics are permitted, without waterballast. Rigging normally involves four people, but can be reduced to three using trestles. The waterballast connections come together automatically when the wings are finally pulled together with the rigging tool. The ailerons, flaps and brake controls are easily connected. The tailplane is pushed onto two prongs and secured by a retracting pin in the top of the fin and the small gap between the under surface and the fin can be sealed with tape. The Janus is fitted with the Tost Europa G73 tow hook mechanism.

Flying the Janus B

During the test flights I carried out at Hahnweide there was a moderate crosswind and I wondered how the Janus would behave on aerotow. For the first flight I sat in the rear seat so as to experience the instructor's viewpoint. The seating is very roomy and even a large person could not possibly wish for more comfort. The rudder pedals are unusual as they are of a horse-shoe type and leave the top part of the foot in the air. However, one quickly gets used to them.

We started with +8° flaps so that we would obtain aileron control quickly. This was in fact surprisingly good despite the crosswind. After take-off I selected 0° flap and enjoyed the lightness with which this large glider responded to the control movements. The stick forces are very light, but the rudder needs slightly more push and the change of attitude in pitch is relatively slow. At about 2000ft I began to try out the various controls. The rudder which had at first seemed slightly underpowered did, however, answer well when I pushed a bit harder. After a bit of practice getting the feel of the machine I came to the conclusion that the controls are in fact well harmonised; the Janus is manoeuvrable (rate of roll, five seconds from 45° to 45°) and the stick forces are pleasantly light.

Harmless spin behaviour

Spinning attempts at all flap settings only seemed to produce mushing. The aircraft judders with the stick right back but keeps straight and aileron control is maintained throughout. There is also a good warning of the stall. When the critical speed is reached while circling, the nose dips away slightly which one could hardly call a spin. Only when pulling back at higher speeds will it dip away towards the stalled wing but then quickly picks up speed and responds to the controls immediately. I am really surprised how harmlessly the Janus behaves in incipient spin conditions even with my weight of only 70kg in the front seat. The Janus is quite reluctant to enter a proper spin and we had to try several times and each attempt ended with the Janus recovering by itself after only half a turn.

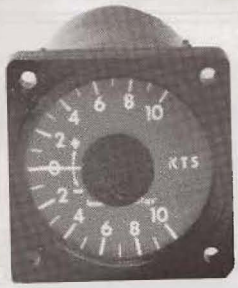
"Escalator effect"

My underlying anxiety about the slow flying behaviour of a high-performance glider with a (measured!) glide angle of 1:39.5 quickly disappeared. It made me appreciative of the possibilities that such a

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machine offers. At high speed – flaps at –4° and then at –7° one has the feeling that the Janus is like a "greyhound" which can gather speed. Following this by pulling back, together with resetting the flap for entering a thermal, the escalator effect becomes quite noticeable. With the flaps producing more lift and an increase in the angle of attack the longitudinal behavour remains almost unaltered.

This effect is shown even more clearly on landing whereby with the flaps in the landing position (+ 18°) the wing mobilises all the lift and produces reserves the section is capable of until touch down. Forward vision from the rear is particularly good because of the steep attitude and a two point touch down can be made with just enough flying speed. When using the brakes to roll to a standstill, I realised why the nose wheel is such a good idea. The strong wheel brake, actuated by a grip on the stick, can tip the machine onto its nose, and the nose wheel then saves the fuselage from any damage.

Tail parachute for extreme approaches

After further launches, flown from both the front and rear seat, I soon became familiar with the Janus. I made a landing with the tail-chute deployed, but although I made a high approach and jettisoned early, it still made me touch down sooner than I had wanted. With some practice it should be possible to make very short landings, approaching over relatively high obstructions. Also, although it should hardly ever be necessary, the Janus side-slips well.

Light stick forces, good ventilation

It is very stable in circling flight and it is easy to keep the lower wing centred into the core of a thermal. This, together with the light aileron movements, makes for effortless and untiring flying. Cockpit noise is minimal, both the edges of the canopy fit well together, and even at high speeds it remains well sealed. The ventilator at the bottom of the perspex canopy produces (with some noise) a good flow of air which is easily regulated. The trim range can be classed as adequate. At my weight it was effective from minimum speed to 180km/h. For speeds above this slight forward pressure on the stick is necessary, but except for final glides this should seldom be necessary.

A word about flaps

There is an often present but unfounded aversion to flapped aircraft for club use, together with many opinionated ideas against a high-performance two-seater such as the Janus being less suitable for training. This is probably why the Janus is not used to a far larger extent within the clubs. Evidently people have been misled into the belief that the performance of flapped aircraft at the high speed end is not desirable when the suitability of such "complicated" machines has been discussed for club use. This is especially true for a two-seater such as the Janus which, in my opinion, has been surrounded by a myth of exclusiveness.

Advantages of a flapped profile

Not taking the stubborn "flap curser" into account, who after all could leave the flap lever alone and fly the glider like an unflapped machine, the advantages for those who like to get the best out of a flapped profile include:

- The ground, take-off and landing runs are much shorter. With +8° flap the Janus becomes airborne at about 35kt.
- The winch launch height is increased by about 15%.
- One can circle more tightly which means one can quickly achieve faster speeds and better glides.
- Also, in slow flight as when landing, forward visibility is good, maximum lift is obtained without large attitude changes and a nose down attitude is maintained.

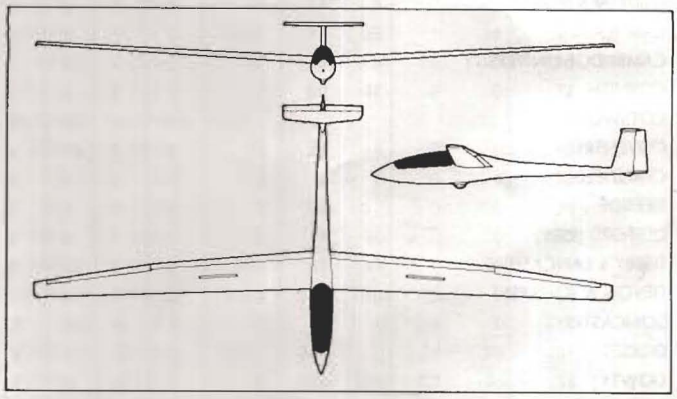
Finally, the qualities of circling flight provided by the differential ailerons and further increased by positive use of the flaps, give effortless thermal soaring with excellent roll control. In my opinion these advantages are already considerable and no disadvantages, such as could interfere with safety, were found. That a flapped two-seater with its inherent kinetic properties is neither especially heavy (compare the empty weight of the Janus with its competitors) nor has to be complicated to handle as shown so clearly by the Janus, should help to earn itself a more widespread acceptance. In conclusion, the alterations to the tail unit, the rear seat and the new flap lever lay out make the Janus without doubt, in my opinion, suitable for club use and trouble free training.

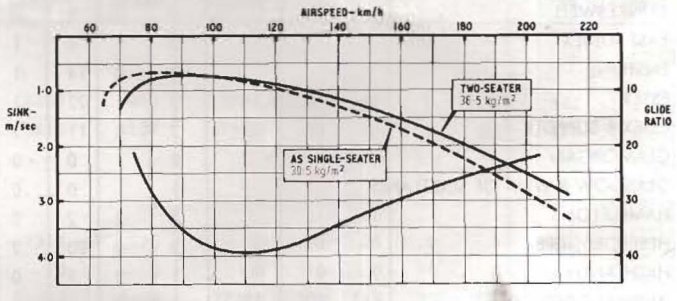
Two Faces

Can it be coincidence that the Janus heads, the god with two faces depicted on Roman coins, are united but their gazes are directed outwards? The Janus B is also two-faced: high-performance in the top speed range and safety at the slow speed end are characteristics which have been excellently combined.

Janus B data

Span (m)	18.2
Wing area (m^2)	16.6
Aspect ratio	20
Min/max wingloading kg/m^2	27 to 37
Min sink at 90 km/h (m/sec)	0.70
Glide angle at 110km/h	1:39½
Stalling speed (km/h)	70
Empty weight (kgs)	370
Pay load (kgs)	250
AUW (kgs)	620





FORTY YEARS AGO

After looking at our annual statistics (p24) readers might find this version intriguing. They were unearthed from the World Research Society's Quarterly Review of October 1938 by Alan Roberts of the Buckminster GC.

US AVIATION STATISTICS

The great development of aviation, civil and military, in the United States in the post two decades may be seen in the following officiol statistics, as of September 1, 1938.

Certificates and approvals

Pilot certificates of competency active	21 118
Airline Transport pilots certificates of competency active	1 158
Student pilot certificates active	37 814
Glider pilots certificates of competency active	160
Mechanics certificate of competency active	9693
Student glider pilot certificates active	110
Certified aircraft active	9918
Uncertified aircraft active	1301
Certified gliders active	46
Uncertified gliders active	191
Repair stations holding certificates of competency active	22
Ground instructors' certificates of competency active	80

ANNUAL STATISTICS – OCTOBER 1, 1977 to SEPTEMBER 30, 1978

GLIDING CLUBS	AIRCRAFT				LAUNCHES	HOURS	CROSS-COUNTRY KMS	FLYING DAYS		COURSES		MEMBERSHIP	
	Club 2s	Club 1s	PO	Tugs				Total	Soaring	No.	Pupils	Flying	Non-Flying
ALBATROSS	2	1	3	0	1823	174	140	60	32	0	62	44	14
ANGUS	2	2	2	0	4224	571	0	96	38	0	0	70	10
AQUILA	3	1	6	1	2478	526	780	102	49	0	0	43	12
AVRO	3	1	0	0	3740	360	260	104	39	0	0	250	0
BAC	1	1	0	0	0	0	0	0	0	0	0	20	0
BATH & WILTSHIRE	3	2	19	2	3692	1428	10400	98	55	0	0	108	15
BLACKPOOL & FYLDE	3	3	14	0	3302	1326	200	100	44	0	0	164	0
BORDERS (Milfield)	2	2	7	0	2416	415	500	100	43	0	0	59	6
BRISTOL & GLOUCESTERSHIRE	3	4	26	3	5806	3283	55688	208	137	23	120	233	39
BUCKMINSTER	2	2	14	1	6309	1649	5460	156	66	0	0	103	2
BURTON & DERBY	2	0	6	0	0	0	0	0	0	0	0	80	0
CAIRNGORM	2	0	2	0	1351	311	250	90	56	9	70	20	10
CAMBRIDGE UNIVERSITY	2	5	24	3	6471	2836	28268	200	103	9	50	260	65
CORNISH	2	3	8	0	4989	1034	256	137	58	19	118	82	26
COTSWOLD	3	2	16	0	6272	1558	6000	162	73	1	6	133	28
COVENTRY	3	3	42	4	5840	2739	22250	242	75	20	128	329	26
CRANFIELD	1	2	11	2	1561	660	1500	79	37	0	0	95	0
DEESIDE	3	2	4	2	3046	2285	500	199	93	4	18	95	0
DEFFORD (RSRE)	2	1	0	0	2000	216	0	72	32	0	0	23	0
DERBY & LANCASHIRE	5	3	23	0	7453	2610	4100	197	172	26	199	226	72
DEVON & SOMERSET	2	2	15	1	7393	2007	2245	175	141	7	54	174	35
DONCASTER	3	4	20	2	7598	2405	4600	187	93	0	0	147	6
DORSET	3	3	13	2	2734	1223	200	108	61	0	0	135	82
DOWTY	2	0	9	3	0	0	0	0	0	0	0	57	0
DUMFRIES	1	0	2	0	555	73	New site – Operational from 3.5.78					23	8
DUNKESWELL	2	0	5	2	3770	249	300	118	42	6	48	50	3
EAST SUSSEX	2	1	8	1	4120	487	1730	102	64	2	12	118	35
ENSTONE	2	0	14	1	2810	627	11750	91	53	0	0	64	5
ESSEX	3	1	23	1	8500	2000	0	150	0	26	143	225	12
ESSEX & SUFFOLK	2	1	11	2	0	0	0	0	0	0	0	75	0
GLAMORGAN	0	1	0	0	Included in South Wales return							7	0
GLASGOW & WEST OF SCOTLAND	1	1	0	0	0	0	0	0	0	0	0	54	0
HAMBLETONS	2	2	2	0	2488	900	0	See Cleveland's return				170	0
HEREFORDSHIRE	3	0	20	2	4584	2162	2340	221	132	24	105	130	0
HIGHLAND	1	2	1	0	2279	345	280	101	56	0	0	35	0
IMPERIAL COLLEGE	1	3	2	0	0	0	0	0	0	0	0	88	0
INKPEN	1	1	6	1	0	0	0	0	0	0	0	30	0
KENT	4	2	16	2	10233	0	3138	230	60	31	296	262	30
KIRKNEWTON	1	0	0	0	50	7	60	6	2	0	0	8	0
LAKES	2	2	4	1	2274	494	0	107	42	8	72	56	2
LANARKSHIRE	2	1	1	0	778	0	0	50	5	0	0	34	0
LASHAM	6	0	108	6	29424	6726	61094	304	0	82	272	705	310
LONDON	4	5	57	5	14950	6434	0	0	0	31	238	369	57
MIDLAND	3	4	15	0	10061	3550	6445	215	143	22	290	205	64
NEWCASTLE & TEESSIDE	2	1	4	1	1595	352	600	91	75	0	0	41	10
NORFOLK	3	2	14	2	3978	1794	5605	179	77	14	84	129	22
NORTHUMBRIA	2	1	15	1	4324	674	1200	167	77	14	84	129	22
NORWICH SOARING	0	1	5	1	204	174	2000	45	40	0	0	11	0
OUSE	2	2	13	1	3113	700	6000	87	40	0	0	120	20
OXFORD	2	3	12	0	3586	1126	4295	114	0	0	0	120	6
PETERBOROUGH & SPALDING	2	2	8	1	1200	0	1500	70	0	0	0	64	2
POLISH AFA	1	2	0	0	1200	650	2000	See Lasham returns				25	0
RATTLESDEN	3	2	5	0	967	88	0	35	16	0	0	34	0
RIDGEWELL OATLEY	1	2	3	3	1420	109	0	75	12	0	0	25	4
ROYAL AIRCRAFT ESTABLISHMENT	2	2	5	0	3302	646	1477	144	48	0	0	83	7

