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Magazine of the BRITISH GLIDING ASSOCIATION

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GO CROSS-COUNTRY

JOHN WILLIAMSON

When your Editor asked me to write this article, aimed to help the Silver C pilot improve his cross-country technique, I pondered for a long time on the best way to do it. Whole books have been written without exhausting the subject! I soon realised that despite the improved glider performances of today, the fundamental lessons have not changed over the years, and each generation may learn from the last. I had only to put myself in the place of the tyro; to see the problems as he sees them; to give advice which is meaningful in his situation.

The answer came as I turned the pages of my logbook back twenty years to the summers of the mid-fifties . . .

Local Soaring

Serial No. of Flight	Date	Glider Type	Place of Launch	Type of Launch	Crew Capacity	Time in Air H	Time in Air M
660	5·7·53	Gon Olympia	Lasham		PI	1	05
Remarks	T.O. 10·45; Max 2800. Gain 1800ft.						

I suppose only a tiny fraction of glider pilots are truly ambitious in their appraoch to the sport. I never was, but I found it well worthwhile to be out of bed really early on the misty summer mornings, with name on list, all the DI's done and the winches refuelled before breakfast. Already one step ahead of the rest I was now assured of at least the chance to soar when things started to pop.

For sheer practice, early soaring on any day is particularly valuable. The thermals don't go so high and you have to use more of them to stay aloft for your appointed hour. You therefore get more practice at locating and centring them and this is the very heart of cross-country technique. Anyone can take a high tow in the afternoon, soar grandly in strong lift to cloudbase and watch the hour go by in aimless wandering from cloud to cloud. Surely more valuable to *fight* for your early soaring experience, learning the hard way to stick with a thermal and *make* it lift you back to a safe height. This way you develop an eye for country, too, so that you learn where the sun's heat on the surface is readily transferred to warm the air which makes the thermal.

The early-day thermals also tend to be narrower so that to get the best out of them the turn must be more sharply banked, and flown with a precision that the lazy afternoon does not demand. You soon learn that doubling the bank to 45° cuts the turn radius in half and turns gentle sink into surging lift.

Cloud Reading

Serial No. of Flight	Date	Glider Type	Place of Launch	Type of Launch	Crew Capacity	Time in Air H	Time in Air M
1171	30·4·55	Weihe	Lasham		PI	1	23
Remarks	Max 3900, gained 2500. Flew all round Lasham + just got back.						

The next big step in developing your soaring technique is to turn to cloud reading. It is an art which *has* to be mastered. No fancy instrument will ever replace the Mark I eyeball in this respect! In the clouds lie the signs which, duly recognised, give the glider pilot seven-league boots. To really learn the worth of these signs you need to be able to fly further from home. A great deal of country and sky may be covered without actually being committed to a field landing.

Cumbersome graphs

We used graphs to judge the height needed to get back to base but they were cumbersome and it took ages to do the sums. Eventually I devised the disc calculator and with this I could move out seven or eight miles, perhaps to fly at this range right round Lasham, confident that I could glide home if all did not go well. Later, on cross-country, confidence in the calculator paid off when deciding whether a thermal gap ahead could be overflown directly or must be circumnavigated.

One snag with cloud reading is that the signs are the more obvious the further you are from them! At cloudlevel the hard base-line of the cloud over there looks much more tempting than the one you are under. Fly across to it and it, too, becomes woolly-grey while the forsaken one unaccountably boils up behind you! But you have to learn to recognise the good bits and often these are marked by visibly-forming wisps against the grey background.

Mark them well

Mark these wisps well by reference to something beyond. As you fly towards them they will merge with the rest, but if you have kept a true course you should fly into the core. This is not of much use, however, if you are already at cloudbase. So you should aim to cruise six or seven hundred feet below the clouds except when you strike a really good core which makes it worth spending time in finding the centre. While climbing mark the next cloud to be sampled, peel off a couple of hundred feet below the base and go straight for the new one. From a little below cloudbase you have a better overall view of the cloudscape ahead, a view which should be augmented by reference to the cloud shadows on the ground.

In Cloud—or not?

Serial No. of Flight	Date	Glider Type	Place of Launch	Type of Launch	Crew Capacity	Time In Air H	M
1809	19.4.56	Weihe	Lasham		PI	6	20
Remarks	Max 8900 early on ... Landed nr Truro, 178 miles.						

The ability to fly confidently in cloud is important, especially if you are in the older type of glider. Your operational height band can be doubled and very fast progress is possible when you select your clouds one after the other. It is not without it's hazards of collision, icing and storm damage, but taken in sensible doses, and monitored by radio, the risks are acceptable.

It is good sense to keep well away from active thunderstorms, and indeed out of any cloud if rain showers are about until you are really proficient. Rain showers can only occur when the cloud reaches above freezing level—about 8000ft in an English summer. Around the freezing level the danger of icing is greatest. In extreme cases the controls can be clogged up. So you should know what the freezing level is for the day, and not approach that level except in really strong lift—10kts or more—so that you will be whisked straight through the ice zone without collecting too much of the stuff.

On this April day the freezing level was about 4000ft. I took a climb to 8900ft after only 30mins but collected a heavy load of ice in the process. I carried that ice for the next three hours until it finally went at 1000ft over the Exe valley (and that's another story!). At the end of the day I landed only eight miles short of completing Lasham's first-ever Gold distance. What price that ice?

Emerging from the top of a crisp cumulus is a truly delightful experience, and the euphoria will last until you try to pinpoint your position through the frosty canopy! So, know your winds. Fly into wind looking for the familiar landmarks so small below. Typically you will take four or five minutes to get back over the spot where you first entered the cloud. And of course you *did* know where you were then, didn't you?

Serial No. of Flight	Date	Glider Type	Place of Launch	Type of Launch	Crew Capacity	Time In Air H	M
1194	8.6.55	Weihe	Lasham		PI	3	04
Remarks	Max 9400, gained 7800. Got lost!						

Navigation in gliders is normally a matter of simple map reading. Simple? Yes, until you get lost. Then, the trick is to look at the ground below; translate the main features mentally into map symbols; orientate them to north; and then find them on your map. One day I got very lost only twenty miles from Lasham. My mistakes were that I went into a low cloudbase directly from aerotow without knowing exactly where I was and I was hurried off the ground inadequately prepared, map wrongly folded.

With a base at 1600 agl and $\frac{7}{8}$ cover, the clouds were fairly boiling. I went straight to 9400ft and then spent an hour, bobbing up and down, wandering the dismal wastes looking for a hole. Eventually I emerged—at 1600ft! I knew that the wind was sort of easterly and that therefore I was presumably west of Lasham. So I picked up my map, refolded it, selected some good landmarks west of Lasham and commanded the landscape below to conform. It didn't! The main road was there, with the river wandering along beside it, but Stockbridge was wrong and Winchester had disappeared into the gloom.

It was still quite soarable so I flew up and down that wretched river for an hour, trying to make it fit. Still it didn't! Eventually, at the end of one beat, an airfield appeared and I found myself looking directly along the great east-west runway at Greenham Common! Stockbridge became Hungerford and Marlborough gave up trying to be Winchester. Under that solid cloud cover I hadn't thought to check which way the river was flowing. Flew home rather sheepishly!

Sea Breezes

Serial No. of Flight	Date	Glider Type	Place of Launch	Type of Launch	Crew Capacity	Time In Air H	M
1809	19.4.56	Weihe	Lasham		PI	6	20
Remarks	... Difficult hour in the Exe valley.						

Sea breezes can easily be found by accident! The day I carried ice to Exeter I had flown the towering cumulus well out to sea across Lyme Bay for nearly thirty miles. Some sort of god I thought myself to be, blue sea sparkling in the spring sunshine thousands of feet below; dazzling cumulus tops all around; a prize of gold awaiting me at Truro. What we hadn't guessed in those days was that an offshore breeze gets undercut by the sea air pulled in across the coast to replace the air bubbling into the sky. This cross-coast flow is inhibited at first by cliffs and hills, but by mid-afternoon and with a broad estuary ahead the incursion was rapid, and the trap was laid.

The line of cumulus pulled back from the coast and I returned from Elysium at 3000ft, three miles out to sea, and not a cloud in sight ahead! I angled cautiously in towards the coast but could see that I would get only about five miles inland with the height I had, and by now the nearest cumulus were five miles beyond that. Silky smooth was the air by now. One thousand, two thousand feet were used up. The ice melted and flew off in great chunks. At last, at 600ft above the small Devon fields, came a brisk thump under one wing. It was gone in a quarter-turn, to be replaced by another a second later.

These were thermals alright, but they were minute! Desperately weaving this way and that we stayed aloft. A K-6 would have been in her element, but the old Weihe, supreme mistress of the gentle thermal and the surging hill lift, handled like an old barge in a tide-rip. For an hour we struggled, gradually working inland, never above 900ft. Suddenly smooth lift! Surprise, surprise—I could fly along on course with lift everywhere! Optimism was reborn and we pressed on.

We know now that this is the classic sea breeze front situation. The colder sea air undercutting the land breeze creates a sharp temperature inversion at only a few hundred feet. The surface is still heated by the sun and thermals are still created. But they never form up properly and often resemble little more than turbulence. It *is* possible to

stay aloft on the wrong side of the front but it is well worth keeping on the right side.

Blue Thermals

Serial No. of Flight	Date	Glider Type	Place of Launch	Type of Launch	Crew Capacity	Time in Air H	Time in Air M
1742	22-5-56	Weihe	Lasham		P1	6	05

Remarks: Cloudbase 7500ft... no cloud between Wantage & Cirencester went cautiously... Landed St. David's. 196 miles.

It is understandable that a pilot gets cautious when a bit of blue sky comes along, especially if he cannot divine the cause. It may be the sea breeze; industrial haze cutting down the sun's heat; damp ground below inhibiting thermal formation; or simply dry air unable to reach its dewpoint level. On this day I was miles from the sea or any industrial complex and the chalk Downs below had the reputation for producing the best thermals in southern England.

I had cast off from tow at midday near Farnborough. At a steady 8kts I climbed to a breath-taking 7000ft, still not at cloudbase. Twenty years later I have still not flown on a day which matched it, in England. I hurried off towards my goal in the far west of Pembrokeshire, (remember the Weihe has K-8 performance) hopping from one shallow cumulus to another. Suddenly . . . no more cumulus. And there was I, 7000ft over Wiltshire, pussy-footing my way westwards, treating every thermal as if it were my last. The barograph tells me I didn't come below 5500ft but still I tip-toed!

Flying blue thermals is bound to be a bit of a lottery. Like a blind man walking through a forest you are almost certain to bump into a thermal. In England the height band at your disposal is not all that great—often no more than 3000ft. So it is important to improve your chances of survival by a little intelligent assistance to the laws of average.

First you should use your surface-sense to spot the likely thermal sources. If a choice of landscape is available choose the more varied, as being more likely to contain hot-spots to trigger a thermal. A mass of wide cornfields may get very hot but the temperature may be too uniform for a thermal too easily form. If forced to fly "blue" across such terrain even a trigger so insignificant as a gardener's bonfire may let loose a torrent of thermal.

Path of least resistance

The distance between thermals over a uniform terrain will get greater as the convection layer deepens—and conversely (remember the Exe valley!) So even in a shallow layer you have as much chance of finding thermals and should be able to keep going with some confidence. With deeper convection and widely spaced thermals, failure to find one by the critical height—say ⅓ of the total convection depth—can mean trouble ahead. In light wind conditions and below the critical height it may well be worthwhile staying put in the weak lift of an old thermal, waiting for the next. A thermal will tend to seek the path of least resistance on its way up and, like raindrops on a window, will follow the wake of the previous one if it can. If there is a bit of breeze, thermals tend to form up in streets like invisible cumulus. Very useful if they are going your way and you can find one. Finally, on a blue day there is usually a strong inversion capped by haze. Thermals approaching this haze are usually better seen with polarised sunglasses.

♦ ♦ ♦

Well, those summers twenty years ago saw me from Silver to Gold; from novice to budding pundit. The lessons learnt then have been applied ever since. Modern speed techniques have their roots only in such fundamentals. The consistently successful contest pilot must have had this sort of grounding. Experience helps you avoid mistakes. And the only way to gain experience is to go, cross-country!

After weeks of hectic packing, Barry Rolfe, general secretary, is installed at Kimberley House, Leicester, with his new staff.

Mike Cowburn buys the last copy of S&G to be sold at Artillery Mansions before the BGA office moved at the end of March

Photographs: Rika Harwood

DEREK PIGGOTT's first book "Gliding, a handbook on soaring flight", first published in 1958 and still a best-seller, has become well known all over the world. His latest, "Beginning Gliding", will be published soon by A&C Black at £5.25. It in no way replaces "Gliding" but concentrates on giving practical advice for the beginner and instructor on how to make learning to glide much easier. The publishers have kindly allowed us to print the following extract . . .

Help with landings

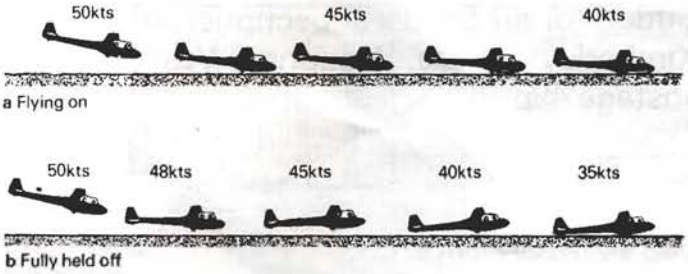
It may seem surprising that there is still considerable difference of opinion on how a glider should be landed. There are two schools of thought: The "fly it onto the ground" school and the "hold it off as long as possible" school.

Many years ago, the majority of gliding instructors believed that trying to teach a tail-down landing would result in many heavy landings when the student misjudged his height and held off too high. At that time it was common practice to level out just above the ground and let the glider land in a rather tail-high attitude without holding it off to lose speed.

Experience showed, however, that the risk of damage was increased by this method, particularly when the landing was on rough ground. The gliders were far more prone to damage if they were flown onto the ground than by being held off too high so that they sank the last few feet a little heavily.

Nowadays, even amongst the cadet training organisations where minor damage is of little concern to the instructor and where speed of learning is of prime importance, a properly held off landing is taught. It takes very little longer but greatly reduces the risk of damage at a later stage. It also makes it an easy matter for a pilot to convert to normal light aircraft since the landing technique is similar.

Fig 1



a Flying on

b Fully held off

If the glider is levelled out and allowed to fly onto the ground straight away, it is landing in a tail-high position and has not lost its flying speed. Any bump in the ground, or rebound from the wheel or skid, will throw the glider back into the air. Then, if the pilot is over-anxious to get down or reacts instinctively by moving forward on the stick, he may fly the glider back into the ground onto its nose skid. Since the nose will always rebound on impact, the bounces will tend to continue and get more violent with a real risk of breaking the skid or fuselage structure above it (Fig 1).

When inexperienced pilots convert onto a new type of glider for the first time, there is an extra risk of damage if they have been in the habit of flying the glider onto the ground. These pilots will nearly always make their first few approaches with a little extra speed in hand and, if the machine is of a higher performance than the one with which they are familiar, it is an easy matter for this "little

Float a long way

extra" to become rather excessive. Naturally they will also tend to be over-cautious about using more than a small amount of air-brake with the result that the glider will float for a long, long way during the hold off. After floating along some distance, the pilot will usually try to make the glider land by pushing it down onto the ground. The strange and unfamiliar view over the nose will generally fool him into believing that he is already in the landing attitude whereas, in fact, the glider is very nose down and about to touch down on the nose skid! Unless the ground is very smooth the glider will cannon off into the air again. Often by this stage, the pilot will be getting a little alarmed and will make a further determined effort to get down by moving the stick forward again. This mistaken action will result in a series of violent nose-down collisions with the ground and very often the skid and nose structure will be badly damaged. This is even more likely to happen if there is any drift or sideways motion at the moment of impact and the front skid at least will be broken or torn from its fittings.

A few gliders of very old design have virtually no shock absorption in the tail wheel or skid and these can be damaged by landing heavily in an extreme tail-down attitude. Most design authorities insist that proper shock absorption is provided for landings in all normal attitudes including a tail down. (It is usually simple to devise and get approval for a modification to strengthen a weak tail skid. However, it must always be weaker than its supporting structure and it must be kept very light. Even a small increase in weight at the tail will necessitate re-weighing the glider and recalculating the Min cockpit load which will keep the centre of gravity within safe limits.)

In the "hold it off as long as you can" method, instead of levelling out and allowing the glider to land, it is kept from touching the ground as it loses speed by gently easing back on the stick. Eventually, the glider will sink onto the ground, in spite of the pilot's backward movement on the control. The glider will be in a much more tail-down attitude and the main wheel and tail skid will touch down more or less simultaneously.

In this way, the landing is made at a much lower speed. (Remember that the shocks on touchdown are propor-

tional to the *square* of the speed, so that any reduction significantly reduces the shock and the chance of damage.)

On touchdown, the majority of the load is taken on the main wheel, which is a good shock absorber and will also stand any sideways loads without risk of damage. Furthermore, since the glider has run out of flying speed just as it touches down, there is little or no risk of it bouncing or ballooning up off the ground again.

The great advantage of this method of landing is that it ensures a perfectly safe landing in any glider, or in any type of powered aircraft. However, it is not safe in very high winds with gliders which are not fitted with any form of airbrakes, or those using only flaps to control the approach and landing.

Unless an aircraft touches down very gently, it is likely to rebound from the ground. The type of undercarriage and in particular the position of the main wheel in relation to the centre of gravity (c of g) of the machine largely determines what will happen at this moment (Fig 2).

Gliders fitted with a main skid at the front under the nose, usually have the wheel just behind the c of g. This acts in a similar way to a tricycle, or nose wheel undercarriage on a light aircraft. As the glider touches down, it tends to pitch nose down a little, reducing the angle of attack of the wing and so reducing the lift. There is, therefore, very little tendency to bounce off the ground since after touchdown there is nowhere near enough lift left to support the weight and keep it flying.

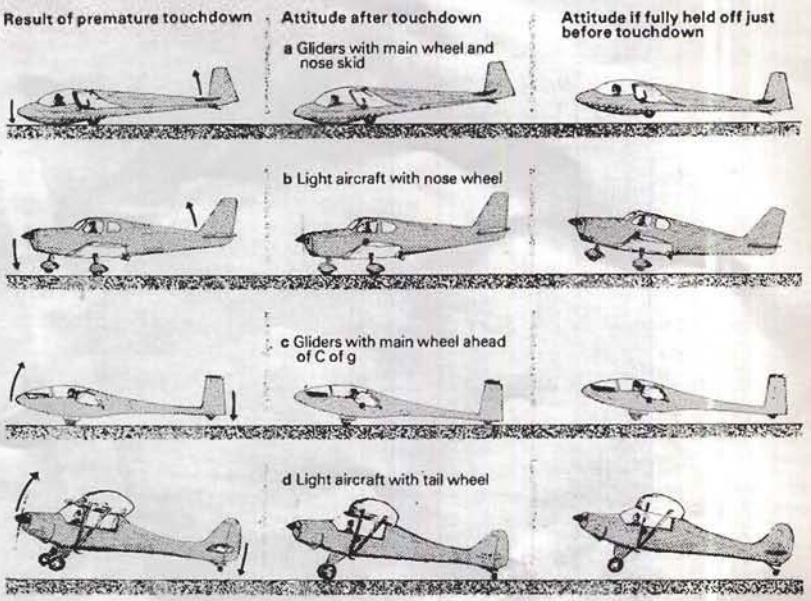
Bouncing and ballooning

On other machines, the main wheel is well forward of the c of g. Unless a perfect landing is made onto smooth ground, any touchdown made with the tail skid off the ground may result in the rebound pitching the nose up as the front wheel touches first. This will cause bouncing and ballooning. If, however, these machines are held off fully, the touchdown will be on both the front wheel and tail skid simultaneously. Then there will be no tendency to pitch nose up, no bouncing will occur, and, as before, all the excess flying speed of the approach has been used up so that as the machine sinks onto the ground there is not enough speed, and hence not enough lift, for the aircraft to leave the ground again.

With most aircraft, the designer sets the wings onto the fuselage at such an angle that, if the aircraft is held off fully just above the ground for as long as possible, it will touch down correctly for a perfect landing. For example, on most gliders this technique will result in a touchdown on the wheel and tail together. On a tail dragger (a tail wheel aircraft such as the Condor or the Cub) again the landing will be wheels and tail together. On a nose wheel type (Cessna, Cherokee, etc), the aircraft will settle down on the main wheels with the nose off the ground. In this case the wing incidence is set so that it is practically impossible to touch the tail of the aircraft. It lands itself before it can reach such an extreme angle.

The principle of holding the aircraft off the ground as long as possible will result in a good landing in all cases and it is only in very windy or gusty conditions that it needs to be modified. In these conditions there is a possibility of the glider being ballooned up a few feet at the last moment

Fig 2



by a gust and this could result in a heavy landing if the gust subsides a few seconds later. It is prudent in very gusty conditions to allow the glider to touch down a little earlier than normal while it has a bit of speed in hand. If the airbrakes are opened fully at the moment of touchdown this will reduce the risk of a gust of wind or a bump in the ground lifting the glider off again.

It is also much safer to arrange for all landings to be made with some airbrake applied. (Usually your instructor will be manipulating the airbrakes in the early stages while you are learning to land.) Then, if the glider does bounce or balloon and there is a risk of it sinking heavily onto the ground, the airbrakes can be closed (partially or fully as necessary) so that it will float on further for a safe landing. Closing the brakes increases the lift and reduces the drag so that the glider will keep flying a little longer. It is rather like using a burst of engine power in a light aircraft, except that there is only a limited amount available and it can only be used once on any landing! If the airbrakes are opened fully at the moment of touchdown and the stick is held stationary for a few seconds the glider will stay firmly on the ground. This technique for correcting a bounce or balloon cannot be used in gliders or aircraft using flaps instead of airbrakes. Closing the flaps reduces the drag but also reduces the lift as well and if this is done at low speed the aircraft sinks or, in an extreme case, stalls. Special care is needed in gusty conditions for the approach and landing control if you are landing a glider fitted only with flaps. (Some modern gliders feature power flaps for this purpose.) On touchdown, therefore, a small forward movement is required to hold the glider down firmly while the flaps are raised to reduce the lift.

When we first adopted the tail-down landing for gliders it was particularly noticeable that the main opponents were instructors who had learned to "fly on" and who were themselves underconfident about holding off for a proper landing. Now it is almost universal to find that a landing which is not fully held off will be criticised by an instructor. In my own gliding centre, it seems to have greatly reduced the number of bad landings and minor

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damage and this is well worth the little extra trouble needed during tuition. It is particularly important for cross-country flying, when the surface of the landing area may turn out to be rough and where there is only a limited area available. But quite apart from the risk of damage, there is, I believe, an even more important reason for adopting a proper style of landing.

Many glider pilots convert to powered aircraft at a later date and habits are very difficult to change. Any power instructor who has tried to convert glider pilots onto light aircraft, particularly tail draggers, will tell you that it is often much quicker to teach a student who has done no flying at all. This is because the glider pilots who have never been taught to hold off fully for a landing have become inhibited and frightened of holding off for fear of being too high or stalling the aircraft. Once this fear has become established, it is extremely difficult to overcome. The result is that these glider pilots keep touching down prematurely when they attempt to land any normal aircraft.

