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Magazine of the BRITISH GLIDING ASSOCIATION

98 **Cross-Country Soaring Weather in Central France** W. E. Malpas

103 **Understanding Gliding** A. D. Piggott

108 **Coaching Corner – Club Fleet Planning** W. G. Scull

110 **The Optimum Design and Wing Section of a 15m Glider Without Flaps** R. Eppler

118 **Whose Glider?** K. R. Mansell

119 **The British Women Pilots' Association** Julia Wales

120 **BGA Weekend** Gillian Bryce-Smith

122 **One Man's Opinion** V. C. Carr

123 **Life and Repair Policy on Parachutes** J. N. Goodwin

124 **Self-Verification System for Sailplanes and Motor Gliders** Günter Cichon

127 **International Gliding Commission (CIVV) Meeting** I. W. Strachan

128 **BGA and General News**

130 **Overseas News**

132 **Your Letters**

J. C. Riddell, K. Klitgaard-Lund, Gren Seibels (reply by F. G. Irving), A. E. Salter.

133 **Book Reviews** Rika Harwood, G. Harwood, R. Q. Barrett, B. H. Bryce-Smith

134 **Club News**

139 **Service News**

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Cover: John Glossop photographed this LS-1F finishing the task at the South African Nationals in December.



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RENDEZ-VOUS at CHATEAUROUX July 1978 No. 1

CROSS-COUNTRY SOARING WEATHER IN CENTRAL FRANCE

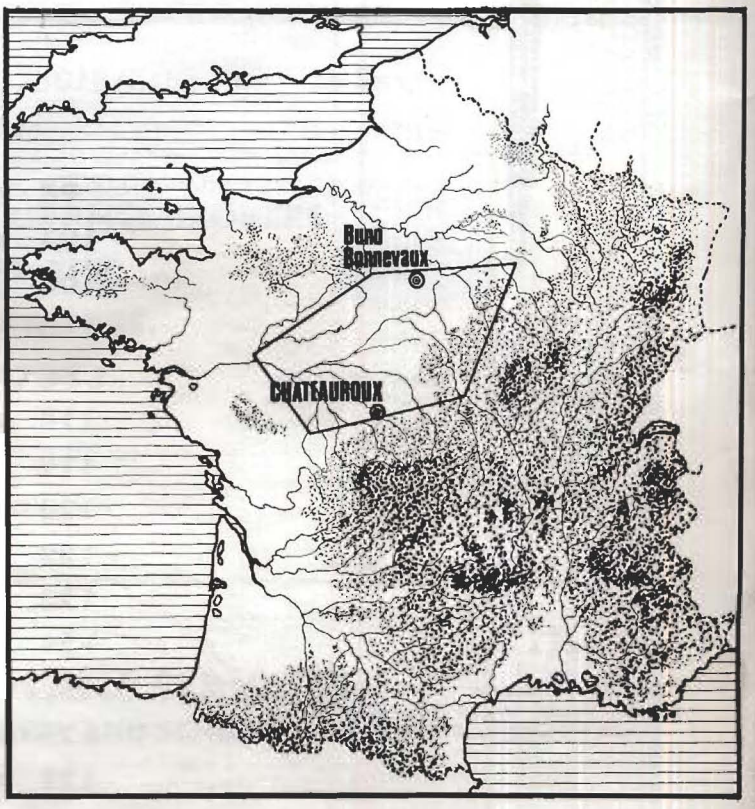
WILLIAM MALPAS

Tom Bradbury has depicted the main features of a good soaring day in southern England (S&G, October 1975, p194). With the help of Norbert Siacchitano of the French meteorological office I have done the same thing for an area of France which is shown on the map. This overlaps to a large extent the area which will be exploited by soaring competitions based on Chateauroux. Therefore, the picture which emerges will be of interest to those pilots going to the French Nationals in August, 1977, and to the World Championships in July, 1978.

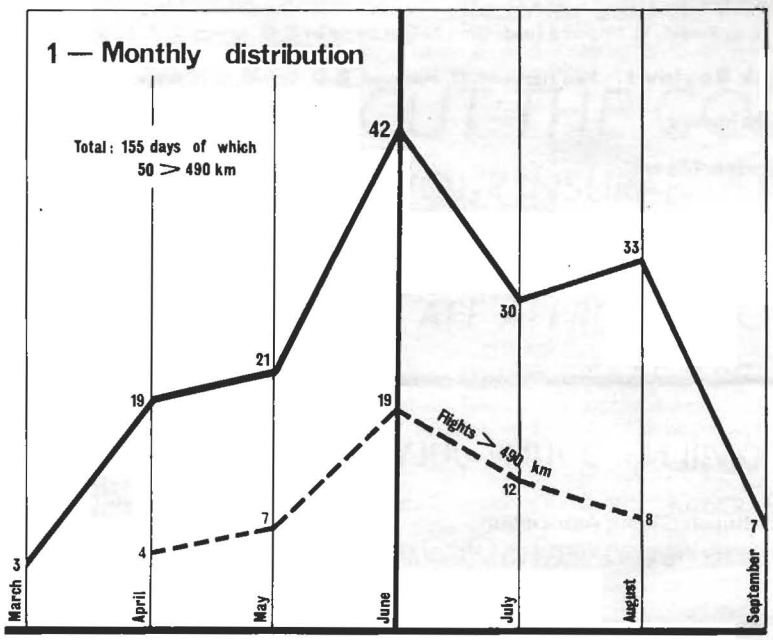
This study, which has already been published by M. Siacchitano in *Aviasport* (February, 1977), is based on flights from Buno-Bonnevaux during the period 1973-1976. Conditions at Chateauroux are, on the average, better than at Buno, which is 170km to the north, but we do not expect the general features of good days to be different.

One factor, however, will be different for Chateauroux. Its location gives access to the Massif Central, with its high plateaux, its mountains and river valleys. Except on rare occasions, we do not penetrate that far from Buno. However, this does not change the significance of our study; and it remains to be seen to what extent the task-setters will exploit the Massif Central. We believe that a large proportion of the tasks will unfold in the area indicated.

Our sample of "good soaring days" consists of 155 days during the four-year period 1973 to 1976. On each of these days at least one closed circuit of 300km was completed from Buno by a Standard Class glider. Because the club participates in the Coupe Fédérale, these circuits were all declared and photographic evidence produced. Buno operates seven days a week, and the utilisation of the gliders during this period has been such that, except in rare cases, if 300km was available, then somebody did it. In support of this claim, and to give some idea of the level of activity at Buno, here are the total numbers of 300km and 500km closed circuits completed by Standard Class gliders during the period:



	1973	1974	1975	1976
300km	41	149	118	373
500km	5	24	18	87



ANALYISIS OF 155 GOOD SOARING DAYS

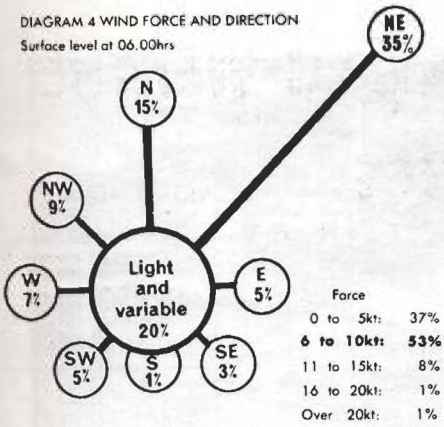
Graph No. 1 - **Distribution by month of the 155 300km days and the 50 500km days**

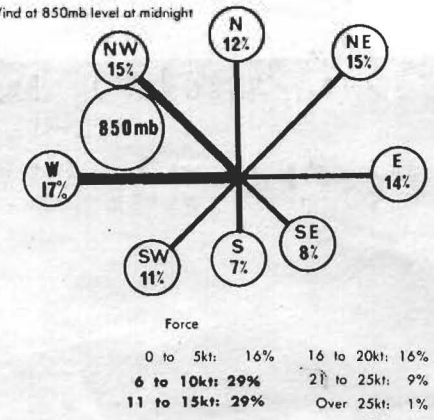
June is the best month for the following reasons:

a) Long days.
b) It is still early enough in the season for frequent arrivals of cold air.
c) High surface temperatures compared with air temperatures.

Table No. 2 - **Rain during the night before**

For 95% of the days the rainfall between 19.00 and 05.00 hrs is nil or negligible.





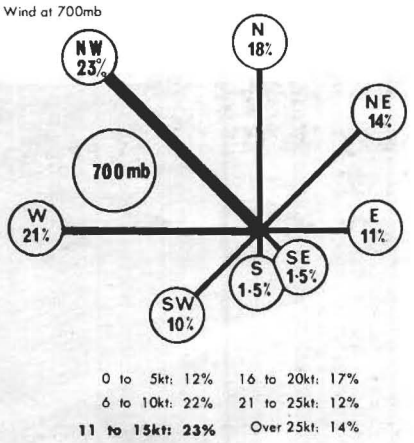


Table No. 3 – **Sea-level pressure**

For 98% of the days the pressure is in the range 1010-1030mb with a 90% chance of a rising tendency at 06.00hrs local time.

Table 2
RAIN DURING THE NIGHT

92% No precipitation
3% Negligible (less than 1mm)
5% Slight (1 to 4mm)

Table 3
PRESSURES AT SEA LEVEL

1026-1030mb: 8%	Tendency at 06.00hrs
1022-1025mb: 33%	Rise: 0 to −1mb: 11%
1018-1021mb: 28%	Fall: 0 to + 1mb: 52%
1014-1017mb: 23%	+ 1 to + 2mb: 37%
1010-1013mb: 6%	
Over 1010mb: 2%	

Diagram No. 4 – **Direction and speed of the wind**

For 90% of the days the surface wind at 06.00 hrs is 10kt or less and, excepting the occasions when the winds are so light that it is impossible to determine their direction, on 90% of the days the wind is in the northerly half of the compass; *ie,* including all directions from, due west, through north, to due east.

At altitude, at 850mb, the wind direction is not very significant. However, for 90% of the days the speed is less than 21kt.

At 700mb, both direction and force become very significant:

87% in the northern "half" of the compass.
86% less than 26kt.
97% less than 31kt.

Table No. 5 – **Contour heights for 850mb and 700mb**

These values are obviously related to pressure which, as we have seen, is high in our sample. Therefore, it is no surprise to find that for 85% of our sample days these contour heights are also higher than average. We have related them to the averages for each month.

Table No. 6 – **Temperatures**

First, maximum surface temperature during the day:

This is frequently available early in the morning as a forecast. It is obviously a significant factor as it reflects, among other things, the expected cloud cover. As our table shows, 67% of our days fall in the top 40% of the temperature range for the period of the year.

The acceptable minimum is around 10°C at the beginning of the season, rising to 21°C in August, but the sample is too small to establish realistic minima for each month of the year.

Temperatures at 850mb and 750mb are compared with averages for the month. For nearly 50% of the days, this temperature is within 2°C of the average.

Table 5
CONTOUR HEIGHTS 850 and 700mb

Average values:	850	700
March	1440	2973
April	1460	3000
May	1475	3035
June	1493	3070
July	1506	3095
August	1495	3080
September	1490	3075

Average differences at midnight local time.

850mb		700mb
7.7%	+ 150 to + 100	15%
48%	+ 99 to + 50	43%
30.8%	+ 49 to + 0	27%
11%	− 0 to − 49	10%
2.5%	− 50 to − 99	5%

Above normal
850mb: 86.5%
700mb: 85%

Below normal
850mb: 13.5%
700mb: 15%

Table 6
MAXIMUM SURFACE TEMPERATURE

1 Very cold:	5%	16%
2 Cold:	11%	
3 Average:	17%	
4 Warm:	24%	67%
5 Very warm:	43%	

Temperatures at sub level

Average values:	850	700
March	0.4	−7.6
April	1.4	−7.0
May	4.7	−3.9
June	7.6	−0.6
July	9.5	1.6
August	9.1	0.9
September	8.0	0.3

Average differences at midnight local time

850mb		700mb
2%	−7 to −8°	2.5%
25%	−3 to −6°	18%
47%	+ 2 to −2	47%
16%	+ 6 to + 3°	30%
10%	+ 7 to + 10°	2.5%

Table No. 7 – **Comparison of soaring potential Chateauroux/Buno-Bonnevaux**

	Chateauroux	Buno-Bonnevaux
Average sunshine per year in hours	1850	1825
Average number of days per year with no sunshine	50	60
Average relative humidity (%) at 15.00hrs local time during July	52	56
Frequency (%) of cloudbase greater than 1000m at 12.00hrs local time	35	38

Note: These data were taken from the diagrams in an article by Monsieur Bossoutrot (*Aviasport* February, 1977).

Table 7 confirms that Chateauroux is probably slightly more favoured than Buno in sunshine and humidity, but no better in the development of a good cloudbase. The rather more subjective impression of many pilots is that the area between Chateauroux and the valley of the Cher is the "Texas of France".

Portrait of a good soaring day

As in southern England, a high proportion of good days occurs soon after the passage of a cold front with the weather chart showing anticyclonic curvature of the isobars.

From our preceding analysis, we would expect to see in addition:



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a) No rain during the previous night.
b) Pressure in the range 1010-1030mb, probably 1014-1025mb and rising.
c) Wind somewhere in the northern "half" of the compass and not exceeding 10kt on the ground, 20kt at 850mb and 30kt at 700mb.
d) Forecast of temperatures – higher than average.

Although we have not analysed the data, we would also expect to see dew-points at ground level at least 10°C below air temperature.

In other words, our portrait of a good soaring day is very like that of a similar day in southern England – with one important exception. A glance at diagram No. 4 shows that we are very happy with NE winds. Such a wind direction is frequently disappointing in England because the air picks up moisture over the North Sea, whereas in northern France a NE wind often brings dry air from Central Europe.

500km days

We have also made a "study within a study" confined to a smaller sample of 48 days, on which at least one 500km closed circuit was completed by a Standard Class glider. The striking thing here is that we have not been able to establish any highly significant difference between the larger and the smaller samples:

We are tempted to ask – is there any such thing as a 500km day? – except perhaps early in the season when the day is too short, or late in the season when the thermal activity starts late owing to persistent temperature inversion.

This appears to be the theory of Jacques Berger who flying from Buno during *weekends only,* declared 18 500km triangles during the summer of 1976, and completed 14 of them with his LS-1F. Perhaps if he or other optimists had been able to spend the whole summer at Buno, some of the 300km days would have been turned into 500km days. This idea is supported by the following statistics which distinguish between weekend days and week days; and at the same time between 300km days and 500km days:

	Total No. (1) of days	300km days (2) No. of days	%	500km days No. of days	%
Weekends and public holidays	224	35	15.6	24	10.7
Other days	488	72	14.8	24	4.9

(1) The period covers March 26-September 20, 1973 to 1976.
(2) The 300km sample here excludes 500km days.

Whereas the 300km days are evenly spread over the period almost without bias, the 500km days are significantly concentrated into the weekends and public holidays. With a total sample of over 700 days, this observation can hardly be a fluke. A more likely explanation is the larger attendance at weekends, with additional optimism and competitiveness leading to earlier starts and less inhibition. The corollary of this hypothesis is that we must be missing a lot of 500km circuits on week days – something like five or six days a year – which would increase our overall 500km potential by about 50%!

Future work

We hope to refine our portrait, using as far as possible information normally available any fine summer morning. The next step will be to switch to the predictive mode; to see whether a simple approach based on very limited information is any substitute for a full forecast by a soaring Met man.

Aviation Exhibition

The Guild of Aviation Artists are holding a Jubilee Exhibition at The Qantas Galleries, Piccadilly, London, from June 16-July 9. The private view on June 15 will be followed by the Guild's annual aviation dinner at the RAF Club.

The exhibitors will compete for a collection of trophies awarded for the best pictures in several different classes.

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Vega

THE FACTS!

As a regular reader of this column you may perhaps have thought that all our claims about Vega (lighta, stronga, cleana etc.) were just so much advertising garbage – I would like to assure you that we take the Trades Description Act very seriously and so far as we have been able to ascertain have made no claim which is inaccurate. As the prototype Vega progresses towards its first flight date so we are able to verify more of the information which originally was by calculation alone. Eventually – all will be revealed – warts and all and we think you will like the product.

We have had a recent hiccup in our progress when the fourth design of flap mechanism proved to be too much like bits of meccano and this has delayed first flight by about two months. The final re-design is looking very good and has resulted in the elimination of one gap in the wing surface which is good from the performance viewpoint. The major part of Vega is now complete and we have recently had the opportunity of comparing it with the Mosquito. We think we shall be "the Brand Leader" as soon as you can do the same. Just a few facts to think about . . . the empty weight of the prototype Vega is 505lb (229Kg). Mosquito No. 20, less instrument panel, weighs 557lb (253Kg). According to the advertisement on page 79 of S&G, April, by Mr. Hanfrey this is "below design weight!" What are the customers going to say whose ships are on the design weight? On the other side of the coin – the PIK 20 owned by D. Carrow weighs 495lb (225Kg) but it is of course designed to the previous Ostiv requirements which did not specify such a large gust case. Vega is designed to the Joint European Airworthiness requirements which specify a 15 m/s gust as opposed to the earlier Ostiv gust of 10 m/s.

Our competitors have consistently tried to say that our retractable tailwheel is a gimmick: if you want to be convinced on this point try holding a tailwheel so that it projects half way out of your glider window when you are doing 90 knots and feel the drag! Another point where Vega eliminates drag areas which are still present on both the Mosquito and the PIK is the elevator/ rudder gap. In a World Championship one always sees makeshift fairings held on with sticky tape where manufacturers have neglected to think out their design at this junction. Vega solves it completely.

The mainwheel of Vega projects the full 14 inches of its diameter below the fuselage in the landing configuration – this gives you confidence in landing in a rough field – compare it with the competitors.

There are so many other points where Vega is a generation ahead of its contemporaries that we at Slingsby's have no doubts that it will shortly become the standard against which the others are judged.

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Understanding Gliding

DEREK PIGGOTT follows "Beginning Gliding" with "Understanding Gliding", reviewed on p 133. The publishers, A&C Black, have kindly allowed us to print the following extracts which give an idea of the real value of this book.

Turning downwind at low altitude

The dangers of turning downwind at low altitude are very real, whether you are flying a glider or any other kind of aircraft. Any turbulence or loss of height is bound to be serious and at heights of less than 200 or 300ft there is a high degree of probability that there will be adverse conditions in windy weather. The real hazard for the glider at low altitude is the final turn back into the wind. In a light aircraft there is also the very poor *angle* of climb while flying downwind to be taken into account and the risk of being drifted into an obstruction. The actual rate of climb is normal, but, with the wind behind, the distance covered is much greater, giving far less chance of clearing obstructions. The rate of climb will be affected by any wind gradient, and climbing downwind there will be a loss of speed and therefore a loss in rate of climb. (In effect the aircraft is climbing into an ever decreasing wind speed when it is climbing downwind near the ground.)

In windy or turbulent conditions, *any* turn at low altitude can be dangerous. With their large wing spans and rather low rate of roll gliders are particularly vulnerable during a low turn into wind. The upper wing may be as much as 30ft above the level of the lower wing during a well-banked turn and this means that the speed of the airflow meeting the upper wing may be 10 or 15 knots higher than that of the lower wing because of the wind gradient. This causes a serious overbanking tendency, making it difficult, if not impossible, for even full aileron to be effective in bringing the wings level. This loss of control is nothing to do with stalling and can occur at any airspeed. In effect, the rate of roll becomes too poor to overcome what the pilot would almost certainly consider to be a gust (Fig 1).

Some years ago I had an extremely lucky escape at Lasham from this type of situation. The student had made a very sensible final turn at several hundred feet and was approaching with plenty of speed. At a height of about 50 or 60ft, the glider unexpectedly banked over in a sudden gust. He immediately applied full aileron and rudder to bring the wings level, but with no effect at all. A few seconds later it was "You have control, Derek, I can't hold it!" (Quite what magic he thought I could do, I can't imagine.)

By then the glider was sideslipping down towards the ground, still with no signs of any response to the ailerons, and it was pretty obvious that we were going to crash. Fortunately, we had plenty of speed and so I abandoned the attempt to get level and changed the sideslip into a tight turn by pulling back on the stick. To my amazement, we completed the turn through 180° with the wingtip just clear of the ground. The wings suddenly came level and we arrived on the ground in a surprisingly gentle landing facing downwind. Luckily we rolled through a very convenient gap

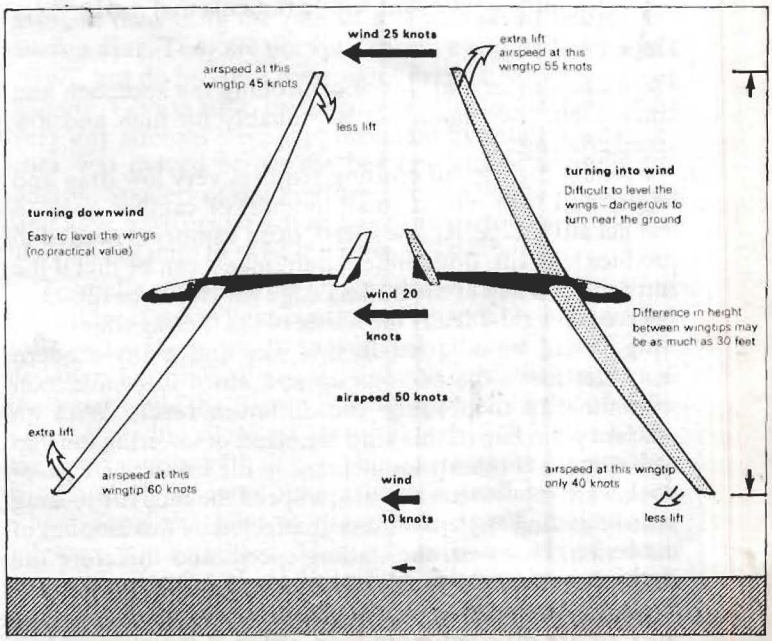


Fig 1. The effects of the wind gradient on a low turn. Always complete the final turn into a strong wind with extra height.

in the boundary fence and stopped with no actual damage, except to our morale and pride. Needless to say, on the next flight we landed back at the hangar and resolved to be a little more careful about the maximum wind strength we would fly in. At the time my reactions were almost instinctive and it was sheer luck that we had not written the glider off.

It is interesting to analyse what probably happened, and to learn some lessons from it.

Firstly, the rolling over was caused by some turbulence. This could have been catastrophic if it had happened during a low final turn as it probably would have rolled the machine past the vertical. Since the final turn had been completed nice and high this risk was minimised. A high straight approach is usually sufficient to ensure that the glider is not tipped over too far by a gust. There was no question of the glider being stalled, or even at a low airspeed. The controls were just inadequate to overpower first the gust and later the wind gradient effect. Unless it is turning, an aircraft cannot fly steadily in a steeply banked position without sideslipping, and therefore it started to slip down towards the ground. The effect of the wind gradient was then reinforcing the effect of the initial gust by giving the upper wing much more speed and lift than the lower one. At this stage a crash seemed inevitable, However, by pulling back on the stick, the slip was immediatly changed into a steep turn and the speed was sufficient to allow the

turn to be made for a short time without any loss of height. Whereas while facing into wind the effect of the wind gradient had prevented any levelling of the wings, now that the glider had been turned downwind, the effect was reversed and the rate of roll was much higher than normal. This had the nearly magical result of levelling the wings almost instantly. Facing downwind, any wind gradient now caused a *gain* in airspeed, and, together with a slight cushioning ground effect, this saved the glider from a heavy landing.