ANNUAL STATISTICS – OCTOBER 1, 1977 to SEPTEMBER 30, 1978

GLIDING CLUBS	AIRCRAFT				LAUNCHES	HOURS	CROSS-COUNTRY KMS	FLYING DAYS		COURSES		MEMBERSHIP	
	Club 2s	Club 1s	PO	Tugs				Total	Soaring	No.	Pupils	Flying	Non-Flying
SCOTTISH GLIDING UNION	4	5	20	2	11647	7173	9541	298	219	22	229	317	25
SCOUT ASSOCIATION	1	1	1	0	0	0	0	0	0	0	0	40	0
SHROPSHIRE	0	0	11	1	437	549	4039	61	51	0	0	28	0
SOUTHDOWN	3	3	15	1	6449	1573	6758	164	59	0	0	203	54
SOUTH WALES	2	1	11	1	3017	1143	3800	124	72	5	37	90	12
SOUTH YORKS & NOTTS	2	0	5	0	3910	343	276	98	26	0	0	64	0
STAFFORDSHIRE	1	1	5	0	1358	200	0	75	26	2	16	61	3
STRATFORD ON AVON	3	2	10	2	0	0	0	0	0	0	0	85	0
SURREY & HANTS	0	10	0	0	5316	2159	12848	0	0	0	0	280	71
SWINDON	2	3	12	1	4024	374	3391	166	83	0	0	86	5
TIGER CLUB SOARING	0	0	1	0	122	46	0	17	5	0	0	10	0
TRENT VALLEY	2	2	14	0	5646	1106	3850	97	38	1	16	82	5
TYNE & WEAR	2	0	3	2	1463	365	52	106	8	0	0	26	0
ULSTER	2	1	5	1	1027	570	0	80	47	0	0	32	0
UNIVERSITIES OF GLASGOW & STRATHCLYDE					Included in Lanarkshire return							20	0
UPWARD BOUND	4	0	1	0	3226	322	72	75	18	0	0	18	5
VALE OF NEATH	1	1	2	0	0	0	0	0	0	0	0	18	0
VECTIS (As at January 1, '78)	1	0	0	0	182	54	0	16	12	0	0	25	1
WELLAND	2	0	2	0	1634	138	0	58	26	0	0	25	0
WEST WALES	3	0	1	0	1400	220	300	62	44	0	0	28	0
WOLDS	2	1	8	1	6308	961	2000	158	34	0	0	110	8
WOODSPRING	2	1	4	0	0	0	0	0	0	0	0	110	0
WYCOMBE (AIRWAYS & THAMES VALLEY)	5	9	40	4	12500	10000	10000	288	0	24	90	487	0
YORKSHIRE	2	3	32	2	7650	2177	0	246	203	22	195	256	24
CIVILIAN CLUB TOTALS:	168	140	858	92	289579	89456	402338					8939	1276
ARMY GLIDING ASSOCIATION:													
KESTREL	2	4	1	0	4400	800	5784	88	44	0	0	64	16
SOUTH WEST DISTRICT (Wyvern)	2	4	2	1	5616	1107	7500	90	0	2	24	87	0
ROYAL AIR FORCE GSA:													
ANGLIA	2	2	0	0	2314	295	0	93	25	0	0	52	0
BANNERDOWN	2	3	4	1	0	0	0	0	0	0	0	64	0
BICESTER	10	20	0	6	21582	8419	27391	308	149	15	330	700	0
CHILTERNS	3	3	2	0	2809	501	2310	102	54	0	0	48	3
CLEVELANDS	4	5	9	3	4015	2368	9875	144	82	0	0	120	0
CRANWELL	4	3	3	0	4749	796	958	0	25	0	0	40	1
EAST MIDLANDS	2	3	1	0	3308	512	500	90	35	0	0	85	0
FENLAND	2	2	2	0	0	0	0	0	0	0	0	90	0
FOUR COUNTIES	3	4	7	0	7245	1708	8720	115	52	0	0	67	31
FULMAR	2	2	2	0	4457	567	119	88	32	0	0	60	0
GREYLAG	2	0	0	0	1096	92	0	52	1	0	0	19	0
HUMBER	2	2	5	0	3646	516	160	90	32	0	0	62	2
MAWGAN VALE	2	1	3	0	0	0	0	0	0	0	0	43	0
WREKIN	2	3	5	1	4584	844	3118	118	0	0	0	100	0
ROYAL NAVAL GSA:													
CULDROSE	3	2	2	2	2567	425	228	77	22	1	17	55	0
HERON	2	3	3	2	1977	697	4561	84	41	1	14	45	0
PORTSMOUTH NAVAL	4	3	4	4	2757	898	1523	0	0	1	14	165	19
SERVICE CLUB TOTALS:	55	69	55	20	77122	20545	68637					1966	72
CIVILIAN CLUB TOTALS:	168	140	858	92	289579	89456	402338					8939	1276
GRAND TOTAL:	223	209	913	112	366701	110001	470975					10905	1348

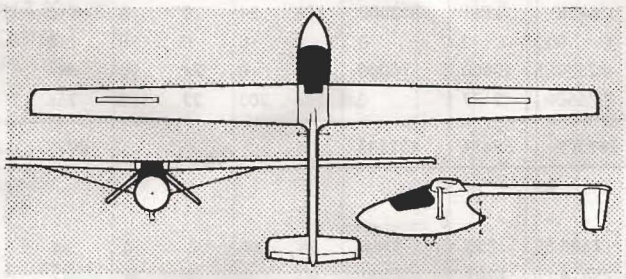
SAILPLANES 1979

Compiled by ANDREW COATES



ASW-20

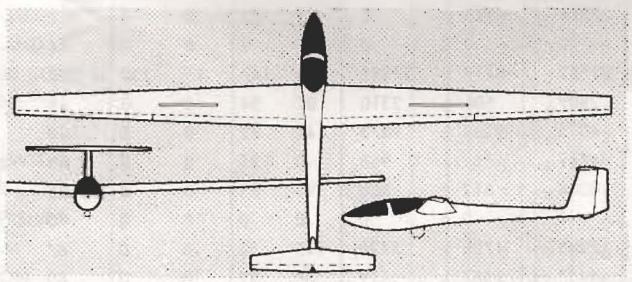
The following tables present (in alphabetical order) the majority of sailplanes at present in, or about to go into production. The figures included give a guide to the sailplanes but for a complete picture, careful reading of the Pilot's manual is essential. In particular the weight of maximum waterballast should be checked against the maximum all up weight. Stall speed is given for minimum weight because of the jettison of water before landing. Performance figures are in most cases calculated. Prices have not been included and anyone interested should write to the manufacturers or their agents. This is the fourth S&G review of sailplanes, the first being published in February, 1975, p24, the second in February, 1976, p18, and the third in February, 1978, p24.



American Eaglet

Manufacturer	AmEagle Corporation
Span (m)	10.97
Wing area (m^2)	6.69
Aspect ratio	18
Wing section	Wortmann
Wing loading (kg/m^2)	25
Empty weight (kg)	73
AUW (kg)	168
Stall speed (km/h)	63
Max speed (km/h)	185
Min sink at 65km/h (m/sec)	0.76
Best glide at 83km/h	27
Power plant	McCulloch MC 1018
Rate of climb (m/sec)	2.29
Take-off distance (m)	198

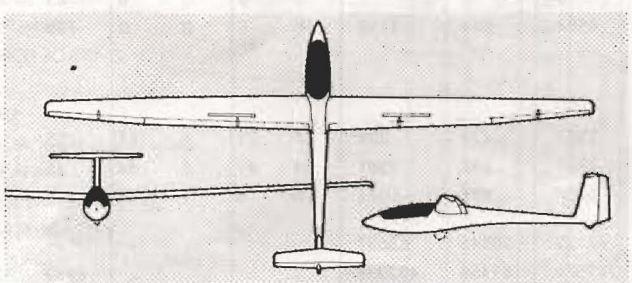
Self-launching single-seater for amateur construction, aluminium and glass-fibre. Spoilers on upper surfaces. Retractable wheel and folding propeller.



Astir Speed 2

Manufacturer	Burkhart Grob
Span (m)	15
Wing area (m^2)	11.47
Aspec ratio	18.4
Wing section	Eppler
Wing loading (kg/m^2)	5
Empty weight (kg)	265
AUW (kg)	515
Waterballast (kg)	115
Stall speed (km/h)	64
Max speed (km/h)	270
Min sink at 75km/h (m/sec)	0.60
Best glide at 120km/h	41.5

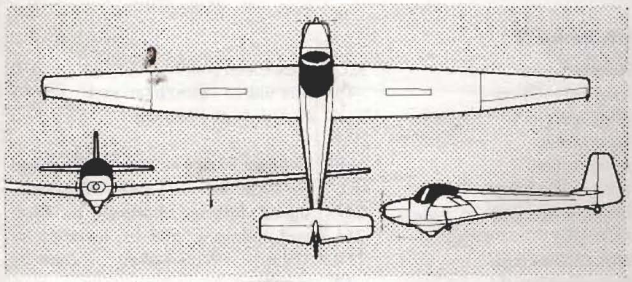
As a result of flight tests further constructional changes introduced to this 15m sailplane. Fuselage of smaller frontal area and fitted with DG-200-type canopy. "Elastic" control surfaces.



ASW-20F

Manufacturer	Centrair
Span (m)	15
Wing area (m^2	10.5
Aspect ratio	21.43
Wing section	Wortmann
Wing loading (kg/m^2)	43
Empty weight (kg)	250
AUW (kg)	454
Waterballast (kg)	120
Stall speed (km/h)	65
Max speed (km/h)	265
Min sink at 73km/h (m/sec)	0.60
Best glide at 100km/h	43

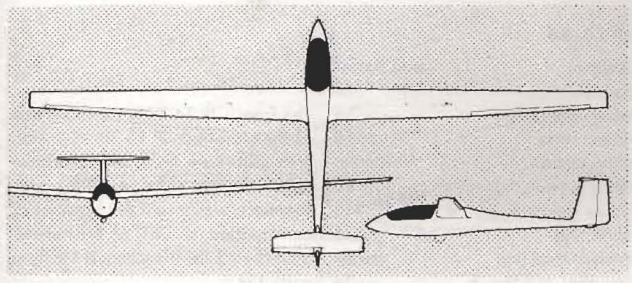
Suffix "F" for French, constructed under licence, to reduce delivery delays. Identical to Schleicher version but with improved waterballast and wheel brake systems. Unflapped ASW-19F also available.



AVo 68 Samburo

Manufacturer	Alpla-Werke	Min sink at 75km/h (m/sec)	1.04
Span (m)	16.68	Best glide at 90km/h	22
Wing area (m^2)	20.7	Power plant	Limbach SL 1700 EI
Aspect ratio	13.6	Rate of climb (m/sec)	1.9
Wing section	Gottingen	Take-off distance (m)	205
Wing loading (kg/m^2)	33		
Empty weight (kg)	487		
AUW (kg)	685		
Stall speed (km/h)	60		
Max speed (km/h)	165		

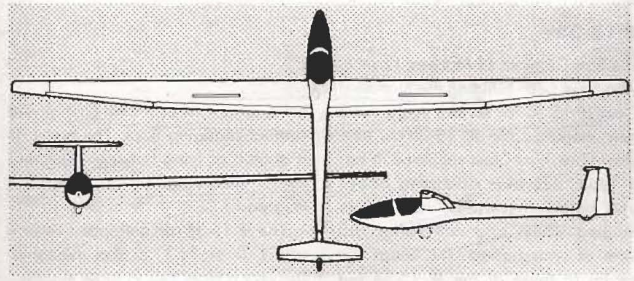
Two-seater training and touring motor glider. Mixed construction. Powered by 68hp engine driving two-blade Hoffmann variable-pitch propeller.



Cirrus 78

Manufacturer	Lanaverre Industrie	Max speed (km/h)	220
Span (m)	15	Min sink at 75km/h (m/sec)	0.66
Wing area (m^2)	10	Best glide at 90km/h	38.5
Aspect ratio	22.5		
Wing section	Wortmann		
Wing loading (kg/m^2)	39		
Empty weight (kg)	215		
AUW (kg)	390		
Waterballast (kg)	80		
Stall speed (km/h)	62		

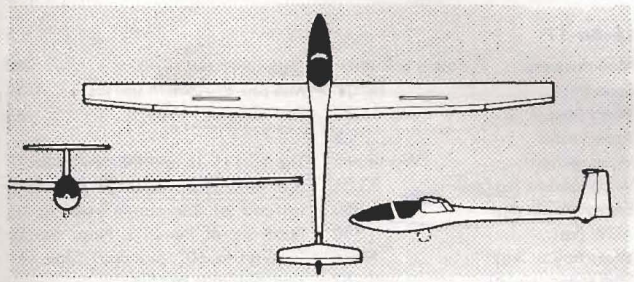
Cirrus 78, now fitted with the Mini Nimbus fuselage and fixed tailplane and elevator. Production of Std Cirrus by Schempp-Hirth ceased, but continues under licence by a French company in Bordeaux.



DG-200-17

Manufacturer	Glaser-Dirks	Max speed (km/h)	270
Span (m)	17	Min sink at 80km/h (m/sec)	0.53
Wing area (m^2)	10.57	Best glide at 110km/h	44.6
Aspect ratio	27.34		
Wing section	Wortmann		
Wing loading (kg/m^2)	40		
Empty weight (kg)	246		
AUW (kg)	423		
Waterballast (kg)	None		
Stall speed (km/h)	60		

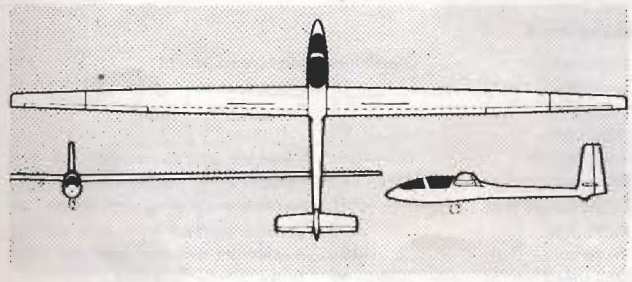
The 17m version of the DG-200 with detachable 6kg wingtips to convert to 15m Class. DG-200-17 and Acroracer have systems for waterballast (130kg) only for use when converted to 15m sailplanes.



DG-200-Acroracer

Manufacturer	Glaser-Dirks	Max speed (km/h)	290
Span (m)	13.1	Min sink at 85km/h (m/sec)	0.07
Wing area (m^2)	9.25	Best glide at 106km/h	37
Aspect ratio	18.6		
Wing section	Wortmann		
Wing loading (kg/m^2)	38.9		
Empty weight (kg)	237		
AUW (kg)	360		
Waterballast (kg)	None		
Stall speed (km/h)	62		

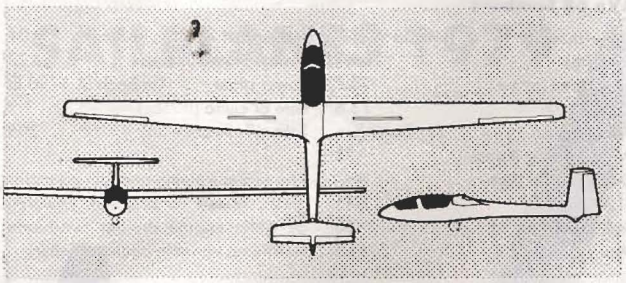
All glass-fibre, fully aerobatic. Available with detachable wingtips fitted with ailerons converting it into a 15m Class sailplane and giving additional weight of 5kg.



Jantar 2B

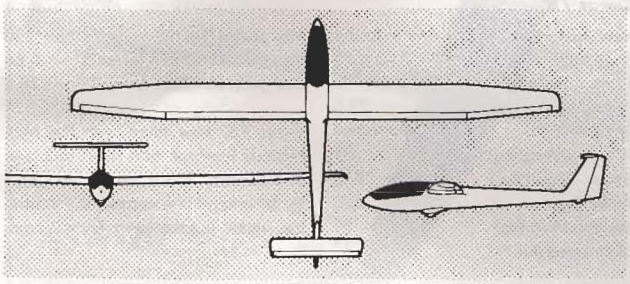
Manufacturer	SZD	Max speed (km/h)	280
Span (m)	20.15	Min sink at 75km/h (m/sec)	0.45
Wing area (m^2)	14.25	Best glide at 105km/h	48
Aspect ratio	29.2		
Wing section	Wortmann		
Wing loading (kg/m^2)	45.3		
Empty weight (kg)	355		
AUW (kg)	645		
Waterballast (kg)	170		
Stall speed (km/h)	65		

Improved version, several changes include: wings raised by 12.5cm and incidence lowered by 1.5°. New wing root fairing. Modified elevator trimming. Hinged canopy. Waterballast capacity increased.