Often the pilot has not really learned to judge his height accurately. He merely levels out a few feet above the ground and allows the aircraft to sink and land itself instead of using the controls to check the sinking just as the aircraft reaches the ground. On most occasions this produces a reasonably acceptable landing but it explains the large number of light aircraft and gliders damaged on landing. If the hold off happens to be a little too high or too low, a heavy landing will occur. It is often difficult for the instructor on a nose wheel type of light aircraft to fault the students' landings unless they are really bad. However, with a tail dragger, lack of judgment is obvious since these aircraft will bounce unless they are landed correctly. Similarly, the gliding instructor can tell immediately whether the pilot has really learned to land if he insists on a fully held-off landing.

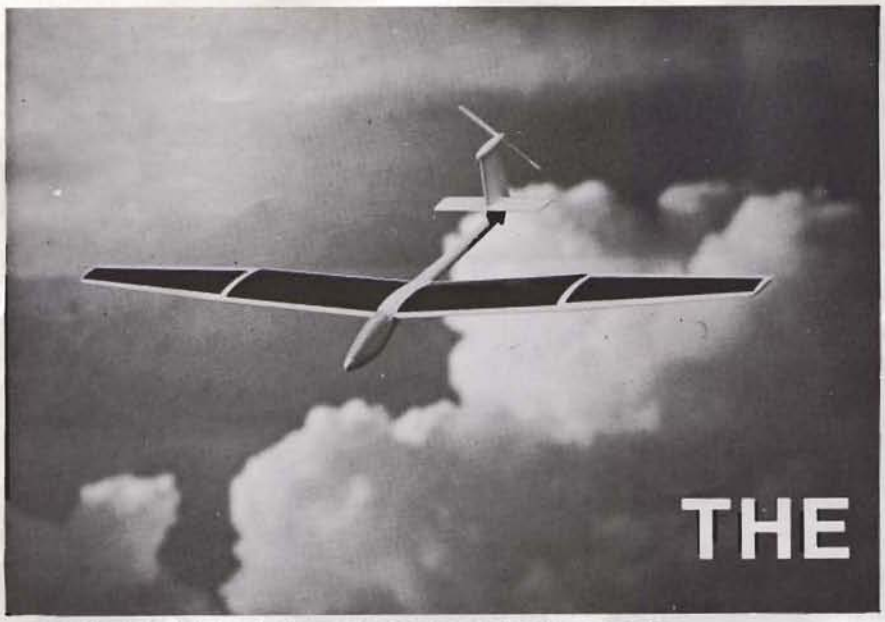
After proper glider and power training, conversion from one to the other should present no particular problems. The real differences are that the hold-off height must be varied to allow for the length of the undercarriage and that the effectiveness of the elevator declines more rapidly as the speed is lost during the final stages of the hold off in the powered machine.

But for this problem of conversion, glider training might easily have become a normal part of pilot selection many years ago. Unfortunately, tests showed that bad landing and rudder habits learnt in the earlier days on older types of gliders resulted in it taking more flying time to train an ex-glider pilot than an absolute beginner.

With modern machines and good instruction, we know that this is no longer true. Of course, at any time poor instruction leads to bad habits and these are always difficult to eradicate at a later date.

While there still are, and may always be, differences of opinion about the most desirable style of landing, the case for a fully held-off, tail-low touchdown is, in my opinion, overwhelming. In brief it can be summed up as follows:

- **a** It reduces the landing speed and therefore the risk of damage on rough ground.
- **b** The shock is taken on the main wheel which can take very large vertical and side loads and absorbs most of them through the tyre.
- **c** It avoids damage to the front skid (if fitted) caused by flying into the ground, particularly with drift.
- **d** It prevents bouncing and ballooning by ensuring that flying speed is lost by the time the glider touches down.
- **e** It leads to good landing habits which can easily be adopted to suit any type of machine or conditions.
- **f** It requires judgment and a proper understanding which are essential in the long run, for safe piloting.



FRANK IRVING

tells us about the

THE SUN SHIP

Fig 4 Model of a 30m span sun-ship (Model provided by Freddie To, photograph by John O'Leary).

Why bother with thermals when, with current technology, it would be possible to build an aircraft directly-powered by solar energy and capable of continuous flight for several hours per day? In effect, it would be a sailplane with a lift-drag ratio of infinity: indeed, in favourable circumstances, it could gently climb.

The idea is quite an old one, originally mooted by the imaginative Dr Raspet. Take a sailplane-like aircraft, cover the top of the wings with solar cells and use the electricity to drive a propeller. In Gus Raspet's day, it is unlikely that the then state-of-art would have permitted level flight in any likely machine but an analysis of more recent developments (see Ref) shows that it is now possible.

Fig 1 shows the intensity of solar radiation arriving on a horizontal surface at sea-level on a clear day at latitude 51°,

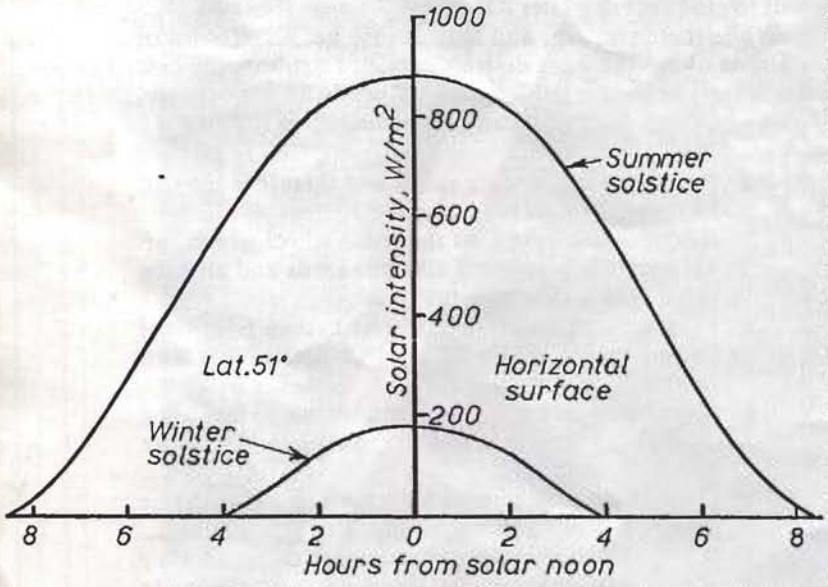


Fig 1 The intensity of solar radiation on a horizontal surface at sea-level at latitude 51°.

roughly that of Lasham. The maximum intensity is nearly 900watts/m² and exceeds 600watts/m² for about four hours either side of solar noon at the summer solstice. Current silicon solar cells have an efficiency of about 15% and, with care, the electric motor and propeller should have an efficiency of about 85%. Putting all this together, an aircraft with a power requirement of about 70watts/m² of wing area looks distinctly hopeful.

Minimise the cost

Fig 2 shows minimum power requirements for a family of sailplane-like single-seat aircraft. They were assumed to have ultimate load factors of 6.0, realistic geometry and structure weight and the various contributions to the total drag were similar to those used for calculating sailplane performance. A figure of 2kg/m² of wing area was inserted to take into account the weight of the solar cells, control gear, motor and propeller. The requirement is obviously that, for a given minimum power per unit wing area, the total power should also be as small as possible, to minimise the cost of the solar cells. This consideration leads to big spans—upwards of 30m—and fairly low aspect ratios—around 12.

If one assumes a series of such machines of various spans, each of the optimum aspect ratio, it is then possible from this data to calculate flying time per day for each span. Since the minimum power speed can also be calculated, the distance, assuming no energy shortage, can also be obtained. Such calculations lead to Fig 3, which also shows the corresponding results at the equator at the equinox. For the larger aircraft, the times and distances in the latter case are shorter than at 51° at the summer solstice because the days are shorter. In fact, one could improve somewhat on these distances and durations by storing energy by climbing during the part of the day when a surplus of energy is available.

These figures assume a completely clear day with no help from thermals. Given thermals as well, but subtracting some direct solar energy due to the cloud shadows, the consequences could indeed be spectacular.

Fig 4 shows a model of a notional aircraft for which I am indebted to Mr Freddie To. It was originally made for a film on manpowered flight and related aviation but, in the event, not used. Its performance is a little more modest than the above cal-

culations would suggest, since only 80% of the wing is covered with solar cells. The characteristics and performance are as follows:

Span	30.00m	Length	13.50m
Height (Propeller horizontal)	3.35m	Aspect ratio	12.00
Wing area	75.00m²	Propeller diameter	4.00m
Weight	1040kp, 2290lb	Max L/D	33.70
Cruise speed (min power)	59km/h, 32kts		

Powers, kW	Level cruise	Max available
Thrust power	5.76 (77watts/m²)	7.65
Prop shaft power	6.40	8.50
Solar cell output	6.78	9.00
Max excess thrust power		1.89kw
Max rate of climb		0.19m/sec

An alternative possibility, instead of building such an enormous heavy machine is to boost the performance of an otherwise conventional sailplane by using solar energy. Allowing for the effect of cloud shadows, the effective mean additional thrust power might be about 60watts/m² of wing area. For a conventional sailplane of 20m span, this would be equivalent to operating in an air mass rising everywhere by about 0.23m/sec. In other words, the overall effect is as if the polar were displaced upwards by this amount: the max L/D would become something over 60:1, but the consequence at high speeds would be far less spectacular. Nevertheless, the gain in performance would be appreciable: with an average rate of climb of 4kts, the cross-country speed would be improved by about 18%.

A completely different possibility consists of passing some suitable working fluid such as Freon through ducts under the wing surface, which is painted black. The vapourized Freon works a turbine which drives the propeller. The Freon condenses and is returned to the heating ducts, so we have a cycle like that of a steam engine. Since the temperature differences are not very great, the efficiency would be low: rough estimates suggest a figure very similar to that of the solar cells.

In principle, the solar-cell aircraft is feasible with present-day technology, give or take a little R&D on the motor. There is, alas, the inevitable snag of cost. Solar cells are very expensive and such a ship would cost several hundred thousand pounds.

REFERENCE

Irving, F.G. and Morgan, D. "The Feasibility of an Aircraft Propelled by Solar Energy". Presented at the AIAA/MIT/SSA 2nd International Symposium on the Technology and Science of Low Speed and Motorless Flight, Cambridge, Mass, USA, September 1974.

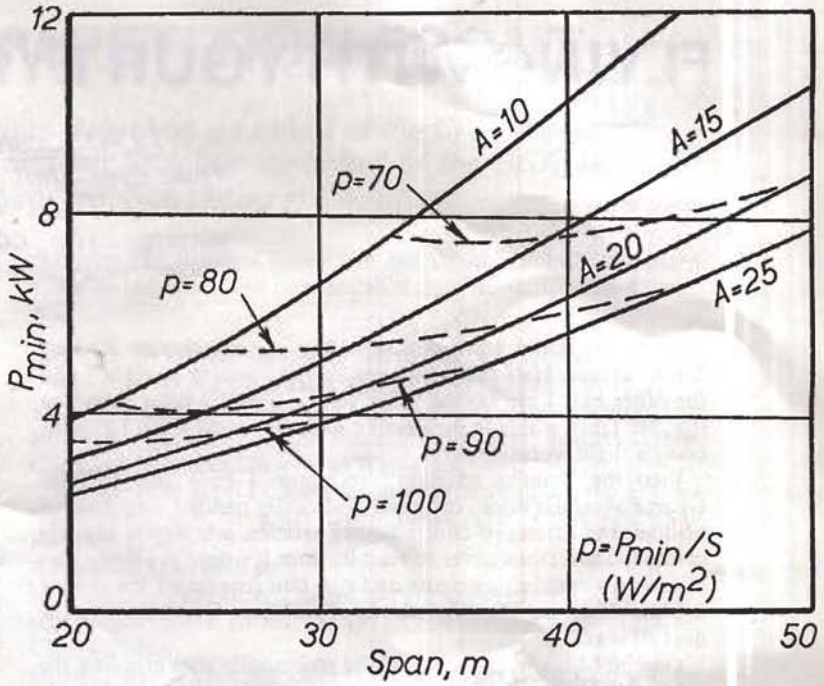


Fig 2 Minimum power requirement of sailplane-like aircraft of various spans and aspect ratios. The solid lines represent total power while the dotted lines relate to constant values of power per unit wing area.

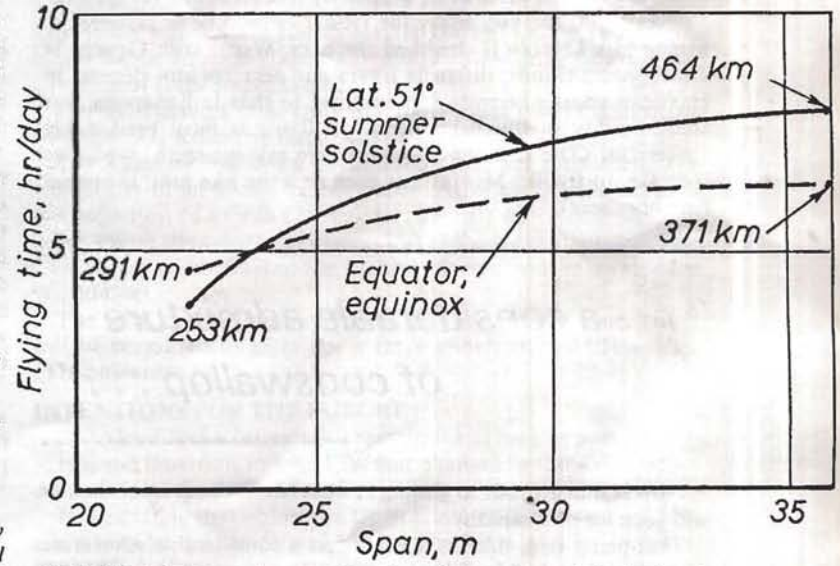


Fig 3 Flying time per day as a function of span for optimised aircraft without energy storage.

FLYING WITH YOUR EYES OPEN

PLATYPUS can't resist commenting on "Flying With Their Eyes Shut . . .", the article in the last issue on p56 by Rodney Tibbs who questions the competitive side of gliding. The controversy spills over onto the correspondence pages.

Ambivalent is the word that describes my reaction to Rodney Tibbs' article. Half the time I am saying "you're so right" and the other half I am saying "don't be so wet!" I hope therefore that Mr Tibbs will take the smooth with the rough when I give his essay a slight working-over.

First the "you're so right" response: I have just finished George Moffat's book, or rather his heavily padded collection of brilliant but often self-contradictory articles, and would heartily commend Mr Tibbs never to read it, since it would probably precipitate an apoplectic seizure and rob him forever of the chance to stumble on the other two-thirds of his Silver C sometime in the next 20 years.

George M is *the* exponent of the philosophy that grinding the other fella's face is life's greatest, if not sole, pleasure. I don't think any Moffatt howidunit describes the scenery, unless it is a source of thermals, or a potential landing field.

To say to him, after being pipped by five seconds over 500kms, "never mind, did you enjoy the view?" would be as tasteless as asking Mrs Lincoln if she liked the play. Worse still, George M clearly hates clouds, distrusts waves and despises any element of choice or chance because it is inimical to that Indianapolis race track rigidity in which his precision flying is most predictably successful. (The fact that I would give my eye-teeth, whatever they are, to fly like Moffatt, or even to write like him, is neither here nor there).

"... a considerable admixture of codswallop ..."

Now if that attitude to gliding is what Mr Tibbs is agin, then he will get a lot of sympathy.

That being said, there is nevertheless a considerable admixture of codswallop in Mr Tibbs' article. The view from a 13000ft climb in cloud or wave is something he has apparently missed, unless he achieved them by accident and resolutely refused to carry a barograph so as to keep his conscience clear. Well, Rodney, it *is* worth while. Again, one of my most memorable flights consisted of threading my way through, rather than over, the Welsh mountains for hours under a clear blue sky to land by the edge of the sea. I would never have done such a thing to the syndicate treasure, nor dragged a loyal crew so far, had it not been a competition day with everyone eager to go and the adrenaline flowing. I might not even have rigged.

One of the most exciting experiences in flying is to race along a cloud street with a dozen other gliders like a shoal of dolphins. If you ain't done it, don't knock it, as the actress said to the bishop.

"... anticlimax and sadness. A common reaction ..."

Mr Tibbs bases too much on one man's observation that a brilliant flight left him with a feeling of anticlimax and sadness. But that is a common reaction: ask a mountaineer or an artist—or ask the bishop. It doesn't mean that the experience was not worthwhile, enjoyable or memorable.

Years ago at my club we had a debate on the motion that the fun was going out of gliding. I opposed, and still do. (If any fun *is* going out it is the government's fault. Parkinson's law says that the number of admirals increases in inverse ratio to the number of ships in the Navy. Similarly, the number of airways and control zones increases as the number of military and civil aircraft declines.) Anyway I defined "fun", then as now, as being wholly absorbed in doing something that you are doing for its own sake.

Competitions and badges and goal flights create the circumstances in which one can have a great deal of fun as I've defined it—though if you are not careful it can degenerate into work. (Work can be defined as wishing you were doing something else.)

There is another kind of fun—armchair fun. (Watch it, this is a clean mag—ED.) I mean, all the winter planning and daydreaming and drawing of *gigantic* triangles on maps, wondering whether a wave or a sea breeze or an *enormous* cu-nim would waft us the last hundred miles home.

There's fun in the bar. (I'm warning you—ED) "D'you remember that day in 1959 on the out-and-return to Cambridge and you and me and that purple Oly and the yellow Skylark 3 were scratching near the turning point . . . ?"

Yes he does remember: you find that *everyone* has photographic memories. The gliders, the numbers, the faces, the weather, the crops. Crews, too, have total recall with retrieve yarns twenty years old about carrying the whole caboodle 300 yards in knee-deep mud (impossible, of course), about beer at a shilling a pint and cream teas—all in glorious Technicolor. Pictures that time cannot erase. Fun that can never be taken away. All through pursuing the sordid objective of acquiring a bit of jewellery or beating the next slob into 36th place.

Go on, R. Tibbs, have a bash. Pretend you didn't even know the barograph was in the glider. "Aw, shucks, I only went up for the view. That little ornament? Just bought it as a hedge against inflation, instead of Krugerrands. But I must tell you about the retrieve from Morocco . . ."

CHANGES ON THE COMPETITION FRONT

A New 15m Class and 1974 Standard Class Rules Rejected—*a précis of the CIVV meeting in Paris on March 14—15, attended by Ann Welch and Ian Strachan on behalf of the BGA, when vital decisions were taken to change the pattern of competition gliding in the future.*

A BGA paper was circulated to CIVV in January, its particular thesis being that the Standard Class Rules (the so-called 1974 Rules) proved to be unsatisfactory on a number of grounds and the 1974 Rules should be dropped. This was discussed at length at the meeting, at which 23 countries were represented, with Holland, Finland, Norway, Italy and the USA arguing for the continuation of the 1974 Rules.

A vote was taken which rejected the 1974 (flap) Rules by 13 to seven, meaning that the Standard Class will now revert to the 1972 Rules with the introduction of a 15m Class with no other limitations.

A new and simplified set of Rules for the "1972 Standard Class" and a CIVV statement on future Classes is given at the end of this report.

Hang gliding. After a fairly short discussion, it was decided unanimously that:

1 Hang gliding should have a separate Sporting Commission under FAI.

2 FAI President would contact National Aero Clubs so that an inaugural meeting of hang glider enthusiasts could be held.

3 CIVV was ready to help with liaison but not control.

Lilienthal Medal: The "father of gliding" in Switzerland, Auguste Hug was voted for this, the highest award that the CIVV can bestow.

A sub-committee was formed under the Chairmanship of Per Oberg (Sweden) to make recommendations on a future "Club Class".

A sub-committee was formed under the Chairmanship of Per Weishaupt (Denmark) to make recommendations on future motor glider performances. "Self-sustaining Motor Gliders" were removed from the Sporting Code, leaving a motor glider only as one capable of self launching in accordance with the CIVV take-off and climb requirements.

1978 or 1979 World Gliding Championships: Argentina had volunteered to run a WGC after Finland. Other countries were asked whether they wished to bid.

CIVV ELECTIONS:

1 CIVV President Pirat Gehriger (Switzerland) announced that he would stand for another year, but retire at the start of the March 1976 meeting. Nominations for the Presidential vote (made in secret) were Gehriger, Morelli (Italy) and Ann Welch (UK). Piero Morelli and Ann Welch then withdrew as neither wished to stand against Pirat Gehriger who was re-elected with acclamation.

2 The existing Vice-Presidents who wished to stand again were re-elected. These were Ivans (USA), Morelli (Italy), Welch (UK).

3 After a secret nomination, a secret vote was held for three further Vice-Presidents from those nominated who confirmed that they wished to stand: Makula (Poland), Ragot (France), Johannesson (Norway) were elected.

Schwing (Holland) was elected unanimously as CIVV Secretary.

Future Meetings: The FAI General Conference—Montreal September 22—27; the CIVV Bureau—November 28—29 and March 4, 1976 (President, Vice-Presidents and Secretary only); the full CIVV Delegates meeting—March 5—6, 1976 and the OSTIV Congress (The International Gliding Technical Commission)—Finland from June 17—26, 1976.

The two CIVV papers already mentioned, follow. These are the plan for future Classes and the simplified 1972 Standard Class Rules, which will now be called the "Restricted 15m Class" Rules.

WORLD CHAMPIONSHIP CLASSES AFTER DECEMBER 31, 1977

The 1976 Championships will be run in accordance with the accepted regulations of the Finnish Organisers: namely, Open Class and Standard Class (as at Waikerie).

For the next World Championships after Finland, the following Classes will be used: Open Class; 15m Class and 15m Restricted Class.

Additional Information

In introducing the three Classes in 1978 at the earliest, CIVV disregards paragraph 10.5 of the 1971 Code in the interest of future Class stability.

Open Class. Within the Open Class the 19m Gold Cup will be maintained.

15m Class. The only limitation in this Class is a Max span of 15000mm.

Explanatory Note

This Class will contain gliders built to the 1974 Rules (with fixed hinge flaps). In such gliders any modification may be made (*eg* coupling of flaps and ailerons).

15m Restricted Class. Only Standard Class gliders complying with the 1972 Rules (no flaps) will be accepted.

The Rules as laid down in the 1965 Code are simplified. The wording is in an annex to this paper. After CIVV has accepted the definition of a Club Class glider, aircraft which conform and those whose span does not exceed 15000mm may be entered. The Club Class glider having the highest placing will be awarded a World Cup.

The total entry from any NAeC may not exceed four, but it will be permitted to enter up to three gliders in one Class from 1978 onwards.

INTENTIONS FOR THE FUTURE

The 15m Class is intended to remain for as long as possible.

It is the intention to avoid further changes in the Rules which define any of the WGC Classes.

It is possible that either the Open Class or the Restricted 15m Class may be deleted or replaced by another Class; for instance, by the Club Class.

Changes in WGC Classes will be made in accordance with the time scale laid down in the Code (10.5, 1971 Code; provisional number for new Code 8.6)

RESTRICTED 15M CLASS

The following definition of the 15m Restricted Class is derived from the 1971 Sporting Code through cancellation of the Rules relating to the flap/airbrake solution.