I learnt quite a bit about wind gradients that day!

Flaps

Flaps can also be a means of controlling the approach and landing but their main use is probably for high and low speed cruising.

Efficient high speed cruising requires very low drag and an aerofoil with only a small amount of camber gives a distinct advantage. At low speed, extra camber is needed to produce high lift. Both these requirements can be met if the aerofoil has a flap at the trailing edge which can be raised or lowered in flight. Ideally the whole of the trailing edge of the wing should be adjusted in this way and many modern machines move the ailerons up and down in conjunction with the flap to produce the optimum result. With an efficient plain flap of this kind the effect of lowering the flap and ailerons is mainly an increase in lift for the first 10° of downward movement, and at low speed the total lift-to-drag ratio or gliding angle is almost unaffected by this amount of deflection. However, the stalling speed, and therefore the minimum circling speed, is reduced by 2-3 knots and this is a great advantage in a fast glider. Unfortunately, if the ailerons are drooped more than about 5° the aileron drag and adverse yaw become so excessive that they spoil the handling.

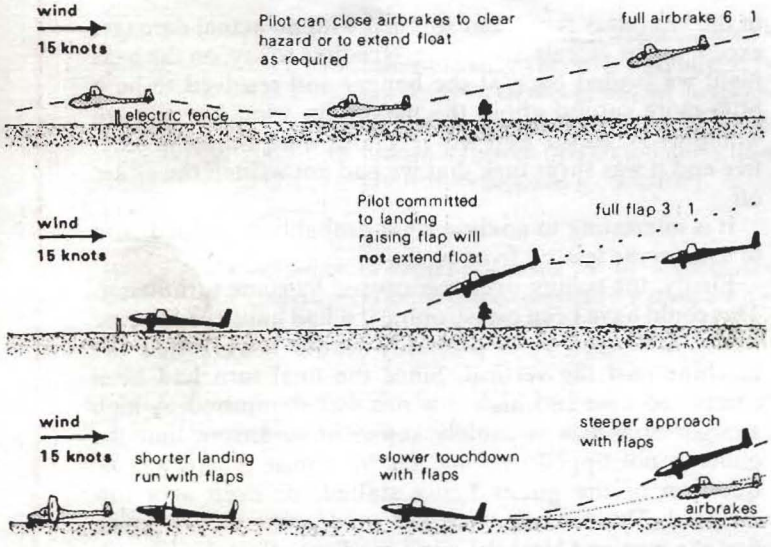
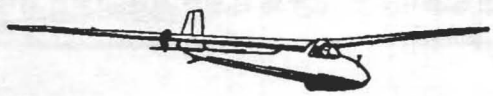


Fig 2. A comparison between the effects of airbrakes and landing flaps. Flaps can produce steeper approaches and lower landing speeds but airbrakes are more flexible and allow more accurate spot landings.

In gusty conditions poor handling may limit the amount of aileron droop which can be used to advantage. After about 10° of downward deflection of the flaps the increase in lift is offset by the much greater drag, and although the stalling speed is again reduced the gliding angle is much worse. After about 30° there is little further increase in lift but the drag increases rapidly so that the gliding angle becomes much steeper. The useful range of flap angles for efficient cruising and soaring is therefore very limited. Larger angles are needed for approach control but in this case the ailerons are not drooped at the same time.

The *lowered* stalling speed with flaps down allows a considerably slower approach speed than with airbrakes and, if the flaps can be lowered to more than 45°, the very large area of the flap surface makes even steeper approaches possible than with airbrakes. However, there are several snags with landing flaps. During the final stages of the approach and landing it is impractical to extend the float to clear a fence or rough ground by raising the flap because this would result in a loss of lift and sudden sinking. The pilot must, therefore, be absolutely certain of the landing area before committing himself by lowering a large amount of flap. The designer also has some difficult mechanical problems to overcome if the pilot is to be able to lower the flap quickly at fast approach speeds. The large area of the flaps results in much greater operating force than is necessary with airbrakes and therefore some kind of gearing is normally required.

When the flaps are lowered there is a considerable increase in the twisting load on the wing and speeds must be carefully limited or structural damage may occur. The longitudinal stability is also decreased because the more highly cambered aerofoil is less stable, but this does not normally cause problems.



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Aileron drag

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When the ailerons are being used to apply or take off bank one wing is given more lift and the other less in order to start the banking movement. Since extra lift means extra drag, the lifting wing is dragged back, and, in addition to the banking movement, the aircraft tends to swing or yaw in the opposite direction. If this is allowed to happen the aircraft slips sideways through the air creating very high drag. The long wings and short fuselage of the glider accentuate this tendency so that the "adverse yaw", as it is known, is very pronounced. Light aircraft with much shorter, stumpy wings are scarcely affected by it (see Fig 3).

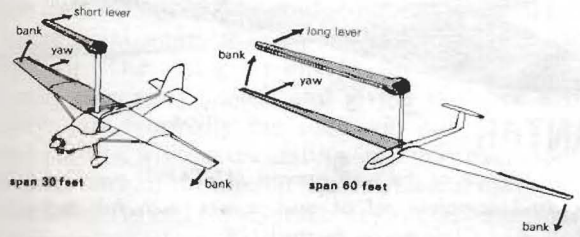


Fig 3. The adverse yaw caused by aileron drag depends mainly on the length of wing span.

There are several ways of reducing the aileron drag and adverse yaw, the most important of which is the use of differential gearing of the ailerons. Fig 4 shows how it works. The downward moving aileron always moves through a much smaller angle than the upward moving one and this reduces the extra lift, but also keeps the drag low. This is due to the fact that ailerons and flaps like these increase the lift for the first 8°-10° with only a small increase in drag. Beyond that angle the drag rise is much more rapid, until above about 25° the increase is very nearly all drag. The use of differential ailerons does not significantly reduce the rate of roll. However, it does lessen the adverse yaw which, if allowed to occur, reduces the rate of roll for a few seconds, and also results in high drag from the fuselage battering its way sideways through the air. All modern gliders use differential ailerons and the upward moving one usually moves about twice the angle of the other.

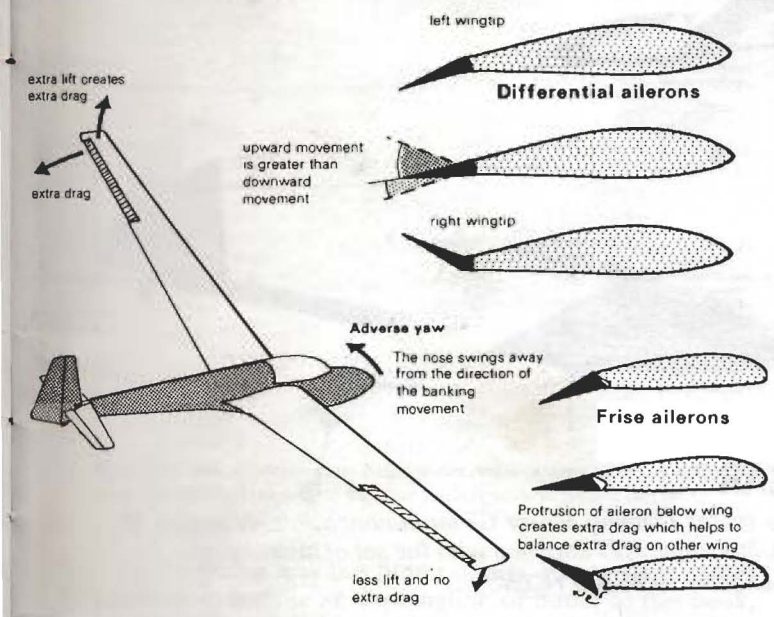


Fig 4. Methods of reducing the adverse yaw caused by aileron drag. Differential ailerons are used on all modern gliders and some use Frise ailerons as well.

Spoilers have been used on a few experimental gliders to assist in increasing the rate of roll without increasing the aileron drag, They are not very effective and have very little "feel", but do produce some extra drag on the down-going wingtip. For example, on the Sigma experimental glider the very tiny ailerons were supplemented by spoilers when the stick was moved across the last few inches to apply full aileron. Spoilers of this kind are also used on some airliners and have a particular advantage over ailerons which is that they do not tend to twist the wing.

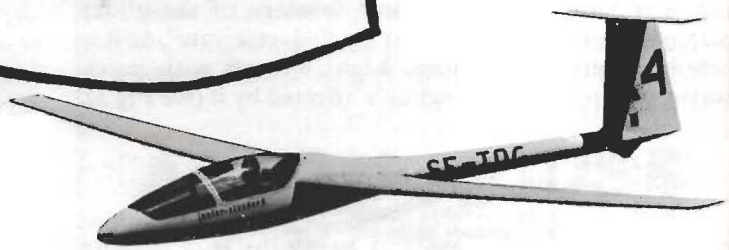
Generally speaking, the glider pilot will like the handling of a glider if it has light controls, a reasonably high rate of roll, and only a small amount of adverse yaw. Some designers use Frise ailerons in order to even out the drag of the wings while the aileron is being applied. In this case the upward moving aileron is arranged to project a little below the lower surface of the wing. This increases the drag on that wing and at the same time acts as a small horn balance which helps the pilot to move the control, making the ailerons much lighter. This system is usually used on powered aircraft and can be seen on the Auster, Super Cub and Beagle Pup, and on the Cobra and Olympia 463 gliders, and Falke motor gliders.

Many of the glider designs using full span flaps for extra cruising performance move their flaps and ailerons in conjunction with each other. For example the Kestrel, Nimbus and ASW-17 all raise and droop their ailerons in conjunction with the flaps in order to keep a similar wing section over the whole span and to avoid the large drag losses which would occur if the flaps and ailerons were at different angles in normal flight. Additionally, on some designs, because the ailerons and flaps move up or down together the aileron in effect runs the whole length of the wing. This is undoubtedly an improvement as far as performance is concerned, but it does mean that when the flaps are down for low speed circling the aileron drag is once again rather high. The downgoing aileron is moving to quite a large angle, creating considerable extra drag with not much increase in lift and this results in slightly less lateral control than when the ailerons and flaps are in the neutral position. This effect is sufficiently marked to make it worth starting the take off run with no flap deflection so that the ailerons are powerful. As soon as speed and good control are gained the flaps can be lowered.

It requires fine engineering and structural design to make the flaps and ailerons work freely, in spite of the bending of the wing which may be as much as 4-5ft under load.

A few older glider designs resorted to geared tabs on the ailerons to reduce the pilot effort needed to make a full stick deflection. This is very common on medium-sized powered machines but should not be necessary on gliders or light aircraft.

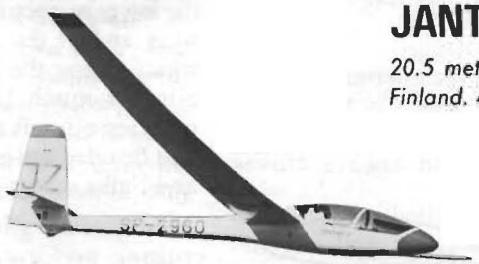
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Aileron flutter

The feel of the ailerons is sometimes spoilt by a snatching of the control, or a tendency for them to oscillate in bumpy air. The pilot likes, and expects, to feel a progressive increase in pressure on the stick when moving it further and further over to move the ailerons. If, during a full deflection, the loads suddenly cease to increase, it will give the pilot the impression that the control is snatching or moving itself for the last part of the movement. This may be due to poor rigging if the aircraft is fitted with Frise ailerons or, on prototype machines, if the Frise shape is incorrect. In these cases the balancing effect of the Frise suddenly occurs after the aileron has moved a certain amount. Another possible cause is lack of mass balance on the ailerons. Complete mass balancing of the controls is not mandatory and on many machines little or no mass balancing is used. If the aileron itself is rather heavy, and so has its mass well behind the hinge point, snatching and oscillations will happen in bumpy air. The test pilot checks for this by flying at gradually increasing speeds and giving the stick a sharp sideways tap. Normally the stick will just return to the central position without oscillating, or it may overshoot and then come back. If the aileron has insufficient mass balance it will oscillate to and fro several times and in bumpy air this will feel very twitchy and unpleasant, although it might not be dangerous. However, if the wings are rather weak or flexible this kind of oscillation may start a serious flutter.

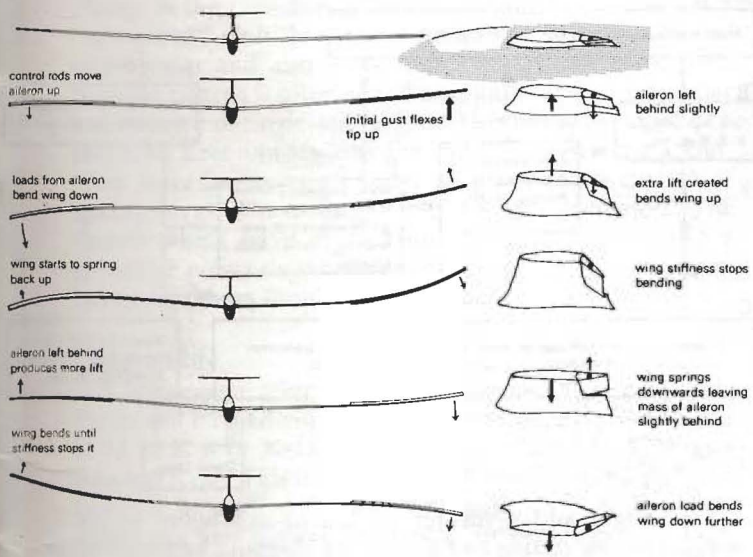


Fig 5. How lack of aileron mass balance can cause serious flutter on a flexible wing. The oscillations tend to build up until structural failure can occur.

Fig 5 explains why this flutter occurs. It may seem rather academic to include an explanation of flutter in this book, but it is likely to become a more common phenomenon with glass-fibre machines. Even a few extra coats of paint on the control surfaces will upset their balance point and make them liable to this kind of flutter, particularly if there is any excessive play in the control circuit. Any snatching or twitchiness of the controls should be taken seriously and investigated immediately.

The risk of flutter increases rapidly at higher speeds when the air loads become greater and tend to flex the structure more. With design diving speeds of less than 130 knots it is sufficient for the designer to show that the structure is reasonably stiff and that there is no tendency for flutter up to that speed during test flights. If it is intended to fly the aircraft above this speed it is desirable for all control surfaces to be fully mass balanced. Many experienced pilots do not seem to understand that all structures will flutter if the speed is increased far enough. In fact, the critical speed may be only a few knots above the "never exceed speed" and this is based on a glider in perfect condition as it left the factory. There have already been an alarming number of catastrophic failures with gliders being flown at excessive speeds in turbulent conditions and it is vital to realise that even the V_{NE} refers only to smooth air conditions and is not intended to be a speed for normal operations.

Flutter is not confined to the ailerons, and the production models of several types of glider have had to be modified because of flutter problems which did not become apparent during the manufacturers' test flying. Because of the relatively flexible fuselages there have been several cases of rudder flutter at high speed. This can be cured by mass balancing the rudder surface in the same way as the elevator and ailerons, or by putting a friction damper in the control circuit. There have been at least two miraculous escapes from the possibility of complete structural failure due to flutter. A case of rudder flutter resulted in such violent twisting of the fuselage that the canopy fell off when the canopy catches failed. The other was a case of an experimental machine which had flutter in the all-moving tailplane and anti-balance tabs. The damage included a complete failure of the torsion box on one wing and a broken stabiliser spar. However, in spite of the damage the glider was flown down to a safe landing by the somewhat worried test pilot. Flutter is dangerous!

AUTONOMIC EFFECTS OF FEAR

I have noticed that when one gets involved in an alarming situation the canopy tends to mist up and certainly other pilots have occasionally remarked on the same phenomenon. Recently while being driven in a car with three others the windows misted up after we had had a near escape from an accident, although misting up did not occur when the car stopped in the ordinary way at traffic lights. It would be interesting to hear other pilots views as to whether they have noticed a similar experience. This is not a finding which can be checked in a simulator since however realistic the simulator is, it is impossible to be certain that the subject will experience genuine fear.

BRENNIG JAMES

Glider and the Lady

Reprinted from The Times, March 22.

Durban. March 21 – A woman whose husband denies the attempted murder of two hang glider pilots by firing an air pistol at them, told a court today that one pilot flew over her garage and made a sexual suggestion as she was sunbathing in the nude on the roof.

(Our thanks to Chris Simpson for spotting this news item.)



coaching corner

Two issues ago BILL SCULL, Senior National Coach, considered some of the problems facing the potential private-owner in the selection of a glider. Now he looks at some of the factors involved in the planning and up-dating of the club fleet.

Club Fleet Planning

Whether your club has a T-21 and a Tutor or the largest and most sophisticated of fleets, there is probably a planning problem. Old gliders must eventually be replaced and improvements in the design of gliders make them easier, and therefore safer, to fly for both the club and the private-owner. The planning problems are several; rationalisation, compatibility, improvement and economic. The economic problems are difficult to resolve. Are the maintenance costs for the old gliders rising rapidly? Would a GRP glider save enough on reduced maintenance to justify the greater capital outlay? The most critical question is what should a club set out to provide for its members?

Where are we going?

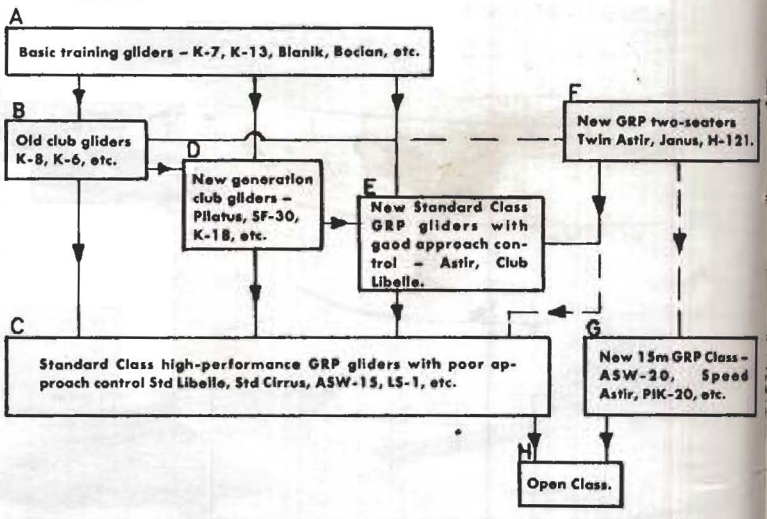
The pattern of the last ten years or so is no longer one of the more established clubs buying the latest gliders for the simple reason they are built abroad and clubs cannot afford them. Of late there has been a hint that this barrier is being broken with a few clubs buying Astirs. A major consideration for any club is the typical experience level at which a member buys a share in a glider. Whether the member becomes a private-owner or not must depend to some extent on what the club provides and what he is allowed to do in the club gliders, that is, fly across country or not.

Some statistics clearly indicated the trend; in 1966 there were 303 club gliders, in 1976 there were 410. In that time the growth in total club membership has increased from 6831 to 10192 and the number of private gliders from 222 to 764. It is my subjective impression that very few clubs provide for their members in the way that they did 15 years or more ago. The only real consequence of this is that unless you are a private-owner nowadays it is unlikely that you have flown a modern GRP glider. Only this year have we seen the first GRP club gliders (*pace* Surrey & Hants).

Should we attempt to reverse this trend? This is a question club committees should ask themselves and I believe we should.

Improving the club fleet.

I think the first approach to the problem should be made by forgetting the financial side and taking some hypothetical cases; to this end the following diagram may be useful:



One might add a further section to this figure which would contain certain two-seaters which could be regarded as obsolete or obsolescent; this is certainly true in regard to their performance and general handling.

Alternative fleets can be planned from this diagram and in doing so allowance can be made for the factors of club size, policy and finance. Of the many alternatives some are given in the table:

Two-seater	K-7 or K-13	K-7 or K-13	K-7 or K-13	K-7 or Bocian
	K-8 K-6	K-8 K-18 Pilatus	Pirat Astir	K-6 Twin Astir Astir
	Std Libelle	ASW-15	Std Cirrus	Std Libelle
Route in Fig 1	A-B-C	A-B-D-C	A-B-E-C	A-B-F-E-C

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Other possibilities can be traced with, perhaps, the ultimate of F-G-H, Twin Astir, Speed Astir and an Open Class glider.

Many questions must be asked and answered before any decisions can be made:

1) What size is the club (and how big do you want it to become) and what is a suitable ratio of members per glider?
2) How many members at the various levels of experience are there and will this change? In the grades of under-training, Bronze C, Silver C, and active cross-country pilots, will the numbers under training eventually reduce as the need in the club's catchment area is eventually fulfilled?
3) Economics: a club with two K-7s might have to sell both of them to buy a Twin Astir. This creates a problem when the only two-seater is damaged. Also expensive gliders must have high utilisation.
4) What is the club's training philosophy? Is it sensible or necessary to use expensive GRP two-seaters for basic training or to provide a glider for the cross-country pilots?

Without the answers to such questions "planning" will be on an *ad-hoc* basis to satisfy immediate needs or whims.

A look at past and present club fleets.

The last ten or 15 years have seen, not surprisingly, a number of changes. The steady increase in privately-owned gliders apart, the most significant development has been the change in the club fleet. The old philosophy was one of a "structured" club fleet with, probably, several types of single-seater and also more than one type of two-seater. Now the pattern is often one of a solitary type of two-seater and one type of single-seater. It isn't always easy to look at a particular fleet and say why the changes have come about; often there has been a change of plan with a change of management. The consequence may be confusion. The factors which have carried most weight in deciding a particular policy may have changed and may do so again, but each of them should be considered.

Compatibility.

A conversion after solo (it is assumed that early solo flights will be made in the training two-seater) from K-7 or K-13 to K-8 or K-18 is an easy one; from a T-21 to a Swallow is not. This is what compatibility is all about. It can however be carried to extremes; a K-13, K-8, K-6 fleet would not give a pilot as diverse an experience as T-21, Bocian, Swallow and Pirat. As was said at the outset the problems are all relative and the consideration that one might have to give (as CFI perhaps) to advising a potential private-owner is that the step from that Pirat to a Kestrel 19 is too big a one to take.

The club fleet which offers easy, progressive steps.

The first requirement for this to be possible is that your club is of moderate size; if you have only one solo glider then the following does not apply.

Progression is usually determined by the glider's performance but account should be taken of the handling charateristics as well. What do you discover at the average club? An easy-to-fly 1:30 club glider is further up the club fleet than a tricky-to-handle 1:25 glider. This is not always the case but it is a paradox that you need a 100 hours and a Silver C to fly the open primary, whilst the first-solo glider may be an Astir.

The factors which should be taken into account are:

1) A reasonable degree of compatibility - not too big a step between each type.
2) A range of performance allied to the probable tasks to be attempted. For instance the Surrey & Hants Club offers K-8s, K-6, Pilatus, Astirs, a Kestrel 19 with Vegas to come for a membership of 300. Such a range of gliders does not present significant conversion problems; the only related one is deciding the level of experience at which pilots convert. This of course is usually based on hours and launches, but is probably better based on cross-country achievement if that is what the gliders are to be used for - but I digress!