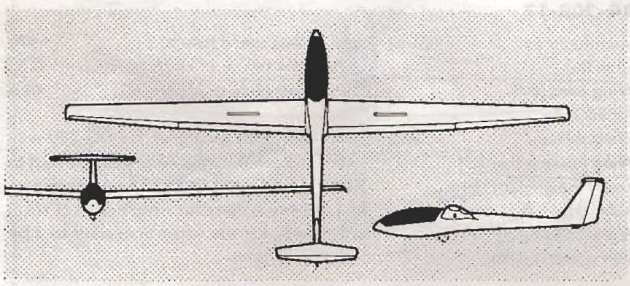
Std Jantar 2

Manufacturer	SZD	Max speed (km/h)	310
Span (m)	15	Min sink at 78km/h (m/sec)	0.65
Wing area (m^2)	10.66	Best glide at 110km/h	39.5
Aspect ratio	21.1		
Wing section	NN-8	Changes in new version: wings raised by 10cm and wing root fairing redesigned, fuselage shortened by 40cm and tailplane and fin lowered by 10cm. Waterballast capacity increased.	
Wing loading (kg/m^2)	48.8		
Empty weight (kg)	247		
AUW (kg)	366		
Waterballast (kg)	150		
Stall speed (km/h)	72		



JP 14-34

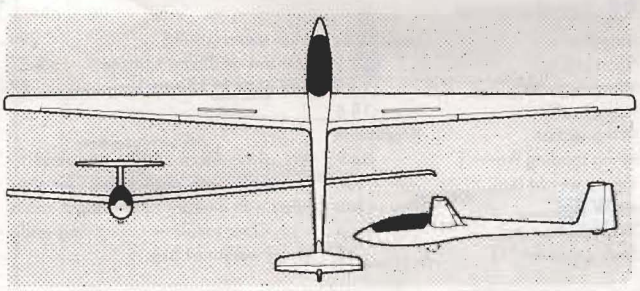
Designer	Jean Pottier	
Span (m)	14	
Wing area (m^2)	13	The French JP 14-34 is the kit version of the glass-fibre JP 15-38. All-metal, with glass-fibre nose section, single-seater training sailplane with a performance similar to K-6. In process of construction at CET of Noend-les-Mines near Lille, it is scheduled to fly in early 1979.
Aspect ratio	15	
Wing section	Wortmann	
Wing loading (kg/m^2)	25	
Empty weight (kg)	215	
AUW (kg)	325	
Waterballast (kg)	None	
Best glide at 85km/h	34	



JP15-38v

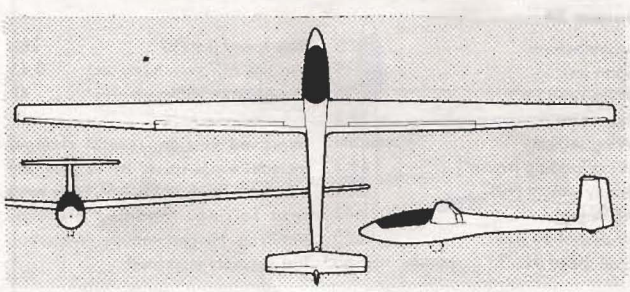
The firm Carmam of Moulins, France, who have been building the Standard Class JP 15-36 for several years, have now marketed the JP 15-38v, a new glass-fibre 15m Class sailplane. It has a T-tail, airbrakes operating above and below the wings, retractable landing wheel and can carry 100 litres of waterballast. The wings are similar to those of the JP 15-36 but have a new Wortmann profile and camber-changing flaps. The best L/D is quoted as lying between 42:1 and 43:1, according to a report in *Flugsport*.

The JP 15-38, an unflapped version with L/D of 36:1, is also available. Delivery is from two to three months.



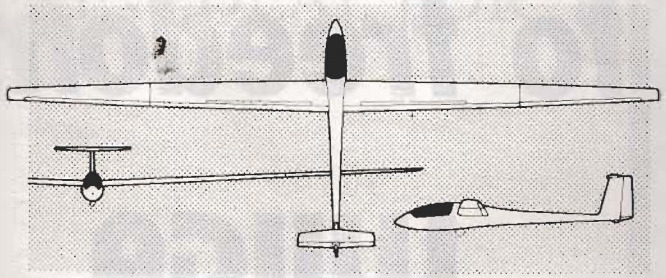
LS-3a-17

Manufacturer	Rolladen-Schneider	Max speed (km/h)	200
Span (m)	17	Min sink at 70km/h (m/sec)	0.50
Wing area (m^2)	11.22	Best glide at 100km/h	43
Aspect ratio	25.8		
Wing section	Wortmann	The 15m LS-3a and the new LS-3a-17 are fitted with ailerons and flaps instead of the single root to tip flaperons of the LS-3. Flaps can be lowered to 60°. Standard Class version available as LS-4.	
Wing loading (kg/m^2)	33.86		
Empty weight (kg)	250		
AUW (kg)	380		
Waterballast (kg)	None		
Stall speed (km/h)	62		



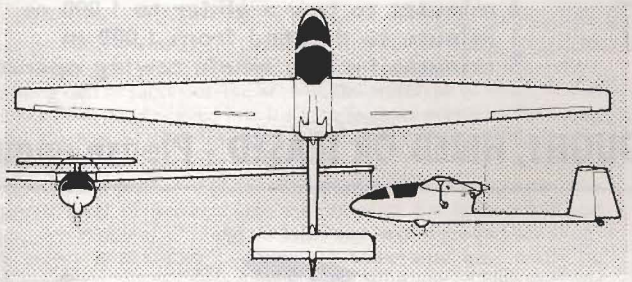
Mosquito B

Manufacturer	Glassflügel	Max speed (km/h)	250
Span (m)	15	Min sink at 80km/h (m/sec)	0.58
Wing area (m^2)	9.8	Best glide at 114km/h	42
Aspect ratio	23		
Wing section	Wortmann	Changes introduced into this new version: wing/fuselage junction flaps incorporating wing root fairing. Improved cockpit with new canopy mechanism and heel-operated wheel brake. Smaller tailplane.	
Wing loading (kg/m^2)	46		
Empty weight (kg)	237		
AUW (kg)	450		
Waterballast (kg)	120		
Stall speed (km/h)	65		



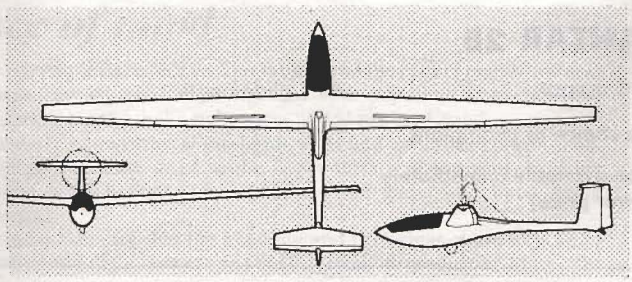
Nimbus 2c

Manufacturer	Schempp-Hirth	Max speed (km/h)	270
Span (m)	20.3	Min sink at 75km/h (m/sec)	0.48
Wing area (m^2)	14.4	Best glide at 115km/h	49
Aspect ratio	28.6		
Wing section	Wortmann	Carbon-fibre wings fitted with flap-brake system. Fixed carbon-fibre tail-plane and elevator. Mini Nimbus C also available with carbon-fibre wings. Reduced empty weight of 218kg and increased AUW of 500kg.	
Wing loading (kg/m^2)	45		
Empty weight (kg)	329		
AUW (kg)	650		
Waterballast (kg)	240		
Stall speed (km/h)	62		



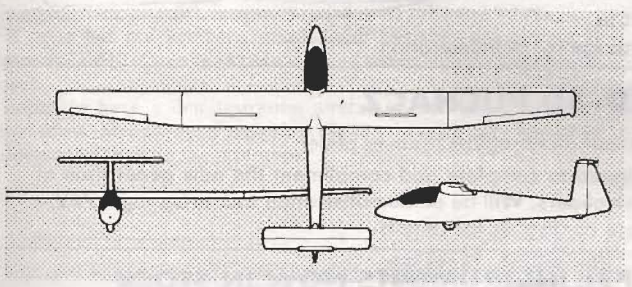
Ogar

Manufacturer	SZD	Min sink at 72km/h (m/sec)	0.96
Span (m)	17.5	Best glide at 100km/h	27.5
Wing area (m^2)	19.1	Power plant	Limbach SL 1700 EC
Aspect ratio	16	Rate of climb (m/sec)	2.8
Wing section	Wortmann	Take-off distance (m)	200
Wing loading (kg/m^2)	36.6		
Empty weight (kg)	470	Two-seater training and touring mator glider of mixed construction, powered by 68hp engine driving a 1.5m dia Hoffmann pusher propeller.	
AUW (kg)	700		
Stall speed (km/h)	68		
Max speed (km/h)	180		



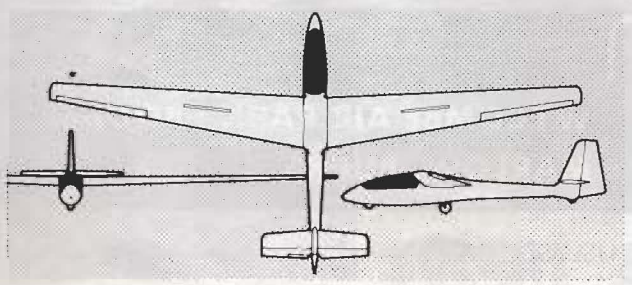
PIK 20E

		Max speed (km/h)	285
Manufacturer	Eiri Avion	Min sink at 77km/h (m/sec)	0.61
Span (m)	15	Best glide at 117km/h	41
Wing area (m^2)	10	Power plant	Rotax 503
Aspect ratio	22.5	Rate of climb (m/sec)	4.0
Wing section	Wortmann	Take-off distance (m)	300
Wing loading (kg/m^2)	47		
Empty weight (kg)	290	Self-launching 15m Class sailplane. Based on PIK 20D. Manually operated retractable 43hp engine with electric starter. Steerable tailwheel.	
AUW (kg)	470		
Waterballast (kg)	120		
Stall speed (km/h)	66		



Pirat C

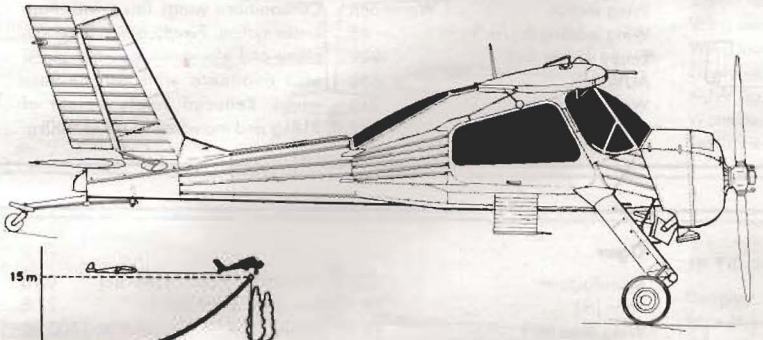
Manufacturer	SZD	Max speed (km/h)	250
Span (m)	15	Min sink at 75km/h (m/sec)	0.70
Wing area (m^2)	13.8	Best glide at 84km/h	34
Aspect ratio	16.3		
Wing section	Wortmann	New nose section with roomy cockpit and larger canopy. Underside rein-forced with thick glass-fibre replacing nose skid. Landing wheel moved for-ward. Improved ventilation system. Glass-fibre ailerons.	
Wing loading (kg/m^2)	26.8		
Empty weight (kg)	255		
AUW (kg)	370		
Waterballast (kg)	None		
Stall speed (km/h)	60		



Puchacz (Night Owl)

Manufacturer	SZD	Max speed (km/h)	220
Span (m)	16.67	Min sink at 75km/h (m/sec)	0.70
Wing area (m^2)	18.16	Best glide at 96km/h	30
Aspect ratio	15.3		
Wing section	Wortmann		
Wing loading (kg/m^2)	30.3	Successor to Bocian, the two-seater Puchacz of glass-fibre construction with fabric-covered rudder. Tandem wheels with shock-absorber on rear wheel. Expected in England in spring.	
Empty weight (kg)	331		
AUW (kg)	550		
Watterballast (kg)	None		
Stall speed (km/h)	60		

300 feet to freedom



WILGA

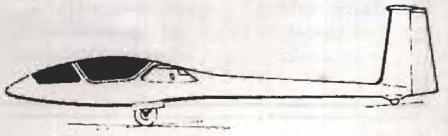
4 minutes to tow a glider to 1,000 m
1 minute to descend from 1,000 m
5 minutes for the whole towing operation.

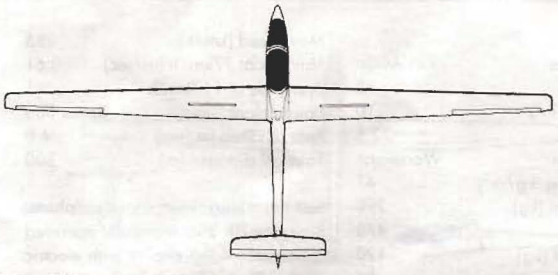
PZL-WILGA MAY BE BOUGHT, HIRED OR LEASED - Please enquire

SZD – JANTAR STANDARD '2'

40:1 Delivered with full set of instruments, dust covers and technical documentation.

Two available ex-stock





JANTAR 2B

20·5 m span 48:1 glide angle

The choice of champions.

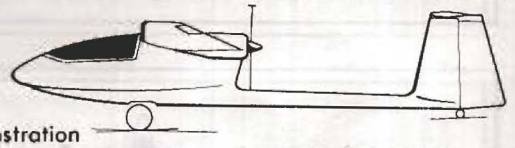
One available immediately (lower price)

OGAR

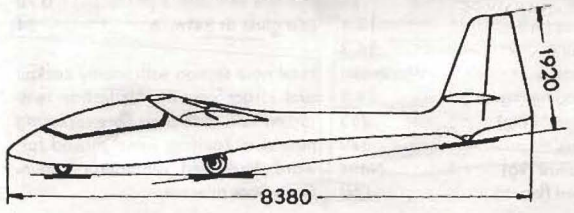
Two seat training and touring motor glider

Glide angle 27·5:1 Limbach 68 h.p. engine

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SZD-50 PUCHACZ

Two seat all fibreglass training glider.

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A NEW DEAL FOR THE INSTRUCTOR



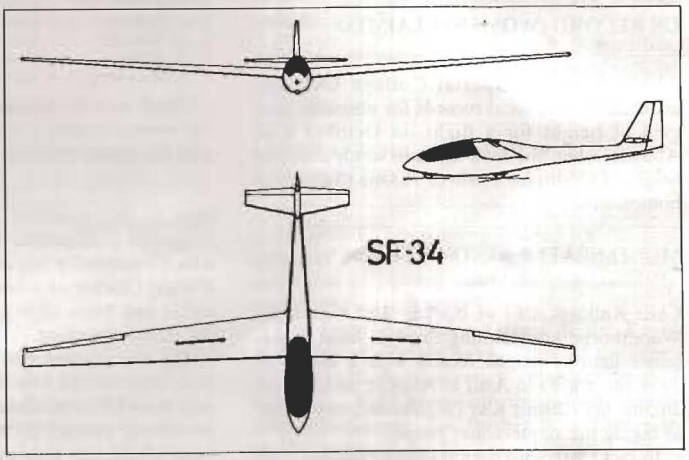
PETTER ROSS

Scheibe's Latest – A Glass-Fibre Two-Seater

Scheibe are no strangers to the world of two-seater gliders for gliding clubs. There are probably as many Bergfalke III and IV two-seater gliders to be found in European gliding clubs as any other make and it is therefore not surprising that its successor, the SF-34H, the prototype of which flew in late October 1978, has designed into it all the features necessary for a long and useful life, plus all those little points which make such a difference to the hard working club instructor.

Scheibe aimed to produce a glider of minimum size commensurate with the required level of performance and comfort for both pupil and instructor, with excellent all round visibility and ease of ground handling.

When empty it balances on the main wheel and may easily be manoeuvred single handed on a hard surface. With one or both cockpits occupied the nose is supported by the front wheel, giving easy access to the nose hook (for aerotow) and the belly hook for winch launches.



Peace of mind

The reclining seats reduce cockpit fatigue and the rudder pedals and seat back angle may be adjusted in flight for both pupil and instructor. The single canopy, hinged to the right, gives added peace of mind.

Particularly noteworthy is the lightweight and generous cockpit load. Powerful airbrakes are fitted to the upper surface of the wings and the instrument panel has adequate space for full glider and blind flying instruments.