Obligatory Requirements

WINGS: The span must not exceed 15000mm. Any method of changing the wing profile other than by normal use of ailerons, is prohibited. Lift increasing devices are prohibited.

AIRBRAKES: The glider must be fitted with airbrakes. No tail parachute is permitted.

UNDERCARRIAGE: The undercarriage may be fixed or retractable. The main landing wheel shall be at least 300mm in diameter and 100mm in width.

BALLAST: Waterballast which may be discharged in flight is permitted.

ASSESSMENT OF TURNING POINT PHOTOGRAPHS

K. R. BROWN

For many years now pilots have been taking photographs of turning points during competitions and on certificate flights and from time to time articles have appeared giving advice on photographic technique. However, as far as I know, there has not been an article on assessing the photographs. Consequently these notes, which describe some of the ways of deducing the position of a glider from a turning photograph, may be of interest.

Equipment

No elaborate equipment is needed. The essentials are a light box and magnifying glass for viewing the film, maps of the turning points, a good quality millimetre scale and some basic drawing instruments.

The light box consists of a translucent screen with a light underneath it, arranged so that the film can be viewed by the transmitted light. This enables scales and straight edges to be placed in contact with the film.

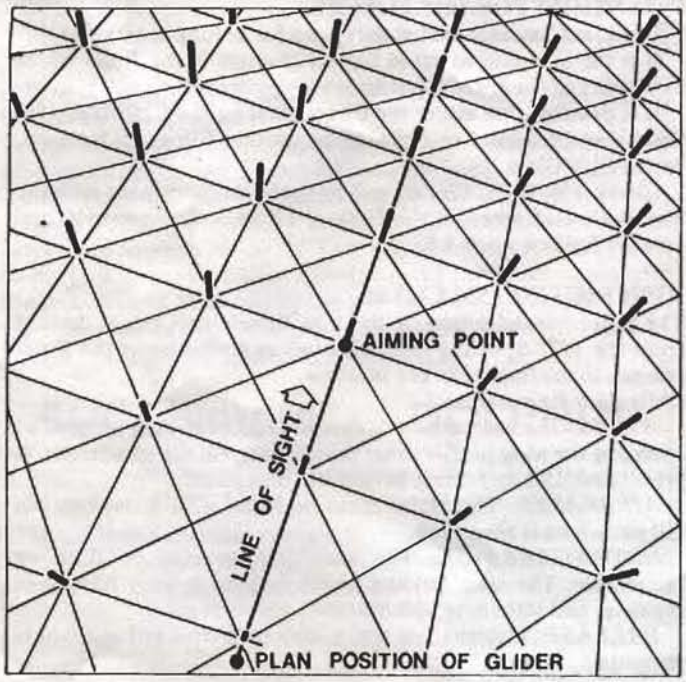
The best maps for the job are probably the 2½in Ordnance Survey as they show details such as field boundaries which do not appear on the smaller scale maps. However, the 1:50,000 or the old 1in maps are usually good enough.

Perspective Effects

Compared with the map, a turning point photograph gives a distorted picture of the ground. The particular pattern of the distortion depends on the position of the camera and the direction in which it was pointing. So, provided there are enough features on the photograph which can be identified on the map, a comparison between the two will enable the position of the camera and the glider to be found.

Fig 1 shows how a pattern of squares with diagonals and long vertical poles at each corner might typically look to the camera.

Fig 1



The point which the camera was aimed at lies at the centre of the picture. The bearing of the glider from the aiming point is given by the line joining it to the plan position of the glider, and I shall call this line the camera's line of sight. In the illustration it runs along the sides of a row of squares. Notice that although all the straight lines appear straight in the picture their relative directions are changed. Only the sight line and lines perpendicular to it are unaffected. Each other set of parallel lines converges towards a point and the more distant lines tend to appear more perpendicular to the sight line than they would on the map.

At the same time the sides of the squares at right angles to the line of sight look smaller the further they are from the camera and in fact the scale of the photograph across the sight line decreases linearly as one goes up the picture. The sides of squares parallel to the line of sight are subject to the foreshortening, which becomes very marked with increasing distance, so that the more distant squares appear compressed. On the other hand the squares in the extreme foreground may be elongated to some extent. All these effects become more marked when the camera is pointed downwards less steeply. If the ground is very hilly the perspective effects will be distorted to some extent. All the vertical lines point towards the plan position of the glider.

Fig 1 also illustrates that the sight line does not generally run perpendicular to the frame of the photograph. This is because the camera is rarely held level, even when it is mounted on a bracket. It is generally rotated about its viewing axis to some extent, *ie* banked as well as pitched down.

Finding the glider

It is only necessary to work out the complete position of the glider if it was outside the required zone and a penalty is to be applied. Usually it is good enough just to show that it was in the zone, and this can often be done by finding its bearing from the turning point or a feature close to it. The most convenient method is to find a vertical object, because a line drawn along a vertical points towards the plan position of the glider.

Figs 2a and 2b show a turning point photograph of Didcot station and the corresponding piece of map with a photographic zone marked on it. Pylon A on the photograph is vertical and the line AL drawn through it vertically downwards will point towards the glider. By noticing its relation to the cross-roads X and the junctions Y the line can be transferred to the map. Here it can be seen to run into the zone, and as the glider was clearly not between the pylon and the station (the south sides of the buildings near the bottom of the photograph are visible) it must have been in the zone.

One could just as well have used pylon B, which gives a line BM pointing towards the glider. The intersection of these two lines on the map gives an idea of the position of the glider but because they cut at a shallow angle, any small error in setting them out would give a relatively large error in the glider's position.

In a competition, where there are several similar photographs to deal with, one mentally transfers the boundaries of the zone onto the photograph. Then, once the direction of the vertical has been established, it is obvious whether the glider was in the zone or not without referring to the map.

Where there are no distinct vertical objects it is often possible to find things such as trees, which although not truly vertical and

Fig 2a

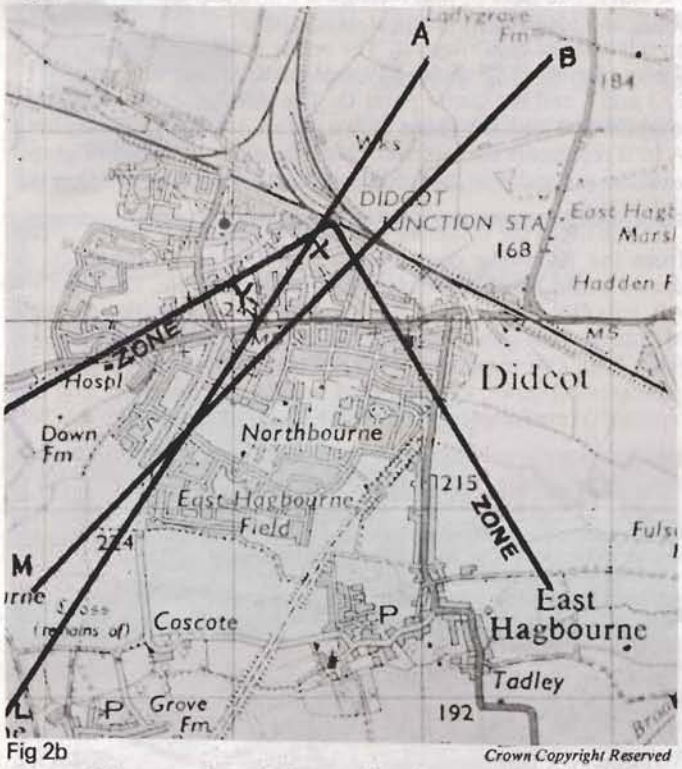


Fig 2b

not straight enough to define a direction precisely, do give an idea of the vertical. Often several such objects taken together give a general appreciation of the direction of view which is good enough if the glider was well inside the zone.

Brian Pratt's Method

Another method of telling whether or not the glider was in the zone depends on the way in which angles are affected by perspective. It is particularly useful when there are no suitable verticals. The two side boundaries of the zone are plotted onto the photograph and if they converge at an angle of less than 90° at the turning point the glider was outside the zone. If the angle is greater than 90°, the glider was either inside the zone or inside the 90° sector opposite the zone. In the latter case the photograph will appear upside-down when viewed from the direction of the zone.

The method is illustrated in Figs 3a and 3b, which are a photograph of Shrewsbury and the corresponding piece of map with a zone marked on it. The turning point is the railway bridge over the river and the two boundaries of the zone pass through the end of the small bridge X and the railway junction Y. The lines joining X and Y to the turning point on the photograph meet at an angle of 111°. The picture is clearly not upside-down so the glider was in the zone.

Miscellanous Indications

The two methods so far described will deal with the majority of photographs but occasionally other indications are useful. For example, if the horizon appears on the photograph, a line drawn at right angles to it through the centre of the picture will be the line of sight.

If the orientation of a building is known, noting which two sides of it are in view will give the bearing of the glider to something better than 90°. This is very convenient if the building is the turning point and the boundaries of the zone are in line with two of its sides.

A circle on the ground (a roundabout, gas-holder, sewage farm or airfield dispersal for example) will appear as an ellipse on the photograph. The short axis of the ellipse points towards the glider.

Fig 3a

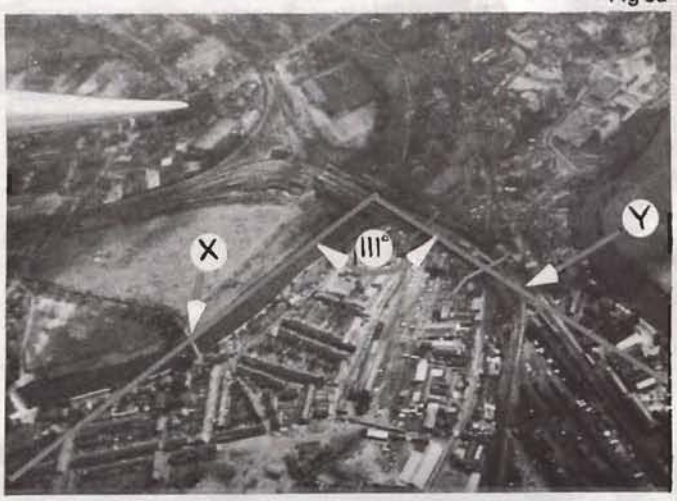
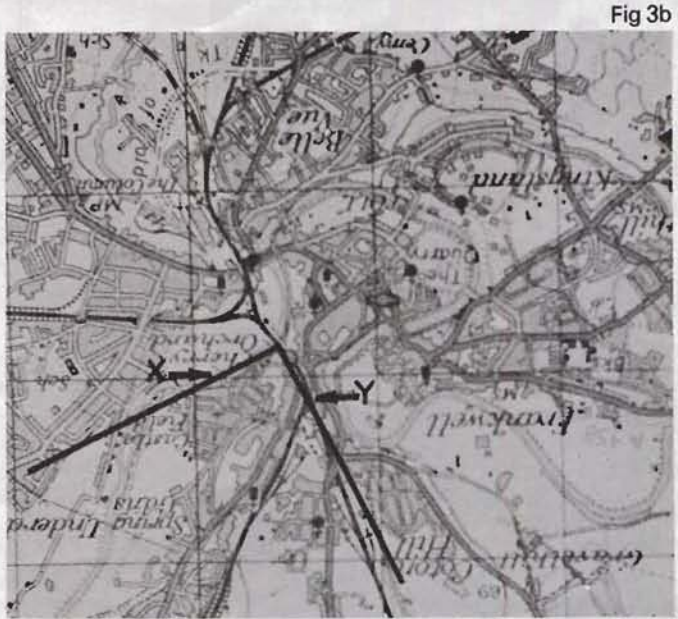


Fig 3b



The complete position

If the glider is found to be outside the zone it is necessary to find its complete position, not just its bearing. The method which I shall describe depends on working out the distance of the glider from two points on the sight line, a simple construction will give its position. Figs 4a and 4b illustrate the method. (Note that the measurements in this example were taken from the original negative and map. Both these have been enlarged for this article so you will find that the numbers quoted do not correspond directly to your millimetre scale.)

First the line of sight is established. The vertical through the power station chimney runs close enough to the centre of the photograph to represent it. Now a pair of features are selected in the distance on the photograph lying on a line roughly at right angles to the sight line and a good distance apart. For example the road junction "a" and the intersection of the track and stream "b". The distance ab between the features is measured on the photograph and the corresponding distance AB is measured on the map. The distance "r" between the centre of the photograph and the intersection of ab and the sight line is also measured. Then, if F is the focal distance of the camera, the distance of the glider from the intersection of AB and the sight line on the map is given by:—

$$S = \frac{AB}{ab} \times F\sqrt{1+\left(\frac{r}{F}\right)^2}$$

S is a distance in three dimensions, not along the surface. If all the measurements are in millimetres, S comes out in millimetres on the scale of the map.

In a similar way another pair of features is chosen, this time in the foreground, for example the road junction "c" and the bend in the stream "d". The distance S of the glider from the corresponding line CD on the map is worked out in the same way.

In the example:—

	AB	=24.2mm		CD	=14.0mm
	ab	=19.1mm		cd	=17.7mm
	r	= 4.0mm		r'	=11.0mm
	F	=42.5mm	(A general value for the instamatic)		
So	S	=55.0mm		S'	=34.7mm

On the map, two arcs are drawn of lengths S and S' and with their centres at the intersections of AB and CD with the sight line. A perpendicular drawn from where the arcs cross to the sight line gives the plan position of the glider (G in the illustration) and the length of the perpendicular incidentally represents the height of the glider on the scale of the map. This construction should really be drawn in a vertical plane above the sight line but it is more convenient to turn it on its side as it were, to give one's pencil something to mark.

As measurements are bound to be somewhat rough, the position of the glider will not be exact. If the arcs were drawn with a brush instead of a fine pencil, the area covered by their intersection would give some idea of the possible error. For an accurate plan position the photograph should not be taken too close to the vertical. The angle of the cut in the example indicates a reasonably good plan position and a very poor height estimate.

Other Methods

There are a number of other methods which can be used to find the bearing of the glider or its complete position when the methods described so far can not be used. Most of them require many measurements, extensive calculations or special equipment and, consequently, are only suitable for the odd difficult photograph. As they are of limited interest I shall describe only one.

A rectangle is drawn on the photograph, as large a one as possible with the line of sight preferably not parallel to either of the sides. The sides of the rectangle are then located onto the map using any identifiable features as a reference. This will produce an odd shaped quadrilateral. The centre point of the photograph is also plotted. Fig 5 shows a typical quadrilateral with corners 1, 2, 3 and 4 and the centre point O. The sides of the quadrilateral are extended until they meet at two points A & B. The line joining A to B represents the intersection of the plane of the photograph with the ground, and the perpendicular from it through O is the line of sight.

If one needs the complete position of the glider it can be found from the following construction (See Fig 6). A semicircle is drawn with ON as diameter. A second semicircle, this time on AB, cuts ON at a point M. A circle with centre N passing through M cuts the first semicircle at P. Finally a perpendicular is drawn from P to ON meeting it at Q. If one follows this exercise in geometry correctly, Q is the plan position of the glider and the length PQ represents its height on the scale of the map.

Fig 4a

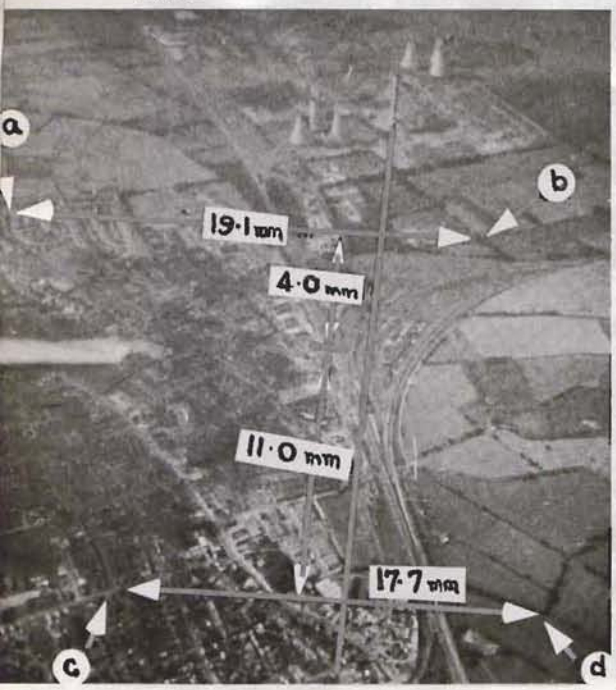


Fig 4b

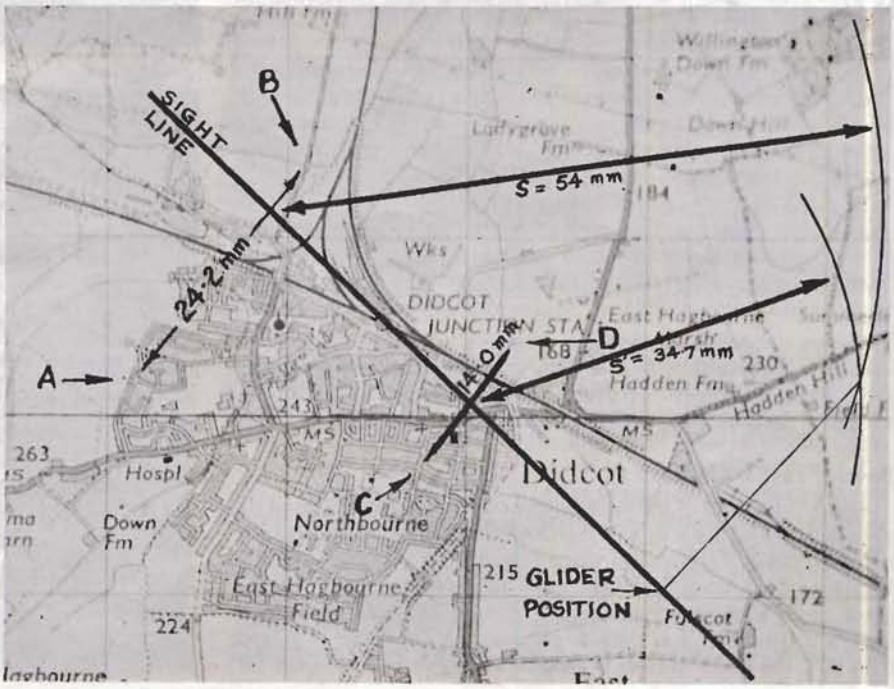


Fig 5

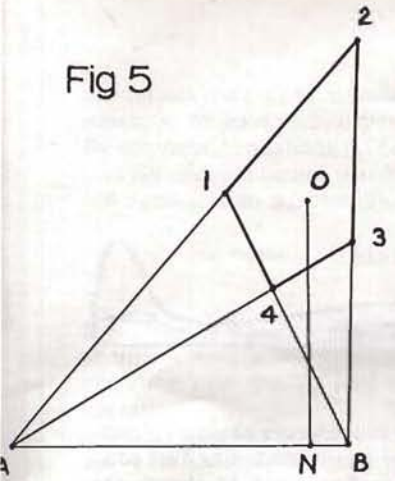
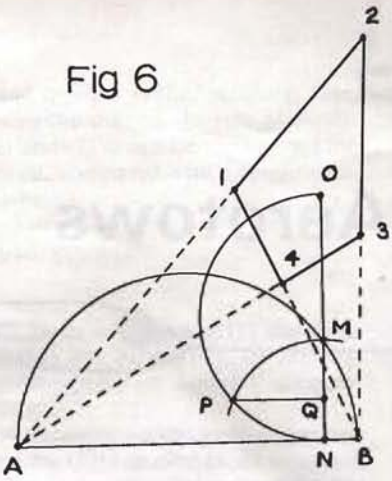


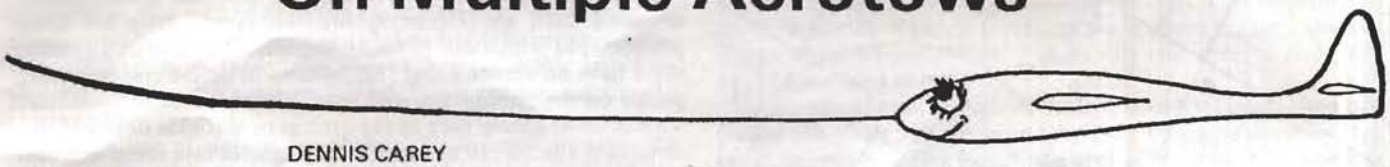
Fig 6



Choice of Turning points

The reader will probably have noticed that none of the methods described can be used in every case; each one has its requirements and limitations, and it is this that makes photo-assessing such an interesting job. However, there are some photographs which are virtually impossible to assess. Typically these have no verticals and few features to define corresponding points on the photograph and map. They tend to be associated with isolated spaces such as the centres of airfields or road junctions in the middle of nowhere. A thoughtful task setter will bear this in mind and choose turning points which as well as being easy for pilots to find and recognise also give the assessor the landmarks and verticals he needs.

On Multiple Aerotows



DENNIS CAREY

Everybody knows that aerotows are expensive and becoming more so, but no one has found a better way of getting airborne. In the absence of any dramatic improvement in (wire) launching techniques, aerotows are likely to remain with us well into the foreseeable future, so that any method of stabilising their cost is worthy of serious consideration.

A double aerotow appears to offer certain tangible advantages over the conventional single tow method, and we shall be concerned here with the relative economics of the operation. As far as the operational, training and legal aspects are concerned, I claim no knowledge of the subject whatever, and we must look elsewhere for practical guidance on how to do it, emergency procedures, organising the launch point, C of A restrictions and any other relevant matters.

Just food for thought

Let it be understood therefore, that the following notes must not be construed as an open invitation to find a willing partner and have a go! They should be regarded only as food for thought while the BGA Technical Committee consider the wider issues involved.

If a tug uses for example, one gallon of fuel in towing one glider to 2000ft, then it might reasonably be supposed that if two gliders are capable of being towed simultaneously to the same altitude by a single tug, not only will the cost of launching each glider be halved, but only half a gallon of fuel will be used for each glider launched. Eureka! We have solved the energy crisis, doubled the launch rate and halved the cost "at a stroke"—to use a famous political expression.

It has undoubtedly been thought of before.

But suppose the tug does not climb so fast with two gliders in tow? Then it will, evidently, take longer to climb to the same release altitude and the tug will use more than one gallon of fuel. It also follows that the tug may not make quite so many flights during the day and the launching rate will not be doubled after all.

Anyway, you might argue, we haven't got a very powerful tug and it just wouldn't get off the ground with two gliders in tow. Or if it did, the rate of climb would be so low that there would be no advantage to be gained. And what about the risk? Double aerotows have never become popular as far as the average club member is concerned—nor likely to.

If the prospect of sharing your tug with a stranger, some nervous novice, or even your best friend, doesn't exactly fill you with enthusiasm, then join the club; the risks are obvious. Nevertheless, with an energy crisis on our hands, rocketing fuel costs and galloping inflation, can we really afford to ignore the potential economic advantages of a routine multiple aerotow launching operation?

Rate of Climb

Let us suppose that the tug always climbs at the same airspeed and throttle setting, then it can be shown that the effect of towing a second glider is simply to reduce the rate of climb compared with a single glider/tug combination, by a factor (X), where

$$X=\frac{A-B}{1+A} \qquad (1)$$

A and B depend only on the weight and performance of the tug and gliders separately.

