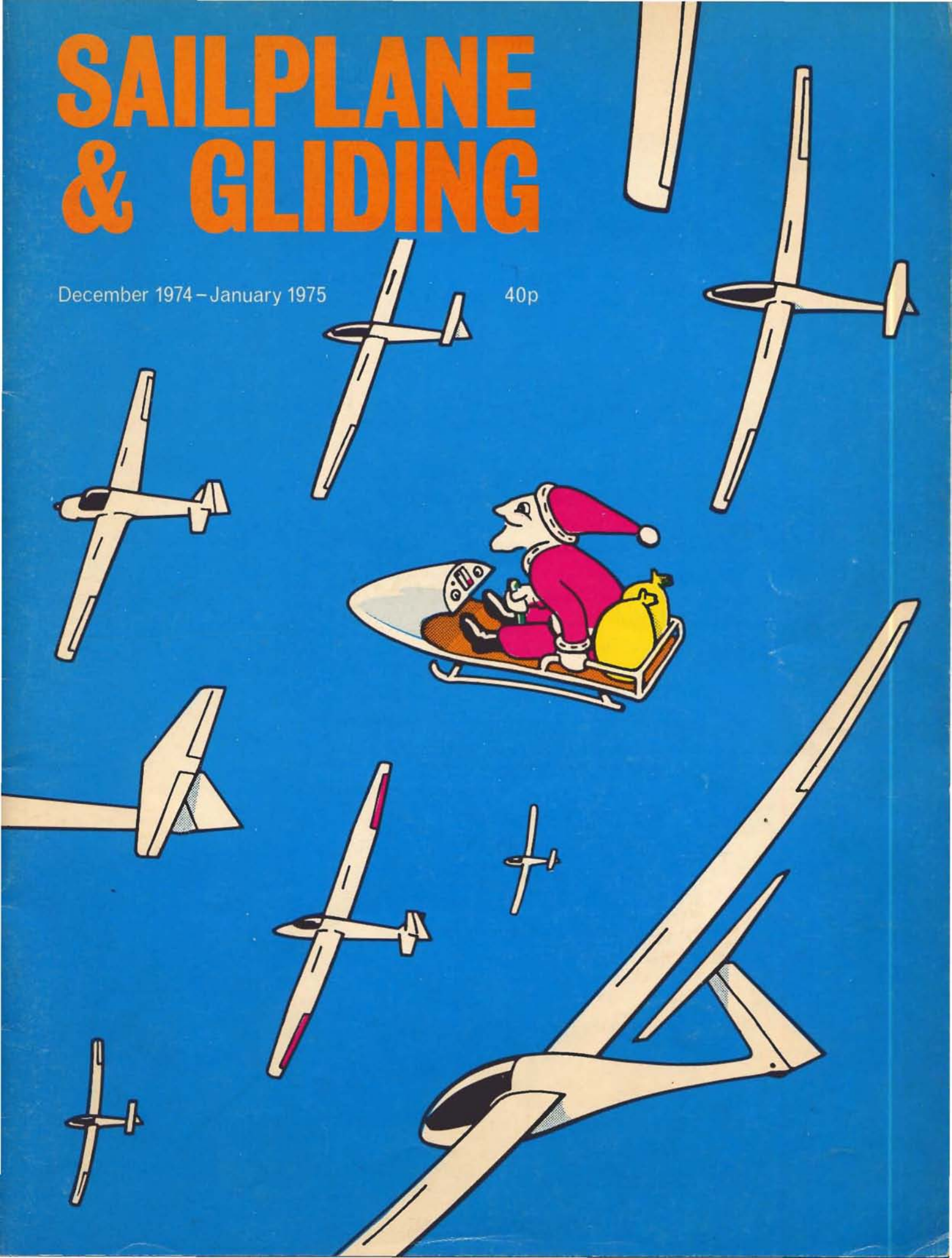
SAILPLANE & GLIDING

December 1974 – January 1975 40p



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SAILPLANE & GLIDING

Magazine of the BRITISH GLIDING ASSOCIATION

Editor:
Gillian Bryce-Smith, 281 Queen Edith's Way, Cambridge, CB1 4NH. Tel. Cambridge 47725.

Consultant Editors:
Alan Slater, Rika Harwood

Committee:
A. W. F. Edwards (Chairman), R. Q. Barrett, M. Bird, and P. A. Wills

Advertisement Manager:
Peggy Miéville, Cheiron Press, 8/10 Parkway, London, NW1 7AD. Tel. 01-267 1285

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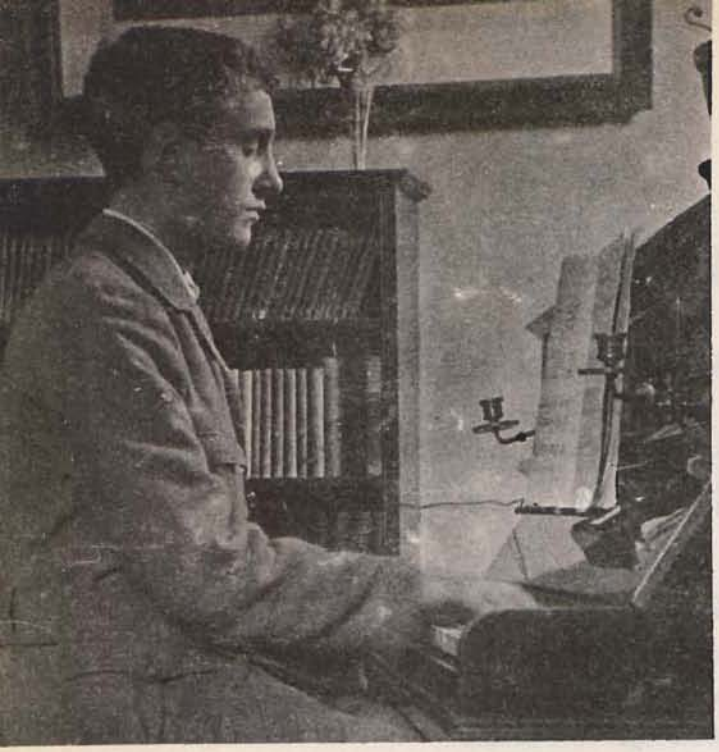


Doc as a 16 year-old

Congratulations to DOC SLATER on his 80th birthday a few days ago and best wishes for many happy years ahead. To mark the occasion, he has written this fascinating article.