First indications are that the handling and performance are well up to expectations and flight tests are on schedule to allow production to start for delivery in late summer 1979.

Although this is Scheibe's first venture into GRP construction, it is evident that lessons learned by other manufacturers have been applied and we may expect the same practical approach in this new material which they have displayed in their earlier designs in wood, steel tube and fabric.

A firm price has not yet been determined, but they are aiming at approximately DM10 000 ex works Munich and the provisional order book is now open.

It is hoped to have a demonstration aircraft in the UK as soon as production starts. Meanwhile if anyone is visiting Munich they would be most welcome to a flight in the prototype.

Technical data – SF-34H

Span (m)	15.8
Wing section	FX61-184/FX60-126 Wortmann
Wing area (m^2)	14.8
Aspect ratio	17
Max wing loading (kg/m^2)	33
Empty weight (kg)	290
Max take-off weight (kg)	490
Best glide at 95km/h	1:35
Min sink at 75km/h (m/sec)	0.7
Max speed (km/h)	250
Max cockpit weight (kg)	200
Seating – one plus one in tandem	



SOLENT SAILPLANES

MANUFACTURERS OF SUPER DE-LUXE RADIO CONTROLLED SAILPLANE KITS CAPABLE OF GIVING THE AVERAGE FLIER TOP COMPETITION PERFORMANCE.

The Five Metre "LS-1c" seen here is just one of the many Super Scale Sailplanes available.

We now have a full range of completely finished scale sailplanes ready for covering and finishing only, or semi-finished Kits with an Epoxy Glass Fuselage, Foam wings and Stab with Air-brakes already installed (you have to skin the foam cores with the Balsa sheeting provided).

The following are all available now in $\frac{1}{4}$ and $\frac{1}{3}$ scale. "LS-1c" – "JANTAR-1" – "ASW-17" – "JANUS" – "MOSQUITO" – "GLASFLUGEL-604" – "SB-10" – "SALTO" – "KESTREL" – "DG-200" – "DG-100".

AVAILABLE FROM JANUARY '78: All Glass Machines $\frac{1}{4}$ scale "ASW-20" – "ASTIR-CS" – "STD. JANTAR" – "DG-200" – "SB-10". $\frac{1}{3}$ scale "SALTO-H101" – "SB-9" (7 metres 33!!).

SOLENT SAILPLANES 11 CARLTON PLACE SOUTHAMPTON, HANTS. TEL: 31420

BGA AND GENERAL NEWS

UK RECORD (WOMEN) CLAIMED

Alison Jordan (Imperial College GC) has claimed the UK local records for absolute, and gain of height for a flight on October 8 at Aboyne, when she took an Astir to an absolute height of 8564m for a gain of 7833m. (Subject to homologation).

MULTI-SEATER RECORD CLAIM

Chris Rollings, CFI of Booker, and Katherine Woodthorpe are claiming the UK local multi-seater gain of height record with a climb of 7469.5m in a Twin Astir at Aboyne on October 26, the day Alistair Kay (Std Jantar) came near to taking the single-seater record.

In fact Chris said they reached 8384.1m with a gain of 7652.4m but the barograph stopped recording before this point. They scratched around a while before making contact with the first of two distinct wave systems used during the flight of nearly five hours.

Once at 4878m, they climbed steadily at 4 to 6kt in the upper wave system and only broke off through lack of oxygen, as did Alistair when at more than 8384m asl. (Subject to homologation).

NATIONAL LADDER WINNERS

John Glossop (Cambridge University GC) is top of the Open Ladder to win the Enigma trophy and Tequin Cockett (Thames Valley) heads the Club Ladder to gain the L. du Garde Peach trophy.

In terms of numbers, the entry is very similar to last year but the scores are significantly less. Once again, Coventry GC had the largest entry of any club with Derby & Lancs a close second.

Open Ladder

Leading Pilot	Club	Pts	Fts
1 J. D. J. Glossop	Cambridge Univ	5767	4
2 L. Beer	Thames Valley	5654	4
3 G. S. Neumann	Cambridge Univ	5650	4
4 J. Cardiff	London	5603	4
5 G. D. A. Green	SGU	5410	4
6 D. Hodsman *	Bristol & Glos	5096	4

Club Ladder

Leading Pilot	Club	Pts	Fts
1 T. Cockett	Thames Valley	2697	4
2 A. B. Crease	Imperial College	2170	2
3 A. Brierley	Midland	1848	4
4 G. Wills	Coventry	1824	3
5 C. Thomas	Coventry	1813	2
6 R. Christey	London	1699	3

Mike Garrod has handed over as National Ladder Steward to Mike Randle of 1 Bell Close, Cassington, Oxford, after eight years in office. Mike Randle has paid tribute to this great contribution in the first of the new season's Ladders.

He writes: "I am sure all who participate in the National Ladder would wish me to express their gratitude to Mike Garrod for his efforts in running it so efficiently. He had handed over to me a meticulously kept file, so any fumbles which occur from now on will be entirely of my own making."

Most of the entries for this first list have come from the Essex GC due to their successful visit to Aboyne when the best flight was a gain of 25 800ft by Mike Throssell.

Open Ladder

Leading Pilot	Club	Pts	Fts
1 G. Corbett	Essex	3310	2
2 M. Throssell	Essex	3090	2
3 D. Appleby	Essex	2880	2
4 A. Manwaring	Essex	2690	2

There were no entries for the Club Ladder.

AIR TRAFFIC ZONES - AN AMENDMENT

Due to the deadline demands inherent in magazine publication, the Rules of the Air to which I referred in my article in the August issue ("Hang Gliding and Aerodrome Traffic Zones," p171) had been slightly amended by the time the article appeared.

The amendment is to Rule 34. The amended Rule removes the absolute prohibition on entry into the ATZ of an uncontrolled aerodrome that previously existed. So a powered aircraft, or a hang glider, can now penetrate a gliding club's ATZ without permission (and, of course, *vice-versa).* The BGA is looking into ways of protecting any gliding club which may be adversely affected, from the safety point of view, by this change.

My own view is that the change makes little difference to most clubs, and indeed that it may be beneficial to glider pilots overflying airfields where power flying takes place. The change is not in any case a licence to blunder into other people's airspace. For example, Rule 34(b)(a) requires aircraft to conform to the pattern formed by other aircraft in the ATZ and the general rules of "good airmanship" continue to apply. So a circuit pattern on a flat site, or the "beat" on a ridge would have to be conformed with, including shape (*ie* the size of the circuit) height and speed. It would for example be a breach of the Rule for an air taxi at 200kt to cross the ridge at (say) Great Hucklow 1000ft above the site. I cannot see how hang gliders could conform with a ridge soaring pattern except by keeping clear. This happens also to be the general attitude of NATS.

The right to penerate an ATZ for the purpose of landing (subject to conformity with the pattern) is unchanged.

Lionel Alexander
Member of the BGA Executive Committee

MAN-POWERED FLIGHT

The Royal Aeronautical Society's Committee for Man-Powered Flight announce that the £100 000 Kremer Competition for the first flight from England to France is now officially open and more than 250 applications for the rules have already been received.

The whole subject of the competition and the optimisation of aircraft design and human power will be discussed at a symposium arranged by the Society for February 6.

For further details and copies of the rules contact the Secretary of the Man-Powered Aircraft Group: Mr K. W. Clark, 4 Hamilton Place, London W1V 0BQ. Tel. 01-499 3515.

TUG RELEASE CONTROLS

As the result of two accidents fatal to tug crews, the probability must now be assumed to exist that some release controls may become difficult to reach, in cases of emergency. In particular, under negative *g* conditions, which might well arise in such glider/tug related accidents, access to release controls on the floor (PA-18 Cubs/ Citabrias, etc) or between the seats (Auster variants) might well become impossible. Furthermore, upper body restraint may have the effect of reducing pilot mobility, and release controls located in extreme positions will then become more difficult to operate.

a) There is one preferred position for release controls - adjacent to the throttle control.
b) Alternatively, a release arrangement in the roof, where possible, would be acceptable. (Foot operated devices may be retained, but an alternative, as in (a) or (b) should be installed as soon as possible).

The BGA and CAA have agreed that action under minor modification procedure (AD FRM 261), should be initiated forthwith to elimate the hazard described in para 1.

The Design Requirements for such installations are contained in BCAR Section K, and were repeated to BGA Technical Officers and Inspectors in TNS 6/7/78.

In case of queries, please contact Mr E. Neidermeyer, CAA, Redhill 65966.

The responsibility of initiating this action lies with the owner/operator!

R. B. Stratton,
BGA Technical Officer.

COACHES' THIRD CONFERENCE

Bill Scull, our Senior National Coach, and Chairman of this year's conference, provided a meticulously prepared "package" for discussion during the weekend of October 27-29, which was partly held at Lasham and partly at a Basingstoke Hotel. Those present, all members of Committees in their own National Aeroclubs, were:

Denmark	–	Ole Didriksen.
Finland	–	Mikko Holma, Jaakko Kaskia.
Germany	–	Hans Held, Wolfgang Politt, Fred Weinholtz.
Holland	–	Jan Jansen.
Norway	–	Vidar Halvorsen.
Sweden	–	Lennart Stahlfors.
UK	–	Bill Scull (Chairman), Brian Spreckley, (Part-time), Vic Carr, Arthur Doughty, John Williamson.

Starting and finishing at noon (from Friday to Sunday) there were no fewer than nine working sessions on the agenda. They covered all aspects on flying instruction, accident prevention and analysis, changes in gliding since the last conference (1976), club management, airspace and a number of other allied subjects. Add to this breaks for meals, etc, where yet more "shop" was discussed, the weekend managed to finish up as a most interesting and stimulating occasion. No doubt it will take those who were

present rather more than a weekend to digest all the matters which came under review.

In the short time available, Bill had managed to squeeze in a visit, albeit short, to what was termed a "typical" British Gliding Club. Although the weather was foul, members of the Southdown GC had taken great trouble to make their visitors welcome, and a well prepared short "illumination" was given by Jim Rochelle (club Secretary) to show the workings of an average club. In contrast to this, Wally Kahn had outlined the history and present set up of a large conglomerate such as Lasham, on the Friday evening.

One of the perhaps most vivid impressions delegates took away had, in fact, nothing to do with the conference but with our freedom, which in Britain we take for granted. At the start of the first session at Lasham one of Dan Air's Boeings took-off, causing minimum delay to the gliding which was in progress at the time. Our visitors rushed out to have a look at this, while the Brits hardly noticed, and only paused for a moment, because of the noise. They could hardly believe that a "happening" such as this was still possible in this day and age, and they were clearly very impressed with the "no fuss" situation. The head of the German Flight Safety Information, Wolfgang Politt, said that for a thing like this to occur in Germany they would have to mobilise umpteen ministerial and aviation departments, and probably even then meet with a refusal.

It would take too much space to go into the details of the discussions, suffice it to say here, that each session produced many interesting questions and answers, in which all present took an active part, guided and chaired by Bill Scull in a most professional manner.

It showed clearly that international conferences of this type have on offer a tremendous amount of "know how", with useful information and ideas which can be followed up by individual countries. Unfortunately they cost money. This time, as the host country, it probably cost the BGA quite a lot, but in my view, so long as we can learn and pass this knowledge on for the benefit of all pilots in this country, and no doubt our Coaches will see to that, it is money well spent, and we should continue to partake in these events as and when they are arranged.

I feel sure that had this conference been held in public, so that those interested could have seen and listened to one of the BGA Committees at work, they would have agreed with the sentiments expressed by the delegates, that through work of committees such as the one they had attended, the BGA is pursuing the right approach.

* * *

On the Saturday evening, Roger Barrett, BGA Chairman, attended a dinner laid on for the delegates. It gave the visitors from various BGA Committees and clubs (mainly Lashamites), a chance to talk to our guests.

Rika Harwood.

IMPORTED GLIDERS

Purchasers of imported gliders are reminded that the export C of A of the country of origin must be exchanged for one of the airworthiness documents listed in Para 3.2 of the BGA Operational Regulations before flying at a club site.

In the usual case when a BGA C of A is required the glider must be inspected by an approved inspector who will ensure, as far as possible, that it is correctly assembled, that controls, etc, are properly lubricated and have the correct travels as stated in the flight manual, and that any additional instrumentation and equipment is properly installed. If the instrumentation and equipment differ significantly from those included in the manufacturer's weighing, the new empty weight and CG position must be obtained by weighing or calculation after any adjustment of fixed ballast recommended by the flight manual.

Application for a BGA C of A should be made on Form 267, with details of the new empty weight and CG position, and enclosing copies of the export C of A and the manufacturer's inspection documents. The fee is £8.64 including VAT.

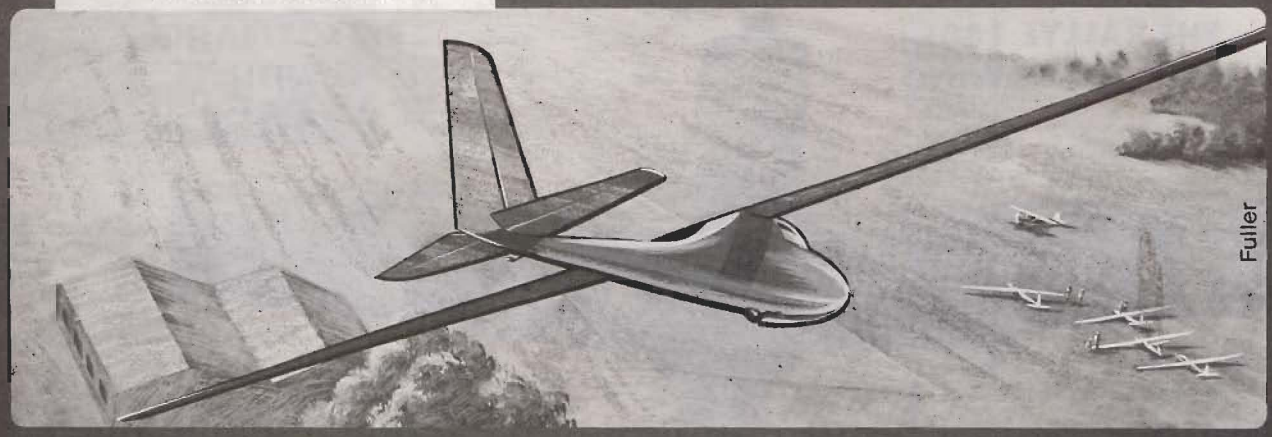
R. B. Stratton,
BGA Technical Officer.

LIGHT AEROPLANE DESIGN COMPETITION

A prize of £2000 is being offered for the best design of a light aeroplane suitable for training and club use which could be commercially manufactured in Britain.

The Light Aeroplane Group of the Royal Aeronautical Society have launched the competition in the hope of encouraging a renewal of interest in light aeroplane technology, design and manufacture. For further details write to the Secretary of the Society, 4 Hamilton Place, London W1V 0BQ.

BGA WEEKEND



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CHURCHILL AWARD

Once again we invite nominations for a gliding project to capture the Churchill Award for 1979. This annual award of £100 is available to individual pilots for organised projects of some kind of research into gliding or related subjects such as meteorology.

Full details and entry forms are available from the BGA office and the closing date for receipt of entries is May 31.

LET'S KNOW WHERE YOU ARE

There are occasionally complaints from readers that they don't know where the various clubs are positioned. We did do a "Directory of Club Sites" for the February 1977 issue, p36, but there have been changes since then.

The simplest thing of all would be for club news contributors to give their site name when they send in their next report and this information can be incorporated in the heading, much in the same way as we do for most of the Service clubs.