Launch Rate

We must postulate a somewhat idealised but not unrealistic continuous launching operation, such as occurs at a competition launch involving tugs and gliders of similar performance, where the demand for launches exceeds the supply available. Within certain plausible assumptions, a double aerotow operation will increase the launching rate compared with a single aerotow operation, by a factor (R), where

$$R=\frac{2}{1+C\,\frac{(1-X)}{X}} \qquad (2)$$

X is given by equation (1) and the constant C represents the proportion of the launch cycle required for climb, in a single aerotow operation.

Fuel Consumption

The tug uses fuel at a rate which depends on the throttle setting, which we assume to be constant. If it always descends without delay at idling power, it can be shown that the fuel used per glider launched is reduced compared with a single aerotow operation, by a factor (F) where

$$F=\frac{1}{2X} \qquad (3)$$

and X is again given by equation (1). Note that if X=0.5 (F=1.0) the time required for climb to a given release altitude is doubled and there is no reduction in fuel used per glider launched. Equation (3), which assumes that the fuel used in descent is negligible, is a simplification of a more general expression which applies to tugs which have an engine cooling problem and consequently descend at an intermediate throttle setting to maintain engine temperature.

Cost Per Launch

Fuel consumption represents a significant proportion of the tug operating cost, but the most important parameter that

determines the cost of launching a glider is the launching rate, which, as we have seen, depends primarily on the rate of climb. By combining equations (1) (2) and (3) it can be shown that the cost per glider launched is reduced, compared with a single aerotow operation, by a factor ($), where

$$\$= \frac{1}{R}\,[1+D(RF-1)] \qquad (4)$$

R is given by equation (2), F is given by equation (3) and D is another constant which represents the proportion of the tug operating cost due to fuel consumption in a single aerotow operation.

We are now in a position to work out some examples using the above formulae, to illustrate the improvement in launch rate, the reduction in launch cost and the fuel saving which it might be possible to achieve.

It should be noted that the following tug/glider combinations are chosen only for convenience and do not necessarily represent practical double towing configurations.

Consider a tug such as the Super Cub, towing typical lightweight (K-6E) and heavyweight (Kestrel 19) gliders in single and double tow configuration at 60kts to 2000ft. The tug will have a solo rate of climb of about 12kts, and at a not unduly optimistic launch rate of about six gliders per hour it will consume about 8gals of fuel @ 50p/gal, representing 40% of the total operating cost (say £10/hr) in the single tow configuration. The following additional data is required to evaluate the rates of climb and values of X, R, F and $ in the double tow configuration.

Tug, W=1165lb; K-6E, W=660lb; Kestrel 19, W=1040lb
Glide Ratio @ 60kts; K-6E, γ=26 ; Kestrel 19, γ=42

Single Tow	Rate of Climb	Double Tow
6.85kts	K-6E	4.42kts
5.66	Kestrel 19	3.39kts

For the double tow configurations we obtain:—

	X	R	F	$
K-6E	0.645	1.725	0.775	0.658
Kestrel 19	0.598	1.615	0.836	0.705

In other words, double aerotows will:—

		2xK-6E	2xKestrel 19
1	Reduce the rate of climb	35.5%	40.2%
2	Increase the launch rate	72.5%	61.5%
3	Reduce the fuel used per glider launched	22.5%	16.4%
4	Reduce the cost per glider launched	34.2%	29.5%

when compared with the single aerotow operation.

We can compare the apparent advantages in a more tangible form, bearing in mind that it is the percentage difference between the single and double tow parameters which is rather more important than the absolute magnitude of the numbers involved. Taking average values of X, R, F and $ (corresponding with an average glider of intermediate weight and performance) we find that with:—

Fuel @ 50p/gal

	Cost/ hour	Gals/ hour	Launches/ hour	Gals/ launch	Cost/ launch
Single Tow	£10.00	8.0	6.0	1.33	£1.66
Double Tow	£11.33	10.65	10.0	1.065	£1.13

Note that we have ignored the additional revenue from soaring charges on club owned aircraft due to the higher launch rate, which has increased by 66%.

The cost of fuel we are told is likely to rise to £1/gal in the not too distant future, and the effect of such an increase will increase the tug fuel and operating costs by £4/hr in the single tow configuration, changing the constant (D) in equation (4) from 0.4 to 0.57. Keeping all other factors constant we obtain the following comparative results:—

Fuel @ £1/gal

	Cost/ hour	Gals/ hour	Launches/ hour	Gals/ launch	Cost/ launch
Single Tow	£14.00	8.0	6.0	1.33	£2.33
Double Tow	£16.65	10.65	10.0	1.065	£1.66

Although the percentage reduction in launch cost is slightly less in this example, the nett saving in hard cash increases to 67p/launch compared with 53p/launch with a double tow and fuel at £1/gal, remains virtually the same as the cost of a single tow with fuel at 50p/gal.

The examples given above are based on the somewhat optimistic assumption that the fuel used by the tug during descent is negligible, and consequently there is an average fuel saving of 20% per glider launched in a double tow operation. If we now make the conservative assumption that there is no fuel saving, then putting F=1.0 into equation (4) and keeping all other factors constant we obtain:—

Double Tow

	Cost/ hour	Gals/ hour	Launches/ hour	Gals/ launch	Cost/ launch
Fuel @ 50p/gal	£12.65	13.3	10.0	1.33	£1.26
Fuel @ £1/gal	£19.30	13.3	10.0	1.33	£1.93

We now find that the reduction in launch cost with no fuel saving, depends only on the higher launch rate, but there is still a significant saving in hard cash of 40p/launch, or £400 per 1000 launches, which, for the particular example given above, is independent of the cost of fuel.

Clearly, other combinations of input parameters can be investigated, in particular, the values assumed for the launch rate, tug performance, fuel consumption and operating cost, in a single tow operation; all of which will influence the comparative results and the advantage to be gained, both in percentage and real terms. The numerical values which have been used, are considered to be typical, and representative of current practice and experience.

The general conclusions therefore, appears to be fairly obvious, although further examples would be needed to prove the point beyond dispute. As the cost of fuel continues to escalate, it becomes economically advantageous to use a tug in a double aerotow operation. This is equally true when the demand for launches can be satisfied by single aerotows.

To put the matter in a different perspective, on present day costs and with a tug of reasonable performance, a double aero-

Three for the price of two

tow operation can be expected to provide three launches for (very nearly) the cost of two single aerotows. The principle advantage to a club however, arises from the higher launch rate and a substantial improvement in the revenue derived from tug operations, when charged at the single tow rate, which even for a small club could amount to several hundred pounds annually. For a large

club, a larger peak demand for launches can be satisfied without having to increase the size of the tug fleet or, conversely, a worn out underpowered tug can be pensioned off without reducing significantly the launch rate which can be provided with a double aerotow operation.

The foregoing examples have been based on a simple comparative assessment of the relative economics of single and double aerotow operations, a copy of which may be obtained by anyone interested on application to the address below.* For very powerful tugs, such as the Wilga, it may well prove feasible to tow three or more gliders simultaneously, and the analysis can be easily extended to cover this case, to yield, possibly, potentially greater advantages in launch rate and lower cost per glider launched.

A note of warning, however. Very few tugs are approved for towing more than 1500lb and it must be understood that only single aerotows are normally permitted although the tug C of A may not state this explicitly. In the examples given earlier, a double tow involving two Kestrel 19's, even if it is feasible, would be illegal (at present) since the combined towing weight would exceed 1500lb; but a double tow of two K-6E's (or gliders of similar weight up to 750lb each) would be possible with a special dispensation from the CAA.

There are important and wider issues involved, some of which have been mentioned, not the least of which are the correct operational procedure and the effects on take-off performance, climb gradient and engine temperatures. The latter effect cannot easily be predicted in advance and every tug/glider combination must be considered on its merits. The whole position is currently under review by the BGA Technical Committee and until such time as the present requirements are replaced by new and more flexible regulations promulgated by the CAA, all towing operations must comply with the tug limitations stated in the flight manual and C of A. The only advice that can be offered at present to anyone inspired to have a go, is don't—not yet.

[Requirements for aerotowing are currently under discussion by the Technical Committee and CAA, and trials of double towing have been made so that appropriate limitations can be derived. An announcement will be made when new requirements come into force. ED.]

**Haverthwaite, Cumbria, LA12 8AE (please enclose a large SAE).*

ACCIDENT REVIEW

In this issue BILL SCULL, *Senior National Coach, looks at*

THE COST OF INDECISION

From time to time every pilot is faced with an in-flight decision making situation which is outside his previous experience. Whether he copes depends on how decisive he is and, to some extent, on how big a step in decision making terms the particular situation is from his previous experiences. One hopes that by the time a pilot has some soaring experience he will have been "exposed" to a variety of situations which will improve his airmanship. This exposure can, to a certain extent, be controlled by good supervision, but there is no way in which a venturesome or overconfident pilot can be gradually exposed.

It is not all that easy during training for an instructor to create sufficient critical situations which are realistic. Realistic must be qualified; a critical situation to really test the mettle of your student will induce stress which will impair his decision making ability. If he makes a correct decision under stress, then one can be reasonably confident of his ability.

In the two-seater, however, with the instructor present, the stress will rarely be as great as when the pilot is on his own or, rather, the nature of the stress will be slightly different, *ie* "checkitis". Taking a particular example, say, soaring downwind of the airfield in weak lift and a moderate wind, an instructor may not allow the glider to get into a true final glide position (and rightly so perhaps). Unless he does, however, the student may be oblivious to the fact that the situation was critical.

In the last few years accidents attributable to poor soaring airmanship have been on the increase. Such accidents are in many cases due to too rapid a rate of progress, (lots of launches and hours in a relatively short period), and airmanship which does not match up to the situations. The airmanship requirements for the drifting-downwind-in-weak-lift-case are decisiveness and one other attribute best described as "keeping the options open". In this case, drifting downwind over a field or fields suitable for outlanding may be acceptable if the pilot is decisive enough to use that option; of course he very often isn't and attempts a final glide (usually at the wrong speed) and crashes into the undershoot or worse. For example:

Pilot's statement *(Comments in italics)*

"I was launched in the K-13 to attempt a 30min soaring flight after having been briefed regarding both thermal and wind strengths.

On releasing at the top of the launch (aerotow) I immediately contacted lift and commenced to soar. After 20min I realised that I was drifting away from the airfield and headed back. On leaving the last thermal at 1400ft I thought I had ample height to reach the airfield but when I was about ¾ mile from the runway I encountered up to 6kts of sink and lost height quickly.

Instructor who witnessed this reckoned the speed was too slow.

When approx 400yds from the airfield, with some construction works directly ahead of me, I realised that I would not be able to reach it, so turned 90° crosswind over a row of tall trees.

Estimated height of turn 60—70ft.

My intention was to land across the field heading for the far corner. When heading into the field the crosswind caused considerable drift and, although I attempted to correct the drift, it caused me to collide with a tree."

The glider was still airborne when it hit the tree which was 150yds into the field. The length of field in the direction of landing was 175yds!!

CFI's Comment

"I have not flown with him often as he was flying solo before I became an instructor but I have found that although his flying was correct and superficially safe, he was slow in his reactions and I have doubted his ability to cope with an emergency. Since I became CFI I had not had the opportunity to fly with him and test his limits.

4—6 weeks

He is in fact an example of what can happen in a gliding club. A slow learner with slow reactions—partly due to age—who could never be sent cross-country but who is very happy with local flying and is safe so long as there is no emergency. In this instance his capacity to react quickly and to make a decision (to land out safely while he could) was found wanting. Once he realised that there was real doubt about regaining the airfield there were plenty of fields he could have landed in safely had he made the decision in time.

When was this? I suspect that it was not until it was too late, ie after being in the sink for some time.

The damage was substantial; the starboard wing severed close to the fuselage (3ft) with damage to the steel tubing of the fuselage and the wing root fittings.

Even though there were other options, the pilot did not take them or perhaps even consider them. It is of academic interest only whether it was a lack of confidence which made him reluctant to land out as it is almost certain that he failed to recognise the situation, not surprising if this was the first time he had ever been in a genuine undershoot situation.

For the record the pilot's experience is as follows:

P1 23hrs, 184 launches; P2 13hrs, 134 launches; in the last six months 10½hrs and 91 launches; previous solo flights the day before the accident with the last dual check seven weeks earlier; he had flown five types from one site with no field landings; launches to solo 120, the first solo was four years ago and he held a C certificate.

Although it probably was not relevant in this example, knowing the glider's performance is important in making the glide back or land out decision.

Knowing the glider's performance

Pilot's statement

"We originally picked the field at about 1100ft agl on the return leg of an out-and-return. As we were only two miles from the airfield we decided to press on with the idea of returning to the field if we did not get a continuation of the reduced sink we were in. When the sink rate increased we returned to the field at approx 600ft. This gave insufficient height for a proper circuit from the point at which we reached the field. We then carried out a low circuit; as we came round the final turn it was apparent that we

could not clear some power lines on the approach which we had not seen before. I then decided to land in a field which was adjacent to the first field and instead of doing the final turn approaching straight off the base leg. This field was about 150yds long and I was unable to touch down until about halfway up it. As we approached the far hedge I ground looped the glider to prevent us hitting it. We stopped with the fuselage touching the hedge and the wing over it."

The damage was slight; a wing tip rubbing skid broken off and some fabric damage. However, the CFI, an active cross-country pilot, had this to say:

"The reason for sending the two-seaters on tasks is to provide advanced training for pre-Silver C pilots in aspects of cross-country soaring, including field selection and landing if need be. In this case it is apparent that the field selection was left far too late resulting in last minute change of plans—hence the problem. Having read the pilot's statement I must admit that I am a trifle surprised that he had to attempt a field landing at all. At 1100ft, two miles out with a headwind of 5kts I would consider myself comfortably home.

"To permit an accident of this nature to happen is bad enough, to permit it to happen with a P2 on board is inexcusable. The pilot (an instructor) has been prohibited from solo cross-country flying for three months and dual cross-country flying for a year, in order to give him time to develop a more responsible attitude to field landing."

Note: From 1100ft a K-7 will go almost 4nm.

The pilot's experience—230hrs, 1050 launches.

This next example is a fairly common one and comprises faults in several respects, lack of options and inadequate margins being the most significant.

Pilot's statement

"Having attempted to soar the student was flying the glider on the downwind leg. About halfway between the winch and the launchpoint I estimated height at 350—400ft. (The altimeter is graduated in metres.)

Possibly wasting time converting metres to feet instead of "eyeballing" the situation.

I decided to use an option previously discussed with the instructor in charge and land towards the launch-point, there being no other aircraft in the circuit.

Not unreasonably as there was a 90° crosswind.

I commenced a turn to the left to get rid of the surplus height before doing so (land). A region of heavy sink was encountered and the 360° turn I had intended to make was not completed.

Possibly in heavy sink before the turn was started. Monitor the vario!

A heavy landing in, I suspect, a semi-stalled condition was made in a field of barley adjacent to the airfield. The day was thermic with areas of heavy sink. The fault lay in failing to allow any reserve of height for this possibility.

As the strip is fairly narrow at the end in use, a landing across the strip is not a good option.

The pilot's experience—150hrs, 1500 launches.

The next accident is in a different category altogether and shows the consequences of deliberately reducing options on a competition cross-country flight.

Pilot's statement

"Outbound I was on the ridge for about an hour. On the return leg I used the same ridge for another 30min, flying about 250ft above the ridge. I had chosen a field for landing in if necessary a short distance back from the ridge, but which would have involved a crosswind landing unless the approach was from the east end of the ridge which was as I intended.

An into wind landing was only possible from one end of the ridge. This state of affairs can best be described as a "half" or "intermittent one option" and was a last resort attempt to stay airborne, understandable on a competition cross-country!

I hoped that there would be an improvement in the weather, but eventually rain reached me and I saw that upwind heavier rain and stratus at about my height were approaching fast. The ridge ceased to provide sufficient lift and I had to land immediately from an easterly beat. I failed to carry out the usual downwind checks. When I opened airbrakes during the final turn for the inevitable crosswind landing the u/c warning sounded, probably about 50ft agl. I lowered the u/c but the horn still blared. Visual check showed that the u/c lever though forward was not home into the locked position.

Quite a lot to do from 50ft.

I rectified that; the horn stopped but looking ahead I saw that the glider was very close to the ground in a diving turn to starboard. The wing tip struck the ground or wheat and the glider ground looped.

The pilot's experience—124hrs, 181 launches.

Damage to the aircraft was substantial with the starboard wing a probable write-off and the fuselage cracked. The pilot suffered a compression fracture of a vertebra which necessitated a day in hospital and three weeks off work.

A competition pilot may deliberately accept such a reduction in the number of options. The degree of risk depends on his experience.

Suffice to say that there are risks lurking around the corner to which you may be oblivious. Try to remember the "one-option" situations that you have been in and whether you made a decision which averted a potential incident or accident. It is often the case that because you made no decision at all and the circumstances improved that nothing untoward occurred. If this was so, do not delude yourself into thinking that your decisiveness provided the solution.

HOME NEWS

KRANICH

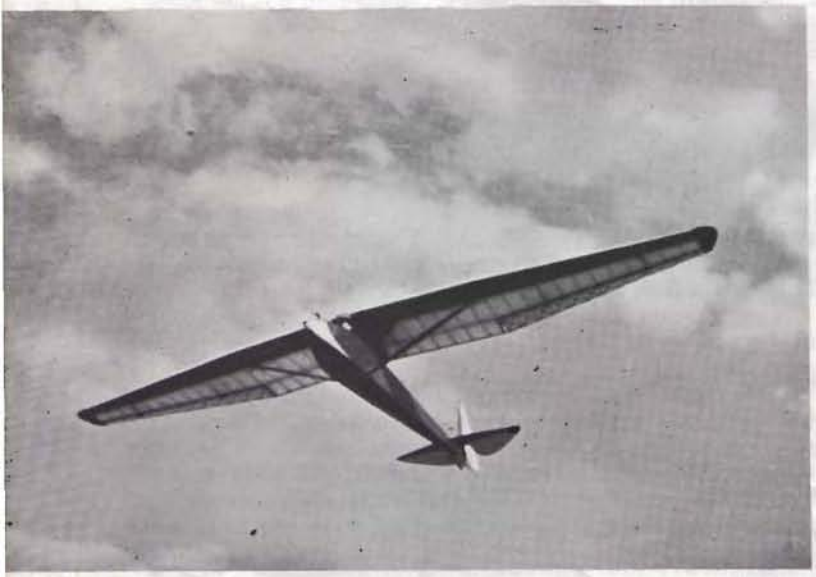
Kranich 2 BGA 1147 (ex RAFGSA 215), constructor's No. DFS 821, manufactured by Schleicher, Poppenhausen during 1942/43, has been bought by *Mike Russell!* The machine has been stored on Carlton Moor for many years. It is still in its original condition except for a modified canopy. The machine will probably be stored at Duxford until it is restored. Mike Russell now owns a half-share in the Petrel (built 1939), the Wren (built 1932) and the Kranich: their ages add up to the staggering total of 113yrs!

Last year, of the five Kranichs in Britain that we knew about, only one was being worked on after an accident. All the others were languishing almost without hope. Now, one of them is airworthy and three others are, or will be, worked on. The only Kranich that still lies unattended is that owned by the Midland Aviation Society. However, plainly now there is a good chance that the species will survive.

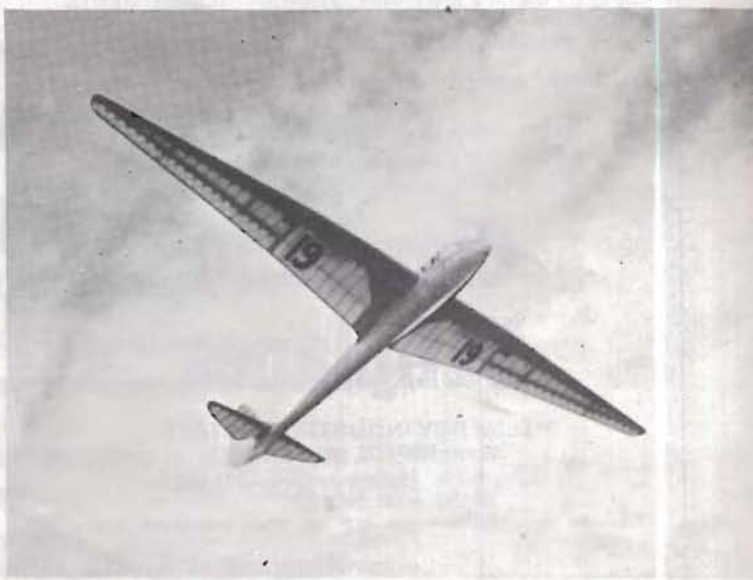
WILLOW WREN

The Willow Wren has a clean bill of health. This 1932-built machine was inspected during February by Lou Glover and its structure and fabric have been found to be sound. The way is clear for the machine to be restored to an airworthy condition. Materials have now been bought for a trailer and it is planned to fly the machine during 1976.

Green Wren



Petrel



Photographs by A. E. Slater

RHÖNSPERBER

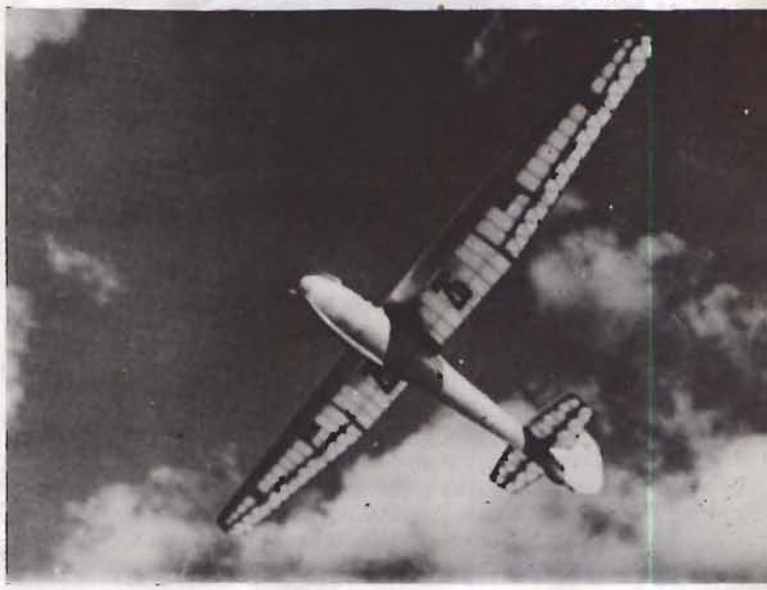
Rhönsperber BGA 260 now owned by Rodi Morgan and kept at Tangmere airfield. This machine received its British C of A in May 1936. Joan Price ordered this machine from *Flugzeugbau Schweyer* after General Ernst Udet had allowed her to fly his Rhönsperber. She was so impressed by the Rhönsperber's flying qualities and handling that she could not resist buying one for herself. She was at the time staying with Rhövater Oskar Ursinus at Frankfurt am Main. When she returned to England she formed a syndicate with Jack Dewsbury, Phil Cooper and Kit Nicholson. The aircraft was originally painted in almost exactly the same colours and style as Ernst Udet's machine. As its dark blue nose made the machine look rather heavy, Kit Nicholson in 1937/38 reversed the light and dark to its present scheme. As Kit had great artistic talent, he created one of the most beautiful Rhönsperbers in existence. This aircraft once held the British Distance Record (120½ miles on April 17 1938) and won the 1939 British National Contest.