Undoubtedly there are advantages for the pilot who flies a variety of gliders, whether he is aware of it or not; a pilot who has flown ten types is usually more experienced than one who has flown two or three. Practically all this means is taking more care of the less experienced pilot if the type conversion step is a big one.

Economics.

The economics of gliding sometimes seem a bit odd to say the least; £100000 worth of gliders waiting for a launch and perhaps not getting one because the towcar (cost £125) has broken down. The great delusion of gliding is that it's cheap which it certainly isn't, and in many respects a re-think is necessary. It is interesting to see that some clubs are now buying new K-13s even though they cost £8000 plus. The significance of such a purchase can be measured in increased launch height, frequency of soaring flights and the general satisfaction of the members. I well remember the remarkable change at Lasham when the Capstans were replaced by K-13s, the Swallows by K-8s and the old towcars by new ones; successful soaring flights became the norm for early solo pilots.

Why not undertake a budgetting exercise to see whether you could really afford a good "top end" to the club fleet? The two provisos are that there are enough pilots to fly it and the policy for its use will not mean that the Calif or Nimbus 2 are doing circuits or one-hour local flights.

A good fleet and pilots achieving things with it is a tremendous morale booster as you would find out if you visited the few forward-thinking clubs.

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The Optimum Design and Wing section of a 15m Glider without Flaps

An introduction by Frank Irving. In 1971, a splendid meeting (Euromech Colloquium 26) was held at Oberwolfach, to discuss The Aerodynamic and Structural Design of Gliders. Professor Eppler and I read papers on the overall optimisation of gliders which, although different in detail, came to broadly similar conclusions: that if one wanted a 15m glider to be near-optimum in terms of average cross-country speed over a wide range of thermal strengths, its aspect ratio should be somewhat lower than generally fashionable. Its empty weight should be low but it should be capable of carrying a large amount of waterballast. The "Astir CS" was designed in accordance with this philosophy, presented here in a straightforward but comprehensive manner by Professor Eppler.

By PROF. RICHARD EPPLER
Translated by Joachim Schneibel

At a seminar in Oberwolfach nearly six years ago the well-known glider pilot/designer Frank Irving stated that allowing the use of waterballast in the Standard Class would cause fundamental changes in future designs. I myself reached the same conclusion in another contribution to the same seminar. We both calculated that the wing area would have to increase, but to date we have been waiting in vain for this revolution.

The first glider designed with a significantly larger wing area was the Astir CS which has led to heated discussion throughout the world on the pros and cons of this change in design. In the following paragraphs an attempt is made to compare carefully the different theories. This is not a simple matter. In the early days most gliding was carried out on slopes and the most important requirement at that time was a low minimum rate of sink. Later during the thirties, the emphasis shifted to the best glide angle. Today nearly all soaring is done in thermals, so some people feel that high speed performance is of prime importance while others say that they cannot cover much ground unless they can climb well. Honestly, who ever calculates in much detail which parameters yield how much improvement in particular weather conditions?

Here we will compare several gliders and attempt to obtain some figures which have real meaning. We have chosen very different data so that the particular influences in the performance can be seen easily (see Fig 1). After completing these comparisons we will be able to say more about how to obtain the optimum.

First let us imagine two gliders 1 and 2a with different wing spans $b_1 = 18$m, $b_2 = 15$m, but with equal wing area $S = 14$m^2. All other features, the wing section, the weight, the fuselage and therefore the parasitic drag, are supposed to be equal. The main difference is therefore the aspect ratio A. Glider 1 has $A = 23$ and glider 2a has $A = 16.1$. According to the well-known formula below the aspect ratio is of great importance for the induced drag $C_{Di} = D_i/\frac{1}{2}\rho V^2 S = kC_L^2/\pi A$

The coefficient of the induced drag is inversely proportional to the aspect ratio and proportional to the square of the lift coefficient C_L. The factor k is slightly greater than 1 if the lift distribution is not elliptical. We will rate all the gliders the same in this respect and always take $k = 1.03$.

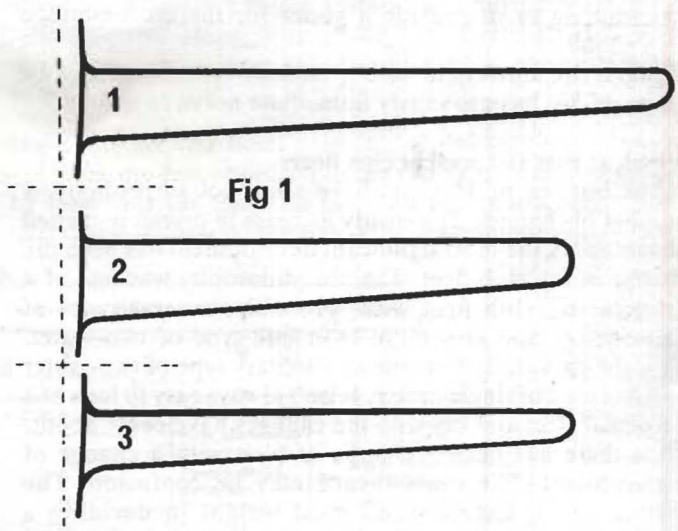


Fig 1

Glider	1	2a/b	3
Span (m)	18	15	15
Wing area (m^2)	14	14	10
Aspect ratio	23.1	16.1	22.5
Weight (kg)	350	350/420	300
Wing loading (kg/m^2)	25	25/30	30

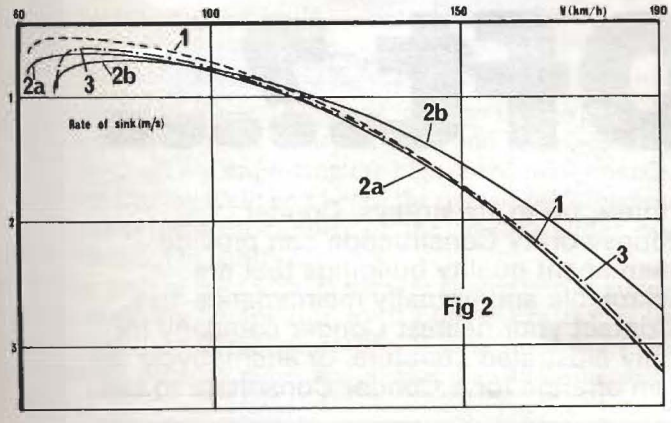
The lift coefficient C_L depends on the speed V and the wing loading W/S and the density of air ρ the relation being $C_L\frac{1}{2}\rho V^2 S = W$

In combination with the first formula this means that $C_{Di} = (4kW^2/\pi A\rho^2 S^2)(1/V^4)$ holds. A doubling of the speed results in a decrease of the induced drag coefficient to a sixteenth of its original value. In other words, at high speeds the induced drag is of little importance!

What then is the difference between our two gliders in high speed flight? The total wing area, wing loading, fuselage and parasitic drag are equal. The only difference is that the mean chord of the second glider is larger – it has to achieve the same wing area at reduced span. It therefore has at any speed a larger Reynolds number which is proportional to the product of chord and speed. It is generally known that the profile drag decreases with increasing Reynolds number (see also Fig 4). This means that at high speeds 2a will be somewhat better than glider 1, and this is

illustrated more accurately in Fig 2 showing glider 2a to be better above about 170km/h. However the differences are sufficiently small so that one can say that the two gliders are equivalent between 140km/h and 200km/h on average.

However, the different aspect ratios of course result in differences in performance at slower speeds. The differences at the best gliding angle and at the minimum rate of sink are shown in the table inserted in Fig 2.



Glider	Best Glide Angle	at km/h	Min sink	at km/h
1	40.35	85	0.528	70
2a	35.03	95	0.655	73
2b	35.35	104	0.715	81
3	37.30	92	0.612	75

When these polar curves are considered one pilot will say that if there are no advantages at high speeds he would prefer manoeuvrability in thermals to a large wing span. He is convinced that he would do as well in a competition with a 15m glider as in a 18m glider. Another pilot will say that he will always be ahead if he has a better rate of climb, even if the performance is the same at high speeds.

It is difficult to estimate what advantages are given by the better manoeuvrability of the smaller glider. We can, however, take a closer look at the advantages of better slow speed performance in cross-country soaring, and examine the statement of our second pilot who considers there is no advantage in better manoeuvrability. It is of little use to look only at the best gliding angle for this purpose as we really have to compare the performance of the gliders when circling.

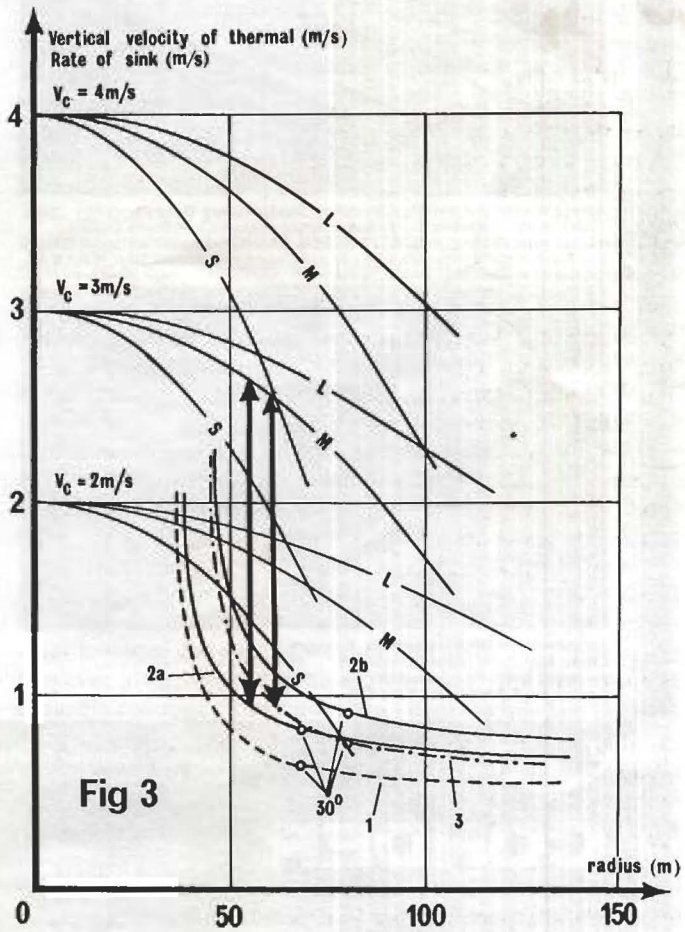
The minimum rates of sink which can be obtained as a function of the radius of turn are shown in the lower part of Fig 3. If one wants to estimate the attainable rates of climb, however, one has to bear in mind that both gliders do not fly in the same air conditions. As is well-known, every thermal has a core and it is often advantageous to turn tightly, despite the increased rate of sink of the glider.

In order to take this factor into account it is assumed that thermals have a certain core velocity which decreases outwards in a parabolic manner more or less rapidly. In the upper part of Fig 3 three sizes of thermals, large (L), medium (M) and small (S), are plotted for different values of core velocity V_c = 2, 3 and 4m/s. One can, of course, consider many additional values and for example calculations were also carried out for all three sizes with V_c = 5m/s. With this multiple selection, however, we have a fairly good spectrum of the various types of thermals normally encountered. This does not mean that in reality thermals look like this. It means that for normal rates of turn, the updraught velocities are fairly well represented and hence calculations can be made of the advantages obtainable by turning tightly.

Indeed, the optimum radius of turn and the attainable rate of climb V_{st} for every up-current and type of glider can be calculated in this way. This rate corresponds to the maximum value of up-currents minus the rate of sink of the glider. In Fig 3 it corresponds to the maximum separation of the up-current and circling performance curves in the vertical direction. The attainable rate of climb is indicated by arrows for two different gliders in a medium thermal with a core velocity of 3m/s.

When we compare the circling performances of gliders 1 and 2a in Fig 3 we can immediately see that the rate of sink of glider 1 is always lower. The wing loadings are identical so the smallest possible radii of turn are approximately equal; also equal are the radii corresponding to 30° angle of bank, which are indicated on Fig 3 by '30°'.

What effect does this difference of about 0.17m/s have on an average cross-country flight? This can be easily found by using the well-known MacCready construction where one draws a tangent to the performance curve from a point V_{st} above the origin (which is not visible in Fig 2). The average cruising speed V_R is given by the intersection with the velocity axis.



A remarkably large difference is obtained, especially in small weak thermals, when the inter-thermal speed is kept

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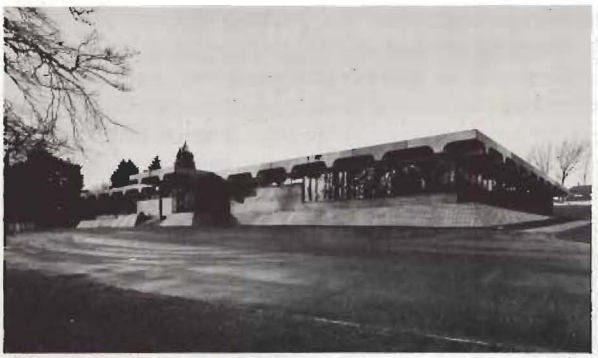
Queen Elizabeth II Terminal Building, Southampton Docks
Client: British Transport Docks Board, Southampton. Chief Docks Engineer: D. J. Doughty, C.Eng., F.I.C.E., F.I.W.E., M.R.I.N.A. Designed by E. W. H. Gifford and Partners, Consulting Engineers, in association with Ronald Sims, A.R.I.B.A. Contractors: Brims and Co. Ltd.



Production, Research and Service Complex for J. C. Bamford Ltd., Rocester
Architectural Services: Staff Architect's Department, J. C. Bamford Ltd.
Contractor: R. M. Douglas Ltd.



Department of the Environment, Taunton
Client: Alan Curtis Developments Ltd.
Architect: Leach Rhodes and Walker
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low. Glider 1 also shows an advantage in that respect and some examples are listed in Table 1. Everybody who knows about the importance of tiny differences in a competition will appreciate the significance of these figures!

Table 1

Up-current	V_R (1)	V_R (2a)
2S	47.8	36.4 (km/h)
3M	78.5	73.8
4M	91.9	88.5
5L	105.1	102.9

Summarising, the first comparison shows that given equal wing area, an increase in aspect ratio and therefore wing span, although not improving the high speed performance, improves circling flight and hence the overall performance. The greater manoeuvrability of the smaller glider can diminish this, but hardly cancel it.

As an aside, a pilot who on average succeeds in climbing faster than his competitor by 0.17m/s, has the same advantage (I have the impression that in most cases the differences between pilots are greater than those between gliders).

Hitherto it has looked as though a high aspect ratio always carries great advantages, but we are now going to do a second comparison. If the wing span is limited, as it is in the Standard Class, a large aspect ratio then also means a small wing area. In order to clarify this difference we will compare two gliders, again having as much as possible in common, but with different aspect ratios though having the same wing span.

First we shall take a normal glider 3 of the Standard Class with $S = 10m^2$, $A = 22.5$, and $b = 15m$ and with $W = 300$ kg, giving a wing loading of $W/S = 30kg/m^2$. This glider would in fact have difficulty in reaching such a low wing loading at all.

For comparison we shall take glider 2a again as before, but increase its weights with ballast to $W = 420kg$ and thereby obtain a wing loading W/S of $30kg/m^2$. We will call this glider 2b. This comparison is also very informative.

There is now not only a greater difference in the Reynolds number than between gliders 1 and 2a but in addition there is a further decisive influence in the coefficient of the parasitic drag, which is related to the wing area and is thus larger for glider 3 by a factor of exactly 1.4. Since at high speeds the parasitic drag is approximately half of the total drag we would expect large differences in the performance curves in this region. These can be seen at first glance in Fig 2 which shows the results of detailed calculations.

The magnitude of this effect may be slightly puzzling to some. They might say that as glider 2b has the same fuselage and a larger wing area it should have larger drag. Correct, but on the other hand it is heavier for the same wing loading, and hence has more energy available per metre of height loss. It can easily be calculated that this is the more important influence. The fuselage of glider 2b is smaller in relation to the wings and therefore contributes a smaller fraction of the total drag. Whichever way one looks at the facts, glider 2b is distinctly superior to glider 3 in high speed flight.

Glider 3 is of course better at slow speeds but the difference is much smaller than between gliders 1 and 2a because of the parasitic drag. The difference in the minimum rate of sink is 0.10m/s instead of 0.13m/s, and for the difference in best glide angle it is reduced from 5.3 to 2.0!

It is again of interest to consider how this affects the mean cruising speed V_R. Table 2 contains some comparisons. In average weather conditions, when the real rate of climb in thermals exceeds 1.7m/s, glider 2b is better, and in good weather by a factor of about 3.2%. This is once again a remarkably large difference.

Table 2

Up-current	V_R(3)	V_R(2b)	V_R(2a)
2S	28.7	14.7	36.4 (km/h)
3M	72.5	71.7	73.8
4M	87.4	88.8	88.4
5L	102.9	106.2	102.9

In poor weather glider 3 is better. However, in such conditions glider 2b will have jettisoned its ballast, so one ought to compare gliders 3 and 2a in the case of weak thermals. This proves to be another surprise. There is such a distinct difference in induced drag that glider 2b can easily jettison 70kg of ballast, thereby reducing its wing loading by $5kg/m^2$, and still be as good as glider 3 at high speeds. The difference in minimum rate of sink has reduced to 0.043 cm/s: the lift/drag ratio has fallen by 0.3 because of the smaller Reynolds number to a difference of 2.3. The minimum speed of glider 2a is 62km/h in contrast to that of glider 3 of 68.2km/h. Glider 2a was taken to have a relatively high weight of 350kg while glider 3 has a very low, hardly attainable weight of 300kg.

One could make the mistake in this comparison of only considering the performance curves above 70km/h, where glider 3 is always slightly better. However, a look at the circling performance curves shows that glider 2a is considerably better in all turns with angles of bank above 30°. The important consideration is again the effect on the cruising speed. Table 2 shows that glider 2a is distinctly better in weak thermal weather but is exactly the same in extremely good soaring conditions.

Summarising, the second comparison shows that given limited wing span the glider with the larger wing area has remarkable advantages in thermal cross-country flight.

One immediately asks to what extent the enlargement in wing area is advantageous. It has already been shown that with $14m^2$ wing area and the same wing loading the aspect ratio has a considerable influence at low speeds. More detailed investigations show that the optimum value depends on one's assumptions as to what weather conditions are most common. In the case of relatively strong thermals the optimum area is around $14\text{-}15m^2$, and somewhat lower in the case of weaker thermals. The optimum is however always broad, which means that the performance is hardly reduced if one chooses an area slightly less than the best.

Of course there are arguments against large wing areas, especially in the case of handling during rigging. On the other hand the low landing speed is a big advantage during training and for field landings. Furthermore one does not have to worry about every gram of weight in design and production, and one can thus introduce economies. As for genuine performance, more detailed and extensive calculations show that enlarging the wing area from 10 to $12.5m^2$ reduces the best gliding angle by 1.5, increases the min-

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imum rate of sink by 1cm/sec (effectively nothing) but is beneficial in cross-country flight by 2-3% on average. These predictions have been confirmed by carefully conducted comparison flights.

By the way, these statements are not restricted only to the Standard Class. I am expecting there to be a tendency to use distinctly larger wing areas in the Racing and the Open Class.

These comparisons reveal another very important conclusion. A mere increase of the wing span in our first comparison resulted in performance gains which cannot be achieved by the Racing Class over the Standard Class. An increase in wing span costs very little compared with the installing of flaps. An 18m Class with all other restrictions of the present Standard Class would allow much better and cheaper gliders than the Racing Class, which is therefore fundamentally a regrettable development in the wrong direction.

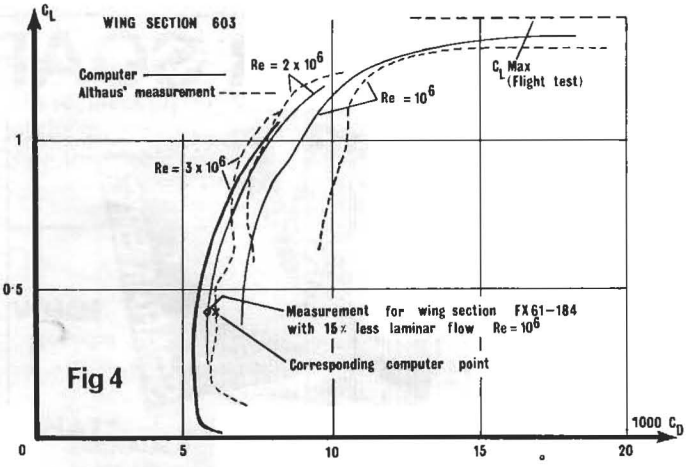


Fig 4

All the previous calculations related only to the measurements of the glider. There are other features of design which have to be optimised for cross-country flying rather than for the best glide angle, such as wingtip incidence and wing section. Flight experience shows that factors other than the purely theoretical circling performance given in Fig 3 are important. These theoretical performances have to be achieved with very high lift coefficients flying close to the stall. The stalling behaviour is of great importance in that case. It is of even greater importance for "dynamic soaring", when one is trying to profit by utilising small irregular "cores" at low flying speeds. This method can hardly be used safely because one has to take the risk of a wing dropping or stalling.

It can easily be seen that at high speeds wingtip incidence, or washout, results in a contribution to the induced drag that does not approach zero like C_L. Washout is therefore always a disadvantage at high speeds, so one has to attempt to design a wing profile without an abrupt stalling behaviour even without washout. Judging by experience hitherto this did not seem to be feasible, as extremely good performance wing sections have had the disadvantage of a more or less culpable behaviour at the stall.

It now appears that to obtain gentle stalling one does not have to sacrifice either high speed flight, the best glide angle or the minimum rate of sink, but only to have a slight reduction at coefficients of lift above $C_L = 1.1$ to achieve extremely gentle stalling characteristics.

The result of this philosophy is wing section 603, whose polar curve is shown in Fig 4. All essential information available is listed. The computed coefficients of lift and also the wind tunnel measurements of drag by Dr. Althaus are plotted in addition to the value of C_{Lmax} determined from flight tests.

Some additional observations need to be made. Several approximations are contained in the theory used for the calculations; the theoretical curves as calculated are not absolutely reliable and are more suitable for comparison of different wing sections. On the other hand neither do wind tunnel measurements give an absolute measure because the measurements are made between horizontal and vertical walls. The influence of the horizontal walls is well known and is corrected for in the curves of C_L and C_{Lmax} of the total wing section. However no account was taken of the influence on the details of the pressure distribution and the boundary layer. In addition, the ascertainable measurement of the profile drag by a pitot traverse of the wake contains uncertain assumptions. Wind tunnel measurements also show differences between different wing sections rather than providing absolute values.

The measurement of the transition point at which the boundary layer becomes turbulent is very easy and reliable. For this section Fig 4 also contains an experimental value for another wing section FX 61-184 which proved to have 15% less laminar boundary layer during measurement than wing section 603. This difference can of course easily be verified by use of a computer. The corresponding computer value is also plotted. The reason that the measured values are slightly better than the computer values for one wing section and are slightly inferior for the other is mainly due to local laminar breakaways and breakaway bubbles. The high Reynolds number of 3×10^6 makes these improbable in practice and this was confirmed by carefully performed oil-soot experiments showing that there were no breakaway bubbles. One can therefore expect that the computer calculated performance in this region is fairly realistic.