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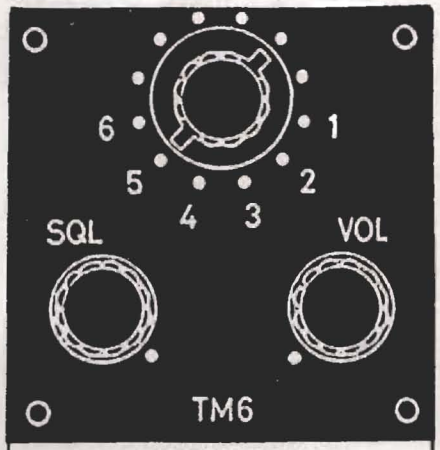
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Tel. 0653 2469

NEW ANGLO-FRENCH AGREEMENT

Issoire Aviation of France have appointed Soaring Equipment of Ashby Lodge, Daventry, Northants (Tel. Daventry 3725) their sole sales agent for the UK and Eire. The agreement covers the E78 Silene side-by-side, two-seater, high-performance sailplane and the single-seater D77 Iris, both of glass-fibre construction. It includes variants of both currently under development. Of particular interest will be the D77 Iris DIY kit which should stimulate a healthy response from the growing band of home-build enthusiasts within UK gliding.

The Directors of Soaring Equipment are Peter Taylor and Bob Neill together with their wives Joan and Jill. The Taylor family currently fly from Husbands Bosworth and the Neill's from the Long Mynd. Both Peter and Bob have long and close associations with many aspects of aviation. Their paths first crossed in the early 1950s when they flew together as Fleet Air Arm pilots. Both started gliding in 1949.

Issoire Aviation is a new company formed by Siren, d'Agenton-sur-Creuse who bought the former Wassmer facilities at Issoire aerodrome. The factory is being extended and a considerable financial investment has been made by Siren in new tooling and equipment under the Directorship of Phillipe Moniot, the well known and respected sailplane designer and soaring enthusiast.



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Gliding Certificates

ALL THREE DIAMONDS

No.	Name	Club	1978
92	S. J. Easton	Norwich	6.10
93	D. D. Carraw	Surrey & Hants	16.10
94	D. H. G. Ince	Lasham GS	4.10

DIAMOND GOAL

No.	Name	Club	1978
2/886	J. R. Wiseman	Heron	3.9
2/887	G. C. Metcalfe	Surrey & Hants	4.9

DIAMOND HEIGHT

No.	Name	Club	1978
3/358	Alison Jordan	Imperial College	20.9
3/359	S. J. Easton	Norwich	6.10
3/360	C. K. Lewis	Surrey & Hants	4.10
3/361	E. Corbett	Essex	6.10
3/362	E. J. F. Lusted	Airways	6.10
3/363	A. O. Harkins	Wyvern	8.10
3/364	P. J. Richie	Kestrel	5.10
3/365	J. E. Morris	Lasham GS	4.10
3/366	D. D. Carraw	Surrey & Hants	16.10
3/367	G. C. Metcalfe	Surrey & Hants	9.10
3/368	D. J. Whyte	Kestrel	8.10
3/369	J. M. W. Howlett	Highland	26.9
3/370	N. F. Collier	Highland	5.10
3/371	G. K. Fryer	Surrey & Hants	4.10
3/372	D. S. Saunders	Surrey & Hants	4.10
3/373	S. Y. Duxbury	Derby & Lancs	8.10
3/374	P. M. Hormer	RAE	11.10
3/375	D. H. G. Ince	Lasham GS	4.10
3/376	W. S. Y. Stephen	Deeside	23.10
3/377	C. J. Nicholas	Essex	8.10
3/378	P. L. Manley	Essex	6.10
3/379	D. Appleby	Essex	11.10
3/380	A. J. Manwaring	Essex	5.10
3/381	A. R. Newberry	RAE	11.10
3/382	B. R. Pearson	Deeside	6.10
3/383	R. J. Fox	Portsmouth Naval	8.10
3/384	K. G. Lawrence	Burton & Derby	23.10
3/385	J. W. Harrison	Fulmar	23.10
3/386	E. K. Stephenson	Bicester	5.11
3/387	P. Bolton	Bicester	5.11
3/388	K. Stewart	Surrey & Hants	9.11
3/389	S. J. C. Parker	Bath & Wilts	1.11
3/390	J. D. Hessey	Doncaster	24.9
3/391	M. J. Silver	Norfolk	5.11
3/392	J. W. A. Webster	Bristol & Glos	1.7
3/393	M. D. Kachman	Surrey & Hants	9.11
3/394	M. Pocock	Bath & Wilts	23.10
3/395	R. F. T. Lynch	Bath & Wilts	23.10
3/396	M. Albert-Recht	Deeside	5.11
3/397	D. M. Cholmers	Airways	23.10
3/398	G. N. Ballard	Surrey & Hants	9.11
3/399	N. C. Bennett	Norwich	9.11
3/400	N. L. Murphy	Bicester	23.10

GOLD C COMPLETE

No.	Name	Club	1978
681	Alison Jordan	Imperial College	20.9
682	J. E. Morris	Lasham GS	4.10
683	J. R. Frompton	Southdown	4.10
684	D. S. Tawson	Herefordshire	24.9
685	R. Dalling	Kestrel	18.10
686	A. G. Gordon	Surrey & Hants	20.10
687	D. S. Saunders	Surrey & Hants	4.10
688	K. W. O'Riley	Surrey & Hants	4.10
689	P. M. Harmer	RAE	11.10
690	K. G. Lawrence	Burton & Derby	23.10
691	P. D. Jacobs	Wrekin	4.11
692	D. L. Martlew	Surrey & Hants	31.5
693	J. W. Rice	Trent Valley	17.11

GOLD C DISTANCE

Name	Club	1978
J. R. Wiseman	Heron	3.9

GOLD C HEIGHT

Name	Club	1978
J. T. Philips	South Wales	24.9
J. Faunds	Clevelands	24.9
J. B. Giddings	Oxford	24.9
Alison Jordan	Imperial College	20.9
K. S. Lines	Surrey & Hants	6.10
D. Ball	SGU	4.10
H. Clarke	Portsmouth Naval	24.9
K. B. Smith	Clevelands	24.9
P. J. Stewart	Clevelands	24.9
N. Spencer	Doncaster	24.9
Sheila Corbett	Essex	6.10
R. W. Watson	Southdown	9.10
D. E. Miller	Angus	8.10
A. J. Keen	SGU	11.6
A. O. Harkins	Wyvern	8.10
J. E. Morris	Lasham GS	4.10
R. J. Thorley	Surrey & Hants	4.10
J. R. Frompton	Southdown	4.10
J. A. Davies	Surrey & Hants	4.10
M. Albert-Recht	Deeside	7.10
D. Bailey	Herefordshire	9.9
E. R. Duffin	South Wales	24.9
N. W. Baker	Scout Assoc	16.10
D. S. Tawson	Herefordshire	24.9
M. C. Marley	Burton & Derby	23.10
D. J. Whyte	Kestrel	8.10
G. H. Keats	Wyvern	6.10
R. Dalling	Kestrel	18.10
J. J. McGovern	Clevelands	20.10
A. G. Reid	Essex	6.10
K. S. Davis	Essex	8.10
M. G. Nixon	Essex	8.10
D. J. Walker	Surrey & Hants	16.10
P. Collier	Thames Valley	19.10
M. J. Evans	Surrey & Hants	16.10
A. G. Gordon	Surrey & Hants	20.10
W. J. Dale	Burton & Derby	24.10
D. S. Saunders	Surrey & Hants	4.10
K. W. O'Riley	Surrey & Hants	4.10
B. Scougall	SGU	4.10
Jill Atkinson	RAE	8.10
Daphne Knowles	RAE	18.10
C. A. D. Patterson	RAE	19.10
J. A. Knowles	RAE	20.10
P. M. Hormer	RAE	11.10
P. L. Manley	Essex	6.10
D. Dungey	Essex	6.10
A. Pickles	Surrey & Hants	22.10
A. R. Newberry	Essex	11.10
D. M. Smith	Derby & Lancs	24.9
R. J. Fox	Portsmouth Naval	8.10
K. G. Lawrence	Burton & Derby	23.10
R. W. Fox	Fulmar	19.10
S. Partridge	Fulmar	23.10
R. G. Hanson	Fulmar	20.10
J. W. Harrison	Fulmar	23.10
P. D. Jacobs	Wrekin	4.11
K. Richards	South Wales	18.10
P. Storey	South Wales	19.10
K. R. Buckner	Clevelands	24.9
D. L. Martlew	Surrey & Hants	31.5
A. B. Dickinson	Derby & Lancs	24.9
J. B. Wilson	Essex	23.10
A. A. Green	West Wales	6.10
W. M. George	West Wales	6.10
M. J. Law	Wyvern	20.10
Jay Lynch	Bath & Wilts	24.10
E. Wilks	Derby & Lancs	1.5
D. M. Cholmers	Airways	23.10
G. N. Ballard	Surrey & Hants	9.11
F. Townsend	Derby & Lancs	17.9
N. C. Bennett	Norwich	2.11
J. W. Rice	Trent Valley	17.11
N. L. Murphy	Bicester	19.10

SILVER C

No.	Name	Club	1978
5158	P. N. Janes	Thames Valley	3.9
5159	A. D. Kear	Cotswold	30.8
5160	R. Murray	Fenland	9.9
5161	G. Morris	Norwich	26.8
5162	P. Woodcock	Cambridge Univ	17.8
5163	S. F. Sim	Peterborough & Spalding	2.9
5164	S. Atkins	Essex	2.9
5165	D. N. Laidlaw	Surrey & Hants	3.9
5166	R. D. Payne	Bath & Wilts	28.8
5167	P. K. Milner	London	12.9
5168	G. Van Lent	Lasham GS	20.8
5169	G. Martin	Culdrose	11.7
5170	P. Cullen	South Wales	24.9
5171	C. Dunifer	Thames Valley	17.9
5172	T. Beedham	Trent Valley	17.9
5173	M. Hamill	Doncaster	19.8
5174	M. J. Burley	643 GS	24.8
5175	A. D. Langlands	Bath & Wilts	3.9
5176	P. Ferryman	SW District	3.9
5177	J. H. D. Williams	South Wales	3.9
5178	M. E. Dry	Bicester	25.9
5179	J. R. Bissett	Deeside	26.9
5180	S. G. Naujaim	Oxford	17.8
5181	M. Glancy	London	4.10
5182	P. S. Roberts	London	3.9
5183	E. D. Strachan	SGU	6.10
5184	M. G. Ward	SGU	4.10
5185	B. Fowkes	Trent Valley	25.7
5186	A. K. Jenkins	Oxford	23.8
5187	G. H. Keats	Wyvern	6.10
5188	J. Dixon	SGU	22.10
5189	T. J. Dickinson	Cranwell	26.10
5190	S. P. Johnson	Yorkshire	2.11

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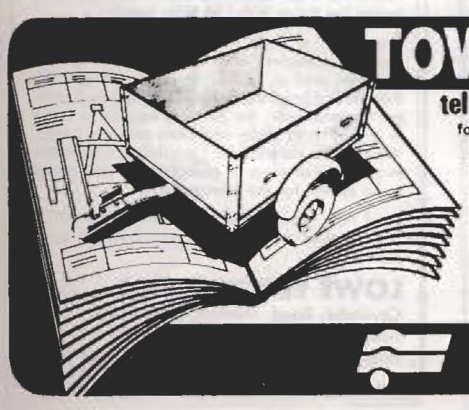
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OVERSEAS NEWS

Please send news and exchange copies of journals to the Overseas Editor: A. E. Slater, 7 Highworth Avenue, Cambridge, CB4 2BQ, England.

HELMUT REICHMANN RETIRES

Helmut Reichmann, Germany, three times World Champion, has announced his retirement from World Championships flying. He will be coaching the next National Team, and continue to fly competitively, but from now on, purely for fun.

WOLF HIRTH AWARD FOR SB-11 PROJECT

In November the Akaflieg Braunschweig received the Wolf Hirth Award, donated by the magazine *Flugrevue/Flugwelt*, together with a cheque for DM5000 for their very successful work on the SB-11 project. The SB-11 was flown by Helmut Reichmann in the recent World Championships to become the first World Champion in the 15m Class.

MONTREAL'S SEVEN DIAMONDS

Nine members of Montreal Soaring Council set off on July 3 last on Diamond goal attempts, eight to Cedar Airport, Merrickville and return and one to St Andrews Airport and return; eight got back and seven completed the task.

Good cumulus made the first leg easy, then thermals were still good and strong but the clouds disappeared and so anyone who lost the gaggles was in difficulty. Pilots were: Hans Baeggli (Nimbus), Gunter Gayer Doersch (DG-200), Bernard Palfreeman (PIK 20), Dick Kirschner (LS-1), Bill Roach (LS-1), Peter Trent (Std Cirrus), Eric Newsome (Astir CS), Karl Kovacs (PIK 20) and Garry Nye (HP-14). *Free Flight.*

AUSTRALIAN'S TISSANDIER DIPLOMA

J. R. "Bob" Muller has been awarded the Paul Tissandier Diploma for 1977 by the FAI Council for "services covering every field of endeavour in the development of gliding in Australia". He is co-founder of the National Gliding School for Instructors and Ground Engineers and was Australian Team Manager for several World Gliding Championships. He has been active in Australian gliding from 1949. - *Australian Gliding.*

THIRD INTERNATIONAL SYMPOSIUM

The NASA-SSA Third International Symposium on the Science and Technology of Low-Speed and Motorless Flight will be at the NASA Langley Research Centre, Hampton VA, USA, from March 29-30. For further details contact Perry W. Hanson, Technical Program Chairman, Mail Stop 340, NASA Langley Research Center, Hampton, Virginia 23669, USA. Tel. (804) 827-2265.

VINTAGE ASSOCIATION FOR AUSTRALIA

Doug Vanstam, of 33 Franklin Street, Bacchus-Marsh, Victoria, has formed a Vintage Glider Association of Australia, and its opening rally was held on Bacchus-Marsh airfield on October 7-8 last year. - *Australian Gliding.*

PUBLICATIONS

"SOARING" - official monthly journal of the Soaring Society of America. Edited by Douglas Lamont. Address: Box 66071, Los Angeles, California 90066 USA. Subscriptions: $13.00 outside USA; apply to your post office for a form.

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AUSTRALIAN GLIDING Monthly, publication of the Gliding Federation of Australia. A complete coverage of Australian soaring and exclusive features of international interest. Subscription: $10.50 Aust or $12.50 US, to Box 1650, G.P.O. Adelaide, South Australia 5001.

NEW ZEALAND: "Gliding Kiwi" official Gliding Magazine of the N.Z. Gliding Association. Printed October and alternate months. Write N.Z. Gliding Kiwi, Private Bag, Tauranga, New Zealand. £4.00 sterling for year's subscription (inclusive of postage).

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Send now for a detailed leaflet on the AP12. This receiver will become your constant companion.

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SECOND TRANS-EUROPEAN RALLY

The closing date for this year's event is April 15 and pilots interested in taking part should write for the rules and regulations to the address below.

It will be held from May 27 to June 16 starting the out-and-return from Angers, France to Zell am See, Austria, with TPs at Marburg and Sisterton, the total distance being 2980kms. Only a limited number of pilots will be accepted (probably 20) so don't delay if you are interested to take part. Write to: Aéro Club de l'Quest de la France, Transeuropèenne, 6 bis, Route Nationale, 49240 Avrille, France.

WORLD RECORDS

On December 4 last, Erwin Müller and Otto Schäffner, Germany, flew their Janus over a distance of 780km starting from Bitterwasser, South Africa, to claim the two-seater Goal and Return Record.

The same pilots and machine also claim the 750km triangular speed record at 122.4km/h for a flight on November 26, 1978. (Subject to homologation).