Rhönsperber

RHÖNBUSSARD

Joan Price, whom we are pleased to welcome as a member, has asked about the fate of her first Rhönbussard, BGA 145, which she imported in 1934. Our records show that this machine and three other Rhönbussards were flying in Britain at the outbreak of war. All four were impressed for military service and all four were seen at the first post-war gliding meeting at Rearsby at Easter 1946. The other three machines were BGA 335 (original C of A dated October 1937), BGA 337 (original C of A dated April 1938) and BGA 395 (original C of A dated May 1939). BGA 337 is flying at Wycombe Air Park (this was the second Rhönbussard Joan imported) and BGA 395, flown before the war by the Passold brothers, is flying at Doncaster. So the fate of the first two, BGA 145 and BGA 335, is in question. One was certainly crashed by an ATC Instructor during the 1950 Camphill National Contest, the other may have gone to Ireland, where it was probably destroyed. However, our records do not show which Rhönbussard crashed where. Can anyone help with information please?

Rhönbussard



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The Administration of Glider Airworthiness by the BGA in the UK

DICK STRATTON—BGA Chief Technical Officer

The UK is almost certainly unique in that glider airworthiness and operations, including crew qualifications and standards of instruction, are exempt from most of the requirements of the Air Navigation Order. This happy state of affairs was generated at a meeting in 1947 between Ann Douglas and Lorne Welch and Lord Nathan, Minister for Civil Aviation at that time.

The BGA were effectively put on trust to manage their own affairs in toto and this they have done ever since. The saving in costs and exasperation in respect of some 900 gliders, more than 200 BGA inspectors, 1800 instructors and the issuing of glider qualifications to a gliding population of 9000 in 90 clubs is probably no longer really appreciated, since no real comparison can be made with any other such organisations, world-wide.

Airworthiness requirements for gliders are contained in British Civil Airworthiness Requirements (BCAR) Section E, OSTIV requirements and similar documents published by Federal Governments as required. On the whole, OSTIV seems to be the common denominator and regrettably few people are building to BCAR Section E, since world leadership in glider manufacture now lies more in Europe than anywhere else. JARs (Joint Airworthiness Requirements) are in course of preparation within Europe and the UK CAA have delegates to such working parties in respect of public transport aircraft and rotorcraft. However, the German LBA have recently published revised glider and motor glider design requirements and it is inevitable that these, with few, if any, amendments, will become the European standard.

Certification and Validation of New Types

Some 118 types, or variants of types, have been accepted by the BGA, after examination of type records, engineering evaluation of samples and flight testing by one of the five BGA Flight Test Groups, a process which is achieved at minimal cost to the applicant, by the BGA Technical Committee, its specialist members and its Test Groups, who complete searching reports and only charge the launching costs!

The BGA are now faced with validating the certification already achieved by foreign products in their own and other European countries, and any reservations we may have on standards of design and manufacture set by others can only be transmitted as observations, rather than requirements. To attempt to enforce the latter might well result in the UK denying itself access to such products, for which there are no UK equivalents! Hopefully, as is very often the case, constructive observations are incorporated as product improvements by enlightened manufacturers, who, after all, have no requirement under the UK Air Navigation Order to seek UK airworthiness certification, as they would have to do in respect of aircraft required to be registered in the UK. However, it is the privilege of every citizen to place his glider on the UK Civil Register, if he so wishes, and to seek CAA certification if he prefers it. He will, of course, have to fund such design survey and inspection costs as the CAA may impose under their statutory powers.

Motor gliders which come within the BGA/ARB (now CAA) negotiated "Redhill Definition" must, in the first instance, be UK registered and type certificated by the CAA, a process dependent upon competent type certification in the country of origin, the issue by such Authority of an Export C of A, the availability of a type certificate data sheet and operating and maintenance handbooks. Thereafter, subsequent identical types may be inspected for certification, maintenance and re-certification under the BGA's CAA Inspection Approval, as delegated to appropriately rated BGA inspectors, and the CAA will accept such recommendations and will issue or renew such Special Category C's of A.

The "Redhill Definition" is based upon the following parameters:

a)	Max AUW 750kgs	
b)	,, take-off distance	600m to 15m in zero wind
c)	,, rate of climb	300m in 4Min in zero wind
d)	,, stall speed	75km at Max AUW CG forward
e)	Min glide ratio	20:1
f)	Glide ratio with spoilers	8:1 or less at 1.4Vs.
g)	Min span	14m
h)	Max seats	2
i)	,, power loading	not more than 1BHP per 20lb AUW
j)	,, fuel	6gal (single-seat) 8gal (two-seat)

If it cannot meet these performance requirements, it remains a glider!

The Maintenance of Airworthiness Standards

A C of A, whether issued by a government agency, or by such an association as the BGA, is a periodic technical audit of the condition, and modification standard of a particular sample of a particular type. As a result of accidents or incidents, or as the result of airworthiness directives issued by a government agency, or service bulletins or technical notices issued by the manufacturers, it may be necessary to make special inspections or to incorporate mandatory modifications at the time of C of A renewal, or at any other intermediate time, if the necessary degree of airworthiness urgency can be seen to exist.

The degree of inspection, dismantling or the depth of examination required for C of A renewal, has not so far been defined by the BGA, who prefer to leave such matters to the judgement of the people concerned, who should sensibly take into consideration the hours flown, number of launches, the contents of previous inspection reports and the obvious condition of the glider as visible to the naked eye..

However, changes in the philosophy of aircraft maintenance have been taking place throughout the world, with leadership lying with the Americans and the Canadians, both of whom have "never expiring" or "continuing" C's of A, subject to compliance with maintenance requirements at 100hr and annual intervals, in respect of their general aviation aircraft.

As with motor cars, so with aircraft, technical developments and new materials have reduced the requirement for maintenance man/hours per flying hour, compared with gliders of 20yrs ago, in much the same way as glass-fibre boats require much less maintenance than wooden boats, but these changes are not always reflected in the maintenance costs incurred!

The BGA is therefore giving consideration to publishing a combined guideline and inspection report document, which will more closely define the requirements for C of A renewal at whatever interval may be decided, along the lines adopted by general aviation aircraft. Compliance with such guidelines must

inevitably lie with the person concerned, who may opt out of, or into, the items on the schedule at his discretion. However, in January 1975, the BGA Technical Committee formally "killed off" the requirement for a ten year major inspection, a requirement now considered to have outlived its airworthiness usefulness, on the grounds that gliders should be maintained airworthy at all times and not merely at ten-yearly intervals!

Non-airworthiness Events

Because we pursue a policy of periodic inspection and maintenance at C of A renewal intervals we do not expect gliders to die a slow death, in airworthiness terms. Non-airworthiness must arise from such events as:

Accidental damage—of varying degrees of severity, in flight or on the ground.

Poor storage in unventilated "sweat box" trailers, or even in damp hangars or open trailers.

Failure of primary structural components or control systems or parts and accessories as a result of poor design or sub-standard manufacture.

Mis-use in operation, *eg* exceeding the weight, speed or manoeuvre limitations contained in the type certificate data sheet or certificate of airworthiness, such that permanent damage is inflicted upon the glider.

Lightning strikes, and hailstone damage.

The monitoring of the day-to-day state of airworthiness must therefore inevitably lie with those responsible for the daily or pre-flight inspections, which will continue to be significant occasions at which to detect non-airworthiness events, and to these inspections must be allied an alert and effective defect reporting system, which currently manifests itself in the BGA Technical Committee's Technical Newssheets, which are sent to inspectors and club technical officers at monthly intervals with an annual revision.

In the case of special events affecting the airworthiness of specific types to a degree which requires instant action, a direct mail shot will be sent to every registered owner of the type, followed by repetition in the next Technical Newssheet, so it pays to keep the BGA informed of changes of ownership.

Recent non-airworthiness events which have been dealt with by the BGA Technical Committee, are worth reviewing.

ASW 15—in flight failure of a glider in the USA resulting in the death of a UK citizen. The BGA recommended that the type should be grounded temporarily, pending in-depth examination of evidence and structural testing by the manufacturer. The results were not conclusive, other than to determine that the tail-plane separated from the glider in flight.

Foka 4—in flight fatal accident in the USA resulting from wing root failure. Report received from the National Transport Safety Board indicated sub-standard glue joints. BGA were not convinced and subsequent inspection of a UK machine and others at the factory substantiated the BGA view that other factors were involved in the USA accident. The Foka 4 was not grounded but the facts, and a request for inspection, were promulgated in TNS, after a mail shot to registered owners.

Dart bonded spar—the BGA declined to recommend the grounding on the basis of one sample found in poor condition by the manufacturer, on inspection prior to export. The sample had been poorly stored and maintained and subsequent inspection of Dart spars using non-destructive techniques failed to disclose an epidemic of such conditions, and no further cases have been reported.

Calif A-21—failure of both outer wing panels in flight, in South Africa, crewed by UK citizens. Although the BGA had only issued a Permit to Fly to this type, pending further investigation of the stick force trimming device, from the comprehensive and competent reports received from the crew, the BGA have taken the precautionary view that there may be an inherent airworthiness deficiency, resulting in classical aileron flutter. They have asked CAA to take action with the *Registro Aeronautica Italiano* to raise an Airworthiness Directive as the manufacturer has declined to accept any responsibility technically or morally for what has occurred!

(We have just heard that the efforts of the BGA and CAA on the RAI has resulted in a mandatory speed restriction of 108kts being enforced, pending the possible introduction of mass-balanced ailerons.)

So much for the non-airworthiness events of the more spectacular kind.

Accident Investigations

Fortunately there are seldom accidents directly attributable to airworthiness, and such few in-flight structural failures as may have been recorded in respect of UK types over 20yrs or more, have, in every case but one, been associated with exceeding limitations! However, the Accident Investigation Branch of the Department of Trade reserve the right to investigate all notifiable accidents. In practice, whether in respect of gliders or private aircraft, they will normally opt not to initiate a detailed investigation, unless fatalities are involved in particular circumstances. The BGA, therefore, analyses its own accident reports and makes such investigations as may be necessary, and in any case the incident is likely to be reported in the GASCO Flight Safety magazine, in Lloyd's List and the DoT annual review of UK accidents!

CAA approval of the BGA in respect of motor gliders. Because motor gliders which comply with the "Redhill Definition" have to be registered in accordance with Article 3 of the ANO, it follows that they may not be flown unless they are certificated in accordance with Article 7 and crewed by persons licenced in accordance with Article 19. However, by virtue of the BGA seeking inspection approval from the CAA and having

inspectors whom it approves against acceptable standards of experience, skill, knowledge and access to information (Civil Aircraft Inspection Procedures, Technical Newssheets, etc) BGA members are relieved of the formality of having to seek the services of licenced aircraft maintenance engineers and others in the maintenance of motor gliders. Furthermore, the BGA may process modifications to such motor gliders and make recommendations on overhaul requirements, the most noticeable of which has been the "on condition" overhaul of engines and the extension of engine maintenance checks to 100hr intervals.

Major and Minor Modifications to Gliders

The Technical Committee of the BGA is privileged to enjoy the voluntary services of airworthiness specialists in the field of aircraft structures, stability, handling, repair and maintenance, and can therefore give design approval to modifications which may or may not qualify as "major" or "minor" changes in the design of gliders without reference to the manufacturer, should he still exist.

Some recent examples include a disabled person's control system, retracting gear on an otherwise non-retracting type, and extension of aerofoils. Minor modifications are normally approved by the Chief Technical Officer and include substitute replacement parts and items of that kind.

Defects

Defect reports are received from the Accidents Investigation Branch, DoT, the Airworthiness Division (defects section) CAA, from foreign government Airworthiness Agencies, from the manufacturers, from owners, instructors, club technical officers and BGA inspectors. These are transmitted in the BGA Technical Newssheets and reviewed and revised annually in the BGA's "Compendium of Airworthiness Directives, Mandatory Modifications and Special Inspections for UK and Foreign Gliders (and Motor Gliders)". We doubt if any other agency offers such an effective service.

Veteran and Vintage Gliders

There is a healthy movement to resurrect, rebuild, preserve and fly the older types of aircraft upon which present day gliding was born and the BGA places no arbitrary airworthiness "kiss-of-death" on such types, but prefer to allow them to fly on condition they can be seen to be airworthy. Several pre-war gliders are still flying in the UK.

Repair Stations

In the past the BGA appointed senior inspectors, mature and experienced people, to supervise the ten year major inspections and other such major activities.

More recently it has become apparent that such mature experience is now required to supervise major reconstruction of damaged gliders, and particularly the rebuilding of badly bent GRP machines. Therefore, in January 1975, the BGA declared a policy leading to Repair Station Approval in which such organisations must gain access to the services of a senior inspector to supervise the quality of such major repair work, whether it be to wood, metal or glass-fibre structures.

Minor repairs—in accordance with established practices and procedures remain the prerogative of ordinary inspectors.

Courses and Technical Data

Courses and inspector conferences are arranged as and when required and in particular on such subjects as glass resin structural repairs and the maintenance of motor glider power plants.

The BGA's shop markets 52 selected CAA Civil Aircraft Inspection Procedure Leaflets (CAIPs) covering wood, metal and powered aircraft, instruments, and related systems and these leaflets are now regarded as the airworthiness bible of the BGA. In addition, copies of "Standard Repairs to Wooden Gliders" are still available.

In conclusion, Great Britain enjoys a unique privilege in administering its own glider airworthiness and operational affairs, with so few people doing so much for so many, mostly on a voluntary basis. The BGA does not claim to be devoid of sins and ommissions, but it does offer a mostly fumble-free airworthiness system at a fraction of the cost that would be levied by any government agency, and actively encourages a strong DIY element in the process. It has under constant review the developments in the state of the art in the interests of its members, and achieves all this with 1 part-time staff (CTO), plus the necessary secretarial assistance.

This paper is also to be presented at the Canadian Aeronautics and Space Institute's Symposium on Recreational Aircraft at Ottawa from June 23—25.

BGA & general news

MORE VAT ON GLIDING

As soon as it became apparent that gliding would again be hit by the Budget, the BGA Chairman sent the following letter to the Chancellor of the Exchequer.

Dear Chancellor,

I am writing to request you to review the impact on the gliding movement of your proposal to impose VAT at the rate of 25% on light aircraft, since I am sure that you cannot be fully aware of the effect.

There are some 9/10000 people from all walks of life who glide in Great Britain; the vast majority are far from wealthy and belong to voluntarily managed non-profit making clubs. Most clubs, by reason of present high costs, are registered for VAT. Gliders are purchased by clubs and then used by club members in return for hourly charges to cover the running costs, insurance etc. As I understand the position, the new 25% VAT will be levied not only on the purchase of gliders, but also on the hourly charges for their use. These hourly charges represent by far the greatest proportion of the cost of gliding to the individual and I am sure that this aspect of the impact of VAT has been overlooked.

Mindful of the effects of inflation on voluntary sports clubs, the Sports Council has strenuously endeavoured to obtain exemption from or zero-rating on such bodies. Whilst I can appreciate that at the present time you have, perforce, been deaf to their entreaties, I find it hard to believe that you should have consciously trebled the burden on our minor sport, at a time when, due to sharply rising costs, the vast majority of its adherents are finding it increasingly difficult to follow.

I realise that the sailing fraternity find themselves in the same predicament, but I imagine that most sailing clubs are not registered for VAT and the question of VAT on hire by individual club members will not therefore arise.

A further, and I think very relevant consideration, is that gliding clubs are subject to the very increased burden of local authority rates and, in common with all sports, cannot claim the mandatory rates exemption to charities, though of course, some have been granted a degree of discretionary exemption.

The gliding community is fully prepared to bear its share of the country's economic difficulties, but the present proposals seem to impose on it an excessive burden and I earnestly ask you to reconsider the position of voluntary non-profit making gliding clubs.

Christopher R. Simpson
Chairman

BGA DIPLOMA WINNERS

Congratulations to the three BGA Diploma winners who have given long service to gliding.

John Jeffries

John joined the London Gliding Club 26yrs ago and has devoted himself wholeheartedly to the cause of gliding. As a professional instructor he imbued hundreds of pilots with his enthusiasm for the sport in all its guises from first solo to competition flying and record breaking.

He has been the club's manager and chief administrator for the last ten years.

Ansgar Sambale

Ansgar, who was born in Germany where he flew gliders and powered aircraft, was re-introduced to gliding in the early 1950's by the Scottish Gliding Union. He was appointed a full time instructor at Portmoak in 1965, having spent some time in his career as an instrument engineer.

His engineering skills have been invaluable and Ansgar has earned respect for those under his care. As an instructor he is a specialist, a wise counsellor and a good example to all concerned with sporting gliding.

Ted Warner

Ted joined the Cambridge University Gliding Club in 1946 as ground engineer, later to become the CFI. His friendly cynicism and legendary imperturbability have endeared him to generations of pupils.

For years he served with distinction on the BGA Technical Committee. Master joiner, master instructor, diplomat, deflater, philosopher and friend, Ted Warner is the Cambridge Club.

FLYING COMMITTEE NOTES

It has been agreed that the following records be implemented.

British National & UK Local

Speed over an out-and-return course of 300kms and 500kms.

UK Local only

Speed over a triangular course of 600, 700, 750, 800, 900 and 1000kms.

Longest triangular distance. This record to be set-up with the first completed valid triangle over 600kms.

For all the above triangles and *including* the existing 500kms triangular speed record the new 25/45 rule will apply. This will make tasking large triangles in UK airspace a little easier. For all triangles that are flown for British National and world records, the 25/45 rule only applies to triangles larger than 750 kms. (See S&G Dec. 1974, p254.)

To bring the present lists of UK local records more into line with current performances, it is proposed to discontinue the speed to goal flight records at the end of 1975, unless further interest is shown during the current season.

John Glossop,
Flying Committee

S&G SUBSCRIPTIONS

Our move to Leicester has necessitated some changes in the distribution of Sailplane & Gliding.

Subscribers are advised that starting with this issue the magazine is being sent out from our Printers at Basingstoke. It is therefore no longer possible to insert in the magazine reminder and renewal cards for expiring subscriptions. Instead only one renewal form which constitutes notice of subscription expiry will be sent out under separate cover about four weeks before the subscription is due to expire.

Subscribers are therefore urgently requested to return these renewal forms together with their remittance as soon as possible after receipt so as to ensure uninterrupted delivery of their copies.

The major change is that subscription reference numbers will no longer be used

because the system hitherto employed is now entirely alphabetical. So please ensure that names and *all* initials together with complete postal address are clearly given and posted so as to reach us about 14 days before the issue is due out.

All correspondence regarding subscriptions should be addressed to Kimberley House, Vaughan Way, Leicester, England, and *not* to the Printers.

Jenny Rolfe, S&G
Subscription Department

NATIONAL LADDER

The National Ladder, now in two sections, is short of entries, largely due to the poor weather at the start of the season. T. Pentelow heads the Private Ladder, 1045pts in three flights, with D. Jones second, 800pts in two flights. They are both from Bristol & Gloucestershire.

J. Scarsbrook (Deeside) is at the top of the Club Ladder with 450pts in one flight.

THE BGA's NEW MOTIF

This distinctive emblem, dark blue on white, is the winning design in the competition to find a new motif or symbol for the BGA. It is by Peter Wildbur of 22 Seabrook Road, Tonbridge, Kent, who is a member of the Southdown Gliding Club.

There were more than 30 entries with such an impressive standard, that the final decision was difficult. The panel of judges was chaired by Michael Carney, a professional designer.

The prize was £25 plus a year's subscription to S&G.

TECHNICAL NEWS

Tug Maintenance. The BGA are discussing with CAA certain proposals for the maintenance of tugs, and we *urgently* require documented evidence of delays, difficulties, lack of facilities and capacity, overcharging and inefficiency experienced by clubs in arranging tug maintenance.

Budget News. The higher rate of VAT means that from May 1, the C of A fee is **£6.25** (£5 plus 25% VAT of £1.25). However, please note that the higher rate is *not* applicable to glider repair and maintenance work, only to the statutory BGA fee.

Dick Stratton,
BGA Chief Technical Officer

STOLEN INSTRUMENTS

An instrument panel was stolen from a Kestrel 19 at Wycombe Air Park at the end of March. We have given details in case any of these items comes onto the secondhand market.

Ferranti MK5 artificial horizon, ser no. 135/61; Jessop 12v inverter, ser no. 044; two variometers PZL WRS5 (with speed to fly rings), only one ser no. is known, 7001048; PZL ASI PR250s 140kts ser no. 7204001; Kelvin KAA1505/K altimeter, ser no. 1K 329; Kelvin Mk2 turn and slip indicator ser no. 6185; Peip Audio 12v unit of German manufacturer; two 6v batteries, type 806 (wet cells); two change-over switches, 107-01-219; Cook compass and Field Avionics 360 channel radio type F 360.

GLIDING CERTIFICATES

DIAMOND DISTANCE

No.	Name	Club	1974
1/78	C. Withall	London	2.8

DIAMOND GOAL

No.	Name	Club	1974
2/593	A. Shelton	SGU	11.12
2/594	R.B. Larkinson	in Australia	11.12
2/595	A.H. Yates	Inkpen	7.5
2/596	D.W. Davis	Bath/Wilts	26.5

DIAMOND HEIGHT

No.	Name	Club	1975
3/223	T. Pentelow	Bristol/Glos	1.4
3/224	E.R. Smith	Eagle	16.11.74

GOLD C COMPLETE

No.	Name	Club	1974
456	R.C. Addis	Yorkshire	18.8
457	A. Shelton	SGU	11.12
458	A.H. Yates	Inkpen	7.5
			1975
459	C.H. Gardner	Devon/Somerset	23.3
460	D.D. Carrow	Surrey/Hants	29.3
461	T. Pentelow	Bristol/Glos	29.3
462	D.A. Benton	Bristol/Glos	31.3
463	E.V. Goodwin	P'boro/Spalding	22.2
464	B.J. Davey	Imperial College	31.3

GOLD C HEIGHT

Name	Club	1974
C. George	Yorkshire	21.7
T.K. Simmons	Portsmouth	8.11
		1975
J.J.T. Taylor	Clevelands	11.1
R.S. Acton	Crusaders	16.1
A.C. White	SGU	29.3
P.J. Gibbard	Surrey/Hants	24.3
D.B. Eastell	Southdown	10.3
T.M.H. Jenvey	Devon/Somerset	24.3
C.H. Gardner	Devon/Somerset	23.3
J.M. Luke	SGU	24.3
D.D. Carrow	Surrey/Hants	29.3
T. Pentelow	Bristol/Glos	29.3
C.C.J. MacPherson	Kent	24.3
P.E. Gillett	Lakes	19.3
C.D. Berry	Southdown	24.3
M.G. Shaw	SGU	23.3
D.A. Benton	Bristol/Glos	31.3
E.V. Goodwin	P'boro/Spalding	22.2
B.J. Davey	Imperial College	31.3

GOLD C DISTANCE

Name	Club	1974
R.C. Addiss	Yorkshire	18.8
A. Shelton	SGU	11.12
A.H. Yates	Inkpen	7.5
D.W. Davis	Bath/Wilts	26.5

SILVER C

No.	Name	Club	1974
3891	A.D.G. Cummings	Cambridge Univ	14.5
3892	B.M. Marren	in Belgium	2.6
3893	R.A. Hackett	Two Rivers	25.8
			1975
3894	R.C. Green	Culdrose	2.5
3895	M.S. Milton	Derby/Lancs	23.3
3896	J. Saunders	Wrekin	23.3
3897	P.H. Steiner	Bicester	19.3
3898	R.W. Welch	Devon/Somerset	26.3
3899	R. Rodwell	Ulster	14.3
3900	P.A. Gillham	Wrekin	22.3
3901	A.W. Donaldson	SGU	24.3
3902	M. Lynch	Bath/Wilts	30.3

OBITUARY

THURSTAN JAMES

Founder of *The Sailplane & Glider* in 1930 as the first periodical solely devoted to gliding, Thurstan James, who edited it until the end of 1931, died suddenly on April 11 at the age of 71.