Corresponding statements are valid for the maximum coefficient of lift. They were ascertained from flight experiments using a calibrated airspeed indicator thereby including the part of the wing area affected by the fuselage. While the C_{Lmax} value determined in the wind tunnel was lower than the calculated one, the one measured during flight was higher.

The co-ordinates, the co-efficient of pitching moment at zero lift, and the angle of zero lift of the wing section 603 are listed in Table 3.

Incidentally our glider comparisons were carried out using the theoretical calculations of drag coefficients for wing section 603. There is very little change to the basic results using different wing sections; this was checked several times.

Summarising the results of this report one can say:

1) The performance of a glider cannot be judged by means of the speed performance curve alone. One has to take into account circling flight and average cross-country flight.
2) There are advantages of about 3% in cross-country flying hitherto by enlarging the wing area of a Standard

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Class glider from common values of $10m^2$ to $12.5m^2$, although this results in a decrease in the best glide angle of 1.5 points.

3) It is only possible to compare performances by means of the best glide angle in the case of very weak conditions and identical wing loadings.
4) The attainable performance in climbing depends substantially on the flying qualities at slow speeds. These should be obtainable from the wing section, not from washout.

Profile 603

N	X	Y	N	X	Y
0	100.000	0.000	30	0.597	1.557
1	99.625	0.085	31	0.083	0.465
2	98.549	0.365	32	0.075	-0.409
3	96.873	0.853	33	0.697	-1.143
4	94.683	1.495	34	1.949	-1.875
5	92.005	2.228	35	3.741	-2.573
6	88.838	3.038	36	6.045	-3.221
7	85.222	3.945	37	8.836	-3.814
8	81.227	4.952	38	12.078	-4.352
9	76.930	6.043	39	15.727	-4.833
10	72.409	7.193	40	19.738	-5.251
11	67.743	8.369	41	24.060	-5.600
12	63.009	9.527	42	28.642	-5.876
13	58.283	10.612	43	33.427	-6.072
14	53.631	11.543	44	38.357	-6.186
15	49.058	12.223	45	43.367	-6.207
16	44.515	12.624	46	48.393	-6.124
17	40.001	12.785	47	53.370	-5.907
18	35.553	12.729	48	58.260	-5.519
19	31.208	12.470	49	63.043	-4.927
20	27.003	12.025	50	67.745	-4.099
21	22.979	11.414	51	72.447	-3.092
22	19.177	10.654	52	77.144	-2.066
23	15.636	9.762	53	81.732	-1.148
24	12.390	8.754	54	86.086	-0.415
25	9.472	7.651	55	90.073	0.086
26	6.907	6.474	56	93.558	0.334
27	4.720	5.246	57	96.386	0.340
28	2.930	3.995	58	98.417	0.201
29	1.552	2.752	59	99.610	0.057
			60	100.000	0.000

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Club Comment

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WHOSE GLIDER?

KEITH MANSELL

For some time now we have had glider identification problems. A number of these relate directly or indirectly to BGA competition numbers. Last autumn the BGA Executive set up a Sub-Committee (Keith Mansell, John Brownlow, Frank Irving, Lemmy Tanner and John Williamson) to study the problems that had arisen, to consider likely future problems and to make appropriate reccommendations.

The Sub-Committee has reported back to the Executive which asked that the report should be published as a "Green Paper" for consideration and comment by all those interested. Accordingly the report is set out below.

Please send your written comments to Keith Mansell via the BGA office.

GLIDER IDENTIFICATION

I THE NEEDS

Currently the main needs for identification are:

1) **Sighting** – at competition start/finish lines
   – for accurate log keeping
   – to help the establishment of radio contact between gliders flying in fairly close proximity.
2) **Call signs** – for those gliders fitted with radio.
3) **Certification** – for C of A and insurance purposes.

The needs in 1 and 2 would be substantially extended if the owners of all gliders sought visual identification and/or a radio call sign.

II SUITABILITY OF PRESENT SYSTEMS

The needs are at present catered for by three quite separate systems:

BGA competition numbers
Home Office call signs
BGA C of A numbers

Each of these systems is adequate for its basic purpose although the first two suffer from some administrative inefficiencies. A pilot whose call sign differs from his competition number is in some difficulty in complying with the competition rules. The use of competition numbers for log keeping and for air to air recognition is a bonus additional to their basic purpose and is only effective for the 572 gliders with such numbers. There are, however, local identification systems used by some clubs for log keeping.

If the owners of more than 1000 gliders wished to display a competition number then the present three-digit system would be inadequate. The individual digits of a four-digit number would be smaller on the fin/rudder area than are those of a three-digit number.

III PROBLEMS OF PRESENT METHODS

The problems associated with the present methods are:

1) **Expense** of removing from a glider a competition number which the seller of the glider wishes to retain.

2) **Confusion** through duplication caused by:
   a. Competition numbers not being removed from a glider the seller of which puts the same number onto another glider.
   b. Administrative fumble resulting in the duplicate authorisation of a competitive number or of a call sign.

3) **Confusion** between competition numbers and height calls when a numeric call sign is accompained by poor R/T procedure.

4) **Inadequacy** of the three-digit competition number if the demand for it exceeds 999. (There are approximately 1150 BGA and 250 ATC & RAFGSA gliders and 572 allocated competition numbers.)

Transferability of competition numbers is the main cause of problems 1 and 2a and without it problems of the 2b variety would probably be much rarer. The combination of the two factors poor R/T procedure and a numeric call sign causes problem 3. The absence of either factor eliminates the problem.

Problem 4 is not current. It would arise if the demand for visual identification *via* the competition number system were to exceed 999 but only then if four-digit numbers were to be considered unacceptable.

Problems 1 and 2b can involve significant expense. Apart from this the problems in 1, 2 and 3 are not major. If problem 4 were to arise then it would be major and could aggravate problems 1 and 2.

IV PROPOSALS FOR RESOLVING THE PROBLEMS

We recognise that there are pilots who are emotionally attached to their competition numbers. Our claim is to provide glider owners with an opportunity to avoid the problems in III. We propose the establishment of a new system to operate as an alternative to the existing three-digit competition number system and any other visual identification markings.

A THE NEW SYSTEM

The new system would feature a three-letter character identification which would be:

1) Allocated to each of the non-military gliders (in the UK at the start of the system or which enter subsequently) that are subject to Cs of A issued by the BGA or by the CAA and to those other gliders operated by the RAFGSA, the RNGSA, the AGA or other service organisation.
2) Recommended to owners to be used as the means of visual identification.
3) Recommended strongly as the radio call sign (except where a different visual identification is used).
4) Permanent and non-transferable.
5) Acceptable for competition purposes.
6) Free and without renewal fee.

B THE EXISTING SYSTEM

The present three-digit competition number system would continue but no new numbers would be issued. Holders of existing numbers would be able to:

1) Continue the practice of transferring their number to successive gliders subject to the payment of an appropriate registration fee,

OR

2) Abandon their number when the glider bearing it is next sold. In such an event the new owner of the glider could opt to retain the number as the identification of the glider or to remove the number and then use the appropriate three-letter identification if required. Subsequent owners of the glider would have this same option. Once the three-digit number is given up it would not be re-issued.

It will be necessary to have an accurate list of current competition numbers. To achieve this a complete list should be published and then corrected where necessary.

The new system has a gross capacity of 17576 which would be sufficient for more than ten times the number of gliders at present in the UK. The new system would therefore be well able to cope if all owners wished to use it to identify their gliders. It would provide a sound basis for radio call signs and would eliminate the problems associated with transferability. It would, however, need to be supported by good administration although this should be simplified by the removal of the need for renewal. An important interface with the new system is the authorisation and allocation of radio call signs.



THE BRITISH WOMEN PILOTS' ASSOCIATION

JULIA WALES – Chairman

We were founded in 1955 with the help of the Women's Engineering Society whose President for a number of years was Amy Johnson. When a scholarship in her memory was awarded for the first time in 1955, several women pilots present decided to start their own association. On March 11, 1955, 22 pilots and eight members of the WES voted the British Women Pilots' Association into existence. We now have 260 members and cater for pilots of all standards and anyone interested in aviation generally.

The love of getting airborne.

We have several airline pilots, ferry pilots, flying instructors, balloon enthusiasts, glider pilots, hang gliding addicts, parachutists, helicopter pilots and Air Traffic Controllers. The common denominator is the love of getting airborne, or even just watching others getting airborne. We aim to cater for beginners through to more advanced pilots and our activities include ground lectures on navigation, flight simulator practice, seaplane flying, aerobatics and helicopter instruction. We have held gliding weekends and tried our hand at parascending on a couple of occasions. We also aim to visit as many foreign rallies as possible, with the more adventurous taking part in the Malta Rally.

The BWPA administers the Amy Johnson Scholarship which gives assistance to girls wishing to become flying instructors, and awards several major trophies annually.

We are proud of our more famous members and have enjoyed their inspiration over the years, but we mainly exist to help girls who are new to flying or who need assistance to get into careers in aviation. We also welcome men as associate members! The BWPA was amongst the first group of people to visit Concorde 002 in the hangar at Fairford, three members took part in the Transatlantic Air Race, several in the annual national air races and we now have a member who plans to cross the channel in a hot air balloon. No one could accuse the BWPA of lacking in enthusiasm when opportunities to fly present themselves!

Our excellent magazine is published three times a year and keeps members in touch and gives news of those living overseas. Since taking over as Chairman just over a year ago, I am delighted that we have gained so many glider pilots as members. We are organising two gliding weekends this summer and I hope to meet some of them on one of these occasions. We would naturally welcome any of your readers to the BWPA and those interested should contact Mrs Muriel Tucker at PO Box 13, British Airways Terminal, London SW1.



A

BGA weeke

Church Stretton, March 12-13

The BGA Weekend, an extension of the traditional AGM followed by a dinner-dance, was a resounding success. Based at the Long Mynd Hotel in the foothills of the Midland Gliding Club's spectacular site, during the weekend of March 12-13, the response was so good that Marjorie Hobby filled various other hotels in the area with members from all corners of the UK.

Last year the BGA contented itself with an AGM in London when the annual trophies were presented. This was thought by many to be an anti-climax and it was agreed to try a complete weekend of activities.

The programme was lively, well considered and everyone we spoke to appreciated the opportunity to meet up with so many old friends, to make new contacts, to talk endlessly about gliding and to join in the discussions chaired by Roger Barrett, BGA Chairman.

Dee Reeves, BGA Publicity Officer, helped Marjorie Hobby of the Midland Club with the organisation and the programme had an ideal balance, including a series of activities for the benefit of those wives and girl friends who are less dedicated to gliding. A flower arranging demonstration followed by a cream tea, a shopping trip and a visit to a china factory and museum were the main diversions, plus the Saturday evening dance-cum-party after the dinner.

The AGM was followed by an open forum when general topics were thrashed out from the identification of gliders to planning for the future, the afternoon ending with a film show.

More than 170 were at the dinner with George and Maren Lee as guests of honour and another 30 came to the dance. Maren later presented the trophies which included the new one given by the Yorkshire GC in memory of Barrie Goldsbrough. Designed and made by David Lilburn, it really is superb and went to George as the pilot who came highest in any Class in the World Champs. (See S&G, April 1977, p74, for the list of annual awards.)



B

George was also presented with a beautiful replica of the ASW-17, his World Champs' glider, by Roger Barrett on behalf of the BGA. It was made in wood by John Glossop.

Roger welcomed the guests, spoke about the triumphs in Finland and said how proud they were of the British Team. He also presented BGA diplomas to Doug Jones, Albert Johnson and Chris Wills (see p 128).

Ian Scott-Hill, Chairman of the Royal Aero Club, who responded, brought a personal message of best wishes from Kitty and Philip Wills. Philip, President of the BGA, was in hospital and sad to be missing the annual meeting for the first time in many years.

George Lee proposed a vote of thanks to Marjorie Hobby, Dee Reeves and the Midland GC for organising the weekend and went on to talk about 1976 being a vintage year for the gliding movement in the UK. He said if asked to select one of the many memorable flights of that summer it would be Chris Garton's 801km out-and-return in a Kestrel 19. "A long out-and-return flight somehow kindles the pioneering spirit that lies dormant in us all," he commented.

As to the World Champs, George thought there were two principal benefits from competition flying.



C

D





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F



end

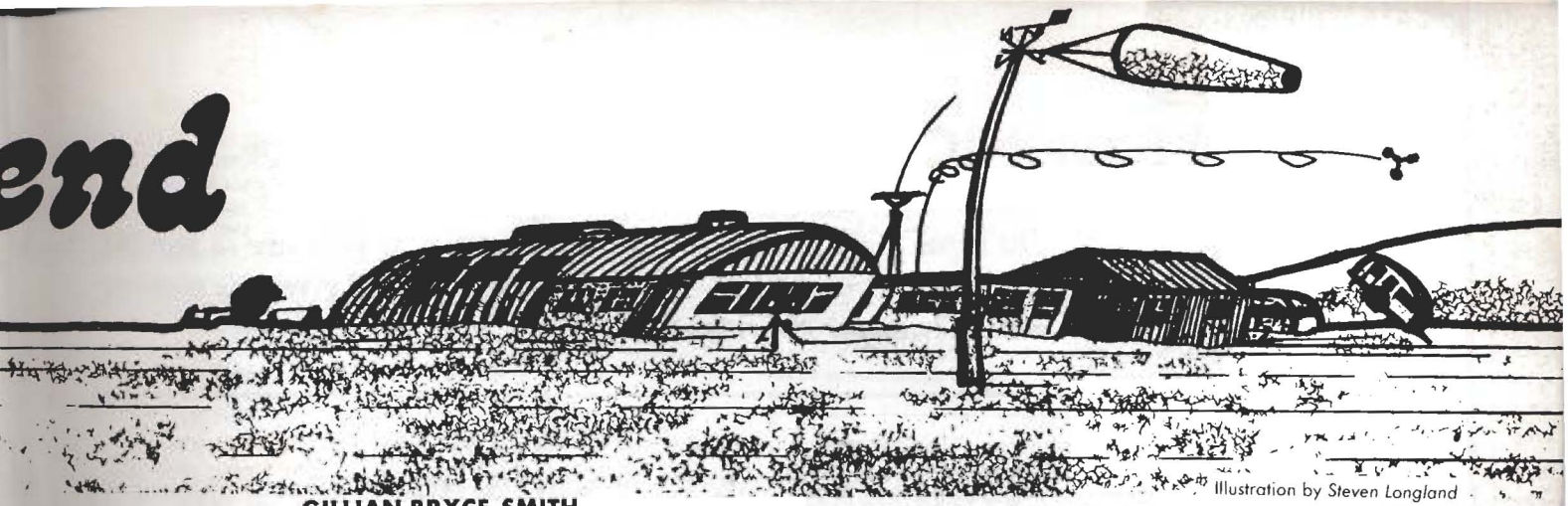


Illustration by Steven Longland

GILLIAN BRYCE-SMITH

The design of gliders and instruments wouldn't be at its present high level were it not for the incentive of commercial advantages that follow success in competitions. And there are many whose gliding has been enriched by the advantages that increased performance offers.

"However, the greatest benefits to my mind," he stressed, "come under the broad heading of politics. International competitions offer many opportunities for the exchange of information and ideas between countries, and national teams serve as representatives of their gliding movement and ambassadors of their country. On a national level, the fact that we send a full team to every World Champs enhances the stature of our movement and assists in our dealings with the various departments of civil and military aviation."

The World Champion concluded that the two greatest long-term problems facing our sport are the preservation of our freedom of airspace and the security of tenure of our club sites. George thanked Roger Barrett for his calm and efficiency as Team Manager and paid tribute to his crew.

The youngest pilot present, Philip, Ralph Jones' 11 year-old son, presented a bouquet to Jean Scott-Hill and Maren and boxes of fruit to Marjorie Hobby and Dee Reeves.

There was dancing until two in the morning and prizes were given for the best limericks (too *risque* for publication!) and for various other competitions, but in typical fashion the bar became the focal point with the continuation of gliding talk.

A cross-country brains trust in the morning was packed with George Lee and fellow competition pilots being induced to give away trade secrets. Then came the pilgrimage up the hillside to the Midland Club where a magnificent lunch was waiting.

There was some flying on the Saturday but Sunday brought low cloud. However, the Mynd looked as fascinating as ever and was obviously an initial attraction. But the success and sustained enjoyment of the weekend, which started for many on the Friday night with special rates at the hotels, must convince the organisers that this is a format to be continued. If the programme can be kept on these lines, the venue is far less important.

It's thanks to Roger Barrett's enthusiasm and vision that the BGA Weekend may well become a part of the glider pilot's annual calendar.

**The World Champs Fund was opened during the Saturday evening when £52 was collected in cash and more than £50 raised on the tombola.*

A. The replica of the ASW-17 presented to George Lee. B. George Lee, with his wife, Maren, admiring the new trophy in memory of Barrie Goldsbrough. C. Roger Barrett, BGA Chairman, presenting one of the three BGA diplomas to Chris Wills. D. Derek Davis, Manager of Surrey & Hants GC, collecting the trophies on behalf of the Lasham pilots. E. Barry Rolfe, BGA General Secretary. F. Pam Davis, who won the California in England trophy far the longest flight by a woman. G. No prizes for what they are saying! Mike Carlton and Brian Spreckley (National Coach) with the Seager cup awarded for the longest flight in a two-seater. H. Keith Mansell, BGA Vice-Chairman, on home territory. I. Dee Reeves, BGA Public Relations Officer. J. Maren with Alan Kenworthy, winner of the De Havilland cup for the best gain of height. K. Philip Jones making a presentation ta Marjorie Hobby.

Photos: Jack Minshall.

K



J



I



G



H



ONE MAN'S OPINION

Do some clubs need to change their policy if they are to survive the coming years? Vic Carr thinks they do and gives his reasons with advice for the future.

I have spent a considerable part of my leisure time gliding and enjoyed immensely the many activities in which I have participated, including quite a lot of instruction, high-performance flying and not least of all club management. More recently I have come to recognise that many of the policies, or non-policies, followed by many gliding clubs will not be good enough as a survival mechanism for the changing circumstances which are and will be pressed upon us in the next few years. What follows is essentially a brief description of the various problem areas which, in my opinion, could be changed for the benefit of us all.

First of all, let us look at one problem brought about by inflation. What I have to say on this subject has an impact on the subjects which follow. In the interests of simplicity, my explanation is described outside the club operation. Many clubs augment, sometimes rely on, resident aeroplane owners to fulfil the supplementary launching rôle. Bill, for instance, buys a tug and allows other pilots to fly it. Launch fees are collected by the tug owner based on historical costs and current running charges. A small profit results. When towing is first introduced, only 500 tows are taken but by year three it comes to nearly 2000pa. In the fullness of time when Bill's tug needs replacing, he finds he needs £5000 instead of £1500 to replace it, and he recognises that his first little aeroplane has been burnt up towing. If he had kept it to himself, it would have lasted five years at least, and he might never have had to replace it and be compelled to find that extra £3500.

Replacement cost too high to think about.

Therefore, in three years towing Bill feels he has subsidised club flying by £3500, or 50p per launch. In an accounting sense, he probably has. That he feels aggrieved is not surprising. Now, the same rules apply to the club-run tug, towcar or winch. The effect is probably worse in respect of the winch, because Fred, in the late 1950's(?), built it in his own workshop. The real historical cost is not recorded, and the replacement cost is too high to think about.

Now the point I am making is that launches, for launching sake, even within the club, are at a discount on tomorrow. My complaint is that many of the pupils on whom we waste these launches, and some of the assistant instructors who participated, will have left us altogether when the club has to finance the replacement launching equipment. So don't waste them! Launches are a scarce resource and should be allocated properly to each activity. When taken, they should be used to achieve as much flying as possible. We cannot possibly afford to waste them on unnecessary and unproductive training, which brings me to my second point.

The constitutional accident. Most club committees contain a disproportionate number of instructors. Many club policies discriminate against solo pilots overall and private-owners in particular. Why? Well - it is one man one vote. If 30 odd per cent of all members are of one year or less, 50% or more are of two years or less; it must be obvious that as a matter of course instructors will be the dominant group *and* matters of training will dominate club policies or non-policies. I find it a paradox that at those clubs where the constitutional accident has most impact, *ab-initios*, as individuals, get the poorest deal. In addition, instructors whose motives I for one do not doubt, seem complacent in the sure knowledge that the training treadmill must be trod. I doubt that it is really necessary. If the membership over-subscription accepted by many clubs, and the cost of replacement gliders and launching equipment results in financial problems, what can we do about it? I think that as most of our clubs are run by the activities of a small band of long-term members, then constitutionally we should give them a more dominant vote. One vote per year of membership up to a maximum of two or three must be worth a try!

I come now to national policies; in particular, those of the Instructors' Committee and our two National Coaches. We are currently training about 200 new assistant instructors each year (the coaching operation trains approximately 110 each year). The total on our books is about 1000. My guess is that old timers and long standing instructors represent about 25% of the total which implies an underlying wastage rate in the order of 30%. My point here is that instructors of less than several summers cannot pass on very well advanced flying techniques or advice on flying advanced gliders. So would it be worthwhile to divert a proportion of the coaches' time running special training test weeks where they could lecture and help solo pilots with their flying? Not sitting alongside them in two-seaters necessarily, but by flying and watching them in the air. I think this diversion would make a very real contribution to accident prevention, and the spread of knowledge which cannot possibly travel through the assistant instructors, however well motivated and trained they may be. At the moment, the club level treadmill is making an assistant instructor treadmill.

The last point I want to make is that at club and national level, we do not sufficiently clearly define what it is we are trying to achieve. It has been said that "if you don't know where you are going, all roads lead there" How many clubs know where they are going? In my experience, very few.

Manifestations of the lack of clear agreed objectives create a scenario which I will endeavour to describe:

1. All decisions in the club can only be made at the monthly meetings by the full committee. Any number of committee members between 12 and 20 sit between 7.30pm and 2.00am discussing an agenda of 30 items. The important questions are never asked - let alone answered.
2. Enthusiastic and talented members of the committee try to short cut the lack of agreed objectives with independent projects of their own. Frequently, their lack of experience and ability for hard work leads to quite deep involvement before other members of the committee recognise their objections to the project. Instant recrimination and confusion occurs, often followed by resignations.
3. Annual operational and financial results are accepted with complacency, because the committee has no idea what results could be expected except by comparison with last year, or the year before.
4. Our committees frequently resort to well-known subterfuges to avoid making decisions at all. Either they put the decision off until the next meeting or, depending on the day and protagonists present, they reverse each decision at alternate meetings.

My contention is that all this waste of management time is just not necessary. Clear objectives seem to be fairly straightforward. Most people want more and better flying, so why not more flying hours per member? We need enough new pilots to replace the wastage; you can put a figure on that by researching your flying and membership records. Every member needs a different number of launches depending on his experience. Why not tot up what is a reasonable expectation for each class of member and see if it adds up to what the club can achieve? If not, then you may have too many members, or too many gliders.