MOTORISED FLYING WING

Charles Fauvel is adding a motor to a modernised version of his flying wing without sweepback which he first produced in 1954. An amateur, F. Gross, is building it. With a span of 12-15m, the wing is to have a laminar profile FX 66 H/159 specially studied by Wortmann. The aspect ratio is 13.5 and wing area 16.65sq/m. As with its predecessor, the trailing edge of the wing carries ailerons in the outer portion and elevators in the inner. There are Schempp-Hirth brakes. The prototype is of wood, but production models will be of plastic. - *Aviasport.*

WITCH HITCH

Written by DAVID MOSS, aged 12, who has had more than 150 flights since starting gliding with the Northumbria GC when eight years old.

Agatha witch,
The broomstick ace,
Took up gliding to try a taste
Of proper flying, but soon found out
That you sometimes "get low" and find you're without
Your Lenticular Broth, a particular brew,
Made by the Witches of Khatmandu.
When poured on your glider, this thick odorous stew
Forms wave and thermals and cu-nims too.

Agatha opened a "lennie-brew" shop.
The Khatmandu Witches were working non-stop.
Pilots who used it were always "on top",
The Linnie-Brew trade boom was far from a flop
'Til an FAI meeting pronounced "This must STOP!"

Agatha packed up gliding that day.
She reverted to broomsticks and flying display.
And, as for the Witches of Khatmandu,
They've retired from making Lenticular Brew.
And so, to this day,
Agatha flies.
Queen of the Witches,
Queen of the Skies.
Far off in Russia; discovery new!
A great source of power!
LENTICULAR BREW.


American EAGLET
PILOTS DON'T NEED HELP GETTING IT UP

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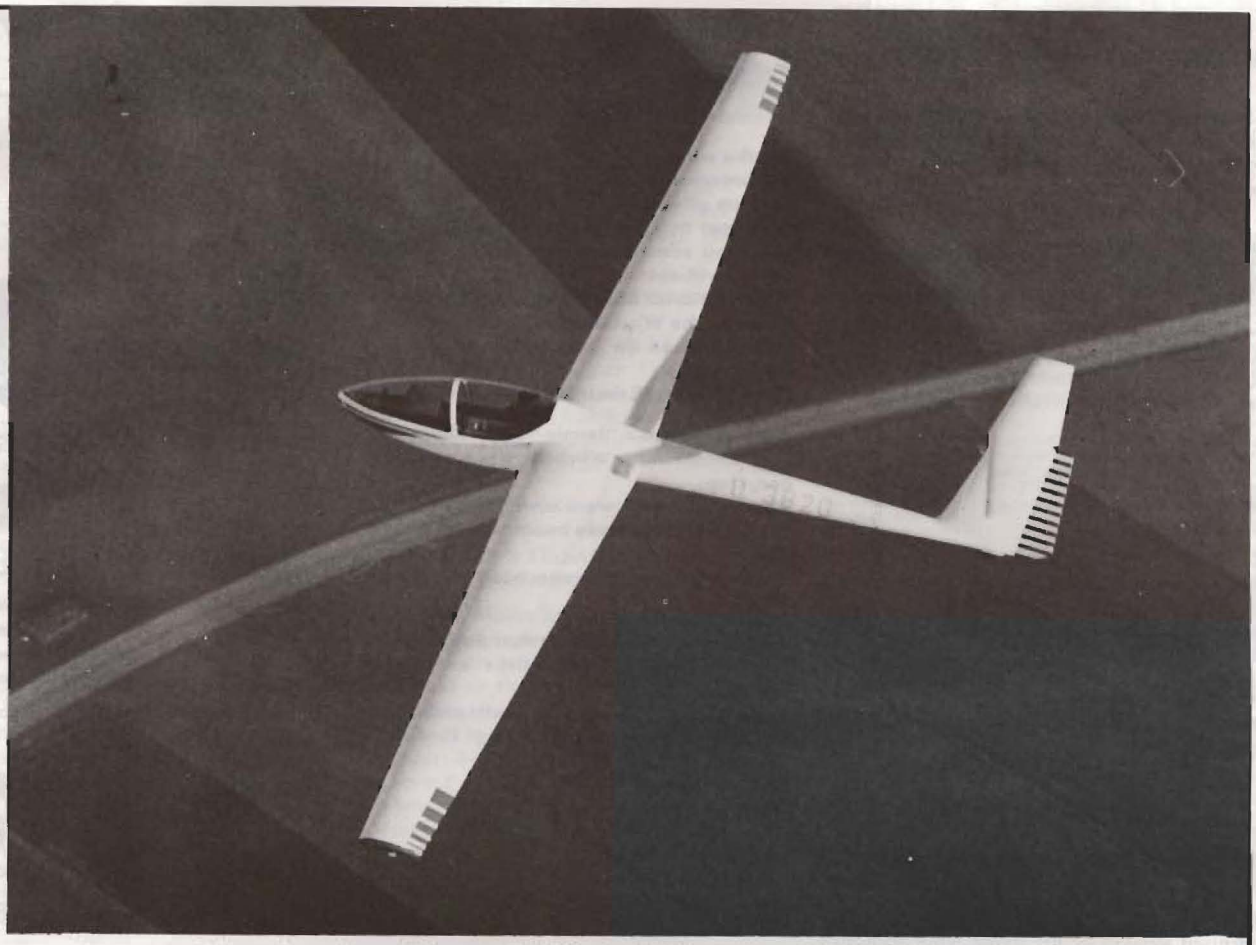
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'PLANADOR POR CIMA DO BRASIL' – *Glider Over Brazil*

BILL MEYER



Quero - Quero. Photo: Bill Meyer.

"Abrir!", calls the lad holding the end of the tow-rope.

"What on earth can that mean?" I think as I pull the cable release.

"Fechar!" he calls again and, as I release the knob, I remember; the buttons for the lift door in the hotel - Open, Close.

I am sitting in the front seat of a Blanik on the grass strip at Nova Iguaçu, about 50km out from Rio de Janeiro; on the other end of the tow rope is the ubiquitous Super Cub, and in the back seat is Oscar, an instructor with the *Aeroclube de Vôo a Vela do Rio de Janeiro.*

It all began sometime back in 1977 when I was working in the North of Scotland (and flying with the Highland and Deeside Clubs). My boss mentioned that we had obtained a contract to assist Petrobras to get oil from offshore. Would I be interestdd to work in Brazil?

My mind, conditioned to the priorities. "Gliding first, work second" immediately responded - "That will cut my flying down in Libby, but it could be fun all the same," so I replied, "I'll talk to Chris; I think we would be interested." Thus in due course I found myself as advance guard, stepping off the VARIG flight from London to Rio.

I had taken the precaution to obtain a couple of lessons in Portuguese before leaving London, but I really have to rely on sign language and the good offices of those Brazilians who speak English. The first task was to find out if there was a gliding club and, if so, where? I asked the senior secretary in the office, and she remembered that one of the Petrobras staff flew with the *Aero Clube* and arranged a meeting. Torro did not know about gliding but kindly arranged for me to go to Jacarepagua, where they fly a selection of light aircraft, including ex Air Force Fokker Trainers.

I was taken for a sightseeing flight along the beaches of Ipanema and Copacabana and fortunate enough to see a most impressive aerobatics display by a Harvard. At last we ran to earth a clue to the gliding club - *"Nova Iguaça"* they say, the only problem is that it is pronounced *"Novvgwarsoo"* and I had great trouble finding it on a map!

Next weekend I launched myself into the Rio traffic in a hired VW Beetle, bound (I hope) in the general direction of Nova Iguaçu. My key word, which has to work, is "Planador" (equals "glider") and I try it on a couple of the locals when I get to the appropriate town notice board. Faces light up, there is a terrific argument as to which way to go, and finally a sketch map is drawn . . . and there is a **windsock**! Made it!

Nova Iguaçu is a grass strip, surrounded by a residential area, and the local weekend recreation is flying kites - I counted 40 flying at up to about 200ft on the approach one day and at least as many at the upwind end! The kite strings are coated with powdered glass mixed in glue with the objective of cutting other kite strings. This works quite well on the leading edge of a wing too, and each Blanik has about six fine saw cuts in the corner of the tip-pod. Recently the tug tangled the tow rope (a substantial hawser about 18mm in diameter) on a kite string which promptly severed the tow rope!

There is *nowhere* to land except on the strip, and the country around Rio is just not on for cross-country flying. The centre for soaring appears to be Jundiai, North of São Paulo, and, viewed from a car, the countryside around there appears to be almost ideal – but Jundiai is a six hour drive from Rio - we may make a pilgrimage one weekend.

Medical before flying solo

Anyway I was greeted like a long lost friend, checked out in the Blanik (the club has two, plus a selection of solo machines), and told that I could fly solo when I had passed the medical. Sounded simple enough, but consisted of the full Air Force treatment; fortunately the Air Ministry is close to the office, for it took no less than five visits, three of which were of more than three hours duration, to complete the task. Included was a three hour examination of my psychology (*psicologia*)! It was really very interesting, and the people concerned could not have been more helpful; they laid on a keen young sergeant with a good command of English to steer me through, and I am now the proud bearer of a *Certificado de Capacidade Fisica.*

The first solo machine at Nova Iguaçu is a Grunau Baby. With 20-plus glider types in my logbook I thought this would be a formality, but nevertheless heeded the briefing that it was sensitive on the elevators and non-responsive on the ailerons. Even so warned, it was the *most* difficult glider to fly – very interesting to compare with today's machines with their light, responsive controls in all three axes, and with control force response rates nicely balanced.

We did manage to find a weak thermal and to actually go up a bit (mid-winter), but the attempt to fly to the next hopeful looking cloud was disastrous and had to be aborted for a return to the circuit. The claimed L/D is 14, but I doubt if it reaches that dizzy performance level anymore.

Next I was put into the Quero-Quero (named after an Amazonian bird), which is a nice machine with K-6cr performance and handling, but with spoilers only. The Urupema is a very sleek machine, with claimed L/D of 36 - I shall try to worm my way into that after a few more flights in the Quero-Quero.

Some going the "wrong" way

A local feature is the urubu, a smaller version of the vulture, which is a fine thermal indicator. However, their birds are quite large and can smash a canopy in a mid-air collision, so one has to exercise due care – not all that easy when you are amongst 30 or 40 of them, some going round the "wrong" way! And yet another feature is the gaggle of children from the houses nearby which forms up behind any aircraft during run-up – to sample the slipstream.

To sum up then, it is quite a hassle to get the medical, but it is worth it. A fair proportion of the members speak English, although some (through false modesty) will deny any ability until they have become used to having you around. The scene is Any Gliding Club Anywhere – the same rush to get names on the list, the same scramble to clear the strip when several gliders return together, the same push-start of the retrieve vehicle, the same small children trying to ride bigger children's bikes, the same arguments as to which way to put all the equipment in the hangar at the end of the day –

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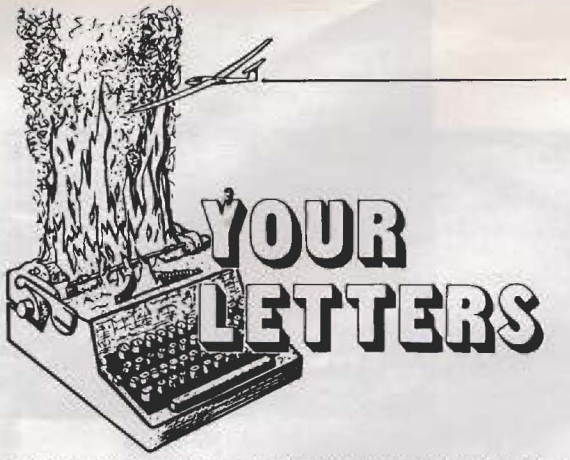
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ENOUGH PERFORMANCE POSSIBLE FROM 12 OR 13 METRES

Dear Editor,

I would like to comment on Mr Sunderland's letter in the last issue ("No Choice But Increase the Span", p290) in which he states the minimum wing area of a glider is $10m^2$ and then argues that this logically leads to a span of 15m (*ie* an aspect ratio of 22.5).

In S&G, June 1977, p110, you published an article by Prof Eppler in which he presented detailed arguments that for optimum cross-country performance a 15m glider should have an aspect ratio of 18 (wing area $12.5m^2$) and ballast to allow wing loading to vary between 25 and $30kg/m^2$. He strongly refuted the idea that the highest aspect ratio is always best.

If we take Mr Sunderland's requirements of $10m^2$ wing area and an aspect ratio of 18, this requires a span of 13.4m. Unballasted flying weight would need to be 250kg and deducting 100kg cockpit load this leaves 150kg (330lb) as the desirable empty weight of a $10m^2$ machine. A 15m machine cannot be cut down to such a weight but a 13.4m could get near it. If one selects the low figure of $10m^2$ wing area, a 13m machine is going to out perform a 15m one, but not of course a 15m machine with a larger wing area.

Having flown the 13.5m Salto, I am quite convinced that enough performance to satisfy the majority of pilots can be built into 13 or even 12 metres.

There is another intriguing possibility. It is known that to achieve adequate take-off performance the relationship of static thrust to flying weight of a tug and glider combination should not be worse than 1:5. This implies that the above machine with a flying weight of 250kg would have adequate take-off performance if fitted with an engine and propeller giving a thrust of 50kg. The hang glider boys are currently getting 37kg of thrust from 110cc single cylinder engines and slightly larger engines are available. The prospect is opening up of a light convenient self-launching glider, possibly in kit form, that would enable us to do without our expensive, fuel guzzling, accident prone tugs.

You don't believe it? Well the Americans are more than half way there. The 11m self-launching American Eaglet has sold about 200 kits of which more than a dozen have been completed. It features a strutted Wortmann section wing, a pod and boom fuselage and an incredible empty weight of 160lb complete with engine and folding propeller (ungeared). (See Sailplanes 1979, p26). I believe it can be improved upon by adding another 1½m of span and doing away with the struts. To make up for the extra weight a slightly larger motor is needed with cogged belt reduction gear and a larger diameter propeller.

High-performance gliding may have reached a plateau but gliding for the average pilot could be heading for a big improvement.