In 1929 he had joined the editorial staff of *The Aeroplane*, and soon news of the spectacular soaring flights in Germany came pouring in, and the result was the special "gliding issue" of *The Aeroplane* which sparked off the "gliding lunch" of December 4 at which the BGA was tentatively formed. He told the full story in S & G for December 1969, and followed this in April 1970 with an account of the early flying days of the London Gliding Club, where I often met him. The *Sailplane & Glider* first appeared on September 6 1930 as a weekly at 3d, later becoming fortnightly at 6d. It was fathered by *The Aeroplane*, but he had to do most of the editorial work in his own spare time. By the end of 1931 he could spare the time no longer, so the magazine was "given" to the BGA as its official organ.

During the war Thurstan James worked at the Ministry of Aircraft Production, where he became "Director of Aircraft Production (B)". At the war's end he moved back to *The Aeroplane*, this time as its Editor, and I was writing a regular column of gliding news in it. James retired in 1965 and a few years later it became absorbed in *Flight*.

As Editor of S & G James had a hard task trying to interest readers in the possibility, let alone the duty, of trying to achieve the sort of advanced soaring that was being done in Germany; most were content to glide down slopes; very few clubs had a slope suitable for soaring, and hardly any members capable of doing it even then.

Thurstan James performed a very necessary service to British gliding. A.E.S.

overseas news

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

Cross-Country—A Way of Life

WILLIAM MALPAS reports on Buno-Bonnevaux, 1974 winners of the "Coupe Federalè"

In the heroic days of cross-country gliding, when 300 and 500kms were normally attempted by a downwind dash, several British pilots visited La Ferté-Alais—a very active club 300kms south of Paris. The club is alive and well and has moved 10kms further south to escape the Paris control zone. It is now located at Buno-Bonnevaux, halfway between Milly-La-Forêt and Malesherbes.

Previous visitors will remember the chef-du-centre, M Pechaud, whose positive attitude to cross-countries encouraged many pilots to achieve flights they were previously afraid to attempt.

His influence is still strongly reflected in the 1974 statistics:— flying members 300, 7465hrs, 6355 launches, 173744kms cross-country, 148432kms completed with declarations and turning point photos, 166, 300km flights; 22, 500km flights and two 600km flights.

Cross-country flying is a way of life at Buno-Bonnevaux. Each soaring day the gliders (28 single-seaters are owned by the club) are allocated by "le chef" with priority to pilots seeking badges. M Pechaud recommends the size of triangle to be attempted and almost everyone gets away by midday.

No one ever organises a retrieve crew. It is understood that if you land out someone will fetch you. By the same token, if you are around when the telephone starts ringing in the late afternoon you are expected to go on a retrieve. On the record day in 1974 when 18 gliders were aux vaches, everyone was home by 10pm, despite some trailers going out twice.

Visitors are given a warm welcome but anyone coming from the UK for a short stay will probably find the flying fairly expensive. A tow costs £1.60 and flying charges are from 40p to £2.70 an hour. Even on a brief visit the annual sub of £72 is payable if more than 18hrs are flown—it is £4 per hour for those doing less flying.

Those bringing their own gliders pay only the launch fee and the only formality for them consists in having their pilots' licences validated in France.

The visitor will find a number of young pilots flying glass-fibre gliders who have already amassed impressive experience in hours, cross-countries and competitions. This is because the sport is subsidised in France and, in theory, the subsidy is directed mainly at encouraging pilots less than 22 years-old. In practice, everyone benefits to some degree.

The level of cross-country activity results from an attitude of mind which regards these flights as the norm, and it's no disgrace to land out. This attitude is encouraged by large fields in the area, although they are full of crops in June and the choice is limited. We also have our share of international class pilots to set the pace.

There is camping on the airfield with all mod cons and inexpensive bistros in the vicinity where members gather for an agreeable end to a long soaring day.

1004km TRIANGLE DECLARED

Although the flight was not quite completed Klaas Goudriaan has flown the first over 1000km triangle during February in South Africa. He flew his ASW-17 over a distance of 1001.3km of his 1004km declared. It is tough at the top!

SOVIET SEX SEGREGATION

Soviet men and women competitors held their last National Championships, the 36th, at widely separated sites, according to accounts in *Krylia Rodiny* translated by Chris Wills.

The women flew at Kaunas in Lithuania. After nine days, including four no-contest tasks, Tamara Zagainova won a 103km triangle in 2hrs 38mins 34secs. Then came a 100km out-and-return in which none reached the turnpoint; followed by a day when the weather cleared at noon to allow a 200km triangle, won by Garmutye (Lithuania).

Finally a proposed 300km triangle was reduced by weather to twice a 64km out-and-return=128km. Gorokhova, who failed the day before through going back for a second start, retrieved her reputation by winning in 2hrs 30mins 24secs.

The contest was won by Garmutye, who has been gliding for 20yrs but only now has become Absolute Woman Champion of Soviet Russia with 2956pts; 2, Laan, 2923; 3, Zagainova,2620.

The men flew alone at Orel, but next time the women will join them there, though flying separate tasks. At Orel the men completed three contests during seven flying days. Task winners: 1, 105km out-and-return: Panafutin (Dniepropetrovsk) at 52km/h; 2, 159km dog-leg; Pasiechnik (Moscow) at 68km/h; 3, 105km triangle: Koval (Orel) 73.2km/h.

Final results: 1, V. Panafutin (Ukraine); 2, Oleg Pasiechnik; and 3, L. Vaskov (Central Russian Fed). Of the eight prizewinners, seven were state gliding instructors, who also took 11 of the 12 medals.

In the Ukrainian Championships, with three triangular tasks completed, leading results were: 1, Rudyenski; 2, Vesielovski; 3, Vinitsa. All pilots flew Blaniks.

COUPE D'EUROPE FOR TWO-SEATERS

The Aero-Club du Poitou is again organising a competition for two-seater gliders. It will be at the Poitiers-Biard airfield from August 3—15 with the practice week from July 25—August 2.

Each team will consist of at least two pilots and not more than four. The first pilot must fly every task, but the second pilot may be chosen each day from the other members of the team.

Entries will be accepted up to June 15 with priority given to non-French competitors. Entries should be sent with

the equivalent of 300 French francs to L'Aero-Club du Poitou, aerodrome de Poitiers-Baird, 86000 Poitiers, France.

Poitiers lies about 120kms SE of Angers, right in the middle of the famous 500km triangle flown by nearly 50 of the competitors in the 1971 Coupe d'Europe. *(Our Paris correspondent)*

ORANGE FREE STATE CHAMPS

A record entry of 24 in this event put in 10000kms of cross-countries in four days. W. Shields won every Standard and Open Class task and W. Gonlag won in the two-seater Class: both are from Witwatersrand. S. van Sandwyk of Harrismith won every task in the Limited Class. *(Wings over Africa).*

PUTTING THE RECORD STRAIGHT

In our last issue "Australian News" p82 we reported from a newspaper cutting that Malcolm Jinks had taken his Nimbus 2 around a 763km triangle. In fact the flight was made by Tony Tabart, but Malcolm has claimed a new world record for the 500km triangle in his Nimbus on January 31 at a speed of 140.70km/h.

Sue Martin who had claimed a 100km triangle (world feminine) for a flight on 6.2.75 at 140km/h has had to drop her claim owing to incorrect photographic evidence.

your letters

GLIDING—A MOUSE-DERBY!

Dear Editor,

Rodney Tibbs seems to have crowned himself king of the non-competitive castle and appointed me its philosopher and court fool (S&G April, p56). I would like to announce my immediate resignation.

This is not because I am instantly going to become 60 times more competitive (quite difficult). I agree with almost everything Rodney says (and why not, when the flattery is so outrageous!), but not with some of the things he seems to imply. For example, are we really to form a group to spread the "non-competitive gospel"; the gliding equivalent of the anarchist party?

Are we to compare our pleasures instead? (My flight only lasted five minutes but it was much more beautiful!) Are we to have a National Unladder, so to speak? The Meek Cup. Worse, are we to state that men who do not compete are morally inferior (which might be so), and that we are morally bound to do something about it? You know the formula, "God is Love, Damn you!"

As for the Rev Tibbs' sermon XVI "But will he reject the rat race?", I would like to point out, non-competitively of course, that gliding isn't really *The Rat Race,* only a symptom, an initiation, a kind of mouse-Derby. My "lengthy and introspective study" wasn't intended to be *Saul on the Road to Damascus* and I am not converted, therefore, to half an hour's circling round a bird . . . Instead, my study was little more than the mutterings of a victim of self-induced shellshock. In these idiot times there's no copyright on that.

Cambridge. STEVEN LONGLAND

RODNEY, YOU ARE THE LOSER

Dear Editor,

I have just read one of the saddest and most pitiable articles ever written by Rodney Tibbs in the last issue.

Rodney claims to fly for pure pleasure . . . exhiliaration . . . adventure . . . sensations . . . experience. He also claims to be completely non-competitive and backs it with a statement of non-achievement.

I can assure Rodney that by being non-competitive he is denying himself much of the joy of gliding. I don't mean the sense of achievement but the world of pure pleasure (his type) that is accessible only to those who press onwards and upwards.

The sensation and exhilaration in one's entire psychological system is far different during the fifth hour of a flight than during the first.

The experience of being at 1000ft and 50 miles from base is far different from any local flight. The sensation of flying free as a bird cannot be complete if you always have one leg firmly fixed to your home field.

The view of the world from 1200ft is nothing like the view from 12000. I have promised myself that some day I shall view the world from 20000ft.

The spectacle of a dozen other gliders silhouetted against the blue sky, sharing the same thermal as oneself, is not the same as a background of green. I have promised myself that I shall see Shep's Std Libelle against a background of green, some day.

Rodney cites a few of the things that have pleased him including something about a buzzard. I could list dozens of different joyous moments, many of which were only possible because I was striving for something bigger, better, higher, further or faster.

I am sure that every other glider pilot could compare similar lists. If Rodney would only open his eyes when he next visits a gliding site he will realise that over 90% of the flights are made when there is absolutely no hope of achieving a badge flight, any other record, rung, point or position. We all fly most of the time for pure pleasure, but we also know that there is a far greater range of pure pleasure possible if we only indulge in a bit of competition flying as well.

Rodney is probably confused by all the talk of records, badges etc. Such talk only occurs because statistics are so very easy to communicate and understand. 300km triangle means exactly the same thing to everyone while words like "elation, exhilaration, pleasure . . ." are so subjective that communication becomes difficult and uncertain. When men discuss women they usually refer to a set of statistics, but have you ever seen a man in search of a mate while carrying a tape measure in his pocket?

Rodney, I believe that by limiting yourself to the easy flights you are the loser.

South Harrow, Middx. GARDNER SORUM

ANOTHER WITH HIS EYES OPEN!

Dear Editor,

I would like to assure Rodney Tibbs that he is certainly not "in the minority of one" in his attitude to gliding. I am sure that many pilots would join me in applauding his article and in hoping that it will move you to ensure that S&G doesn't become "a fair imitation of a railway timetable".

Rodney Tibbs has only to turn two pages past his own article to be heartened by the poems of Atholl Robertson, Leon Roskilly and Michael Erdman and see that he is not alone in gliding for pure enjoyment.

S&G does a grand job, but in the spate of no doubt necessary articles on the technicalities of our sport, may the Editor encourage contributions of articles, poems and good photographs for those of us who do not "fly with their eyes shut",

Crieff, Perthshire. K. F. LLOYD

CLUB GLIDERS AND GLIDING

Dear Editor,

We have had in effect a Club Class for gliders for 17 years, called the Standard Class. This was supposed to encourage the design of gliders suitable for club operation. It takes an optimist indeed not to predict the same fate for a new Club Class, as more and more of the rules originally devised to protect the concept are first ignored by manufacturers gaining a temporary advantage, and then deleted because of pressure from the competition pilots who have taken over from clubs as the main customers.

This situation is bound to be repeated so long as the pattern of gliding operations is distorted by over-emphasis on competition. What attempt has been made to find the proportion of glider pilots really interested in competition? I bet it is under 5%, yet

their needs are provided for while the rest look around in vain for the sort of glider they want. Where are the extra competitions going to be held for all those club pilots who are supposed to be bursting to enter? No doubt ordinary club members will not be consulted about the further distortion of their operations, but they want to fly too and a great many resent giving up any of their limited opportunities.

What kind of rules could attract manufacturers back into making club gliders? A span limitation is arbitrary and blinds many people to the all-round merits of gliders not of this span. The 15m span limit of the Standard Class was supposed to keep costs down, but it has neither done this nor makes sense in the face of the 16m ASK-19 built to the cost limit of the German Club Class. So how about a price limit? This must be unworkable internationally with widely differing inflation, fluctuating exchange rates, and Eastern Bloc gliders with prices set by currency earning considerations and not profit. No cheer for Western manufacturers there.

A performance limit of say 35:1 max glide angle would, based on measured performance, let in the Std Libelle, hardly suitable as a club glider—perhaps we would see manufacturers claiming less than the real performance to get into the Class! This would be a refreshing change from the usual exaggerations but it would also begin the destruction of the Club Class all over again. Anyway, glide ratio is only part of the performance picture, so what is meant by performance and who is going to certify it? You only have to consider the scandal of Standard Class airbrakes to realise the difficulties. Club gliders also need other qualities than performance.

I don't know what the solution is, but I am sure it does not lie in yet more competitition. It is difficult to be optimistic about the benefits of competition when one observes its effect in the hang gliding world, surely the epitome of scorn for rules and regulations: two British entrants refusing to speak to each other because each claimed to be the National Champion, and non-USA entrants complaining about the unfairness of the USA team using a more advanced Rogallo than theirs!

Rodney Tibbs is too modest in his article. He writes for thousands who like him get their pleasure in ways unconnected with competitive gliding. To this hardened believer in *club* gliding, it is very gratifying to observe the reminiscent delight of visitors to our developing site at the spectacle of members (including private owners) deep in field drains, fixing roofs, our 60ft by 60ft hangar which cost us under £2500 etc. Their wish that it was still thus in their own flying factory contrasts with the attitude of some other visitors, who introduce themselves as advanced pilots and what facilities have we to offer them? Our suggestion that facilities are what members make them and what has such an experienced type got to offer us, seems to result in a rapid loss of enthusiasm.

While there are plenty of non-contributors in any group of members, and it is certainly not my intention to criticise pot hunting, it is easy to gain the impression that, with a few notable exceptions, the pot hunters are so busy with their next record attempt, badge flight or competition that they could not possibly be expected to repay any of the effort that was put into the provision of facilities and training when they were mere sprogs. Yet without such repayment, and with interest, gliding cannot remain within reach of the wide variety of people traditionally associated with the sport, with costs soaring faster than a T-21 in the core of a thermal. From what I hear, it is already nearly too late.

Preston, Lancs. JOHN GIBSON

ACCIDENT REVIEW?

Dear Editor,

I have hesitated in writing this letter as it is some years since I instructed, but finally decided that some action was necessary even by way of duty to the young, and what better means than the official magazine of the BGA?

Accident Review (S&G February, p20) is the article that drives me into print since it gives me a sickening feeling that all the labour of love so many of us put into the formulation of instructional procedures in the early fifties, in the belief we were striving for posterity and all that, has gone down the plug-hole within a single generation.

I am well aware, from the need to comment upon scores of accident reports whilst serving as a member of the Accident Analysis Panel, that the reports the BGA receives often omit vital data, and the case quoted is no exception in this respect. It is therefore unwise, in my opinion, to compile a lengthy list of supposedly contributory factors when, if we are really concerned about accident prevention, the real need is to get at the *basic* cause and *ram it home.*

What comes over clearly—straight from the horses mouth—as the basic cause in the account of the accident, is that the pilot cannot have had the remotest idea of *why* he was doing a square circuit. Perhaps 47hrs at five different sites had not made the reason any clearer. What I find even more alarming is that the rest of the article leaves the impression that he is not alone in his ignorance.

Whether or not my fears are well-founded will be more evident perhaps after you have received other readers' comments upon this letter.

Ilford, Essex. CHARLES ELLIS

Bill Scull replies:
In the analysis of an accident it is not always possible to pinpoint a single, simple cause; if there is one then Charles is right with his "ram it home" philosophy. However, when an accident shows up a number of minor faults or errors and indecisiveness, then thorough analysis is essential. It is not for me to comment on the second paragraph of the letter but some may resent the implication—didn't that sort of accident happen in the fifties?

IN PRAISE OF BILL'S ACCIDENT REVIEW

Dear Editor,

May I congratulate you on your new series of articles analysing accidents. I was unfortunate enough to see a fatal crash last year, and to be called as a witness at the subsequent inquest. This gave me the opportunity of talking quite extensively with the accident investigator from the AIB.

He made the interesting comment at the time that the gliding movement seemed to suppress all information about accidents, rather than publicise it so that others might learn by it. He cited your contemporary *Pilot* magazine whioh carries an accident analysis every month, and said he wished that S&G would do the same. He pointed out that his department goes to an enormous amount of trouble and expense to analyse the causes of serious accidents, and publish these, and that this is done not to satisfy

morbid curiosity or merely to apportion the blame, but in order that all pilots may learn by it, and avoid similar accidents in the future.

One appreciates that brief details of all accidents are printed in Instructor, but this is not available to the great majority of pilots who would benefit from the kind of brief account which Bill Scull is giving in your present series. Ours is a very safe sport and no one would wish to make it appear more dangerous than it is, but a cool, thoughtful analysis of accidents could well save someone's life.

Dunstable, Beds. PATRICK GEORGE

ARE YOU A NELSON OR A BYNG?

Dear Editor,

Your April issue contains two interesting accounts by Brennig James and Hugh Hilditch on "Flights that Failed" (p52) from "which something valuable was learnt". (Actually a more appropriate title for Brennig's would seem to be "A magnificent recovery by D. B. James!" but we will let that ride.)

Brennig opines from his flight that the "moral is that in a dangerous situation your IQ tends to fall to a low figure." This may be so in some cases, but an experienced member of the Institute of Aviation does not agree. He found that human beings (and animals) divide in two directions when danger threatens. Some tend to have their wits sharpened by danger, while others tend to get into a flap and panic. Of the former type was Admiral Nelson and of the latter Admiral Byng. (If history can be believed.)

In the gliding world the former type is represented by such characters as Philip Wills *et al* plus probably many others. On the other hand I have seen quite frightening incidents in gliding where pilots have completely lost their heads when faced with danger. The real moral of Brennig's story is that if you are a "Byng" type of pilot, alpine flying is not for you. The Bas-Alps referred to by him may be relatively safe, but the real high Alps in the Central Massif (Bernina, Matterhorn etc) can be very unforgiving to a pilot prone to panic.

Incidentally I am sure Brennig has a slight tendency towards the "Nelson" type, despite his modesty, or he would not be still alive.

Hugh Hilditch's article I found much more technically interesting, but I wonder really whether his basic trouble was not after all compass error? Thus if the wind is 50kts west and you "fly and fly and fly" due north at presumably 50kts, started after a short climb (in time) from Lasham, you will end up north of London not south of Gatwick. Hugh says "5. Don't put a lightmeter near a compass", but is he really satisfied that this was the **main** reason for compass error (inferred).

He says he was flying near to lightning strikes and it is more than likely that the induced discharges (that need not be fatal) going on to his control wires, levers, pedals, etc, put his compass out for a considerable time afterwards, enough to account for the 90° error in his article.

I personally have had direct experience of this in South Africa. Having just flown a world out-and-return record from Kimberley, I embarked the next day with gay, over-confident, abandon on a mere 100km triangle in an attempt to beat Dick Schreder's other world record. Alas after pride was to come a great and salutary fall.

Halfway to the first turning point a fierce strike rose up from the ground and entered a big cu-nim on my left. All I felt, having a very dry skin, was a slight twitch. I duly rounded the first turning point, visually, still in a happy state of gay abandon, and set course magnifically for the next turning point. It never came up, and I landed out after 8hrs of "square" searching, over featureless terrain, for Kimberley. The landing point 200 miles to the south of the Orange (which, but naturally, I thought was the Vaal!) was in extremely advanced terrain. The wind had been northerly the whole time.

Actually it is possible that, unlike Philip Wills *et al*, I have a tendency to revert to the "Byng" syndrome when danger threatens. I am sure Philip and his like would have cottoned on early to the fact that the compass was wildly out.

With the sun shining I had only to fly north or south for a bit, checking the afternoon sun angle roughly and the time by my watch, and it would have become abundantly obvious that the compass was U/S. From then on I could easily have flown due north by the sun until the Vaal came up and so left turn for Kimberley and home.

It's not only amateur pilots (or really navigators) like Hugh and myself that get caught this way. The classic all time boob of this type was the airline pilot who took off from Gibraltar for London at night and landed in the early dawn, fuel gone, somewhere north of Timbuktu in the Sahara. He had had an induced strike at 10000ft on the climb out and, with all other aids gone, had relied on his compass which, of course, was now wildly wrong. There was great argument that he should have checked his course by the stars, but frankly I felt a deep sympathy for him. I believe he managed to survive the court of inquiry.

Hugh, by the way, seems to think that the bonding of gliders will improve matters *vis-a-vis* induced strikes. (No glider pilot will survive a direct strike.) This is not so. All that bonding will do is to reduce the tendency to welding of the control hinge points. In other respects it may actually heighten the dangers. This applies to glass-fibre as well as wood gliders.

On the other hand, an all-metal glider, owing to its "Faraday cage" effect, is a vast improvement against induced charges from not so distant strikes from cloud to earth (or *vice versa*) and from cloud to cloud. So if you are keen, which frankly I now no longer am, on entering active cu-nim, do it in an I-23 or some such. You will be much safer but get your escape drill taped all the same.

The all-metal light alloy surfaced glider will also reduce the tendency of compasses to go haywire after induced strikes.

There is really a lot to be said for metal gliders for the "mad British". No other nation's pilots take such phenominal risks in cu-nims as they do!

I believe there are now some very high performance American all-metal ships available at reasonable prices. The British should look very seriously at them for their team if, after Finland, the next World Championships are once again in cu-nimbus prone country.