Sub-committees to achieve objectives set in their way.

You may be trying to achieve the impossible. If this is so, how about admitting it - at least to yourselves? At least you will know in your own mind whether you deserve the criticism you attract. From these prime objectives, a series of departmental objectives should flow. Each leader, tug master, *ab-initio* senior instructor, treasurer and cross-country senior pilots should be left with their own sub-committees to achieve the objectives set in their own way. The management committee as a whole should try and avoid doing the sub-committee's job. They should, of course, examine the results of different sections to see how well the club is performing to the plan. We won't achieve everything 100%. However, the

items discussed at those monthly meetings will be about how to achieve, not whether we should or should not.

In conclusion then, these problems are inter-acting to make our future more difficult than before. To make our long-term membership secure should be our first aim. We probably need to analyse our own club's statistics separately because our clubs don't correspond to many generalisations. Here are some of the questions I think you should find the answers to, and make your own objectives fit the problems you find:

What is the membership wastage rate on a one, two, three and five year basis?

How many training launches did you achieve last year?

How many launches did those pilots sent solo use?

How many training launches resulted in how many Bronze Cs?

How many launches per member were taken by solo pilots?

How many launches per member were taken by private-owners?

From which members did last year's revenue come?

What would launches cost if you included replacement cost based on 1978 estimated values?

Armed with this analysis it will be possible to see the problem more clearly and, more importantly, convince our existing membership of the need for change. After all, this year's new members have only to pay two more subscriptions before they find themselves in the minority.

LIFE AND REPAIR POLICY ON PARACHUTES

J. N. GOODWIN – Sales Manager of Irvin Great Britain Ltd

For several years now, all Type I.24 parachutes used by the Armed Services irrespective of their application, have been subject to a maximum life of ten years from the date of original manufacture. This life was established to ensure that the parachutes were at all times capable of meeting the requirements of very high speed deployments called for in escapes from modern jet aircraft, particularly in conjunction with ejection seats.

Patently, parachutes used in emergency escapes from gliders are not subjected to the same deployment conditions. Experience has indicated that the standard I.24 parachute, can safely be used for 25 years after manufacture *subject to a satisfactory standard of maintenance being applied throughout its life.*

Regrettably, experience has also indicated that parachutes generally are falling short of the required standard of maintenance. More and more frequently we come across unauthorised modifications or repairs, poor packing or spasmodic and lengthy periods between servicing. Consequently we think it prudent in the interests of safety to review our policy and limit the life of parachutes used in gliders to 17 years.

With immediate effect, the following company policies will apply:

1) Sale of Reconditioned Parachutes

The maximum age of any standard I.24 parachute released from the firm for use in gliders, either separately or as part of any assembly, will be 12 years. This will give the parachute a minimum of five years useful life, if carefully maintained. Parachutes suitable for reconditioning are rarely obtainable but would be offered at a pro-rata price subject to remaining life when available.

2) Acceptance of Parachutes for Repair

No work will be carried out on parachutes received for servicing if found to be more than 17 years old. The only exception to this rule will be reconditioned parachutes sold direct by Irvin Great Britain Ltd since July 1, 1970, having log cards annotated to show a life of 25 years. These parachutes will be accepted for repair until June 30, 1977, subject to satisfactory appraisal by our Quality Assurance Authority and evidence of adequate interim servicing. This two year "buffer" period is intended to avoid individual cases of hardship which could arise through a mandatory change of policy having immediate effects.

When parachutes are returned to Irvin Great Britain Ltd for servicing, all necessary repairs and replacement of components up to a total value of £10 (including the standard servicing charge and VAT) will be carried out automatically and without further reference to the customer. Where more extensive work is required, an estimate will be given and the work will only be carried out on receipt of a written request from the customer.

3) Log Cards

All log cards for standard I.24 parachutes will be annotated with the life expiry date. Existing log cards stating a life of 25 years will be amended to show 17 years except those as described in paragraph 2.

Replacement log cards will be issued with serviced parachutes where the original is missing, using the date of manufacture stamped on the canopy. On parachutes where the date of manufacture has been obliterated or removed, and which have no log card, the parachute will be assumed to be over 17 years old and withdrawn from use unless the manufacturing date can be established from our own records.

4) Re-use of Parachutes after a Live Descent

In addition to the ten year life limitation, all I.24 parachutes used by the Armed Services are scrapped after a live descent, irrespective of the life of the parachute at the time of use. Irvin Great Britain Ltd will not enforce this regulation arbitrarily on parachutes used in an emergency escape from gliders, except on those parachutes which are over the ten year life limit imposed by the Armed Services. However, parachutes under ten years old (or the currently authorised Armed Service limit whichever is the greater) used in a live descent, may be returned to Irvin Great Britain Ltd with a request for inspection and recertification. Recertification will be effected subject to a satisfactory appraisal of the equipment after considering the effects of any repair necessary and remaining life of the parachute.

We regret any inconvenience caused by the above decisions but assure you that they were formulated in the interests of our many customers within the glider fraternity.

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SELF-VERIFICATION SYSTEM FOR SAILPLANES AND MOTOR GLIDERS

GÜNTER CICHON

Some few years ago Hans Nietlispach, Switzerland, proposed to record the line of take-off and the finish line by means of a data camera (the date and time with minutes and seconds being imposed onto each photo. (See S&G, April 1974, p84.) He argued that in championships there would be no more unrecorded, and therefore invalid, crossings of lines due to the pressure on the observers.

Record attempts would likewise be free of problems concerning official observers at the start/finish lines, especially if these are not in the vicinity of the base airfield.

This method can be of great advantage if the best lift area is to be found far from the airfield. Furthermore, all the data of the flight will be available with complete clarity to the official commission and thus will prevent any manipulation.

There are also advantages for the pilot, because it will no longer be required to apply the troublesome regulations concerning the RTI (Recognition Time Interval) with possible necessary intermediate landings. It also means that official observers need not be in continual attendance.

If the barograph and camera remain sealed and the take-off and landing are also officially recorded, the official observer may leave the pilot to himself for several days without any possibility of manipulation existing.

Such a verification system is also advantageous for motor gliders. The point of departure often lies within a control zone or in an area of poor lift. For the sailplane it is possible to be towed to the appropriate point of release, and to any height of release. The motor glider can of course be allowed this only if the pilot can unequivocally verify his point of release (the point where the engine is stopped). This procedure is also applicable to the verification of the finish point at the end of a glider flight performance. It is also necessary for the control of "aerial Derby's" which are under discussion.

The data camera alone, however, is not altogether sufficient for self-verification. An additional control registration on the barograph trace is required. In this system the time of each photo can be seen on the barogram and must correspond with the time imposed onto the photo.

The respective altitude can also be ascertained from the barogram by means of the photo control jag. Any disturbance in the electric control system is indicated on the barogram by a pointer deflection. Moreover, an additional recording vibrator registers the running of the engine in motor gliders.

Example Barogram

The drawing of the motor glider barogram in Fig 1 serves as a model explained as follows:

The top line is the registration of the recording vibrator. The median line denotes the usual registration of altitude. An innovation is the three-graded bottom line, the "base level" being lowest; the "working level" above it, and the photo jag pointing upward. Each photo is marked in the barogram by such a photo jag. Thus the time when and the altitude at which the photo is taken can be read from the barogram.

A picture can be taken when desired by manual release, but the camera automatically takes a photo whenever the engine is started or stopped. Both types of photographs taken can be clearly seen on the barogram; that taken manually is marked by recording only a photo jag upward, whereas those taken automatically, by changing the engine (*ie* starting or stopping the engine) are marked by a photo jag upward and downward in a continuous line.

The photos taken automatically record the place, the time and the altitude at which the engine is started or stopped. The photos taken manually serve to record the essential points of the glider flight section, namely the departure point, the start line, the turning points and the finish point, *ie* the finish line in speed flights.

Following from this, a down stroke reaching the base level will never be found during the glider flight section. If it does, it would always annul the flight and indicate *ie* the starting of the engine, the detaching of the camera or barograph plug, or an attempt to manipulate electric connections.

In a sailplane barogram there is no vibrator or a downward jag in connection with the upward jag of the photo. So a downward jag or a prolonged fall of the control line down to the base level would indicate an attempt to stop the recording of a photo by loosening a plug or by manipulating electric connections and the flight would thus be invalid.

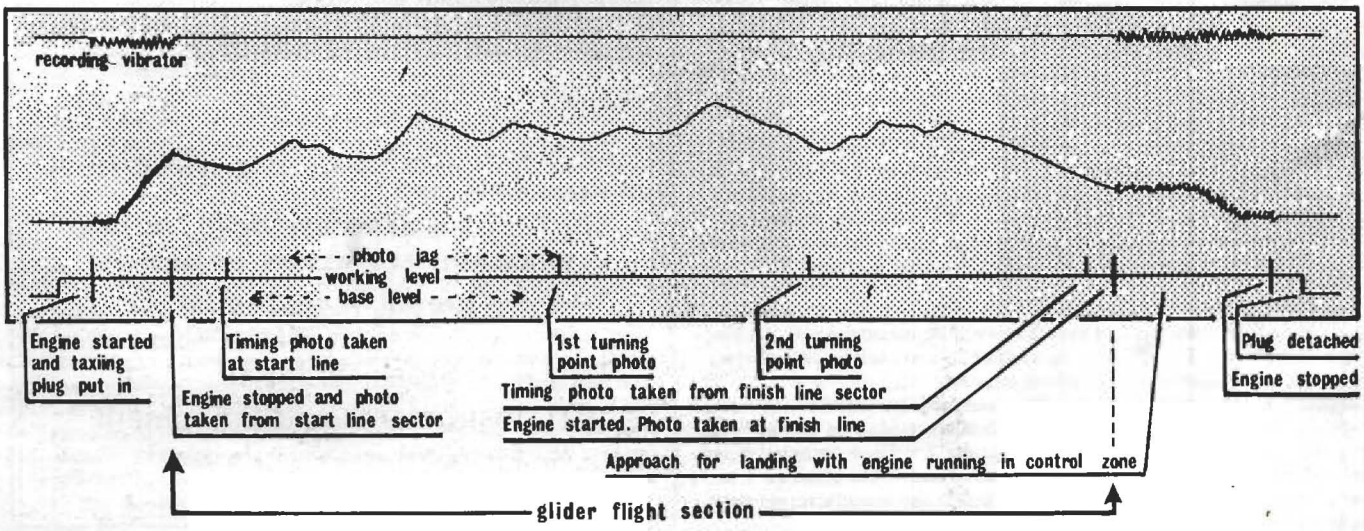
Only before take-off and after landing the plugs can be detached whereupon the control line sinks down to the base level.

Points for Official Observers

As in the past the only task of the official observer is to seal the barograph and camera. Before sealing the camera he should check that it is adjusted to the correct date and time. Also for checking purposes he may detach the plug for the camera or barograph before take-off or after landing to check that the control line is really sinking down to the base level, and that it is functioning properly.

While analysing the barogram the observer must ascertain that during the glider flight section the control line has not sunk to the base line, this would render the flight invalid. He can check that the times marked by the photo jags on the barogram correspond with the times imposed on the photographs.

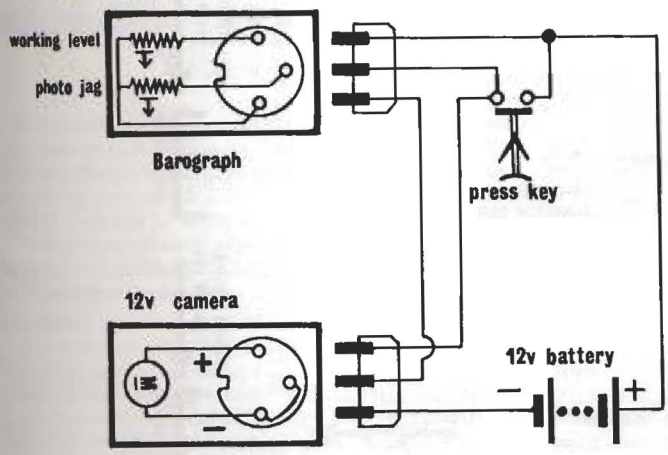
Fig 1 Example barogram of a triangular flight in a motor glider



Technical Solution

The basic principle is comparatively simple. The wiring diagrams shown in Figs 2 and 3 are applicable to 12v cameras.

Fig 2. Wiring diagram for sailplanes (12volt camera)



A little more complicated was the circuit diagram in Fig 4 for the system designed by myself as an experimental pattern with a relatively cheap Super-Baldamatic camera. Three different working voltages had to be used; 12v for the aircraft power supply and photo jags; 8v for the working level; 3.6v for the camera. The voltage had to be reduced to 8v because the working level spool in the barograph was unable to carry a constant load of 12v.

Unfortunately, this cheap camera is no longer on the market, but the more modern cameras all operate on 12v. However, the circuit diagram for the 3.6v camera has been incorporated into Fig 4.



STANDARD CIRRUS 75

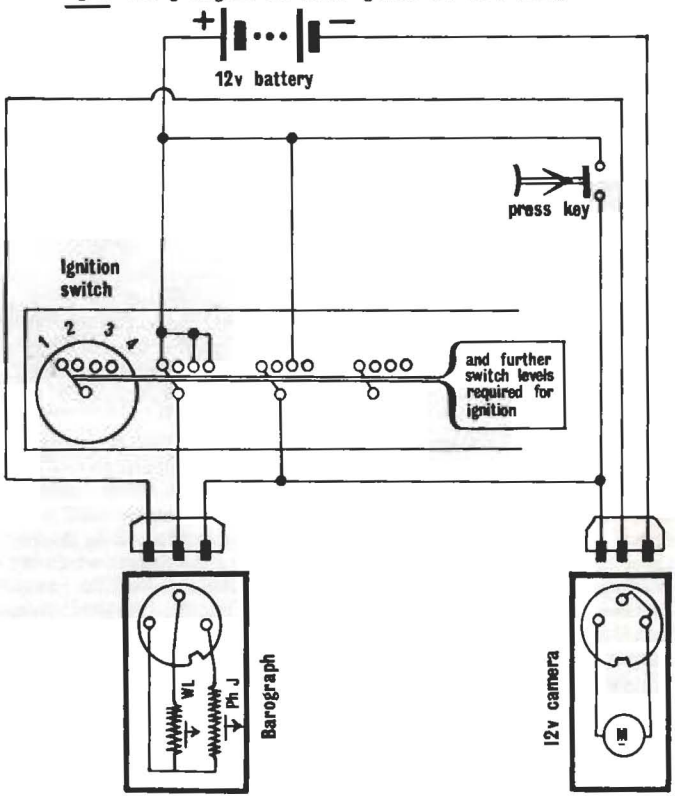
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Fig 3. Wiring diagram for motor gliders (12volt camera)



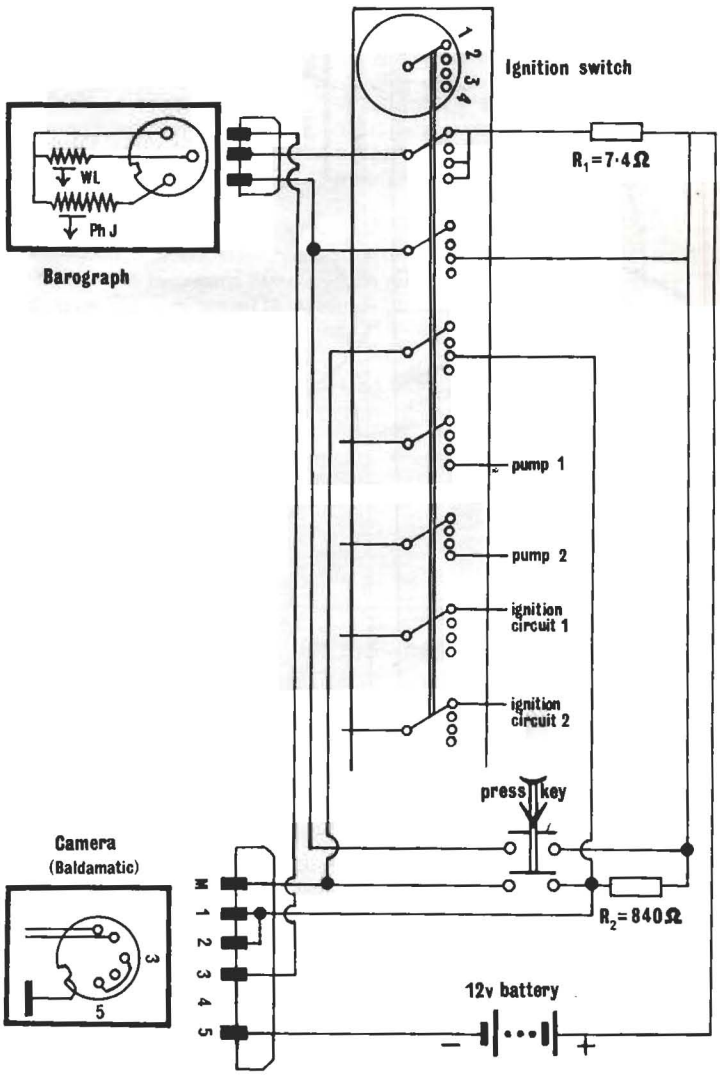


Fig 4. Wiring diagram for motor gliders with 3·6 volt camera and 8 volt working level

Technique of Crossing the Start/Finish lines

The system as designed by me allowed vertical pictures to the ground while the plane was in an horizontal attitude. This was achieved by installing the camera in the bottom of the plane's nose. The test flights, however, revealed a factor of uncertainty in "hitting" the mark. The fluctuations concerned the pitch rather than the bank of the plane. Sometimes there were doubts as to whether the finish line had already been crossed or not. Thus to be certain of the target it is imperative to fly in a rolling motion.

The usual method of photographing along the wing proved to be more reliable, because it creates fewer ambiguous conditions for correct interpretation. In my opinion it is better to install the camera on the right-hand side of the canopy edge. The reason is that cameras suitable for this purpose are not all that thin and could be touched by the pilot's shoulders. Also the left-hand side below the canopy edge is normally occupied by flap or landing levers.

I suggest that the crossing of the start and finish line should be proved by two photos each according to the diagram in Fig 5A. The first picture is to be taken from the sector behind the start line. (In motor gliders the taking of this picture could be combined with the stopping of the engine.) The plane is then accelerated to high speed and, according to Method A, directly above the start line rolled into a steep bank for a moment in which the essential timing photo is taken. When the finish line is crossed the photos are taken in reverse order; first the timing photo and then the photo from the sector behind the finish line.

Fig 5A. The technique of crossing the start and finish lines

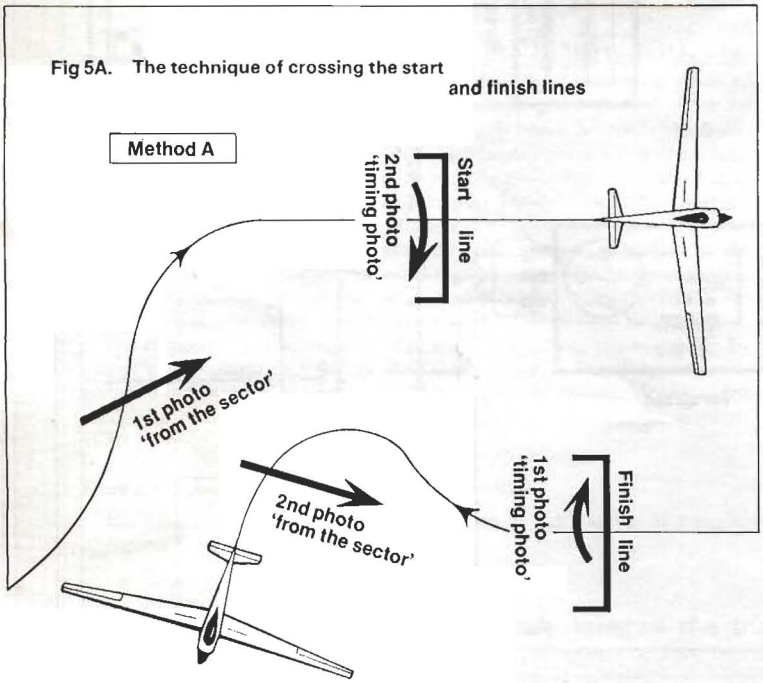
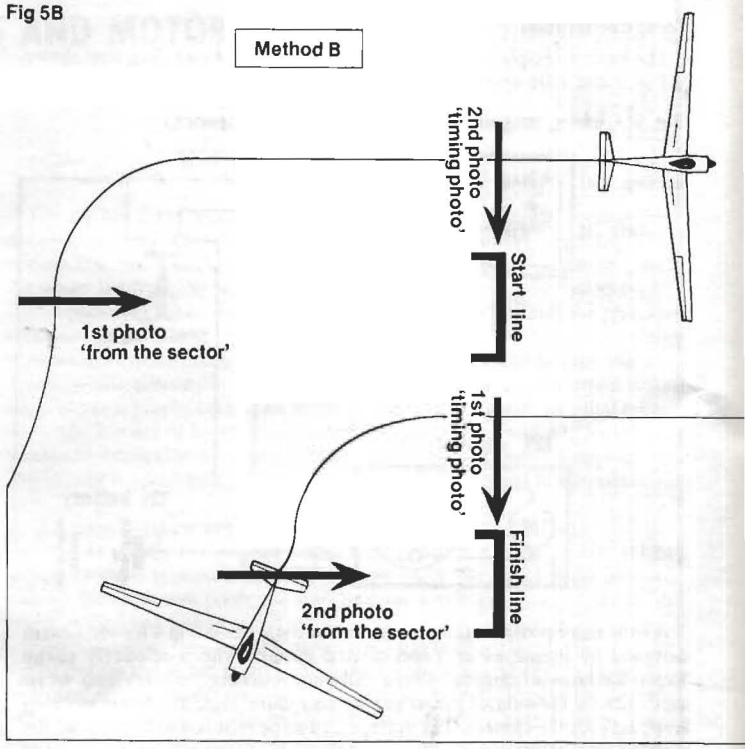


Fig 5B



If the start and finish lines are not crossed by several planes at the same time, as in competitions, there is no objection to a steep turn above the lines for the timing photos. No time is lost by taking the picture at the end of the steep turn when the start line is crossed, and at the beginning when the finish line is crossed.

It would, however, be better still to modify the *Code Sportif* so as to permit Method B in Fig 5B. It is highly appropriate for championships with group flights as well as for single flights.

According to this method the planes pass at the side of the start or finish lines abeam of the outbound or inbound direction. The picture is taken without excessive bank just at the moment when the start or finish line is in exact alignment with the plane. I feel that the second photo in each case taken from the sector is also useful for Method B.

For flights without speed classification it is not necessary to take timing photos abeam or above the start and finish lines. The pictures taken from the sector are sufficient for this purpose.

* * *

The article by Günter Cichon finished with possible alterations to the *Code Sportif* and wording to cover the use of the system described.