Malvern, Worcs. LYN BALLARD

NOW IT'S QUIETER

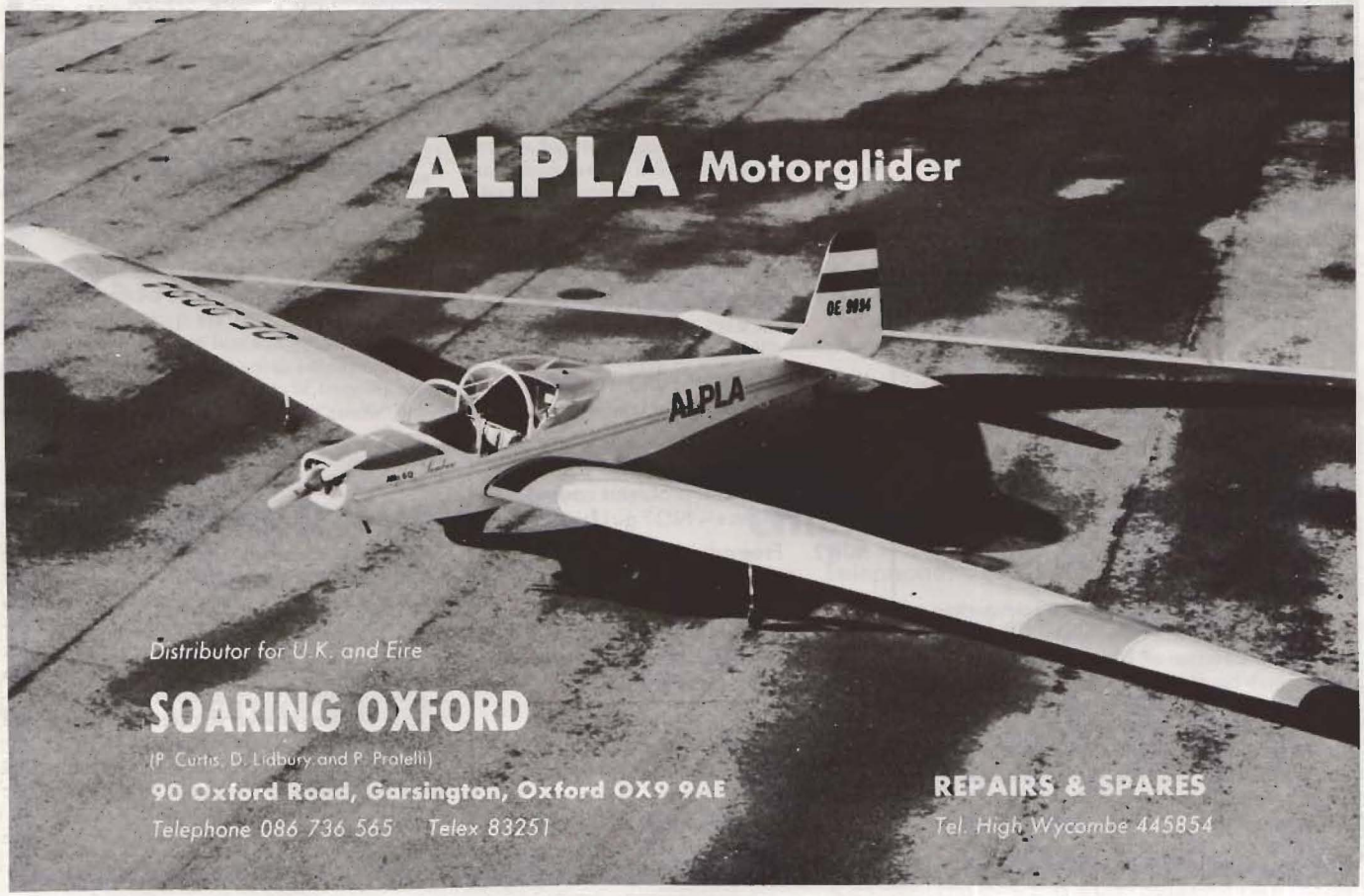
Dear Editor,

In reference to the quite excellent article in the last issue (p276) by Frank Irving on our Cambridge equipment, we have a development to report which will please him greatly and, hopefully, others too!

Frank refers to the absence of a quiet band round the correct speed in our Audio Director which results in his being nagged all the time in the cruise modes. We have replaced this Audio Director with the Mark II, available now from Southdown Aero Services, which has anticipated Frank's wishes. The Mark II has just such a quiet band, of around a few knots of airspeed around the correct speed to fly. Of course, this does not occur in the climb mode of flight, where there is no quiet band.

There are a number of improvements and refinements which have been incorporated into the Mark II and I hope that this unit will be as much of a success as its predecessor.

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Final approach for the Ulster GC's Skylark 2B into the new Bellarena site, beneath Binevenagh's impressive cliffs. Photo: David Hill.

CLUB NEWS

Copy and photographs for the April-May issue of S&G should be sent to the Editor, 281 Queen Edith's Way, Cambridge CB1 4NH, tel 47725, to arrive not later than February 13 and for the June-July issue to arrive not later than April 18.

December 6, 1978 **GILLIAN BRYCE-SMITH**

BATH & WILTS

Our expedition to Aboyne was even better than our expectations. Mervyn Pocock, Ron Lynch, Steve Parker and Chris Rowland achieved Diamond heights with several flights of well over 24 000ft, and Joy Lynch got Gold Height.

Steve Parker's Diamond height on November 1 turned out to be a marathon flight of over seven hours. In fact he only made the 4½ miles descent because conditions were becoming too turbulent on the ground. He left a rate of climb of 4-6kt and reckoned it could have been conditions for a record height. The photographs taken from the ground show layers of lenticulars to fantastic heights - only comparable with those in New Zealand.

J.L.

BRISTOL & GLOUCESTERSHIRE

The club fleet is now back to full strength with both tugs ready to go. We still have a Swallow, two K-8s, a Skylark 4 and three two-seaters.

Progress on renovating the clubhouse continues with the toilet block now receiving the finishing touches. "Chalky" White and Pete Bray have done some splendid work in the bar, giving it a fine new floor. New catering arrangements at weekends are proving very popular with a full cooked meal on Saturday nights.

Visitors recently have included the Vega demonstrator and the prototype PIK-20E motor glider. The latter impressed most of those who saw it and all who flew in it - one syndicate at Nympsfield is considering it very carefully.

Our annual wave trip to Shobdon met the usual low cloud and mist so once again there was no flying. There was a more successful wave expedition to Portmoak by the Kestrel (14) syndicate - they chose the right week yet again.

R.A.R.

COVENTRY

After a most enjoyable annual dinner when we looked back on the successes of the past year we are now turning our thoughts to the new season. An early event which we are looking forward to with great pleasure is the BGA Weekend in March when we shall be host club for flying on the Sunday.

The club fleet next year will be enlarged with another tug and an Astir to improve the single-seater section. Other developments include a newly-surfaced length of runway and extensive improvements to the surface of the field.

D.B.

DEESIDE

We were saddened by the death of Stan Easton while towing another visiting pilot. This tragedy was, however, the only black spot in a very successful wave season.

Over 60 flights have been to over 18 000ft and at least 50 were Diamond climbs. The site record was broken again and is now set at 30 500ft by Alistair Kay (Jantar 2). The woman's height record was broken twice by Alison Jordan and the two-seater record was finally taken from the club Capstan by Chris Rollings and K. Woodthorpe in Booker's Twin Astir. (For further details see BGA News p32). In a ten week period there were only six non-flying days and four non-soaring days. Definitely the best season yet.

The Rallye Commodore is again grounded due to lack of spares, leaving us temporarily tugless. Congratulations to Dave Innes and Peter Whitehead on passing their instructors' courses; to Mark Recht for completing Silver C and reaching Diamond height in the club Swallow and to John Bisset, G. Wilson and Ian Bass for their five hours, albeit at Portmoak.

D.I.N.S.

DONCASTER & DISTRICT

Autumn hasn't been kind to our flying programme apart from a few bright days. A K-6CR has been added to the club fleet which now gives most pilots a chance of five gliders to fly.

Our "tarts and vicars" night was a success and now much singing and dancing rocks the clubhouse as the rehearsals for Aladdin get under way. Unfortunately our version certainly wouldn't suit the West End, so no offers please!

J.A.S.

DOWTY

Being a comparatively newly formed small club we feel we have achieved some success again this season with several going solo, including Geoff Vaughan our senior citizen. Congratulations to those who have gained Bronze and Silver legs and to Derek Tribe and Arthur Kear on completing Silver C. Also to Derek Tribe on becoming a full Cat.

The Dave Ferguson competition cup is now back with the Cotswold GC, retrieved by Eric Burke in the Astir.

Our thanks to Brian Winstanley and the tug pilot team for getting the Husky back quickly after its major overhaul. The flying weeks were well attended and we had visitors from the Blackpool and Fylde GC, the Cotswold GC and Chris Rigby (Britannia Airways) with contingents of Air Scouts. We hope to organise similar weeks next season and to extend our week-day evening flying during the summer months.

Our first annual dance was most successful and our thanks to the organiser, Martin Muecke, and his wife.

A.S.R.

DUNKESWELL

The success of our recently inaugurated morning training courses can be measured by a marked improvement in the rate of pupils'

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progress, more advanced training for solo pilots and greater efficiency in ground operations.

Our CFI is making good use of wet weekends to give some useful and interesting lectures and "winter frustration" is being held at bay by cliff soaring expeditions to nearby Branscombe, where southerly or south-west winds provide much in the way of good lift, fun and enterprise.

A much needed programme of maintenance and re-furbishing of club equipment is being carried out by Tony Eastelow and his team of enthusiastic helpers and many of our major tasks have now been completed.

Congratulations to founder member Mike Bird on his forthcoming marriage.

B.H.F.

EAST SUSSEX

We have had a very successful year and the new tug gave members a new lease of life with even early solo pilots taking advantage of aerotowing.

Our best wishes to the newly formed K-6CR syndicate and to the other members who have taken delivery of the Cirrus. Due to the enormous influx of *ab-initios,* the committee have decided on a waiting list for training, but would still welcome new syndicates and experienced pilots.

The supper and disco on November 3, organised by our Social Secretary, Barry Clarke, was a great success. Our thanks to Barry; also to Phil McKierran for his hard work completing our tractors and Peter Gresham for buying the new Ferguson tractor on behalf of the club.

B.W.

ESSEX

Members have been taking full advantage of the Indian Summer and we congratulate Don Ling on going solo. This year's trip to Aboyne was highly successful with John Wilson, CFI gaining his Gold height and Chris Nicholas his Diamond.

Our thanks to Steve Lymn for his hard work in auditing the club accounts and to Eric MacDonald for constructing our new pulley which will soon be operational, as will our two Ford F100 trucks. The club fleet has been increased to include a new K-8, intended for early solo cross-country flying next season.

Mike Jefferyes, Chris Nicholas and Pete Manley have just acquired a new DG-200 to replace their Astir and the Oly 463 syndicate has been joined by Jon Wand.

J.S.W.

ESSEX & SUFFOLK

In spite of many problems our club has encountered over the past months from councils and wayward landlords, we continue to fly. Our clubhouse is taking shape, regularly being attacked by a band of DIY enthusiasts. Having had our power supply cut off by a "friendly" neighbour, we now have our own generator. Hopefully we will be able to offer a comfortable welcome to visitors next summer.

At long last Vega rules supreme - at least that's what our Chairman, Eric Richards, will say if asked. Our flying butcher, "Spud" Hodges, has that Biggles look in his eye having gained his PPL.

The only notable claims at the end of the season were from a trip to Aboyne - Elvin Hibbard gained Diamond height and his SHK partner, Frances Whiteley, Gold height.

We purchased a rather tatty Condor; now that it has been re-engined, re-furbished and is in excellent condition, visitors are assured of a tow to help them on their way.

C.C.S.

KENT

The extended "summer" gave us a welcome bonus and it was pleasant to operate from a dry surface right to the end of November. This also gave us the opportunity to fill most of the holes that had accumulated at the north-east corner of the airfield.

At the annual dinner-dance our new chairman, Tom Rudge, reported another successful year in financial terms, somewhat marred by the poor soaring weather and a spate of accidents, though thankfully no injuries. We were reminded that past efforts would have to be continued to maintain our growth rate.

Most of the trophies were won by Glyn Roberts; namely the two-seater cup, the Chairman's trophy for the best cross-country and the Frank Connolly Memorial trophy for the best cross-country in a club glider. The League One trophy went to Dave Harris; League Two to Alan Garside; Cook trophy for the best100km triangle to Joe Janszo, *Ab-initio* shield to Cecil Hogarth, Instructor's bowl to Ray Hatton and the Ladies trophy to Lesley Wickens.

Another syndicate machine has arrived - an ASW-15 from the Lakes Club.

D.H.

LAKES

Our annual dinner on November 25 was well attended. Sir Len Redshaw introduced guest speaker Reg Curwen, a new member of our club and deputy CFI of Bickmarsh, who entertained us with comments and reminiscences on gliding and his own long experience of flying with the RAF. The awards were presented by Lady Redshaw to Ray Jackson, Peter Thomas and Alan Lakeland.

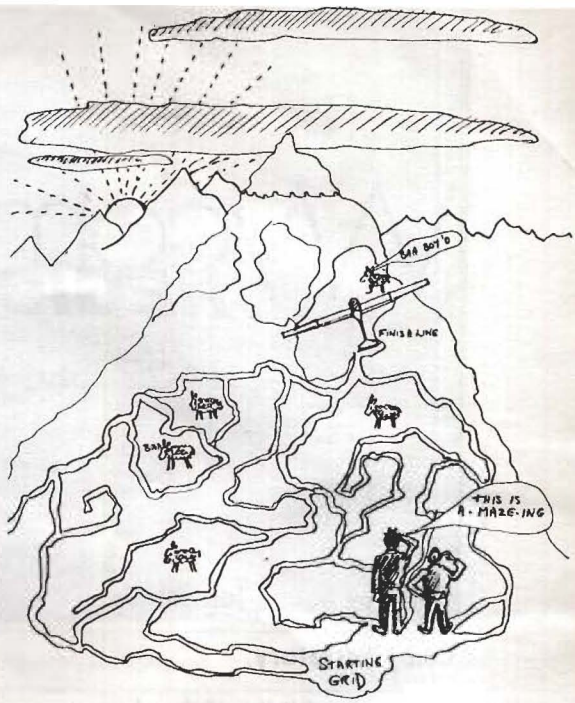
Flying has been very limited by rain and strong winds followed by more rain.

E.G.A.

LONDON

The club invaded Shobdon for nine days at the end of October taking some 20 or so aircraft. A variety of exciting and challenging wave was found each day but two, when it was thermic. John Jeffries introduced the naive to hill soaring the Black Mountains, which is also called "viewing sheep from all angles". We discovered a very friendly farmer who had built a little airstrip just by the Black Mountains and was most welcoming whenever we used it.

One has to be brave to "follow" the Caproni in a K-18 at the best of times and this trip certainly separated the men from the boys, the men not always being the successful ones. We had very few outlandings during the week - strangely the only difficult one was when JJ landed half way up a mountain and, having phoned the airfield for a road retrieve, couldn't find his way back to the glider!



HOW NOT TO LOSE YOUR GLIDER UP A MOUNTAIN IN WALES

Jane Sharp.

John Cardiff got the highest of the week at 14 000ft and completed a 300km triangle. He didn't mean to, he got deliciously lost above cloud and it took a lot of eyes on the ground searching half million maps before he was located at Welshpool. He insisted that it was his syndicate partner's fault who had the map in the cockpit neatly folded to East Anglia! We had two guests with us, Ian Wilson and Roddi Morgan. Altogether we flew for a total of 275hrs and gained a total of 260 603 ft. (JJ flew for 41hrs in the nine day period and that is not counting the aerotow there and back).

We have a new full-time tug pilot, Martin Germann, (Malcolm Humphries and Philly Delaney have gone on to instruct power flying) and we hope to get our second full-time tug pilot in time for the season.

Our sympathies go to Bob Frith and Graham Smith who have bought a brand new 15m ship and they had a beautiful trailer built to the specifications given by the manufacturers. Unfortunately when they went to collect the glider they found not only was the trailer too short but too low as well.

D.Y.

MIDLAND

Several pilots reported climbs in thermals of respectable strength on November 25 and by lunch time most aircraft were climbing well in excess of hill lift, Chris Ellis reaching 6700ft above the site in a K-8. Everyone had at least one good flight.

The AGM was at the clubhouse on November 3. There were no nominations for retiring Committee member Nigel Holmes. Our thanks to Nigel (and Sue) for their valuable contribution to club activities. The meeting itself was fairly short and followed by the usual informal discussion giving everyone an opportunity to air their views.

D.L.W.

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NORFOLK

Sadly no Diamonds have resulted from the various pilgrimages to the north. The Falke is still away having its engine sorted out; if all goes well, however, it will return spick and span and with a three year C of A.

Our Sunday Market has moved away, as also has a sinister neighbour with a box of matches. Half a dozen new tug pilots are under training and a rota for tug pilots will be introduced in the New Year.

Two super parties have got us into the right mood for winter, one at Eric Ratcliffe's restaurant to mark the end of season and one in celebration of Peter and Georgie's Silver (wedding that is).

Secretary, Roy Woodhouse, has several goodies in the pipeline for the dreary months ahead - a New Year social evening with films of gliding at Tibenham, a few chats on soaring techniques for new pilots and a dinner-dance in February.

M.T.B.

NORTHUMBRIA

After a poor soaring season, several wave days have enlivened autumn weekends. Six gained Bronze legs on November 11 in lift within easy reach of a winch launch.

Among the many trophies presented at the annual party in October (our last in the old clubhouse), were the Jack Allister Memorial cup for the best gain of height. Tony Moss led the Non-Silver C ladder and the writer was presented with a miniature fence and whip for efforts in organising the 1977-78 winter sports (fence repairing). Twelve members were presented with "wings", among them several ladies who now make up 10% of our solo pilots.