Farnham, Surrey. D. O. BURNS

NOT SO SIMPLE BUILDING A GLIDER

Dear Editor,

I was very interested to read in S&G Ann Welch's article advocating home built gliders (October 1974, p212) and Lyn Ballard's letter (December 1974, p284), the latter prompting me to write this letter.

At present I am building a 19m sailplane of wood construction and, therefore, feel that I can write on this subject having had experience. Though Lyn made it sound rather a simple job to design and build a glider, I am afraid I have not found this so.

Although I did not design my glider, I prepared all the working drawings, which took approximately six months, working at least three nights per week (Approximately 300hrs.) therefore, in my opinion, before physical work could proceed, at least nine months work would be required for designing and preparing working drawings.

I have now been working on the actual building of the glider for some 18 months, working approximately 1½ days, plus one evening, per week (1500hrs) and would estimate another 12 months before completion. The foregoing indicates that there is a fair amount of work involved in building your own glider, in my

case some 3000hrs over a period of 2—3yrs. So, to any "would-be" constructor I would offer the following advice:

1 Ask yourself if you are prepared to spend 2—3yrs in building a glider and in doing so forego a large amount of flying time.

(In home building, it is an advantage to have a knowledge of the use of tools likely to be used, *eg* woodworking and metalworking tools.)

2 Decide upon the type of glider you wish to build, *ie* high or low performance. (Unfortunately there are very few designs available for high performance, most are for medium to low performance.)

Because of the time involved in building and the problems found during design, construction and test flying, which can be costly both in time and money to rectify, I would not recommend anyone to design and build a glider unless they are very keen. In view of the foregoing, it is better to choose a design which has already flown and has had all the snags sorted out. Even better, a kit, as this can save at least one third of the construction time and there is not the problem of obtaining materials. At this time, there is a shortage of aircraft specification metals and alloys, and for this reason anyone deciding to **design** and build a glider should consider utilising fittings which are used on existing production gliders and are reasonably easy to obtain, or can be salvaged from old/damaged gliders.

3 A reasonable workshop is a necessity and should be approximately 12ft x 36ft with electric points, good lighting and some form of heating (you cannot work efficiently if you are cold. have poor lighting or have a restricted working area!) There is also a need for a reasonable selection of both woodworking and metalworking tools.

4 Finally, I would like to stress that anyone deciding to build a glider should do it on their own. It may be true that four can do the job more quickly but it is also true that too many cooks spoil the broth. More important, however, is that it is very difficult to find three or four people who can work amicably together and are prepared to put in both an equal amount of work and money on the project: it is usually the case that one or two members are keener than the others and put in more work—then the arguments start!

I hope the above points have been of some interest to the would-be constructor and that I have not painted too black a picture, but it is easy to think it a simple job to build a glider and then find out to the contrary and not only lose interest, but also a lot of time and money.

I would stress, however, that I have enjoyed and am still enjoying the time spent on building my glider, and it is a very satisfying and rewarding job for anyone keen enough to tackle it.

Should anyone be contemplating building a glider, I wish them luck and if they have any problems whatsoever, I will be only too pleased to try and help—just give me a call or drop me a line.

21 Farnborough Close, JOHN S. HALFORD
Matchborough East, Redditch, Worcs.

CLUB CLASS RULES

Dear Editor,

Ann Welch (S&G April, p63) is quite wrong to suggest prohibiting waterballast when any manufacturer would tell her that it is a far cheaper and more cost-effective performance improvement than either retractable undercarriages or flaps.

Frank Irving has conclusively shown ("How Much Ballast" S&G, February 73, p27) that a light, low aspect ratio, unflapped 15m glider with provision for a lot of water is a near optimum configuration in all conditions. Surely it is highly significant that, without ballast, it is also a near ideal Club glider?

If such a glider is designed for large amounts of ballast from the start (my letter, S&G April 1974, p90), it will have a reserve of wing and undercarriage strength to absorb wire launches and hard landings in its club rôle.

In short, I consider the Club Class International should have the following rules to provide a high standard of competition and to produce useful club gliders:

Span: 15m.
Prohibited: Flaps and retractable undercarriage.
Full compliance with OSTIV 1971 Airworthiness Requirements at Max ballasted weight (if applicable). Certified through National authority.

Hang glider requirements

Whatever happened to "fly no higher than you are prepared to fall from?"

Surely the flying now being done is very different from the average gliding operation circa 1948, for which BCAR Section E (non cloud-flying) was accepted as a Min requirement?

There seems no reason why the better rigid and semi-rigid hang gliders should not be able to comply with these Requirements, *ie* 6*g* ultimate and no airbrakes. The BGA would be well advised to encourage and accept those, and only those, which do.

Since this "non cloud-flying" category is only contained in British Requirements to my knowledge, there is a danger it may become extinct as the BCAR's are rapidly being replaced by the OSTIV Requirements in certification procedures.

Perhaps Ann could press for an OSTIV non cloud-flying category based on the BCAR one?

Scarborough, Yorks. JOHN SELLARS

Ann Welch replies:

John Sellars should read the article again. I did *not* suggest the prohibition of waterballast; I instanced waterballast as an example of something which might be prohibited in a competition, but otherwise could be used normally. Other sorts of Class Rule limitations, such as span, are not so flexible.

There is a CIVV sub-committee working on rules for the International Club Class at this time. It has taken, and still is taking, advice and information from many people so that the Class Rules will reflect what most pilots want.

At the March CIVV meeting it was decided to accept the Club Class for FAI recognised international championships and competitions. The Class sub-committee will continue to exist even after the rules are finalised to look after the use and operational needs of the Class.

The second part of John Sellars letter does not refer to my article, and I am not very clear what he is trying to say; it could be that the word 'not' is missing. However, nothing has happened to "fly no higher than you care to fall". It still applies to beginners in hang gliding, but experienced pilots flying the robust and controllable aircraft which are now manufactured have no more reason to fall than any other sort of aviator. They are safe slope soaring as high as the lift allows.

BOOK REVIEW

Outdoor Pursuits for Disabled People by Norman Croucher.

Published by the Disabled Living Foundation. Price 75p.

Gliding is covered in this new guide which is intended to encourage disabled people to enjoy the countryside and to learn various skills and sports from sailing to caving. It also includes information about the many pastimes available to the disabled and the addresses of organisations, clubs and authorities able to give constructive advice.

The collection of pursuits listed in this well presented publication may seem surprising until it is known that the author has personal knowledge of overcoming disabilities. Norman Croucher is an experienced mountaineer who has recently climbed the Matterhorn, despite having had both legs amputated below the knee.

club news

Staffordshire Club Treasurer John Graham and Vice-Chairman Charles Webb are about to fly the K-13 for the first time at Morridge. Photo F. Boyce.

Copy and photographs for the August-September issue should be sent to the Editor, S&G, 281 Queen Edith's Way, Cambridge CB1 4NH, tel Cambridge 47725, to arrive not later than June 10 and for the October-November issue to arrive not later than August 7.

April 17 **GILLIAN BRYCE-SMITH**

BLACKPOOL & FYLDE

We were congratulating ourselves on how well our drains were carrying away the autumn rains when we ground to a halt in a sea of mud. So we stayed indoors and remodelled our barn for several weeks, though this is still far from the eventual clubhouse that we plan to make it.

The subsequent spate of check flights coincided with the introduction of a coloured card system to grade our solo pilots. On certain days the hill soaring can be tricky and we need to restrict solo flying to skilled pilots, while giving further tuition to the others. Initial hill soaring is allowed when the wind is westerly and conditions become easy to use.

Our private fleet has swelled from four to seven with an EoN 463, Skylark 3, and brand new Swales SD-3. This is the ninth airframe in the BG-135 Gipsy/Consort series, the project being kept alive and further developed by Bryan Swales at Thirsk. The group flying this machine includes two of the designers, John Gibson and Keith Emslie; perhaps gliders must be built in Yorkshire, but they can be designed in Lancashire!

On his first flight in the EoN 463, Ian Hamilton found a thermal with cloudbase high enough to give him Silver height in clear air. The first time the SD-3 got airborne, it proceeded to explore the whole six mile length of the plateau in a gentle wind from 160°. This meant using five distinct faces, and it is unlikely that this will happen very often, for if the wind veered it would come off the SE face, or if it backed it would stop working on the SW one. However it was good to prove that this overlap exists, for when the wind moves from one face it will blow more squarely on to another. We now know that we can reach hill lift from winch launches in every wind direction between 060° and 330°.

The Fauvette owned by John Gibson had to be grounded for a major overhaul, to bolt in place the fittings originally held only by glue. When it returns it will be operated by a new group and will cease to be treated as a club machine. We are grateful to John for his generosity over the past six years in allowing it to be flown by so many club members.

The club Olympia was returning from a week at Portmoak when it was blown off the M6 on Shap Fell. The road has a reputation for overturning empty furniture vans, it is high up and unsheltered. The damage was not extensive, but was yet another job for Alec Lunn to repair; he had just been given our annual trophy for effort on behalf of the club. Mike Larvin got the cup for progress, Ken Stephenson for enthusiasm, Ron Smith for distance and Roy Greason was awarded the height trophy.

K.E.

BRISTOL & GLOUCESTERSHIRE

Chairman Mike Harper reported at the AGM that the club had had a successful year's flying using a carefully balanced blend of amateurism and professionalism. Aerotows had increased by more than 33% from 1521 to 2029 and winch launches moved from 3162 to 3208.

The club had full planning permission for a caravan site, which was now operational, and work was in hand on a toilet block and septic tank to complete the scheme.

Members voted unanimously in favour of forming an operating company to run the club while a holding company will look after our considerable assets. This will protect the assets in case of an enormous claim against the club.

There was a unanimous agreement too, after an excellent report from Treasurer Norman Harris, that subs should go up to £22 for flying members, £15 for youths, £27 for families, £12 for country members and £1 for associate non-flying members. A new temporary membership arrangement is to be introduced with £1 for an air experience flight from a winch launch and £3 by aerotow.

Following on last year's successful courses which exceeded expectations, double courses are planned for several weeks this summer with club instructors helping out full-time staff.

A group of 13 members attended a series of weekly lectures by deputy CFI, Mike Munday, with guest appearances by Met man Tom Bradbury and Keith Aldridge. As a result they all passed their Bronze C, one of the 13 doing his Silver duration on the ridge to celebrate with others adding Bronze C legs within a short time.

B.S.

CAMBRIDGE UNIVERSITY

We usually begin operating from Marshalls in late February but with the airfield like a rice paddy, Duxford has been the centre of our operations. We achieved a site record on April 13 with 99 launches.

On March 28 John Glossop (Kestrel 19) ambled round a 105km triangle and Sigfrid Neumann took the club K-6CR round an 85km triangle. Then on April 6, in atrocious visibility and after a night of snow, four pilots flew a total of 596 cross-country kilometres, the most notable flights being John Glossop's 180km out-and-return and Paul Sears' 173km triangle in a Dart 17R. The same day Peter Gittins gained his five hours in the K-6CR.

Note.

I would like to repeat warnings about the increasing power traffic at Duxford. Visiting pilots should be on the look out for such things as a Sea Fury, and it is preferable for glider circuits to be to the south of the airfield to avoid areas likely to be targets for beat-ups by the power brigade. Incidentally, Duxford is PPO to powered aircraft. The number to ring is Sawston 3963.

S.N.L.

CORNISH

There have been many changes since we last appeared in these columns and fortunately one has been the weather. After months of the dreariest conditions since records began, we were rewarded with several weekends of excellent soaring in March with most of the fleet thermalling to 5000ft over the airfield on one particular day. This produced two Silver height claims but the headwind was too strong for effective cross-country flying.

Our CFI is now David Pentecost, who takes over from Ernie Hayman, and our new Chairman, Brian Farrow, holds sway over a committee with many new faces.

Early signs suggest that we are in for a very busy course season and we hope our ridge and two-seaters will soon be working overtime.

After the unhappy demise of our K-13, we now have a Blanik as a replacement and acquired another F100 truck for launching. A third Pilatus, owned by John and Jan Smith, has arrived to make eight privately owned gliders.

T.L.J.

COVENTRY

Despite poor conditions and very wet fields, the first few cross-country flights have been made, but we shall need more sunshine before any serious tasks are attempted.

Hopefully the best weather is being saved for the Nationals at Husbands Bosworth from May 24. Forty-five entries have been accepted and there are a further 18 pilots on the reserve

list, so with a good week's weather we hope for a first class competition.

During the first weekend of the Nationals we also have the Welland Valley Traction Engine Rally with about 40 steam engines, lots of tractors, sideshows, fairground attractions and a display by the Blue Eagles helicopter team, so come and visit us and bring the family.

A lot of planning has been done to improve facilities. The club has received a grant for a new sewage system, and the committee have given the go-ahead for a second hangar, which we hope will be completed by the autumn.

A Std Cirrus, bearing the unusual number X7 on the tail, has joined the private owner fleet and we are now awaiting the arrival of a PIK-20 ordered by a syndicate based here.

C.T.

DEESIDE

Two fund raising events in March and April were very successful. The medieval banquet on March 28 was a smash event with a medieval menu and authentic costume.

The attendance for the open days, April 5—6, was disappointing until the better weather on the Sunday afternoon. One flight was quite an experience for Mrs S. D. Gladston, an 83 year-old Aboyne resident who became the oldest person to have flown at the club.

March produced several Gold heights for visitors with one climb to 17000ft. Then on April 1 club member Robert Henderson gained his Diamond height, topping 19000ft.

B.C.

DEVON & SOMERSET

Some members have just returned from ten days at Portmoak with two Gold heights (Tim Gardner and Terry Janvey) and one Silver duration for Reg Welch, thus completing his Silver. He missed his Gold height by 95ft.

The weather improved over Easter when flights of more than an hour were logged. The first April weekend saw two first solo flights for Jack Barnett and Jim Napper, and our tug back in service after its C of A.

Congratulations to John Burrow and Sue Moore who were married on April 5.

J.R.H.

DONCASTER

Despite the disastrous fire in March that destroyed the one and only Regal Eagle and a K-4, both privately owned, and removed half our workshop facilities, everything at Doncaster is in full swing to make this season even more successful than last.

We have to congratulate Frank Walters on a fine first solo, Derek Whiteley for gaining his Silver height and Len Singleton who completed his Silver C. Our thanks to Bob Collins, now our resident inspector in control of the club fleet, Nevil Spencer and various others who have built us a new winch.

G.D.W.

DORSET

Easter brought some very welcome soaring and the steady north wind gave several pilots 2000ft launches off the wire. An *ab-initio* training week followed and task weeks have been fixed for the weeks starting May 25 and August 24.

Ray Witheridge, Alan Milne and Denis Neal have joined the ranks of full rated instructors at Tarrant as a result of a course arranged with Doc Saundby as examiner.

The subscription for 1975 has been set at £16 for the year plus £12 entry fee. The charge for an aerotow to 2000ft is being held at £1.65 with autotow launches at 60p.

M.L.B.

DUBLIN

As far as we can recall, we have not featured in S&G since 1970 when Doc Slater visited us on safari in Kerry. We feel it's high time we let it be known that we're still in there fighting gravity, fuel costs and inflation with the rest of you.

The most important developments have been a steady increase in the private fleet, and the acquisition last year of the ex-Dunstable Rallye Minerva. While less than 100% reliable, this tug has given us some fine flying and has made the annual safari a lot less dependent on the goodwill of the few Irish aircraft owners who fit hooks to their machines.

On the negative side, the ATC climate here too has got more restrictive and we can say goodbye to any hope of more Diamond wave climbs on our home site, jammed tight as it is against the Dublin control zone.

Our approach to financing the heavy outlay for the tug may be of interest to other smallish clubs thinking of the same move. We opted for a very stiff (350%) increase in the sub, making it payable in monthly instalments through the year, and sweetened this by charging only direct costs—*ie* fuel and oil—for launches. At current prices, this comes to about £1.00 for the standard 2000ft. The scheme has worked well for the first year: we've held on to our 600 active members and gained a few, and met the loan repayment, insurance and maintenance bills out of the monthly income with a reasonable margin over. A word of advice, though, if like us you're new to the game: before you do your sums, get the club pessimist and Cassandra to come up with a figure for tug maintenance—then treble it.

Flying from our weekend site on the military airfield at Baldonnel, Co Dublin, we now have, besides the club K-7, K-8 and K-13, a pair of K-6CR's, a Skylark 4, K-14, EoN Baby (older than most of its syndicate), K-16 and, most recently arrived, the ex-Bicester Blanik.

Gliding sites in California, France and Austria as well as the UK have seen members during the past few years, but outstanding was Damien O'Reilly's pilgrimage last October to Waikerie, where on his first acquaintance with anything hotter than a K-6 he picked up the

club's first Diamond distance. All in all, however, we are still some way from the era of Rodney Tibbs's blind-flying pot-hunter, so if all these competitive pressures we keep reading about in S&G are getting too much for you, come over and see us. Even if our tug is grounded, our pulley launch height record is still way above Essex's 2500ft!

T.W.

DUMFRIES & DISTRICT

Our efforts to get established at Glaisters have been in vain and we are forced to move once again. However, we should soon be operating from our new site on Forrestry Commission land nearby. With a 21yr lease, this site offers much improved potential as well as the immediate advantage of easy access and far superior ground conditions.

Heavy rain and gales curtailed flying through the winter months, the T-21 and T-31 getting airborne on only a few weekends with rare appearances of the Oly and Prefect.

Although recent flying has attracted a few new faces, many more would be welcome as the shortage of members is of great concern. It is hoped that our next report will show a large increase in flying activity.

I.J.C.

DUNKESWELL

The club's first "solo" was recently made by Frank Buttery, closely followed by another first solo by David Burrows, a visitor on our Easter mini-course. John Turner has since soloed the T-53 and flown his Oly 2B while Peter Clements and Veryan Stephens have been making good use of their Dart 15 in preparation for an expedition to Fayence.

March, and Easter in particular, has been our best month so far with spring thermals combined with maximal launch rates. The T-53 has certainly proved its excellent soaring ability.

Our ten courses are fully booked and Wednesday flying is in progress to complement our active weekend operations.

We are delighted to welcome the return from Cyprus of Dave Reilly. During his stay in the West Country he has given valuable help as an instructor. It has also been pleasing to have so many visitors from other clubs.

Social activity, combined with the Aero Club, recently ran to a cabaret and dance in the clubhouse.

B.H.F.

ENSTONE

Easter proved to be one of the best in memory with a number of hours flown, even if a great proportion were in snow showers and with a low icing level. With 4kts plus and cloudbase approaching 4000ft, cold feet were forgotten.

Our tug master formed new ideas during these days about flying following an indicated 2000ft/min towing with the Terrier. He is now convinced the one minute tow is possible and has a JIN as a back-up tug, which we hope will cut out the aerotow queues in the summer, together with a number of aircraft shells to provide those expensive bits so often required.

We are preparing for our task week during the spring Bank Holiday week, to be organised by Ron Womble. Over the winter we have seen an increase in the number of glass-fibre syndicates with an influx of Std Libelles.

M.W.

ESSEX

March came in like a wet lion this year at North Weald, but went out with some corking thermals giving Silver height climbs and cross-country flights.

We are breaking in a new Chairman, John Wilson, and a new Secretary, Peter Johnson Snr. Good luck to them and many thanks to Ken Durno and Mike Conroy for their past efforts.

The weather for the Easter Comps was a mixture of rain, snow, and some really fantastic lift. On Monday tasks were set and completed but, because of the unpredictable weather, competition points were awarded for time in the air. The trophy went to the Skylark 4 (No. 411) syndicate.

We are well established in our new control tower clubhouse and a warm welcome is extended to visitors.

T.D.H.

ESSEX & SUFFOLK

At our annual dinner-dance the instructors' tankard was deservedly awarded to Dennis Burchett.

"Eddy" Sherwood has once again returned from his wanderings to get in some more flying hours—a change from the bridge of his tanker. The first thermal soaring from Whatfield was in March with Bob Bousefield (K-6E) leading the way with a flight of nearly 2hrs. Since then Bernadette Planques and Doug Wright have gone solo.

On an expedition to Aboyne at the end of March, Eric Lewis (SHK) was the only pilot to gain his Gold height.

For months now much of East Anglia has been waterlogged, including our site. The runways have never been so muddy and we lost many flying hours. At Easter a local farmer and owner of Alpheton airfield, Lavenham, allowed us to use his excellent site. The huge runways were an embarrassment after our own restricted site.

There were several changes of office at our AGM. Jack Birkin, Technical Officer, resigned after some exceptionally hard work and is replaced by Cedric Vigar; Eric Lewis takes on membership and publicity and Bernadette Planques will look after social activities.

The main points to emerge from the meeting were the need to improve our finances and the necessity of finding a larger site.

Cedric Vigar has bought a Hirth-powered Motor Falke, which we hope will soon be operating from our site.

C.C.S.

HEREFORDSHIRE

The season is well under way with wave climbs to 18000ft. Our Easter task week gave us four out of eight days with Messrs Maitland and King (Diamant) retaining the honours for the club.

To meet the increased demand, another Blanik is to be delivered in May. This brings the club fleet up to two Blaniks, a Pirat and Falke, two tug aircraft and, with David Schofield joining the staff, three full-time instructors and one tug pilot.

With the promise of wave to 20000ft, thermals of 10kts plus and ridges that sometimes work, we are worth visiting.

K.W.

HIGHLAND

In spite of snow and cold north winds, spring has sprung in the north-east, with the thermals popping and gliders soaring.

Our hunt for a site to replace Milltown still goes on, but we have strong hopes of being able to rent part of a disused airfield near here.

Our joint Highland—Fulmar annual dinner-dance, held on February 14, was a success. The cup for the most meritorious flight was awarded to Shirley Higgins for her Silver duration struggle in the Oly 2B on the squally slopes of Ben Aigan. The cup for the absolute altitude went to Jim Tait for his 18000ft wave flight in the Oly 2B in January 1974.

Whilst members of Fulmar were pot-hunting (four Gold heights), the northerly winds brought Ben Aigan into action once more. Several people attempted their five hours on the ridge, but only Trevor Armstrong in the Skylark 3F was cunning enough to be at the right end when the wind changed, thus gaining his duration and completing his Silver C.

Ruth Tait finished her Bronze C at last and husband, Jim, gained his Silver distance.

We congratulate Jeff Howlett and Shirley Higgins, who were married on March 26.

R.E.T.

HUMBER

We flew more hours in 1974 than in any previous year. On New Year's day we experienced slight wave conditions but the following Saturday was even better with several soaring flights, one exceeding ½hr with a height gain of more than 2000ft.

On February 1 we had the use of an Auster

from Hemswell Flying Club and tasted the fruits that are taken for granted at many other clubs.

The fifth and final member of the Wilson family went solo the day after his 16th birthday. Gill Adam and Sara Blackburn have gone solo and Bob Sheffield has joined our ranks from Weston-on-the-Green.

K.M.G.

IMPERIAL COLLEGE

The poor weather has meant that new members under training haven't made as rapid progress as they did last autumn. Hopefully our two courses will see another eight or nine people solo and converted to the K-8.

We have had a few soarable days. Chris Hartley did two long Bronze legs in 6kt thermals over the snow-covered countryside.

The C's of A at least benefited from the disappointing weather of February and March but even when we were back at college there was still the Dart to be done, its fuselage just clearing the optical path of a supersonic wind tunnel.