The only disadvantage of this system is the price of the camera, including adaptations this would come to about DM2000. Barograph changes would take another DM300, and a different ignition switch required for motor gliders would cost about DM10. At the present rate of exchange this would be about £500.

all pilots can read—but the BEST PILOTS read

Sailplane & Gliding

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International Gliding Commission (CIVV) Meeting, March 1977

IAN STRACHAN, BGA Delegate to CIVV

This was a two day meeting, held as usual at FAI headquarters in Paris. I was accompanied by Lemmy Tanner, Chairman of the BGA Competitions and Badges Committee (ex-Flying Committee), who attended as a non-voting observer. He is also nominated as alternative delegate so that the UK vote can be made if the delegate is absent for any reason. A comprehensive written report is made to the BGA Executive and Competitions and Badges Committee. Points from that report which may be of general interest follow.

CLASSES

The Restricted Class has been renamed the Standard Class. Probably most pilots always regarded it as such when referring to the unflapped 15m gliders of Std Cirrus geometry. Considerable interest was expressed at CIVV in both the Standard Class and the 15m Class. It was apparent that in the next World Championships many countries would be entering these Classes, some in addition to the Open Class, some instead of the Open to reduce expense. Meanwhile the BGA Executive have decided that there will be at least one British Team entry in each of the three Classes in the World Championships, both to maximise the chances of winning a Class and also to ensure that all pilots of contest gliders in the BGA can compete for representation at international level in gliders of their Class.

CONTEST DATES

1978 World Championships, Chateauroux, France. The dates have been slightly amended and are now: practice period, July 8-14; World Championships, July 15-29; closing ceremony, July 30.

French Nationals, August 2-14, 1977. Thirty entries from foreign countries will be accepted and as the contest is at Chateauroux, it was anticipated that national teams would come for World Champs practice. An entry limit of two per nation was made, although places were also available at Angers (July 2-14, 1977) and Issoudun (July 2-14, 1977).

International Club Class Contest. This will be in Sweden from May 10-June 16, 1979, for gliders of less than Std Cirrus performance. K-6 and Dart owners, this is **your** opportunity to fly abroad with a real chance of winning! Detailed rules will appear later and will probably divide the contest into two groups of relatively equal performance, and it is possible that some form of handicap may be used to help lower performance entrants. Meanwhile a new Club glider was announced, the Mistral, manufactured by the ISF Ingenieur-Buro of Bannsheim, W. Germany. This is claimed to have a best L/D of 35, and shows that there is still a design interest below Standard Class format.

Motor Glider Contests. 1977 – motor glider contests in Austria and Denmark. 1978 – an international motor glider contest at Burg Feuerstein, W. Germany, from May 28-June 10. Entry fee DM250. There will be three Classes, Single-Seater Open, Single-Seater 15m and Two-Seaters. Entries in by March 1, 1978.

Future World Championships. It was decided that it was undesirable to run a WGC in the same year as an Olympics. Consequently after 1978 the next World Championships will be in 1981.

RULES

1978 World Championships. Proposals for local rules were discussed and voted on where necessary. No cloud flying would be allowed, and there would be no relights after out-landings. There would be no mandatory distance task, and the 19m cup was deleted. At least one national entry in each of the three Classes (Open, 15m and Standard) would be guaranteed.

1980 Revision of the Sporting Code. Work has started on the next Code revision and a two day meeting will be held in March, 1978, after a first draft has been circulated. The BGA Competitions and Badges Committee welcome constructive suggestions for Code amendments.

LILIENTHAL MEDAL (1976)

The Lilienthal medal, the highest award in international gliding, was awarded to L. A. de Lange of Holland, who founded the first Dutch gliding club in 1929 and since then has been active in international gliding and aviation generally, including 27 years as President of OSTIV.

BADGES

A badge was approved which recognised a flight of over 1000km. To date there are 14 pilots who have exceeded 1000km, Karl Striedieck of the USA and Hans-Werner Grosse of W. Germany, having done the distance more often than anyone else. The badge will take the form of a small gold scroll under the normal gliding badge, the scroll inscribed with the figure "1000".

TECHNICAL DEVELOPMENTS

Chronomat Camera. Hans Nietlispach of Switzerland has developed an addition to an Instamatic camera which records the time of pressing the shutter on the film, see p124. Methods of utilising this invention (with proper controls) was discussed at the CIVV meeting.

SOLAR PANELS

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BGA & general news

BGA DIPLOMA WINNERS

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

J. D. Jones

Doug started gliding with the ATC just after the war and became an instructor. He joined the Bristol GC in the early 1950s and was a fully categorised instructor by the time the club moved to Nympsfield in 1956. He has had two short spells as CFI and always taken a keen interest in the maintenance and repair of aircraft. Doug was one of the first senior inspectors and has recently become a PFA inspector.

He is a member of the BGA Technical Committee and has encouraged many others in becoming inspectors. Doug has been a committee member for more than 20 years, with 18 years as Vice-Chairman. He is also a tug pilot and has always been to the fore during club projects.

Albert S. Johnson

Albert, who is CFI of Four Counties GC (RAFGSA), also began gliding with the ATC, as a cadet at the end of the war. He joined the RAF as a National Serviceman in 1947 and when he finished his Service rejoined No 22 School, being a junior instructor when it was re-numbered 643. His category was up-rated at Detling in 1951 and he was commissioned in 1956, becoming the CO of No 643 School in 1961. Albert joined the staff of No 2 Gliding Centre at Spitalgate in 1966.

His involvement with the RAFGSA began in the mid-1950s when he started gliding with the East Midlands Club at Swinderby. He has given dedicated service to both the ATC and the RAFGSA.

Albert is a BGA inspector and has done a limited amount of competition flying, though he has had great success at crewing and was a member of the World Championship team in Finland. A consistently professional approach has earned him universal respect.

Chris Wills

It is true to say that the Vintage Glider movement owes its very existence to the inspiration and enthusiasm of Chris.

He started the Vintage Glider Club with the result that a great many gliders once languishing in dusty corners are now safe in the hands of people who are flying and enjoying them to an extent that must by now have stirred the whole of international gliding. In terms of knowledge with respect to the history of gliding, Chris must be considered a leading authority.

BRITISH TEAM SELECTION

A sub-committee formed to decide on the method of British Team selection for the 1978 World Championships has had its proposals accepted by the Executive Committee. The selection process will be similar to that for Finland. A voting panel will be formed from the 12 potential Team members, plus those pilots who are highest placed in each of the three Classes at the Nationals and Euroglide, having removed the 12 from the results, (*ie*, an extra 12 pilots).

A postal vote will take place as soon as possible after Euroglide to select a single list of pilots from among the 12 potential Team members. The first four pilots listed as a result will be the Team with the next two pilots as reserves. Team members will be asked to put themselves into Classes taking account of the policy of having an entry in each Class. In the event that agreement cannot be reached a further committee will place pilots in Classes.

VORTEX CREATES HAVOC AT LASHAM

One air scout hurt (two broken ribs), four badly and one slightly damaged gliders were the result when a K-13 on finals was 'hit' by the vortex of a Boeing 727 at Lasham on Saturday, April 30, and lost control.

The K-13 came in to land just after the 727 had taken off from the opposite direction (in cross-wind conditions) and flew into the take-off vortex at its worst point of turbulence. It dived or spun in towards the gliders in the aero-tow queue and others parked along the side damaging a K-7, K-8, Astir and Std Libelle in the process. Luckily the K-13 pilots were unhurt. The accident is under investigation, but the cost of this mishap is estimated to be in the region of £25000.

SILVER JUBILEE AIR TATTOO

The Silver Jubilee International Air Tattoo is at RAF Greenham Common from June 25-26. Cross-country pilots are advised that in addition to the show days, they can expect considerable air activity in the Greenham Common area during the week prior to the show weekend due to arriving aircraft and rehearsals, also on the following Monday with departing aircraft.

It is anticipated that approximately 200 aircraft will be involved with the Air Tattoo. Glider pilots are therefore advised to keep a good look out when flying in the vicinity of Greenham Common

Colin D. Street
Airspace Committee

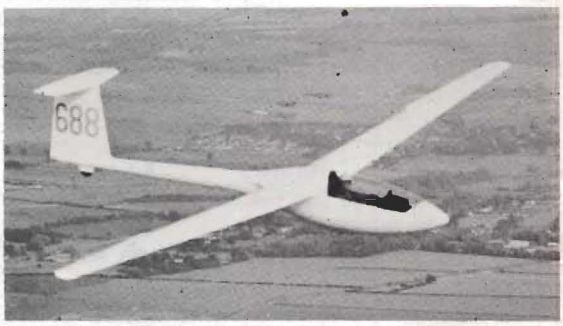
Late News. On going to press we have heard that Mike Field's world record claims for a height gain of 49800ft and absolute height of 51850ft, in a Skylark 4 at Feshiebridge on March 29, have been rejected by the BGA Competition and Badges Committee on unsatisfactory barograph evidence.

pik 20

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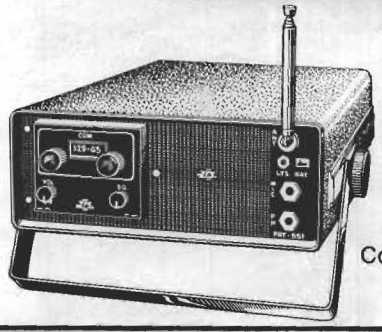
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DICK GEORGESON'S 1000KM

As we reported briefly in the last issue, p78, Dick Georgeson of New Zealand flew his second 1000km on February 29 from Town Peak, S. Island to Hick's Bay, N. Island. We now have more details.

He was flying the first Nimbus 2 built by Klaus Holighaus, not to be confused with the original prototype flown by George Moffat at Marfa in 1970, and the total distance was in the order of 1200km, although Dick is only claiming 1009km because he turned back. The speed for the total distance was 120km/h.

Having had a ten hour attempt the day before, Dick was in the air by 7.30am and flew through rain and snow to try and escape the Te Anau area. However he lost 3000ft in violent turbulence over the bush and it took two more launches before he was hill soaring.

The cloudbase had lowered and the flight from Te Anau was even more difficult. Dick was down to 1000ft with the wind speed in excess of 40kt when he picked up a weak thermal. He found wave over Athol and with a quick run towards Kingston, plus an eventual climb to 26000ft, he was off.

One of his companions, who had given encouragement, landed before Dick reached the coast and the other was on his way back. The weather in N. Island looked dead but, urged on by friends in radio contact, he called Wellington radar and advised them he was crossing. Between five and ten miles out Dick ran into a lenticular and climbed from 16500 to 18000ft.

Intense smoke in the Lake Waikaremoana area was from bush fires. Visibility was extremely poor and the terrain inhospitable. The extra 8000ft needed to reach Hick's Bay seemed impossible, so Dick retraced the 30 odd miles to Napier where he had been offered hospitality, landing after almost 12 hours in the cockpit.

NEW ZEALAND'S AERIAL DERBY

Loosely patterned on the American Smirnoff contest, and sponsored by Air New Zealand, this "Air NZ Derby" started at Auckland on February 6 and ended 6 days later, after 4 flying days covering courses totalling 786km, at Paraparaumu.

Day 1. – Twelve official and 3 not so official entrants all covered the 224km course to Matamata via Te Kuiti. Ian Finlayson averaged 99.49km/h and Ian Pryde 94.41km/h, each with an ASW-17, and were still winners after applying handicaps. Third was Lindsay Stevens, fastest in the Standard Class. Justin Wills, flying *hors concours* in a borrowed Libelle, averaged 73.09km/h, which beat all the rest.

Day 2. – Course 239km via Te Kuiti, Putararu and Reparoa ("to make it interesting") to Taupo. Finlayson won at 92.57km/h. Several others were held up at Putararu by over-development but only two landed out.

Day 3. – Course 158km via Rangitaiki Hotel to Waipukurau, a course unfamiliar to most pilots and with mountains to cross. Launches began under partial clearing of an overcast: first leg, 32km, difficult but next leg the most worrying. Brian Kelly landed out on an old airstrip whose approach road had been washed away, so was retrieved by helicopter. He had ground-looped to avoid an apparent fence which turned out to be an optical illusion; he was allowed another glider to finish the contest. Tony Timmermans, with audio and rate-of-climb instruments both out of order, flew the course in 3½hrs. Six completed it and seven landed out. There followed two days of useless weather.

Day 4. – Only four made the full course: 165km direct to Paraparaumu. The rest were mostly dumped by sea breezes on the west coast side of the hills.

Leading final scores, with handicap applied to the Open Class:– 1. Finlayson (ASW-17) 3875; 2. P. Lyons (Std Cirrus) 3632; 3. L. Stephens (LS-1A) 3173. The other two Open Class machines, an ASW-17 (I. Pryde) and Nimbus 2 (D. Yarrall) came 4th and 5th among 13 entrants.

ROSS MACINTYRE (condensed).

COUPE d'EUROPE TWO-SEATER CONTEST

The French club at du Poitou is holding its fourth annual meet for two-seater gliders from August 1-13 at Aérodrome Poitiers-Biard.

Main points in this event are that participation in all tests is compulsory for first pilots, but second pilots may be changed from day to day. Teams are allowed to select their own task each day. Final results for the cup are calculated without taking flight times into account.

Participants will find every facility for a happy stay (camping sites, hotels, restaurants) as well as sporting, tourist and other activities. Closing date June 15.

Further information from Aero Club du Poitou, Aérodrome Poitiers-Biard, 8600 Poitiers, France.

ITALIAN NATIONALS

They are at Rieti from July 30 to August 14. Further details from the President, Georgio Orsi, AVAL, CNVV, Rieti, Italy.

UNEXPLAINED COLLISION

An official report on a collision between a K-8B and a Bergfalke at 500ft over Denmark is quoted by *Flyv*. The Bergfalke's crew say they saw the K-8 come into their area and assumed it was going to land. But the K-8 came at it from behind on the left side, rammed the underside of the Bergfalke's nose with its wing, then hit the Bergfalke's left wing with its tail and "looped around the wing". The K-8 then fell into an urban area and the pilot was killed, so no explanation of its behaviour is available. "The weather was clear and very warm, which could have been tiring for the pilots."

During 1976, 68 sailplanes were newly registered in Denmark: 14 were of Astir CS type; one was an SG-38 Primary for the Copenhagen Gliding Club. – *Flyv*.



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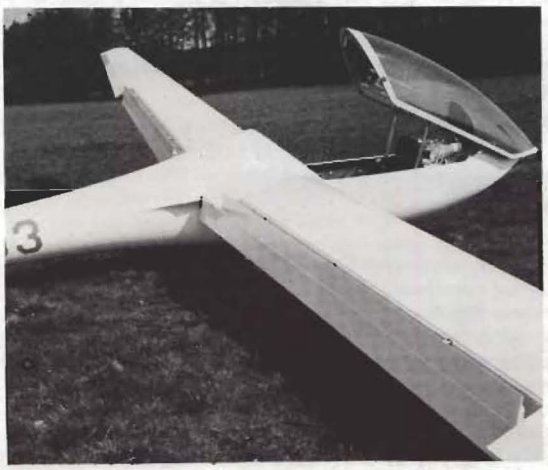
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TECHNOLOGY AND BLACKSMITHERY

Dear Editor,

It is the fate of the heretic to be lashed to the stake of his belief and consumed in the fire of conventional wisdom. Although no incendiary, I run this risk for I do not believe that blacksmithery is more cost effective than technology. (See S&G, April 1977, p77).

As a winch builder, power and sailplane pilot and operator for really too long, I would ask why we have such a widespread system of inspectors and inspection for our wings when such a system is rejected for our winches? Can it be that the frustration of painstaking work in our aircraft is best exorcised by bashing and bending, welding and walloping our winches into just adequate performance?

I would go further: I just don't think that blacksmithery is *fun.* This blinding flash of the obvious came to me last weekend after a thankfully short and successful surgical session with our geriatric winch. The problems that perpetuate in gliding clubs are as a result of the absence of technology. But the technology is there. Dick Stratton has produced an admirable check list, a repeat of the requirements as to reliability that manufacturers of off and on road specialist vehicles must meet to satisfy their customers.

The fallacy arises because the design function and the maintenance function become confused in people's minds. As it is performance and reliability that sell the specialist machine, the designer must make sure that when a replacement is necessary, the service engineer must get it right quickly if their joint customer is to be satisfied. The service engineer is not able to redesign the machine every time something goes wrong. Thus it is when a service orientated engineer comes to design, he often underestimates the difficulties and finds that the theory for the design takes a lot of finding, even if it is there at all.

The old diesel bus has served us well for many years, and it has the massive advantage that a very large engine, improperly matched to the drum, will usually provide enough pull to satisfy, even if working at a fraction of the horse power of which it is capable. Difficulties with wire, brakes, rollers and pulleys, along with the practice and special knowledge required to operate it, in addition to its inherent unreliability in the presence of abundant blacksmithery, suggest that the absent technology was necessary.

Wetherby, Yorks J. C. RIDDELL

HOT-DOGGING, ONCE MORE

Dear Editor,

It was with great interest I read Nicholas Hackett's article about the lift at the edge of cloudbase (S&G, December 1976, p244). Like him, I didn't understand why the lift takes off under the base of certain clouds. This article raised the question again and I think I have found a solution.

Ignoring extreme conditions, let's study what takes place when the warm and moist air condenses and forms a cloud with a clear-cut base. A thermal goes up, bringing along free and bound energy, the latter in the form of water vapour. Condensation starts when the warm and moist air has reached a height where the temperature corresponds with the moist air's saturation point. The climbing rate of the thermals seems to depend on how fast the temperature falls in the given height, or on how high the water vapour content is in the rising air – or a combination of both.

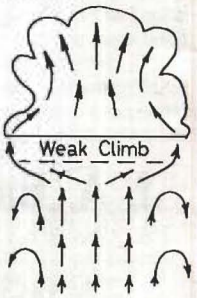
Where the condensation takes place a lot of cold water drops are formed (the heat is released). Consequently it should rain on the next glider pilot coming through my thermal. But no! He just meets a reduced climbing rate. Why? Probably for two reasons. Some of the rising heat energy is used to brake and warm the cold sinking airmass and to re-evaporate the waterdrops (no rain is falling). So in the neighbourhood of the cloudbase part of the heat energy is tied up in water vapour and can thus no longer work as climb-energy. One could say that a condensation cork is placed in the bottom of the cloud.

The released heat, which was tied up in the water vapour that condensed first, combines with more dry air (relieved of the condensed water) and goes further up in the cloud in cold surroundings. There, due to the shock treatment at cloudbase, it condenses slowly without "cork formation" and gradually builds up a good climbing rate.

The new thermal inside the cloud is only possible with admission of compensating air, but as we just placed a "cork" in the bottom of the cloud, compensating air can't be taken from there. However the cloud can draw some air in from the side which it does with effect, but can't take in much at the bottom of the cloud. Here there isn't much "go" in the climbing rate just over the base inside the cloud.

The cloud's own suction of compensating air can therefore hardly be the explanation of the strong lift at the end of the cloud's base. Certainly the condensation at cloudbase stops or slows down, but this doesn't prevent that warm and moist air still rising towards the cloud from below.

We can now add Fig 1c to Mr Hackett's 1a and 1b to show what goes on in the thermal, under and at the end of cloudbase.



It can be supposed that the formation of strong lift at the edge of the cloud's base is a combination of two things – lift from the thermal that has found its way out to the edge of the base where, due to less condensation, it can penetrate into the cloud, and air sucked into the cloud from the side. This explains why shortly after cloud formation has started, the base is considerably broader than the thermal that makes it.

I was once sucked into the bottom of a cloud with a climb of 3-4kt. I have since tried twice to let the same thing happen under clouds with a clear cut dark base, but to no avail. I think the explanation for the failure is the theory I have given. As to the first successful occasion, I must point out that the cloud started as a light fog that slowly grew denser. This meant a light condensation, which corresponds to the fact that the north-easterly wind on that day in Denmark was bringing a rather dry continental polar air.

Aarhus Gliding Club, Denmark. K. KLITGAARD-LUND

A DISCONCERTING PHENOMENON

Dear Editor,

A friend recently gave me a copy of Frank Irving's review of my book, *A Gaggle of One,* (S&G, December 1976, p277).

While I am indeed most grateful for the generally kind tone of Mr Irving's comments, I am compelled to toss back one pebble. He cites "the odd purple passage ('. . . you wince as the fibreglass spar butts . . . creak and groan . . .')." I assume that Mr Irving has never encountered this disconcerting phenomenon, and thus views it with scepticism. Then let him someday ridge-soar a Libelle H301B along the Appalachian slopes of the Eastern United States at redline in a breeze gusting to 40kt. His scepticism will evaporate before he has covered the first mile. A rather more experienced friend, Karl Striedieck, tells me his ASW-17, fully ballasted, protests in the very same fashion. On this side of the Atlantic, the imputation of being a little bit dishonest equates with being a little bit pregnant. I like to think that I am neither.

South Carolina, USA. GREN SEIBELS

Frank Irving comments:

Not for one instant would I suppose Mr Seibels to be either pregnant or dishonest, not even slightly. No doubt he *has* heard noises from the centre-section of his H301B, just as those of us who fly the 201B hear them as we dolphin our way across the English countryside. But I submit that the noises are due to the slight working of the spar-end and fuselage pins in their respective self-aligning fittings in the root ribs. Glass-fibre structures *can* emit sounds when heavily loaded but my structural friends tell me that such sounds indicate local failures and it would be prudent to throw away the component which has emitted them. Soaring the Appalachian slopes is obviously a very manly occupation, particularly when performed in the awe-inspiring style of Karl Striedieck. Flying at redline in rough air in pursuit of a record is, no doubt, a justifiable risk but it strikes me that to do so habitually is too much like Russian roulette. Unfortunately, the German placarding of that generation of sailplanes tends to give the impression that the rough air speed is the same as redline, thus encouraging gambles against the spectrum. Gliding needs you, Mr Seibels!

NOT IN 1929

Dear Editor,

London Gliding Club was provisionally formed in January 1930 and officially inaugurated on February 30, 1930. Its first flying meeting was on March 16 and beginners started training on March 30, 1930. See *BGA Journal* No 1 (March 1930) and No 2 (August 1930). Any claim to have started training with the London Club in 1929 should therefore be regarded with grave suspicion, however often repeated.

Derbyshire & Lancashire Gliding Club was formed in 1935 by the amalgamation of a Derby Gliding Club with a body called "The Gliding Section of the Manchester Branch of the Royal Aeronautical Society". Claims have been repeatedly made that this body was formed in 1929 and acquired a glider in that year. The *RAeS Journal* some years ago published a series of histories of its Branches, in which it revealed that the Manchester Branch and its Gliding Section were formed, and the glider acquired, in early 1930.

One more date correction: the first time a newspaper published a photo of a dismantled glider and called it "A Crashed Glider" was in 1931, not in 1937 (my letter "Handling Those Reporters", S&G December 1976, p275).

Cambridge A. E. SLATER

BOOK REVIEWS

Understanding Gliding by Derek Piggott. Published by Adam and Charles Black. London. Price £7.25, Available from BGA at £7.95 including p&p. (Printed on crown quarto, 250pp.)

Simplicity of expression leads to lucidity of explanation. These are qualities which Derek Piggott has developed to a considerable degree approaching perfection. Doubtless this derives from his own very varied flying career and his numerous hours of instruction. These qualities are particularly valuable in an author of a text book or manual such as **Understanding Gliding.**

One might, not unnaturally, have assumed on first seeing this new title that following two earlier books by the same writer there would of necessity be a good deal of repetition. Such is not the case. While the subject matter is the same the treatment is different. Only occasionally does Derek refer to his previous book **Beginning Gliding**, making no apology for so doing as the items under discussion are of sufficient importance to be repeated.