The IS-28 is at last back with a strengthened undercarriage and we hope shortly to have a second K-7 to replace the Blanik written-off in an accident in August.

A.T.

OUSE

The annual dinner was held in York this year and was a great success - our thanks to Arthur Hartley for his most efficient organisation. A new trophy was presented this year, the "Silver Spanner" award, which is a rather large chrome plated spanner for the pilot who does the most unusual (?) field landing of the season. This year's recipient wishes to remain anonymous. The ladder competition was won - again - by our CFI, Peter Ramsden; the Rose Bowl for the longest Silver distance by Julian Day who completed 80km; David Hey was pronounced the most promising young pilot and the CFI's shield was presented to Geoff Cline.

The private fleet has been increased by two, an Oly 463 and an Astir.

The ideal new site has not presented itself yet but our enthusiasm hasn't waned and the hangar resounds to the sounds of members fettling their machines for next season.

H.B.



Norfolk GC's "Witch" Doctor Souper touching down at Tibenham for Hallowe'en. *Photo: Mike Butcher.*

SCOTTISH GLIDING UNION

Since the Lasham party departed, apparently well satisfied, the weather hasn't been remarkable, but some decent cross-country flying has been possible and the male chauvinist pigs had to applaud Elaine Johnstone's Gold height in a club K-6.

We have had a visit from Vega and the 7am ballot has been introduced at weekends for the club glider flying list, which seems indicative of a healthy state of affairs.

Five out of the first 40 on the 1978 National (open) Ladder are from Portmoak, which seems a remarkable improvement for us.

We had a very enjoyable dinner-dance recently and the Christmas "do" next week promises to be better than ever.

After 17 years, Ansgar Sambale finally persuaded Betty to have a flight in the Capstan. All she will allow me to quote is "super".

R.H.



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SOUTHDOWN

Cross-country kilometres are well down for this year by approximately 60%, which reflects the poor soaring conditions throughout most of the summer.

A wave seeking expedition to Portmoak by John Frampton and Rod Watson produced Gold height for both in the Kestrel 20, which completed John's Gold badge.

Our stream of new solo pilots continues unabated with Paul Stedman, Mike Stanford and Maggie Buchanan all joining the ranks - Maggie amazing everyone by coping at the same time with three children all under five years old.

B.A.B.

STAFFORDSHIRE

Our winter lecture series are well under way. Ken Whitton talked about winter soaring at Morridge; there has been a slide show on the USA Oshkosh Homebuilt Convention and this month Tony Boyce is giving a tape and slide presentation based on our site.

Ken Whitton, Frank Davies, Geoff Davies and Judy Graham are planning to form a syndicate to buy the club Swallow. David Thorpe and his helpers have achieved wonders rebuilding the old tractor and completion is not far away.

P.F.F.

SURREY & HANTS

The closing stages of our Portmoak expedition were as good as the start with David Carrow obtaining 16 000ft on his first launch. Such was the success of this four weeks that Lasham staff instructor, Ken Stewart, and Guy Ballard took one of the Astirs to Aboyne after the main expedition had ended and promptly rose to 21 000ft apiece.

We held our 40th anniversary dinner on November 11. There were members from the earliest days right up to present Bronze and Silver C standard, all revelling in the many stories related. Ann Welch gave us the early history of Redhill and Wally Kahn continued the story up to the present. Every club Chairman was present and this must surely be a record for a 40 year old GC renunion?

We embark upon the next 40 years with a splendidly fettled fleet out of an extremely busy workshop.

C.L.

ULSTER

Heartening features of our move last Easter have been our warm welcome from and quick acceptance into the local community - the envy of any club facing hostility and noise complaints. We responded on December 1 with our first local function, a dinner-dance attended by neighbourhood well wishers including some recent recruits and their friends.

Soaring had been consistently good up to December 2, with wave contacted on more weekends that it wasn't. Jim Weston and Bob Rodwell both soared above 9000ft on November 5, when freak radio conditions were bringing in aircraft operating from several British sites, including Sleap and Usk, at strength five.

Such was the sequence of good weekends that on December 4 we were still undecided when, if at all, to start a winter stand-down for maintenance. Among recent soloists were Kelsey Hudson, our third lady pilot in current practice, Harry Boyle and Joe Irwin, two of the season's new recruits, Loudon Blair and Charles Hill. Billy Bowden, who soloed in April, logged his five hours in June and Silver height in September and had more time than a grizzled seagull by the season's end.

After crewing for Jeremy Bryson at Chateauroux, Alan Sands took his half of the Pik 20D to the Alpes Maritimes for some spectacular flying from Sisteron, including a 300km plus site check through the mountains in a Twin Astir. While there he out-landed the Pik in a potato field, to be greeted back on the site with expressive gallic shrugs and the comment *"Pourquoi pas, pour un Irlandais?"*

R.R.R.

WOLDS

The annual dinner-dance on November 17 was a great success and our thanks to the organiser, Sue Acey. The awards presented by our Chairman, John Durman, were as follows: for the most meritorious flight, Bob Kirbitson; the longest distance flight, jointly to Eddie Room and Bob Fox, and for the most progress made in 1978, the members of the Skylark syndicate.

At the conclusion of the autumn Bronze C lectures by Roy Andrews, ten members passed their theory papers and several have now completed their Bronze C.

Another syndicate has been formed with an Oly 463 which arrived in November. Preparations are in hand for our task week and flying weeks of 1979 and meanwhile club morale is maintained during the winter with the opening of the new bar facilities in the clubhouse on December 16.

A.J.B.

WOODSPRING

As a relatively new club we continue to thrive and even after the poor soaring season achievements to Bronze standard are up on those of last year. Eight members successfully completed Bronze papers after an excellent course run by Ken Wiseman.

We are one of the few clubs who can boast of a working President - Arthur Robinson has proved his craftmanship yet again on our T-21. Bill Scull is giving us a talk on some aspects of glider construction and design this month.

Peter Brittan completed his Silver C with a gain of height and Dave Keeley, Membership Secretary, has his duration.

Barry Hogarth, CFI, has found it difficult to get a tug that would give economic launches from our site so the club Bocian was taken to the Devon & Somerset GC during the late autumn for aerotowing.

We often have good ridge soaring at Woodspring during the winter months, but on the hopeless days there is plenty of work to do on such things as our second winch, the hangar, MT annex, Mt and preparing for the jumble sale.

S.F.J.

YORKSHIRE

Winter suddenly arrived at Sutton Bank but it was rather pleasant to fly over the snow. For the time of year the weather has been good for training but not for soaring. However we provided a number of visitors with excellent ridge and wave soaring earlier in the past month when Graham Chinn achieved 20 000ft for Diamond height.

The Astir has joined the Pilatus at the upper end of the club fleet. The clubhouse is having a face lift and general tidy-up and the new winch should soon be completed. With our re-organised fleet and the decision to hold winch and flying rates to within a few pence of those for 1978, all we need for 1979 is fair weather.

E.S.

Service News

CRUSADERS (Cyprus)

Despite the lack of reports in these columns this year, we continue to thrive. But during the summer we watched with frustration the cumulus over the eastern central plain on the other side of the border. Now the sea breeze isn't quite so powerful, we are enjoying some soaring this autumn.

Our new Astir arrived in September - our many thanks to the Nuffield Trust and HQ Land Forces Cyprus for their financial generosity, the Phoenix GC for collecting the glider from the manufacturers and the HQ RAF Germany for arranging to freight it to us by air.

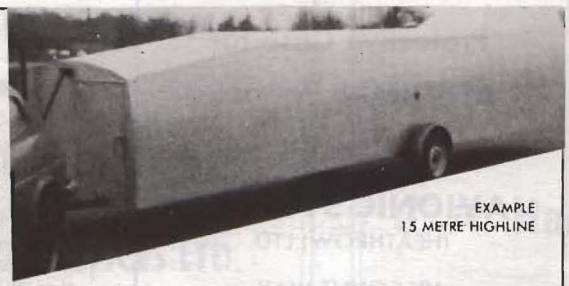
There have been a number of Committee changes due to members returning to the UK. Our Chairman, Les Millar, left in July and our Treasurer, Alex Reid, in September with his gliding family. We are especially grateful for their hard work. We have also said goodbye to Craig Boston, Ronnie and Inga Ehrmann, Ian Clough and Greg Head. We wish them all the best.

However we have several new members including ex Crusader Colin Pinnell, now our Chairman, and Max Mallinson. Our CFI, Ray Brownrigg, continues to employ his considerable energy to ensure the maximum flying. Jock Shearer and Dave Redding have been on instructors' courses at Bicester and are joined on the instructors' roster by Peter Maclaren, Cobb Ball and Colin Pinnell.

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Those going solo include Dave Lancaster, Danny D'anastasi (both now have Bronze C's), Bill Baillie (now with two Bronze legs), Greg Head (Bronze C and Silver height), Joan McBride, Steve Ford, Barry Stephen, Malcolm Swan, Alison Reid, Steve Vaux, Avo Managoian (our resident tug pilot), Stephen Morse and Carol Salmons. Bronze legs have been gained by Chris Putt, Arthur Watt, Alan Sayer and Bib McBride (who now has Silver height and is qualified to carry passengers). Jock Shearer completed his Silver C while on a course at Bicester.

We operate every weekend from Kingsfield strip at Dhekelia and, thanks to Lynne Willbourn and her team, nearly every Wednesday afternoon.

J.S.

EAST MIDLANDS (RAF Wittering)

For the second time within a year, the club has had to say goodbye to a CFI with the departure of Pete and Jan Young. We thank them for their efforts for the club and wish them well for the future. Stu Hoy has agreed to take on the rôle of CFI.

Pete Carr has now completed his Silver and John Norman gained his Silver distance with a 110km flight in the SF-26. He followed this, in September, with an instructors' course. Ian Gill and Dick Cadd have their five hours.

The Astir arrived as expected and has been put to good use. It has not yet been away from the site, but with the work on the trailer progressing well it should be ready for next season.

I.M.G.

FENLAND (RAF Marham)

The AGM produced a heartening Treasurer's report in spite of a disappointing soaring year. The best cross-country was Mark Simmon's out-and-return to Weston on the Green.

Congratulations to Mick and Carol Whitworth and to Mick and Amanda Millar on their marriages.

Plans for the club expedition to Portmoak in February/March are well advanced. The four gliders are fully fitted with oxygen and the 11 pilots are praying for north-westerlies.

F.P.G.

FOUR COUNTIES (RAF Syerston)

The AGM in December went very well. Our thanks to Mike Throssell for his work as Secretary – he has handed over to Dennis Ballinger. The remaining Committee members remain static.

Al Farmer was presented with a trophy for the fastest 100km triangle and Malcolm Norris received the Shirley trophy and the trophy for the most hard work on the ground. The bus catering system is now flourishing under Malcolm's expert handling.

The autumn resulted in A and B Certificates for Sue Gregory, Geoffrey Pointer and Trevor Saddler; Bronze C and duration by Cliff Edmundson; Gold height by Warren Fearon and a Diamond height for Chy-Chinn.

Al Farmer made good use of the pre-World Champs work up period at Romorantin with George Lee by gaining his Diamond distance with a 512km triangle. Finally congratulations to our two new full Cat instructors, Steve Hymers and Warren Fearon.

L.B.

HUMBER (RAF Lindholme)

Phil Airey gained a Bronze leg at the beginning of November and Mick Breeze and Dave Horstead went solo, Mick now having graduated to the K-8.

We have swopped our Blanik for a K-13 and Kathy Gildea can now reach the controls without a pile of cushions! The Astir trailer is in the last stages of construction.

Our AGM is on December 9, with a party afterwards, and we have the dinner-dance the following weekend.

K.M.G.

KESTREL (RAF Odiham)

The autumn expedition to Aboyne produced a Diamond height for Peter Richie, Gold for Roy Dalling and Silver for Warwick Creighton who missed his duration by 20 minutes. Everyone also experienced wave flying including Trevor Cole as P2 in the Bocian who went in excess of Gold height on five occasions.

Congratulations to Don Carey on obtaining his full instructor rating. John Williamson recently spent a day at Odiham with the Twin Astir and several members had their first chance of flying a glass machine.

The C of A programme is well under way and our new Astir should arrive shortly.

P.W.A.

PHOENIX (RAF Brüggen)

Phoenix have had a good year with regard to launches and flying hours, despite the poor cross-country weather, with over 8400 launches and 1800hrs, and our instructors have taught 22 people to fly. The club achieved the following

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during the year: 11 Bronze Cs, 20 Silver legs, three Silver Cs, and one Gold leg, one Diamond leg and one Gold C. We now have a membership of about 100, and while it is nice to welcome Chris and John Morris of RAF Hospital Wegberg and Marcelle Stanard from Wildenrath, we are sad to say goodbye to the following: Ed Durham, our Chairman; Dick Shoebridge, our O i/c; Steve Carter, Roger Davies and Terry Mitchell, all very hard workers; and three assistant Cats, Pete Spevack, Gordon Forsyth and Barry Elliot; also Marie Elliot, our Field Treasurer. Thank you to all of them.

At the RAFGGA (the first G stands for Germany) AGM Bill Tootell won the Pete Lane trophy for the fastest closed circuit and also the Pete Dawson trophy for the best distance flight. His crowning glory, however, was to win the Hog of the Year award at our own AGM! Other prizes awarded at our AGM were: Tom Jones trophy for the most work done for the club, Terry Mitchell; Tony North-Graves trophy for the pilot with the most navigational problems, Oscar Constable (you try explaining to a French policeman that you have lost a Monsieur Constable!); Colin Massey trophy for the Young Pilot of the Year, Ian Smith; CFI's trophy, Harry Worth; and flowers were given to Liz Kiely, Marie Elliot and Jan Parody, for their work at the Stats, as Field Treasurer and, most important of all, for running the bus canteen. Ian Smith and Harry Worth arrived from the UK to be with us for the AGM, having no idea that they were to receive trophies; there followed a splendid party, thanks to our Social Member, Colin Davey, and to all who helped to redecorate and refurbish the clubhouse.

There have been only two solos recently, Geoff McVey, now 16, and Brian Tinsley, who is a bit older; one re-solo, John Harris; three conversions, Andy Jenkins to the K-8, Roger Davies to the K-18, and Terry Mitchell to the Astir. We are planning to hold an instructors' course at Brüggen early next year, the first of its kind in RAFG history, and plans are already underway for an adventurous trip to Sisteron.

M.T.

WREKIN (RAF Cosford)

At the beginning of November Rod Witter, Jake Jacobs, Garry Feeley and Bill Broughall took our syndicate Dart and Blanik to Aboyne to do some wave flying, Jake getting his Gold height.

We held our AGM at the clubhouse on November 18. Our congratulations go to Rich Arnall for winning the club's trophy for the best progression in the year and to Ron Jackson for the quickest Silver C of the year.

Our first A and B of the flying year was gained on November 4 by "Grif" Griffiths.

J.B.R.

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WYVERN (RAF Upavon)

The Army's annual expedition to Aboyne this October was a great success with the best achievement record ever. Successful members from our club were Andy Harkins, secretary, who gained Diamond height and Mike Law and Graham Keates who had Gold climbs. Graham also completed his Silver C with a duration at the same time.

The ATC from Old Sarum have arrived and settled in. We have yet to fly alongside one another as the weather has been poor, so don't know what problems may arise with two clubs operating simultaneously from this site.

Gerry Sturgiss and Brian Roberts are now full Cat instructors. Our congratultations to them and Andy Harkins who has become an assistant Cat.

Mike Shapland has taken over from Berni Hull as Treasurer as Berni has been posted. We also say goodbye to Brian and Anne Roberts who are off to sunnier climes. Our thanks and good wishes to them all.

J.S.

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