A.P.P.

KENT

The wet weather forced us to continue our ban on winch launching to avoid churning up the field. Then to add to our launching problems, our newly acquired tug broke down and we are having to wait a long time for the spare parts. All these problems would have left us without any means of launching if not for Mike Carlton's generous loan of his Stampe for aerotowing. It has proved quite a satisfactory tug, and most of the tug pilots have been delighted with its aerobatic qualities.

We have not had a very good start to the soaring season at Challock, but various syndicates have made trips in search of wave to Usk, Shobdon and Portmoak, with varying amounts of success. "Mac" MacPherson's trip to Portmoak, with his newly acquired Std Libelle, was rewarded with a climb to 14000ft for his Gold height.

The Easter holiday started off with more snowball fights than gliding, but improved gradually until Monday, which was quite a good day's soaring over a snowy landscape.

Finally the controlled airspace situation seems to have resolved itself at last. It leaves us with a total ban on flying in the London TMA, and though raising its base in places, still leaves little room under it; this will severely restrict our cross-country flying. However the airways base over quite a large area locally has been raised from 3900 to 4900ft, so some good news for Silver C height candidates, if not for anybody else.

C.B.

LAKES

Soaring has got off to a good start this year with the successful conclusion of our first course at the end of February. Seven members of the Lake District Leisure Pursuits Centre, for whom the course was organised, all enjoyed extended wave flights to 6000ft/7000ft under the instruction of our newly appointed deputy CFI Peter Jackson.

Arthur Alsford, Harry Conroy and Pete Redshaw have all joined the instructors panel in recent weeks. Peter Jackson's Gold height has been confirmed—while Dennis Carey in the same aircraft, on the same day and in the same wave—missed it by one millimetre!

The T-49 photographed by Colin Beer against a snowy Easter landscape at the Kent Club

The K-6E has departed to Sutton Bank and been replaced by an ASW 15 from Dunstable. By the time this appears in print the first Club Libelle will have arrived on site and according to strong rumours, the Std Libelle syndicate will also have traded up to a Jantar.

Congratulations are due to Roy Kingan, our first solo this year, and also to Geoff Gregson, equipment officer and star pupil of last year, on completion of his Bronze C and Silver height. We wish Geoff every success in his new job on the north-east coast.

Finally we must record the departure, and again our thanks, to our tug pilot Phil Moore, following the commissioning of HMS Sheffield into the Royal Navy.

D.J.C.

LONDON

We are pleased John Jeffries, our CFI, has been awarded a BGA diploma. John's enthusiasm for gliding is very strong and it was through his dedicated hard work that our club competition over Easter was such a success. He set tasks which encouraged a lot of people who wouldn't otherwise have flown.

John Cardiff completed a 100km out-and-return at 100km/h without circling once, with a height of 2700ft, and Maurice Clarke (K-6E) had a wonderful flight to Lasham, although the task was an out-and return to Husbands Bosworth!

The Lasham plate was collected early in the season, on March 16, by Francis Russell in his Weihe.

Our waiting list for tuition has been shortened considerably with a phenomenal number of first solos including Michael Humphries on his 16th birthday and Richard Brown after only 20 instructional launches.

Our built in "up current" has helped secure several Silver C durations with Tony Hawkins gaining his two weeks after going solo. We welcome Dave Saunders and John Whittle as full-time winch drivers and Robert Lee as our new professional tug pilot.

Our annual awards were presented at the dinner-dance. Mike Garrod received the Foster boomerang for a 435km out-and-return to the Long Mynd; John Cardiff a cup for a 505km triangle in his Std Libelle while Carr Withal had a mention for doing the same task in his Kestrel 19; Geoff Love collected the trophy for his attempt at Gold distance (289km) in a K-8 and the trophy for his Silver C distance; John Jeffries won the two-seater trophy and Dave Saunders the trophy for the best *ab-initio*.

D.Y.

MIDLAND

At the annual dinner in March our Secretary, Don Brown, was presented with the trophy for the best distance for the third year running. This year he also has the cup for the best out-and-return.

Other cups went to Dave Carson (best height) and to Bill Smith (best *ab-initio*). John Brenner won the club ladder. The Maxam, for club effort, was presented to Chairman Keith Mansell. The committee were mindful of his services in various capacities over many years and, particularly, of his part in the negotiations for the land we acquired last year.

The heather on several acres of this land, to the east of the "crockery line" was cut during the winter to extend and improve the east-west run.

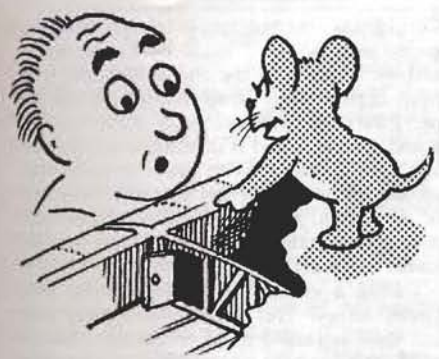
Easter was somewhat chilly at the Mynd, but there was some acceptable soaring. The northerlies finally expired and on April 12 we had a very pleasant west wind wave day. Nothing very strong, but patience and persistence paid, and there were heights of up to 8000ft asl for a number of pilots all afternoon and evening. That day we had, we think for the first time, three generations of one family flying here—ex-Chairman Bob Neill, son Bobby, and grandson Robby.

W.J.T.

NORFOLK

Our second K-13 is now in operation, having been suitably "launched" by the Chairman and CFI. We intend to use the "old" K-13 mainly for local training and hope that the new one will spend much of its time on cross-country trips. We now have 12 gliders at Tibenham, five of which are club aircraft, the Falke, two K-13s, Swallow and Skylark 2B. The other seven are Oly 2B, Skylark 4, Std Libelle, Dart, SHK, K-6 and Pirat. Retired, at least for the time being, are the T-21, Tutor and Dagling.

Mike Butcher has been appointed PRO to promote the all important publicity. He soon had the club in the news with the story of the flying mouse. When CFI Joe Podolski was doing the C of A for the Swallow, a mouse jumped out of the wing tip and nearly landed in



his lap. He discovered a large nest with two more mice inside, but these were both dead—presumably from air-sickness.

C.E.H.

SOUTHDOWN

After many (wet) months of waiting, our new site at Parham has started to live up to the high expectations. Good conditions over Easter weekend produced some good flights—the same weekend also gave some of us a more intimate knowledge of the surrounding countryside with no fewer than eight outlandings! In one flight in the Oly 460, Peter Atkin gained his Silver duration and height, and Richard Marsden his Silver height in a syndicate Pirat. Congratulations to Mark Ashbee who soloed the day after his 16th birthday.

Two expeditions to Portmoak in March resulted in good flying. The syndicate K-13, the Std Libelle and Skylark 3B recorded a total of 78hrs between them in the one week. Derek Eastell gained a Gold height, Ian Bell and Ray Funnell their Silver durations and Dave Connaway his Silver height. Two weeks later Chris Berry, in a borrowed Std Cirrus, gained his Gold height and Keith Mitchell, SHK: climbed to 18500ft. Peter Gellet, at Aboyne, flew to over 15000ft.

Our AGM was in March when the 1974 awards were presented. The York cup (most meritorious flight) went to Keith Mitchell; the Lawford challenge cup (best climb) to Les Merritt and the Skysailing cup (best distance) to Chris Backwell.

We held a party on April 12 for local farmers and some of our good friends and helpers, by way of a "thank you".

I.D.B.

SOUTH WALES

A medieval banquet organised by Gwenda Williams raised our depression over the bad field conditions. Fortunately the site improved just before our wave week, organised by Alan Harris, and allowed aerotowing to start. Everyone was well satisfied with the amount of flying and the visitors, including a large German contingent, savoured the Usk wave.

The Vintage boys graced our skies with Minimoa, Grunau Baby, T-31, Weihe, Kranich and Mü-13, encouraging from hibernation the Usk Cumulus and Ron Hook's Kite Mk II, although Ron had a "mouse in the wing problem" to deal with first. Chris Wills' talk on gliding history and development was of great interest and members hope to see the Vintage Club with us again.

The season is now off to a good start with, amongst other achievements Tim Barton's duration, Norman Evans' emphatic 7½hrs plus a potential Gold height, and Brian Drake's celebration for having survived the instructors' course was a Silver distance to Shobdon using the wave system.

B.J.E.

STAFFORDSHIRE

After a promising start to the year the weather at Morridge turned sour on us during February and March with the result that very little flying was possible. The sodden state of the field in certain areas also prevented much development work being carried out.

The Easter weekend saw us breaking new ground when we made our first launches from a previously unused corner of the field directly into the moderate north-west wind. The Swallow achieved 1000ft on this 2300ft run, and this with a retrieve cable attached. Some good soaring flights were made with plenty of 2—3 metre/sec thermals being reported. Another first this weekend was the launching of a glass-fibre sailplane; a Std Libelle in the hands of Ron Wright. It has been decided to sell our Olympia but so strong are the affections of some members for this aircraft that it is hoped to form a syndicate within the club.

We are looking forward with crossed fingers to Boris Clare's course week at the end of May, and in the more immediate future to a visit from Bill Scull in mid-April.

F.B.

STRATFORD-UPON-AVON

April 1 marked the start of our second year at Long Marston and membership is now approaching the hundred mark. The AGM was well attended and it looks as though we will be able to buy another single-seater, possibly a Skylark or K-6CR, to relieve our overworked Grunau.

Our thanks to Betty Abel for those steaming stews which kept everyone warm inside, if not out, during the winter.

H.F.H-L.

SURREY & HANTS

Short trips of around 50km are all that we have managed so far this season. The ground has never been so sodden with standing water on more than a third of the airfield. Out landings are still very risky with most local fields too muddy and gateways impassable.

Still, the fleet is in fine fettle ready to take advantage of the first good soaring days.

A K-16 two-seater motor glider has appeared in the hangar, but whenever a glider gets near the machine in thermals the motor stops—something to do with the bar talk about "not another powered aircraft in the hangar".

C.L.

TRENT VALLEY

The soaring season would appear to have started with our first taste of thermal soaring and several flights lasting over two hours. Our pundits have therefore all had their cross-country checks completed by our CFI, Vin Fillingham, in anticipation.

We would like to thank J. W. Johnson (Judge) for presenting a cup to the club which is to be awarded to the winner of the "Club Ladder". Our congratulations to Lou Ryan, Malcolm Batty, Don Tong and Dick Pickles who have all gone solo recently. We are also looking forward to acquiring a club Pirat with thanks to the Sports Council for their 50% grant. We also have acquired a new syndicate glider, a Skylark 2.

J.P.N.

ULSTER

Members voted at the AGM to drop the "& Shorts" from our title and revert to the original name under which the club was one of the first to be established in the UK, when its founders soared the cliffs at Downhill in the very early 1930s. With only two members and no financial support coming from Shorts, it was felt the previous name no longer reflected the club's true nature.

Flying resumed on March 8 after a three-month tug grounding. Results over the first few weekends have been reasonably encouraging as we strive to keep the launch figure above the demanding "line of viability" on a graph posted at the launch point by our new Treasurer, Alan Sands. Among a steady trickle of new members, students and Army personnel here on short postings predominate.

A small party visited Aboyne in March, with limited success but huge enjoyment. Two weeks of easterlies followed by strong cross-winds minimised wave opportunities but Secretary Bob Rodwell achieved the overdue completion of his Silver C on March 14 with the season's first cross-country from Aboyne, taking the Deeside K-6E over the mountains to a point near Arbroath.

Later in the week Nick Oakley took the Swallow to Gold height and turned downwind to land 83km away near Fraserburgh also to complete his Silver C. Billy Craig also achieved Gold height—but only in the Bocian with a pupil aboard, while Alan Sands took his Kestrel to 16000ft. The group's unanimous vote—great place and great people.

Preparations are now being made to send both club and private aircraft to the first Irish task fortnight which our friends in the IGA are organising at Kilkenny for the first half of June.

R.R.R.

VINTAGE

Skis on a roof rack would have been more appropriate than a glider in a trailer on the rear through the snow storm en route to Usk for the club's Easter Rally. But we left that all behind at the Severn Bridge to give us four days flying varying from adequate to excellent.

By the time these notes appear we will have been with the Upward Bound Trust at Haddenham in April, and on flying display at the Shuttleworth Collection, Old Warden, in May, then it's off to Competition Enterprise at the Devon & Somerset Club in June.

Our trip to Gruyere in Switzerland for the International Vintage Rally is set for July 19. This will also be a family holiday gathering with excursions for the non-flying attenders. The autumn meeting and annual dinner at Camphill will be over a long weekend, September 19—22.

For owner or associate membership contact Frances Furlong at Otford House, Otford, Kent.

K.C.

WYCOMBE AIR PARK

The terrible snow storms in March and April provided some interesting flying weather with 50kt winds on one occasion with good lift following the line squalls.

We had some bad luck with our tug aircraft at the beginning of April with all three U/S for a couple of weeks. We carried on full, although slower, operations with a Condor hired from Dunstable. We took delivery of our replacement two-seater (following the demise of our Bocian in the airfield fence). This was the last YS-53 built and it has received a mixed reception from *ab-initios* and instructors. It has interesting flying characteristics, but performs well in strong conditions. Our Skylark 4 was quite extensively damaged by battery acid and took three weeks to repair.

We must now have the most highly-qualified team of staff, with our senior staff instructor Dennis Neville and tug pilot John James gaining their USA CPL with multi ratings, John with instrument rating in addition.

Finally, special congratulations to Adrian Wright, (who only has one leg), for his Silver C duration flight on Chinnor Ridge, and for making his first parachute jump.

J.M.C.W.

YORKSHIRE

The weather has been bad with few soaring opportunities in the strong northerlies which have predominated. We are hoping for better things if we are to avoid another heavy financial loss this year.

To add to the gloom, one of our Pirats was damaged on one of the few ridge days by a freak gust during a winch launch. Fortunately the pilot was unhurt.

Barry Gregson is resigning his Directorship after six years. We are grateful for his contribution to the success of the club.

P.L.

SERVICE NEWS

BANNERDOWN (RAF Colerne)

For the first time we have a ladder trophy, a splendid carving of a Std Cirrus, and a points system has been evolved on a handicap basis. So far this year, nine Bronze C legs have been claimed and seven first solos with two re-solos.

Easter weekend was moderately successful with four Bronze legs gained. Bob Brain and Jane Cooper (our CO's daughter) have become our youngest solo pilots. Dave Gledhill and Fred Porton have returned from an instructors' course at Bicester and Den Britton has passed his full Cat's test.

Our Bocian has returned after demob to its new owners and our T-21 stayed after all when we acquired a set of enclosed canopies to fit her. The Cirrus caused a stir on its arrival having been held up by Customs Officials at Dover for more than ten hours.

F.C.P.

BICESTER (RAFGSA Centre)

During March there were expeditions to Aboyne and to Nympsfield where "Russ" Russell, Phil Reeves and Paul Steiner gained their Silver durations on the ridge. Lyn Daby also made his two Bronze C flights.

Future outings are planned to the Inter-Service Regional, in which six members are competing, and to the Nationals where four members are entered.

Recent joint Service gliding courses have introduced quite a number to gliding at Bicester and we hope they continue their interest on returning to their units.

Progress continues with the test flights on the "Supermunk"—a Chipmunk with a Lycoming engine, a project being masterminded by Dick Stratton, BGA Chief Technical Officer. The fitting of a tow hook followed by tug trials are the next stages.

Recent solos at Bicester have been by Jamie Allen, who managed his first Bronze leg shortly afterwards, and Roger Black. Jill Pennell has achieved two Bronze C flights.

W.T.

CHILTERNS (Weston-on-the-Green)

The year started badly with the airfield waterlogged for three months. It was a problem finding a strip dry enough to fly from and these conditions reduced our normal 1500 to 2000ft launches to about 700ft.

On the aircraft side, the Cobra is up for sale due to the syndicate members being posted all around the UK. The K-6E is still on major servicing due to problems with the finish. Our thanks to Roger Crouch and Dave Williams of Bannerdown for their help.

The Doppelraab, being built under the direction of Tony Blyth, should be flying soon and, with the K-4, has been registered with the Vintage Club.

We held another expedition to Aboyne in March with the Fulmar Club. We had two good weeks with wave, thermal and ridge lift, the wave producing a small crop of Gold heights but no Diamonds.

On April 6 two of our girl members, "Chey" Austin (daughter of Don) and Barbara Bird, went solo and Alan Muir gained his first Bronze leg on his third flight in a single-seater.

G.M.

CULDROSE (RNGSA)

Considering the economic gloom and the grotty weather, 1974 could have been worse and we emerged at the end of the year in a fairly healthy state. On all flyable weekends the two Pirats and two Capstans were kept hard at it and several A and B certificates and Bronze legs were obtained. Keith Robinson gained his second Bronze on the last soarable flying day of the season. A couple of Silver heights were flown during the latter half of the year by Lance Peters and Paul Williams.

During a weekend visit to Yeovilton, Bob Green set off into a grey looking sky and somehow managed a Silver distance (though not in the direction he intended), which terminated in a very wet and muddy retrieve. In February he completed his Silver with five hours on the Cornish cliffs, again in dubious weather.

Arthur Brooks has joined the ranks of full cat instructors, and two other members became assistant instructors. On the maintenance side, Peter Wells obtained his senior inspectorship.

1975 has started off quite well with an influx of new members, and already we have had some very good soaring days. Not bad for this part of the world.

One of the Pirats and three pilots will be visiting Sutton Bank and Ian Reed is again trying his luck in the Inter-Services. We have two more lined up for an instructors course at Bicester.

We look forward to the expected arrival of Alan and Billie Davie and their Diamant, who will no doubt be out-soaring us all again this season along with our other resident "Hot Ship", Arthur Brooks' Kestrel.

We will be losing Peter Wells, our CFI for several years, who is leaving the area. His place is to be taken by Bob Green and we wish them both well.

P.W.

EAGLE (Detmold)

Our AGM was on February 8 and despite heavy expenses on the hangar the club had made a reasonable profit on the year. The committee was re-elected with Derek Needham coming in as ground equipment member.

We are still looking for a Falke. We now have the money but can't find an aircraft. But a new arrival is a Rallye tug with a 150hp engine, bought by a syndicate within the club. At the moment there is a shortage of PPL

members but this should soon be rectified as the CAA offices collapse under a bombardment of letters.

We have a number of experts at laying concrete. Slowly but surely a sea of concrete is spreading inside and outside the hangar.

The British Forces German Gliding Championships are again to be held at Detmold, from May 16—27, and it seems as though we will have in the region of 25 British and German sailplanes competing. This is the only competition outside the UK which is flown to BGA rules.

The airfield in early March is still waterlogged after a very wet but warm winter. At the moment we can only aerotow with the new tug but hope to be soon running two winches and a Falke as well.

P.W.W.

FENLAND (RAF Marham)

Our weekend only flat site is second to none in the UK with more than 3000 launches at the time of writing. We have had three solos and three Bronze legs to date.

The Sutton Bank expedition in February didn't find the right kind of weather. John McCarry led a five-day expedition to Swanton Morley for cross-country tasks, but again the weather wasn't favourable.

We will be represented by five members at the Inter-Service Regional. Four of our members have completed an instructors course at Bicester—Geoff Matthews, Tony Steel (RAF) and Floyd Svrko and Tom Prochazka (USAF).

With another AOC's inspection at the end of April, we have been redoing our kitchen, giving it built-in cupboards and a new refrigerator.

J.E. and C.B.

FOUR COUNTIES (RAFGSA)

The move to Syerston went according to plan with nearly every piece of equipment—including the bar—getting moved over during a weekend in March. The only thing not on our side was the weather—it didn't stop raining until late on the Sunday afternoon!

The major inspections and C's of A are now behind us, and last weekend had every club glider soaring—something that hasn't been seen since 1974.

Syerston itself is proving to be quite good for both soaring and instruction. The pupils are finding it easier too, with the large runways clearly defining take-off and landing runs, and circuit planning is at last proving to be not quite so difficult.

We all hope that with Good Friday providing a cloudbase of 5000ft, and a height climb to 6100ft, it is a sign of even better things to come.

J.R.O.

KESTREL (RAF Odiham)

After the loss of our K-13 in August there has been much scrimping and saving by the club and individuals who have contributed generously to the replacement K-7 which arrived in February.

The weather has been appalling with numerous weekends spent in the hangars. This has resulted in a third winch taking to the road, another taxi tractor becoming serviceable and most of the C's of A completed.

Achievements during the winter include solos by Alex Miles and George Stubley and several Bronze C checks and papers completed. The training programme also continues.

We said goodbye to our Chairman, Brig P. Goozee, and CFI John Baker. In their places we welcome Col E. Shephard and Don Webber, late of Bicester. We also welcome Jimmy Wheeler, ex-Eagle (Detmold) and Mike Pobjoy, ex-Crusaders (Cyprus). Final farewells go to Leigh and Marilyn Hood, now in Germany, though I'm sure Leigh will be competing in Britain again this summer.

B.A.R.

MENDIPS (RAF Locking)

Our return to these pages after a long absence coincides with a good start to the year. Four winter months of non-flying due to winch problems have been rewarded with the reappearance of our Tost winch, repainted and with a new engine.

Congratulations to Pat Paul, Eric Shrive, Alec Hannam, Jim Walsh and Paul Goulding on being the first to go solo in 1975. Pat and Eric have been converted to the K-8, Eric gaining a Bronze leg on his first soaring attempt.

A very warm hello to the members of Woodspring Gliding Club who have joined us here at Weston-Super-Mare. We wish them luck and look forward to many social thermals.

Finally, every success to Chairman "Doc" Bramwells who will be flying our K-8 in the Inter-Service comps.

P.G.

WREKIN (RAF Cosford)

An excellent start has been made to the year, with membership now in excess of 120, and some 3000 launches and 500hrs flown by March 31. Achievements include eight A and Bs, several Bronze legs, and—in seven notable days in March—three Silver duration flights by Paul Gillam, John Saunders and Ian Moss.

Since our last notes, four members have attended the instructors course at RAFGSA and received their assistant category instructor rating—Chris Harlow, Stewart MacLean, Dave Cottle and John Saunders.

K-8 (334) and the T-21 have recently been given their Cs of A after intense work by a notable few, and the whole fleet is now refurbished for the challenge of beating even our last year's exceptional record. On the MT side, two new LD's, and a new bus have made a world of difference, and with automatic light signalling—patent Dave Cottle—we are now in fine fettle. In fact, activity is so intense in the airspace around Cosford that we have had to paint our newly acquired Chipmunk in a coat of many colours, for safety reasons.

I.D.M.

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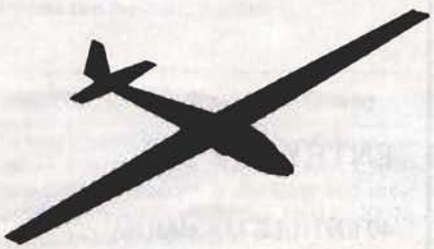

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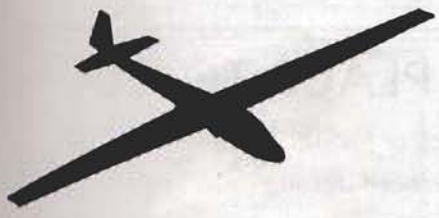

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