Derek has a wonderful gift of being able to pass on his vast store of professional knowledge in a way which can be understood very easily. Almost every page can give an example of this, and it is the simple and logical explanations of technical and theoretical problems which make the contents of the book so easy to absorb.

Although it is not written as a manual for instructors, nevertheless, throughout the book one senses that it is the highly qualified instructor, at the top of his profession, who is putting on paper his thoughts and recommendations on the best manner of improving flying achievement, whether by pupil, qualified pilot or instructor, through the clear understanding of the principles of flight and the reasons underlying them.

In general, **Understanding Gliding** is a natural follow up to **Beginning Gliding**, and despite the accolades showered on him by reviewers of his previous books I think that with this book he has excelled anything he has written before.

Any pilot who fails to read **Understanding Gliding** will be the ultimate loser! At £7.25 (which after all only represents the cost of about three aerotows) who can afford not to acquire this knowledge?

RIKA HARWOOD

Delta Papa by Derek Piggott. Published by Pelham Books, London. Price £4.50.

Delta Papa, denoting in the aeronautical alphabet the initials of Derek Piggott, is a remarkable book by a remarkable man. Few autobiographies can contain such fascinating accounts of adventures in the sky. It ranks with Lindbergh's account of his early flying career and his transatlantic flight in the unconsious display of a very high order of personal courage, determination and single-mindedness of purpose - qualities which are characteristic of the man.

The Foreword to this book has been written by Sir Peter Scott, who testifies that his original intention to take up gliding was inspired by the BBC account of Derek's adventure into a thunderstorm, described in the opening chapter.

It is not necessary to remind a British glider pilot that Derek has been CFI at Lasham almost continuously for over 20 years. It was quickly recognised by the Committee that his spirit of enterprise would be reflected onto the Club and assist in its attaining the prominent place in British Gliding that it now holds.

Derek's leaves of absence for film making were an opportunity for him to satisfy his instinctive desire for new experiences; yet his boldness has ever been tempered with the cautious pre-planning essential to achieve success. This point is particularly well evinced in the fifth chapter "A Game of Chicken" which describes the apparently terrifying event in the "Blue Max" film when he was challenged to fly through a narrow railway bridge.

But in a later chapter he admits that he has had some luck on occasions which could have been fatal. This reviewer having also had the alarming experience of a flying control jamming in flight, can vouch for the "mental discomfort" which may persist, as Derek says, for several days.

Derek Piggott has been friend and counsellor on flying to innumerable glider pilots. His books on the art are standard works which will endure long after his inevitable destiny. Meanwhile, he is still young in heart and spirit and there is time for many more adventures which may, hopefully, be recorded in a sequel to this book - which should be in every pilot's library.

GODFREY HARWOOD

Gliding and Soaring by Bill Scull. Published by Pelham Books, London. Price £3.20. Available from BGA at £3.70 including p&p.

There can't be many people in the world who have written as many words about gliding in the last eight years as Bill Scull. Our Senior National Coach's advice to CFIs, instructors - and those of us who just want to fly solo more safely - has appeared in numerous BGA publications, including of course his regular Coaching Corner column in S&G. Now, for the first time, Bill has written a book for a commercial publisher. And a very useful and attractive guide for beginners it is too, with plenty of diagrams and well-taken photographs.

Gliding and Soaring is a basic primer aimed at the reader who is about to take up gliding or who has started to have practical instruction. Its 64 large-size pages cover succinctly all aspects of the principles of flying gliders up to the solo stage. The latter chapters deal briefly with soaring and flying cross-country, though this book is not worth buying if that is your sole interest. An appendix illustrates the development of gliders from the Tutor to the Kestrel - which happens neatly to span the range of solo gliders in this reviewer's logbooks.

One small complaint: there is no index and the list of contents is inadequate considering the unorthodox order of the chapters. (For good instructional reasons launching *follows* landing).

Bill Scull's 17 years' experience, first as a club instructor and then as a National Coach, means that he understands very well the problems most student pilots have. But his readers also benefit from all the feedback that Bill has had from the BGA accident reports over the years. What better background can you ask of an author who tackles this subject?

ROGER BARRETT

Accidents to Gliders - 1976, a summary of BGA Accident Reports by the Safety Panel. Published by the BGA at 60p, including p&p.

With a slight hiccup in 1974 the number of launches carried out has been rising each year from 268170 in 1972 to 348817 in 1976. Unfortunately the accident rate has not improved at the same time, and in fact after a downward trend in 1974-1975 the rate is now increasing again.

The Review lists all the reported accidents to BGA gliders (not RAFGSA) and gives a thumbnail sketch of each incident. It makes interesting reading and, as Bill Scull (Senior National Coach) says in the section dealing with spinning accidents, "if anyone says to me 'my glider isn't one of those, so I'm all right' then I despair". This refers to the fact that spinning accidents occurred to more than 30 different types of glider in the period from 1965-1976.

In a section called Safety with Ease, it is suggested that accident prevention should be tackled with the three "Es" - education, engineering and enforcement. Education includes instruction, reading, warning posters, etc. Engineering covers both the aircraft and equipment as well as environment engineering - filling in old ditches and other glider traps. Enforcement refers to observance of operational regulations, good airmanship and good groundmanship as well.

All in all this publication is well worth its price and I recommend everyone to read it and give it careful consideration.

B. H. BRYCE-SMITH

CLUB NEWS



A K-4 comes in to land in front of the Benbecula airport terminol buildings. It is one of the two gliders owned by the newly formed Greylag GC on the Isle of Benbecula, Outer Hebrides.

Copy and photographs for the August-September issue of S&G 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 15 and for the October-November issue to arrive not later than August 17.
April 16, 1977

GILLIAN BRYCE-SMITH

BIRMINGHAM UNIVERSITY

The AGM saw the retirement of Alan Staton as Chairman, though he continues as senior instructor. Alan had presided over the club for its eight years existence, guiding it latterly through a difficult rebirth after the dissolution of the association with Aston University GC (now amalgamated with Stratford-upon-Avon GC) late in 1975. The club increased greatly in strength and activity during Alan's last year despite many operational problems.

We welcome our new Chairman, Colin Clark. During his previous office of Treasurer, club funds grew healthily into the black. We also welcome our new Treasurer, John Neal, and are pleased that Geoff Brown's Secretarial, catering and home-baking talents will be at our disposal for a further year.

We operate at Long Marston on Saturday's with Wednesday afternoon flying starting again in the spring. Our T-21 provides sound basic training and there are plans to buy an early solo trainer. Funds in hand and promised loans augur well for the project.

Last year our youngest member went solo soon after his sixteenth birthday whilst his father, Paul Sainsbury, won the club award for the 1976 best (if shortest) cross-country flight.

Dennis Johnson missed his five hours by only a few minutes. Two pilots have passed Bronze C papers and our winter programme of films, lectures and social events were given enthusiastic support.

During the winter we had a "dawn patrol" to start Saturday flying at 8 am to extend training hours. Our thanks to the instructors, particularly Gary Print and Roger Matthews.

G.H.H.

BLACKPOOL & FYLDE

More than 70 members have been working on our site through the winter, levelling bumps and draining two minor problem areas. This has put the field into good shape for long term intensive operation. The dining room has been furnished with alcove tables and given a smooth floor, which completes our initial development. Central heating is being installed, and we look forward to starting to make bedrooms.

Gliders and equipment have also been overhauled. Our silent flying needs the support of eighteen diesels, for winches, tractors, vans, diggers, dumpers and 'dozer. This has become too much for an amateur foreman, so keen members have undertaken to check the health of their favourite engine every week, and keep log books.

At Easter the Vintage Glider Club brought a Kranich, Grunau and Tutor to join our own T-21, Rhönlerche (K-4) and Olympia. Soaring was achieved on all four days, with hill soaring introductions in a gentle north-westerly. The Tutor scorned both the hill and the forecast (weak thermals, freezing level 2000ft) and shot up to cloudbase at 4800ft.

K.E.

BOOKER

Past reports have been under Wycombe Air Park, but in future we will go under Booker as it is the name of the airfield from which two gliding clubs operate. Thames Valley, with 275 members, and Airways, with approximately 225 members, own and operate a combined fleet of four K-13s and ten single-seaters. There are about 30 privately-owned gliders.

A team of professional instructors under CFI, Chris Rollings, operate throughout the year with three tug aircraft. We have ten members with all three Diamonds and many more with two Diamonds.

A new glider which will be the focus of considerable attention – a Jantar 2 – is being delivered to Steve White this month. Our Regionals will be from July 16-24.

M.H.B.P.

BORDERS

Flying continued throughout the winter in spite of the sometimes appalling surface conditions – it reminded us how four inches of snow can improve landings!

There were a series of lectures on flight safety and navigation, culminating in one by the Boulmer rescue helicopter crew which gave food for thought on outlandings in inhospitable terrain.

Charles Donaldson has taken over from Colin Golding as CFI and is proving a worthy successor. Colin, who came as a temporary CFI in 1971, was presented with a suitable inscribed tankard at the annual dinner. Fortunately he will remain in the club and his expertise on the C of A front won't be lost. John Turnbull has joined us from the RAF Wattisham Club and is a welcome addition to the instructors' roster.

Winter wave wasn't up to usual standards, but there were several good flights and the thermal season has started early.

Plans are pushing ahead for our hangar at the west end of the airfield and it is hoped to start construction in early May. There are plans for another open day in June in conjunction with the Milfield Youth Week.

G.N.

BRISTOL & GLOUCESTERSHIRE

The soaring season well and truly started during the Easter weekend with several cross-countries. With the frequent northerlies, our ridge has been well utilised with a strange cross-section of gliders beating to and fro – Tutor, Scud 2 and Kestrels.

Our AGM is planned for mid-April and a major change of personalities is anticipated. A task week from June 4-12 has been set-up for those who want a week's serious flying without the trauma of fully fledged competitions. Weather forecasting has been laid on together with task setting by Chris Hughes and Howard Johns.

The club fleet looks healthy again with the three two-seaters back and the rebuilt Swallow about to fly (this time I really believe it is!).

One note of sadness recently has been the news that Tony Gaze is leaving us for down-under. Tony has been with us for many years and the times he and his faithful Rallye "Victor Juliet" have come to our rescue are too numerous to count. Our most sincere thanks to Tony and best wishes in the future.

R.A.R.

CAMBRIDGE UNIVERSITY

On March 12, Steven Longland opened the cross-country season with a damp squib of an undeclared (completed) 136km triangle. Cross-country flying then paused until April 3 when several triangles were flown, the most sterling being Colin Dews' 420km of a declared 500 triangle.

We have done our annual splits and are operating again from our two sites, Cambridge and Duxford. Work has also been proceeding on the design of a new winch and the usual game of musical aeroplanes has been played, with syndicates dissolving and reforming with mind blurring impropriety. Work is also proceeding apace on the rebuilding of our venerable Olympia 2B, which landed in a cement works pit.

Our congratulations to our second 16 year-old to go solo this spring, John Evans. He climbed to 2788ft on his first solo flight in the T-21 and later converted to the Swallow.

S.N.L.

COTSWOLD

The soaring season is well under way with several cross-countries attempted. Tim MacFadyen landed about three miles short of Aston Down on a 300km attempt in his new SHK. He didn't realise the wind had changed direction on the final glide. The Easter weekend saw the first completed 300km achieved by Larry Bleaken (Kestrel).

Five members recently went on an expedition to Portmoak and had plenty of flying. David Dimmer, who has at long last taken his Bronze paper, achieved Gold height.

P.G.

COVENTRY

The soaring season is in full swing with Nick Hackett snatching the first cross-country again. Most of the pundits have now achieved their first of the season. The others are pulling out their hair in frustration, waiting delivery of new gliders.

The first of our year's events is on June 5-6 – the Traction Engine Rally when once again we hope to have bumper crowds filling the airfield. The club task week will be the last week in July and, of course, we are staging Euroglide 1977 the last week in August.

Jubilee Year is also the Silver Jubilee of the CGC and we will be holding a special party later in the year to celebrate 25 very successful years.

C.T.

DERBYSHIRE & LANCASHIRE

We have had some reasonably thermic days already, plus our first good wave in early March which gave a Dart 17R a climb to 13000ft.

Eric Boyle, our new CFI, has taken over from Dave Pillans, who we thank for all his hard work and for his efforts to successfully offset changes which were to have been made in Amber I, and Amber I East in the vicinity of Camphill.

It was good to have our President, Basil Meads, with us at the AGM in April. During the proceedings he presented the awards. Alan Beckett gained the Camphill trophy, John Humpherson the Jubilee cup, John Shipley the Eustace Thomas trophy and Don Hatch the Mensforth trophy. Peter Ibbotson, for all his flying and hard work on the winches, collected lots of silverware, the Meads trophy, the Chairman's prize and the Mugs trophy.

Now that our new Steward and Stewardess, Sam and Katy have settled in, we hope that they will be very happy with us. Finally, a change of dates. The Vintage Glider Rally, arranged at Camphill for the first weekend in October, will now be on October 8-9. We hope to welcome as many aircraft, pilots and spectators as possible.

C.D.R.



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DEVON & SOMERSET

The soaring season is well under way at North Hill with several new pundits' names to be added to the list. Chris Miller used the K-8 to great effect by completing his two half-hour Bronze C legs within 12 solo launches. John Burrow took the Dart to 8500ft on April 3, a total height gain of 7500ft plus, and Dave Reilly made a modest start to cross-country flying with 70km on the first day of nearby Yeovilton's task week.

About 50 club members attended a dinner and disco. Many thanks to Chris Slade for organising the evening, Carl the chef and Kevin Jenkins for the music.

M.G.P.

DONCASTER & DISTRICT

Apart from the Sunday, Easter weekend was a bubbler as far as thermals were concerned. First and second Bronze legs were gained by Peter Woodcock and Peter Armstrong whilst Martin White gained a Silver height with Geoff Singleton and Ken McGregor flying their Silver distances.

The all-important public inquiry into the future of our airfield started on April 19 so we shall report more fully in the next issue. The club now owns two tugs with the recent acquisition of a Scheibe Sperling to partner the Super Cub.

Our big news is that our CFI, John Stirk, a founder member has retired after nearly 13 years. He remains in the instructors' team and will no doubt find more time for his personal gliding goals in which we wish him every success and happiness. His place has been taken by Jack Sharples to whom we extend a very warm welcome. Jack started gliding in the ATC at Rufforth in 1948. He joined Doncaster in 1967 and became an instructor four years ago. He has a Silver C and a PPL.

P.Y.

DUNKESWELL

We had an enjoyable but cold Easter weekend with some good soaring flights, including one of 55min by the newly delivered Swallow owned by a four-member syndicate. Congratulations go to Julian Pearson who soloed the weekend following his 16th birthday. The demand for aerotows continues to rise, which keeps our Beagle busy, and Dave Bindon continues his repairs to the T-53 which he hopes to complete by mid-summer.

A.C.P.

EAST SUSSEX

A bitter lesson was learnt by Doug Gardner during the club's week at Sutton Bank – he reached Gold height twice in one flight but forgot his barograph.

The Yorkshire trip was most successful. A Gold height was gained by Peter Gresham and there were two durations, a Silver distance and five Bronze legs.

Several members have gone solo during the winter. We have recently obtained a hangar which is being erected and, hopefully, this could represent the first step in our plan for aerotowing. Our second annual dinner-dance was on March 18 and well supported by members and friends.

D.E.C.

ENSTONE

Our task week, organised during the Easter holiday by John Halford, was a fantastic success. Hundreds of kilometres were flown by members and our visitors from Hinton. Talks were given by John Delafield and Derek Piggott, Derek also flying with us for a few days. At the disco at the end of the week prizes were presented by Roger Barrett, Chairman of the BGA, to Paul Lees (Enstone) and Malcolm Lassan (Hinton).

M.W.

ESSEX & SUFFOLK

From the seemingly simple task of trying to obtain planning permission for our new prefabricated clubhouse (as reported in the last issue, p85), matters took a serious turn for the worse. It seems that we never had permission to operate from our site. This was in spite of the fact that we are listed in the official District Council guide as one of the attractions of the area.

The planning sub-committee actually recommended refusal of the club's application to continue operations from Whatfield; however, after two anxious weeks, a lot of intense lobbying and some wonderful help from local residents, our site and club were saved.

Our first gliderborne visitor of the season was in mid-March when Terry Bramford, flying the Kent GC Skylark 4, came from North Weald. We have had some good early soaring, though it has meant dodging the odd blizzard.

Congratulations to Angus Macdonald on gaining Silver height and duration at Portmoak in the club K-6. Rus Richards managed several good wave climbs in his Std Cirrus. Ann Winterbottom has flown two Bronze legs in the new Syndicate K-6CR.

C.C.S.

KENT

The year got off to a bad start because the mud at Challock stopped us flying until March. During this period our Blanik was based at North Weald and our thanks to the Essex Club for keeping some of our members flying.

Unfortunately our new twin-drum winch, being built by Glyn Richards, isn't quite ready for the start of the courses, which are heavily booked. However our old winch is still working well. To add to our problems the Super Cub has been u/s since December, so we have bought a 180hp Jodel as a second tug.

At present we are running an instructors' course for Mike Kemp, Dave Millar, Paul England and Dick Whittington. If they are successful we will have 35 instructors on our rota.

C.B.

LONDON

At the traditional Dunstable Easter Competition fresh new thermals were uncorked to inaugurate the 1977 vintage. Tasks were completed on three days out of the four. The largest, 240km, was won by BGA Chairman Roger Barrett, who set aside his hot air balloon for a change and sped unerringly through the snow, sleet and ice in his Kestrel. This writer is spreading the rumour that propane burners were secretly blowing holes in the blizzards that tormented the also-rans. Winners in class B were: 1, John Whittle/Malcolm Humphries; 2, Peter Davie/Peter Banting and 3, Geoff Lines/Barry Moore/"Shev" Sheveralls, the last-mentioned team also taking the two-pew pot. Class A: 1, Mike Bird; 2, Geoff Love and 3, Morris Clarke. Thank you for organising yet another frozen-footed fly-in, Dilys and J-J!

After 13 arduous years Tom Zeally is stepping down as club Chairman. A club of this size is a major enterprise, demanding great sacrifices of time and effort by whoever is in the chair. The LGC reports itself in good shape in all respects from fiscal solvency to flying zeal (sorry about that one). A truly big thank you, Tom!

M.B.

MIDLAND

Awards and trophies were presented at the annual dinner as follows: club ladder and Siam (longest flight), Don Brown; Tim's triangle, Chris Aldiss: Long Mynd cup, Rob Cook; the Sheffield (best height), John Brenner; the Hardwick (longest out-and-return), Bob Scarborough and the Neill cup (best *ab-initio*), Steve Allsopp. The two-seater cup went to Bob Scarborough and Ron Hayes, and Bob also shared the cup for club effort with Vic Teague. Two more pots are to be competed for, the Pat Moore trophy for the first (declared) cross-country of the year and the Argent cup for the best Silver distance.

It was convenient and enjoyable having the BGA Weekend at the bottom of the hill in March. We only wish we could have had some better winds for the many visitors who came to the club on the Sunday. The frequency and strength of wave in recent months has been disappointing, but Easter gave two excellent days with off-the-clock thermals.

The club fleet, smart again after winter fettling, is again complete - three K-13s and, for the time being, three K-8s.

W.J.T.

NEWCASTLE & TEESSIDE

With a course about to start, we are keeping our fingers crossed for a season to match last year's when John Stout and Peter Lloyd gained Gold height in wave above the site, John eventually raising the club height record to 15800ft asl.

Wave soaring has always been a regular feature of Carlton flying and with the use of a tug it can be more fully exploited. Diamond height gains being a distinct possibility.

Numerous Bronze and Silver legs have been flown, Dave Hodgeson has completed his Silver

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C and first solos were by June Turner, Mark Stokeld and Alan Jones.

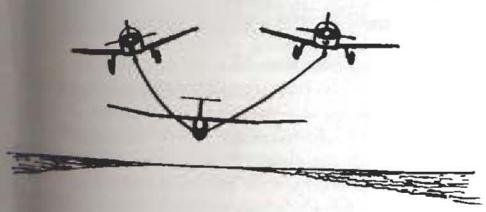
Twelve members of the Cranfield Club visited us in September with their gliders and we hope to see them again soon. Anyone wishing to visit us would be most welcome, but please contact the Secretary, G. M. Turner, at 13 Teesdale Avenue, Billingham, Cleveland.

G.M.T.

NORFOLK

We didn't fly at Easter – we went fishing instead. Apart from catching a few trout, we also "hooked" a few potential new members at our fun weekend at Robin Combe's fish-farm, where we had static and flying displays. Another good publicity opportunity is planned for July when the Sports Council has invited us to hold a "try-gliding" weekend during Sport for All Week.

"Avato," our aerotow "club-within-a-club", now owns two Condors which are operated to suit servicing and check requirements.



One Rallye and four gliders. So what! (Norfolk GC)

A recent innovation which has proved very popular is the briefing pack for new members which contains a logbook, Laws & Rules, airfield plan, car sticker, etc.

Bill Scull paid us a visit to discuss the situation in regard to Falke training, with particular emphasis on practice field overshoot dangers.

C.E.H.

NORTHUMBRIA

We wait equally hopefully for thermals and Sports Council grants. We trust both will arrive and that our soaring season will see us launch a new clubhouse as well as a record number of gliders.

A feature of our Jubilee programme is to take part in "Recreation Spotlight," a Whit weekend exhibition organised by Newcastle's recreation department. We plan a display of our gliders and to give general information on the facilities we offer.

We have had such a good response from new members turning up for instruction, there is a temporary halt to new membership to prevent the list growing too long. However increased aerotow facilities should improve the situation. There are still some vacancies for our courses.

R.R.H.

OUSE

Two more syndicates have been formed, bringing a Swallow and a K-7 to the field. Congratulations to Helen Beard on completing her A and B certificate and to Graeme Bennie on his Bronze C. Evening flying has started again with the usual good turnout.

J.G.

OXFORD

Our new Astir, financed by members' shares and by the Sports Council, arrived shortly before the Easter holiday. It first flew during that weekend, thanks to some speedy work on the instrumentation by CFI, Peter Brooks, and others. With five club aircraft, we are going to be even more dependent on the participation of our members, not only in maintaining the fleet, but merely in utilising each machine sufficiently to cover running costs. Therefore we are hoping for another good season ahead.

We had a social evening during April, with a talk by Bernard Fitchett, cheese and wine and a short film. Graham Barrett attended an instructors' course at Enstone, and our most recent first solo was by Martin Oldfield.

P.H.

RATTLESDEN

Our first annual dinner was a success and we hope to hold more social evenings throughout the year. Plagued, as we were, by squally snow showers over the Easter, we still managed a reasonable rate of launches. Terry Brooker now has his inspector's ticket and is able to take over some of the C's of A from Ralph, allowing him more time to finish the K-2. It should be "in service" by the time this is printed.

C.L.

SCOTTISH GLIDING UNION

Our wave is back after the barren days at the beginning of the year, together with a dry airfield and plenty of thermal activity. A Diamond goal and height in one flight was achieved recently with at least one other 300km triangle and a few Silvers.

Jim Wales' building crew have finished the briefing room and as virtually only tidying up remains on the new offices, there are meditations on possible clubhouse improvements. There was a successful pilot trial of the first of the new winches by Tony Shelton and Al Murray, with work on the second well under way. John Henderson continues his sterling efforts on reconditioning the more mundane equipment.

All this augurs well for the coming season and hopes are high for the open day on May 22 and the Regionals in July.

R.H.

SLEAP

Early spring has ushered in the soaring season with some excellent thermal days at Sleap and numerous triangles have been completed. The usual wave, however, is not up to our expectations. We are looking forward to early June when a contingent of five aircraft, the Kestrel, Std Cirrus, Jantar, Std Libelle and K-6, will take part in Competition Enterprise.

At our AGM in February we learned with regret that Vic Carr, our CFI and Treasurer, had resigned because of a pending move away from the area in connection with his job. Many thanks, Vic, for the sterling work unstintingly carried out and for your help and encouragement to the less experienced.

Ian Paul remains as our Chairman and Secretary with Ron Rutherford as Technical Officer; Barry Bates, Treasurer and Alan Levi, Safety Officer. The position of CFI is yet to be decided.

Our full complement has now been reached and in addition to the five gliders already mentioned, we have the following machines: Hornet, Sky, K-13, Dart 15, K-6 and Skylark 4 with a PIK 20 expected shortly.

D.V.

SOUTHDOWN

The BGA must have some eminently qualified people in charge, for they have had the excellent sense to ask our own Treasurer, Joan Cloke, to become the BGA Treasurer. Les Allard, our popular and capable Chairman, also becomes our President.

We have had a number of events to brighten the dull rainy days. At the AGM a highly successful year's gliding and club progress were recorded and trophies were awarded, Chris Backwell taking two and "Boffin" Plunkett and Jim Rochell one each. A new cup was the "hog of the year" award, this dubious distinction going to Brian Bateson.

A remarkable turnout recently enabled working parties to lay the foundations and erect the skeleton of our "new" transport hangar, due greatly to the untiring efforts of Chris Berry.

On the flying side, a syndicate Astir has arrived and is so popular there are plans for the same group to buy a Twin Astir.

An electrifying incident happened at the launch control van when umpteen thousand volts shot from the telephone cable and transported a member several yards as soon as he touched earth – moral of the story, alway ensure your winch is properly earthed.

B.A.B.

SOUTH WALES

The start of our soaring season has been delayed by the excessive length of time being taken on our tug C of A. The spares supply problem for Rallyes is of great concern as this is the second time we have been affected by the delay in obtaining parts. Typically, wave always appears in the sky when there is no method of reaching it.

The site's syndicate gliders have grown in number by the addition of a Cobra and an IS-29D.

J.D.S.

STAFFORDSHIRE

Over the winter and early spring, wind, rain, snow and cloud acted either singly, or in combination, to prevent us flying on nearly every available day. However, Bob Wilshaw's buffet, on March 5 did a lot to revive club spirits and provided welcome funds.

A new ground equipment maintenance team has been formed under the leadership of Roy Mountford to try to sort out some of our mechanical problems.

B.J.M.

STRATFORD ON AVON

The AGM on April 1 was well attended indicating a healthy interest in the club's future. Andy Coffee continues as Chairman, Mike Coffee was elected Treasurer, Geoff Knight is back on the Committee after a short respite and Bob Abel was re-elected. Our thanks to all these

stalwarts plus Secretary, Bernard Poole, who contributes so much behind the scenes.

For the first time various cups were awarded for flying achievements during 1976 – Jim Tyler, Gary Print and Iain Murdoch clearly deserved the top positions on the club ladder.

A club buffet and social evening was very successful, particularly as the proceeds from a mock auction cleared our debit for the club barograph and gives us a surplus for other equipment. The new diesel automatic towcar is now virtually complete and should be ready the week after Easter.

H.G.W.

SURREY & HANTS

Easter was soarable on all four days with over 400km flown by Alan Purnell on Good Friday in his new Nimbus. Minus 7°C greeted us on two mornings and with the unstable air plenty of snow showers resulted, making a grand sight from 5000ft with the good visibility. All our fleet is now flying and the Astirs are proving very popular with some amazing performances clocked up already.

It's as well April perked up a bit as March was awful with flying limited to only 20 days. This is being written on what looks like the first 500km day of 1977 – the scramble to rig and shovel things out of the hangar is very reminiscent of last summer.

C.L.

TRENT VALLEY

Our winter gliding suffered considerably because of adverse weather conditions, not least being the fact that the River Trent became Lake Trent. Although our airfield wasn't affected, various club members found that instead of a 25 mile round trip to the site they either had the choice of a 70 mile journey or of covering part of the distance by boat!

Our annual dinner-dance and cup presentation was as usual most ably organised by Fluff (Georgina Sewart) and with few exceptions our Chairman, John Rice, swept the board. Peter Fillingham won the cups for the longest flights in both a club single-seater and a club two-seater; Bob Parker the cup for the highest points in the Bronze C paper and Bill Harrison the CFI's cup for endeavour and perseverance.

Our new winch is in use, thanks to stalwart work by Neil Rodgers, Bob Baines and their helpers, and we look forward to those summer days when we are operating our two twin-drum winches. New gliders have also appeared – Norman Jones and Peter Gascoine (deputy CFI) have progressed from Skylark 3 to SHK; the Baines/Holland/Parkin syndicate have changed their K-6 for a Std Libelle and a K-8 replaces our club Swallow which met an untimely end. We are pleased that Martin Bontoft is on his feet and making a fantastic recovery.

J.P.N.

ULSTER

A long winter grounding for a C of A and major engine job on the tug, a Capstan respray and the re-skinning of its trailer, among other tasks, ended on April 3 when a few launches were flown as a shakedown for an Easter expedition to St Angelo – our second safari to the lakeside airfield in Fermanagh. The intended week was washed out by rain and gales on the Tuesday and abandoned, but not before some intensive, though non-soaring, flying had been done on the first three days. Secretary, Bob Rodwell, took a long upwind tow to investigate the stupendous Lough Navar ridge in an apparently dead-cert northerly – the first time the ridge had been flown in a sailplane – only to sink ignominiously and rapidly into a handy field.

We have reserved a delivery position for a Twin Astir in the hope of inducing the Sports Council to pick up half the bill. The faithful Blanik is up for sale after splendid service, together with the Skylark 2, hopefully to raise our piece of the action.

Prospects for a permanent site on the north coast in the Magilligan area have brightened recently. Provision for a gliding site, hangarage and basic overnight accommodation have been written into a projected £3 million tourist amenity scheme professionally prepared for the local authority and now up for government backing.

Meanwhile, we are opening negotiations for a secure lease of a suitable field below the ridge and a safari is being planned to run some proving flights from the potential site.

On the social front the club now promotes a monthly jazz night at Newtownards as a fund-raiser; the annual dinner was scheduled for April 22 and instructor Billy Craig carried off Dublin GC's Mary McCormack into wedlock on February 26.

R.R.R.

VINTAGE

The Vintage Glider Club have their second rally of the season from June 3-7 at the Aquilla GC, Hinton in the Hedges airfield, Brackley, Northamptonshire, with the third rally in July. This will actually be at the fifth International Vintage Glider Rally at Münster from July 9-17.

Russavia Collection.

Grunau Baby 2B (RAFGSA 281) joined us in late February for future restoration, but the Kranich rebuild is temporarily held up while a cracked wing-root fitting awaits repair.

Airline engineer Ronald Lake, and son Richard, are recent recruits so that, hopefully, before long we shall be self-contained in all aspects of inspection and certification of our restoration work on both the gliders and the tug. Our first outing as a group will be the Audley End "fly-in" on May 15, taking the Petrel.

Incidentally, if anyone has old photographs or negatives of any of the gliders collected (listed in this column in the last issue, p87), the loan for copying would be much appreciated, addressed: c/o Glider Collection, Building 63, Duxford Airfield, Cambs CB2 4QR.

M.C.R.

WOLDS

The first three months of 1977 have been unusually active because settled weather has enabled flying to continue without interruption. Bill Young has taken over from Sue Acey as Treasurer and Laurie Johnson has the newly created office of Fund Raiser and Publicity Officer. Laurie was spectacularly successful in arranging full press and TV coverage when his son Grant went solo on his 16th birthday. The BBC North TV film showed Pocklington at its best in the winter sunshine.

Congratulations to Malcolm Gibson and Ian

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Chamberlain on their A and B certificates. Ground Engineer, Colin Milner, has modified the winch to secure the batteries. Hopefully the hernia hazard of carrying batteries daily from the clubhouse is now over.

The faithful Condor has been sold and we await its replacement with some impatience. The K-7 has been overhauled and is back in service after inspection by our CFI, Bob Fox, who is now a qualified inspector, and we welcome a new Pilatus owned by Byron O'Neill and Brian McFadden.

G.H.H.

Service News



A few last words from CFI, Tim Baldwin, of the Greylag GC before taking up Dougie Braid on an initial training flight.

BANNERDOWN (RAFGSA)

With a few good soaring days and the Portmoak expedition behind us, the club has already had solo, Bronze and Silver badge achievements. Most noteworthy are Anne Jones, Chris Bunn and John Pirquet with Silver legs; Ian Hazel and John McQuade with Bronze legs and an A and B from Callum McCall.

The "Flying" Darbys make the news with Cary achieving her assistant rating to become the first female instructor in the club, and Keith taking his Silver distance in complete comfort – wearing his bedroom slippers!

Sadly we say goodbye to Roger Crouch who has been CFI at Bannerdown for three years, and wish him well in his new posting. We welcome Jock Wishart as our new CFI (you know – the one with the funny accent!).

J.J.H.

BICESTER (RAFGSA Centre)

At our AGM we were told that cross-country kilometres in 1976 were the highest ever, up 40 per cent on 1975. However for a large club the amount of cross-country flying was very small. To encourage us, John Delafield has presented a tankard to be awarded annually for the most meritorious 100km triangle flown in a club glider. Rick Horst was the first recipient.

The problems involved in keeping our fleet of Chipmunk tug aircraft airworthy were highlighted at the meeting. The cost of re-lifed Gipsy Major engines has risen to about £3000, so serious consideration is being given to fitting a Lycoming engine to a second Chipmunk. The original Supermunk is continuing to give good aerotows, even to John Delafield's Nimbus 2 fully laden with waterballast.

The re-engined Tost winch is now in service. The engine came out of a heavy lorry and has a more flexible torque-speed curve than the industrial unit previously fitted. Launching a T-21 on a nil wind day used to be a problem, now thankfully overcome. However, even experienced winch drivers have been disconcerted to find that the clutch is disengaged by pulling instead of pushing the lever. Ron Newall has commenced a similar conversion of our other winch.

Roger Crouch has joined the Centre staff for a month before being posted to Dishforth where he is expected to become CFI. He is being given a crash course to obtain a PPL and train to be a tug pilot.

The RAFGSA has ordered six Astirs. Ours was the first to be delivered. Don Hanson and George Young went to Germany with a large trailer and brought back the next two.

The Astirs are being equipped with identical instrument panels because competition pilots are often allocated aircraft from other clubs in the Association.

T.C.H.

CLEVELANDS (RAF Dishforth)

We have more changes in our club appointments. We say farewell and thank you for a splendid job to our Chairman, Cdr Turpin, and welcome in his place Sqd Ldr Brown of RAF Leeming who is Chipmunk Standards Officer. A big thank you to Gordon Hunter for standing in as CFI at Bannerdown GC. Dick Parker becomes our Tug Member.

Thanks to both Hambleton and Clevelands members, the bus engine is again serviceable and the fuel bowser engine has been serviced. Beryl Abbott and Stan Purdy have completed Silver distances to Doncaster with a marginal distance by Pete Bates.

J.A.S.

EAGLE (Detmold)

An exceptional spell of fine spring weather has given us four weekends of good soaring, and has dried our normally soggy airfield well enough to start winching early this year. We have broken all records for hours, 108 recorded for four weekends' flying – not bad for March! We have had some cross-country attempts – notably Andy Harkins' 35km attempt at 50, qualifying for first field landing of the year. John Harrison completed his five hours.

Thanks are due to Karen Shelock and her team of energetic helpers who redecorated the clubroom. It now looks too smooth for a gliding club bar.

Farewells and best wishes for the future go to two of our instructors, Dave Shepherd and Marion McCay, who are posted back to the UK and are getting married as well. Perhaps they have something in common!

M.A.H.

FOUR COUNTIES (RAF Syerston)

March 12 was our first good soaring day with Hamish Brown completing an out-and-return to Cosford and Dave Caunt landing short of Silver distance, a task he and Pete Steward and Tim Brailsford completed later. Tim now has his Silver C.

We are again represented in the Inter-Services, the Nationals and Euroglide. Finally, our congratulations to Terry and Maggie on their marriage. They are leaving the RAF but not the Skylark.

I.Mc.

GREYLAG (Benbecula, Outer Hebrides)

Our inaugural meeting was in July of last year but our two gliders, a K-4 and a Prefect, did not arrive until February and March of this year. Both gliders were provided by the RAFGSA and the club is most grateful to the Association for its support. Although we are barely off the ground, so to speak, the membership stands at 50 and up to mid-April 450 flights were logged, 70 of them on one day. Our longest flight has been 24 min up to 2000ft from a 1000ft launch.

Flying conditions are not always perfect at this time of year as the wind speeds average 15 to 20kt, breaking up most of the thermal activity. However, the splendid effort of our CFI, Tim Baldwin, and the ground crews has enabled training to be carried out over most weekends. All the launches are by autotow from the main runways on Benbecula Airfield.

Since the flights started three pilots have reached solo standard and the Prefect is being well utilised by these lone fliers.

E.G.H.

KESTREL (RAF Odiham)

Easter produced some good soaring weather with several medium distance tasks flown and Bronze legs completed.

Congratulations to John Parker, Mike Reed and Jackie Pobjoy on becoming solo pilots and to Pam Davis, our Secretary, on being awarded the California in England trophy.

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Bob Bickers and John Foey are at Bicester on their assistant instructors' course – their addition to the instructors' roster will be welcomed. This season has seen an amazing influx of new members so we are hoping for more new solo pilots than in the last few years.

P.W.A.

PHOENIX (RAF Brüggen)

Phoenix has had two more successful expeditions – in February there was a wave soaring expedition to Issoire, on the Central Plateau of France, where Dave Malkinson and Bill Tootell gained Gold heights in addition to the expeditions' 40hrs wave soaring. Then in March Vennebeck Ridge was visited yet again. Dick Murray completed his Bronze, gained five hours and Silver height, Dick Shoebridge gained Silver duration and Ian Smith his Silver duration and distance. A total of 120hrs were flown during the five days, with tugging by courtesy of Rick Hesselwood and Tim Oulds. Congratulations go to Roy Twigg and Andy Deighton on going solo – Andy is one of our all too few Army members.

We are sad to say good-bye to a number of our members: Ian Hewitt, one of "the originals"; Bob Rae, long time bar member and instructor; Dave Malkinson, who is joining the RAF; "Porky" Woods, an enthusiastic full Cat, and Rick and Audrey Hesselwood. Audrey has maintained the high standard of our club magazine "Crosswind", while Rick, as full Cat and air member of the RAFGGA, has looked after us well. Many thanks to all.

M.T.

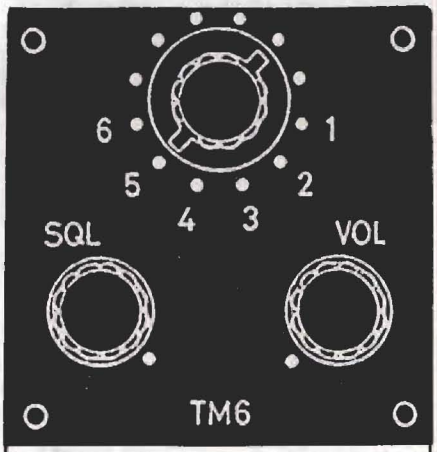
WREKIN (RAF Cosford)

Our Easter course was well subscribed, with two applicants for each of the 12 places, and an instructor available for each pair. Snow and high winds prevented us achieving the aim of six pilots going solo by the end of the course, but Gerry Frew and Nigel Readman flew solo on the last day, and John Russell followed shortly afterwards. On the last day the whole fleet was up in wave – topped by the Blanik above 7000ft, leaving only the T-21 on circuit. We were fortunate in having that aircraft available for the course, but its "major" had been completed in very short time by concentrated work organised by our aircraft member, "Polly" Parrott. He has become the expert in identifying cloud types, after completing a course in Met in Wolverhampton.

We are most grateful for a contribution of £160 from bus funds for the purchase of a barograph, which now gives us one per aircraft. We have welcomed Bob and Rosemary Leadbeater from Germany, and are particularly fortunate that Rosemary has taken over the running of the bus.

Finally, best wishes to Jane and Mick Lee on their wedding and many congratulations to our CFI, Chris Waller, and his wife Jan on the birth of a son, Andrew.

I.D.M.



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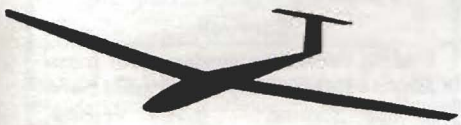
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ADVERTISERS' INDEX

Actic Plastics	142
Air Touring Services Ltd	117
Alton House Hotel	104
Anglo-Polish Sailplanes	106
Austin Aviation	127
Avionic Systems (Heathrow) Ltd	135
British Gliding Association	129
Bristol & Gloucestershire Gliding Club	144
Chiltern Sailplanes	101
Classifieds	142-144
Cleveland Sailplanes	136
Conder Group Services Ltd	112
Cornish Gliding & Flying Club	144
Crystal Engineering Ltd	140
Deeside Gliding Club	144
Derby & Lancashire Gliding Club	143
Doncaster Sailplane Services	Inside front cover
Eagle International	129
Glen Trading (Guernsey) Ltd	142
Glider Instruments	144
Gliderwork	144
A. W. Hanfrey (Sailplanes)	131
J. Hardy (Instruments) Ltd	136
Hugh Harris	143
J. A. Harrison (Brokers) Ltd	131
Herefordshire Gliding Club Ltd	141
J. Hulme	128
Humberside Aviation	117
JSW Soaring	143
Kent Gliding Club	141
Lasham Gliding Society Ltd	141
J & T Linee	143
London Gliding Club	141
London Sailplanes Ltd	108, 140
Mechanical Services Ltd	138
Mentor Radio Co	140
Merlin Aviation Ltd	130
Midland Gliding Club	141
Mowbray Vale Insurance Brokers	Inside front cover
John Murray (Publishers) Ltd	144
Norvic Racing Engines Ltd	142
Pelham Books Ltd	140
Precision Components Mfg Co Ltd	119
Radio Communications Ltd	142
REF Electronics	143
Sailplane & Engineering Services Ltd	131
Sailplane & Gliding	126
Schleicher Aircraft	114
Scottish Gliding Union	136, 141
Soaring Oxford	100
The Soaring Press	116
Southdown Aero Services Ltd	123
Southern Sailplanes	125, Back cover
Speedwell Sailplanes	109
Tec Weld	100
Thermal Equipment Ltd	131
Graham Thomson Limited	Inside back cover
Three Counties Aero Club Ltd	138
Vickers-Slingsby	102
Brian Weare	143
The White House	143
C. P. Witter Ltd	144
Wycombe Gliding School	141
Yorkshire Gliding Club	141

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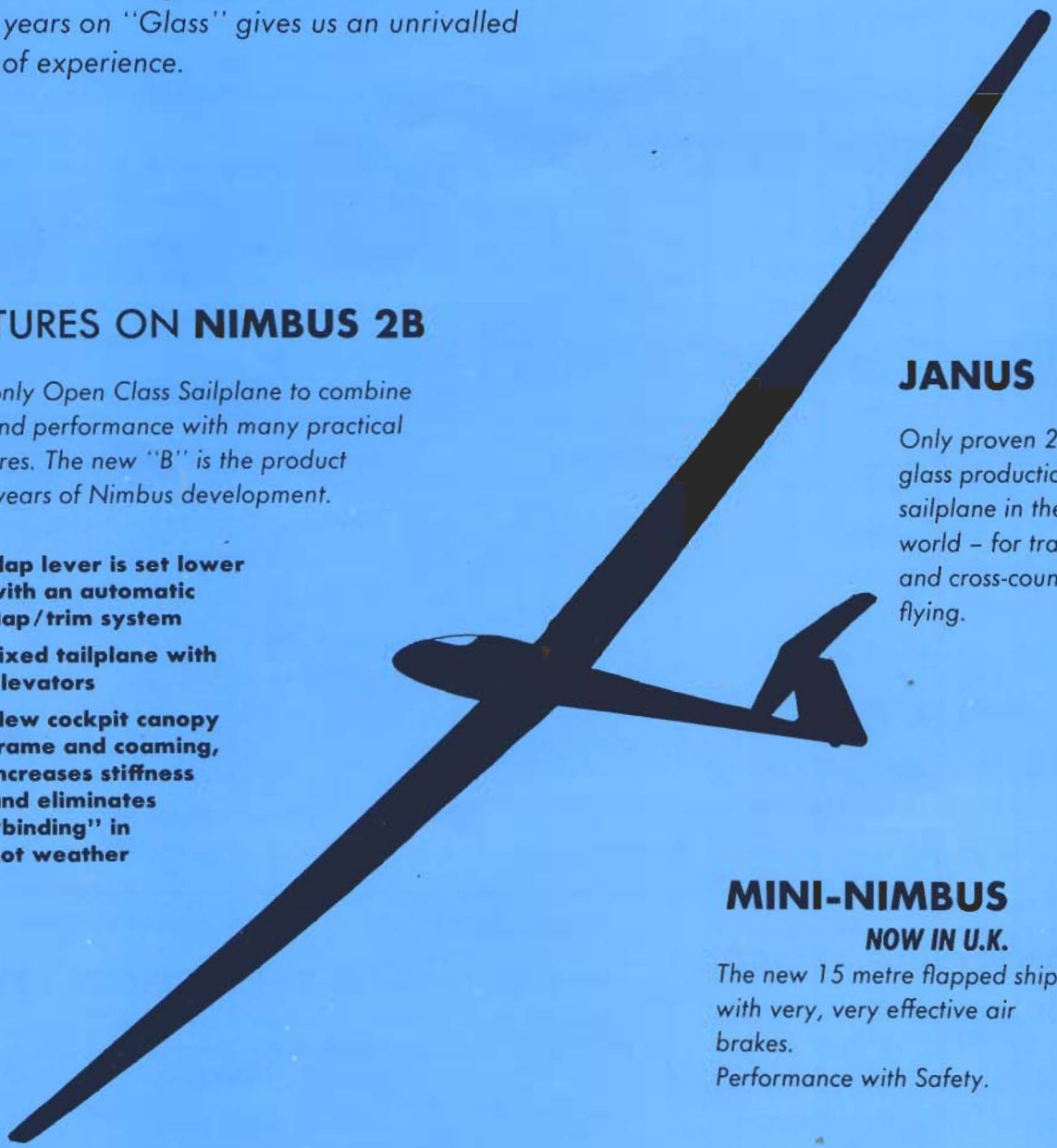
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