When I was born, Otto Lilienthal was gliding down from his artificial hill—though not at that precise moment, because it must have been two o'clock in the morning in Berlin. More likely, he was dreaming about the previous day's take-offs, making token movements of his limbs like a dog dreaming of yesterday's chase.

Percy Pilcher first flew in the following year, so I can claim to have lived through the whole of British soaring history. True, Sir George Cayley's coachman made the world's first human glide at about the time my grandfather left school; but Sir George was unaware that birds could soar. Pilcher, on the other hand, only intended to install a motor to reach the altitudes where, as he could see, birds were able to soar. This information does not seem to have got into print, but it was obtained by Jack Dewsbery, an early British soaring "pundit", when visiting Lord Braye's family, on whose estate Pilcher made his last flights.

This evidence about Pilcher's intentions, slender as it is, must be the first example of anyone regarding soaring flight as an end in itself.

In 1907 Alsatian-born José Weiss began making large model flying-wing gliders of bamboo and paper-backed muslin which could be bent into varying wing sections, in the belief that the apparent soaring of birds was due to Nature having so perfected their design that their gliding angle only differed imperceptibly from the horizontal. He eventually produced a man-carrier in which E. C. Gordon England, then aged about 18, was launched from Amberley Down on June 27, 1909, into slope lift, rose about 40ft, and glided down to the plain below after 58secs in the air. But did this first British soaring record stimulate further research into soaring flight? It did not. The Amberley group merely put the machine away in its shed "to await the installation of a motor".

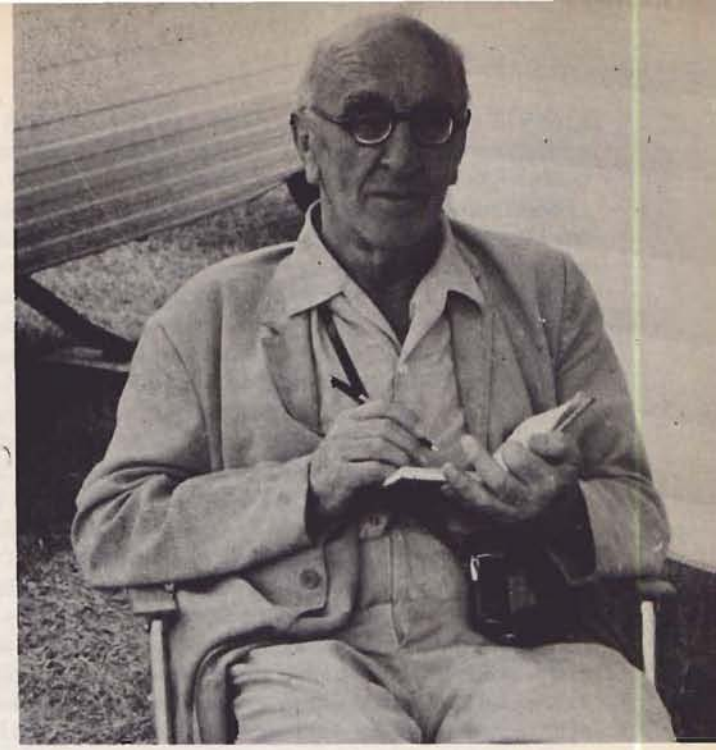
In October, 1911, Orville Wright took a party to Kitty Hawk with the deliberate intention of doing some soaring. *Flight*, in its first year of publication, was not told of Gordon England's record; but it did mention this expedition and explained to its ignorant readers how soaring differed from other forms of flight. But it did not mention Orville's flights on October 24 of 5min 29sec, 7min 15sec and 9min 45sec.

One of the party was an Englishman, Alec Ogilvie. I called on him in 1953, shortly before his death, and got some extracts from his diary: he, too, made some flights on that day, but does not record their duration. So he may or may not have put up a "British National" record by exceeding Gordon England's 58sec. He said it was not easy: the hill was a crescent-shaped dune, so one had to hover over the precise bit of dune that directly faced the wind.

Pioneer years marked by a rash of paper gliders.

But what credit is there in claiming to have lived through the whole of British soaring history if, for the first 25 years, one didn't know it was going on, or even that there was such a thing? At my school, Abbotsholme, the earliest pioneer years of European aviation, 1908-9, were marked by a rash of paper gliders, sometimes built into shapes of the famous aeroplanes of the day. Some of us vied with each other to produce the best gliding angle. But they made such a litter in and around the school that, in the end, the head boy forbade their manufacture, impertinently calling them "darts". Nobody ever launched one into slope lift.

The reality of soaring suddenly burst upon the public's consciousness—and mine—when the Germans began doing it in 1921 and 1922. From the newspaper point of view the news was of great political interest, in that the Germans



As we know him now, photographed at the World Championships in January.

EIGHTY YEARS OF BRITISH SOARING

had by-passed the treaty restrictions on aeroplanes. And the general public, who in the early days had tended to regard all forms of aviation as equally astonishing, were by now sufficiently educated to regard flying without an engine as more inexplicable than flying with one.

Germans said to have special cream to detect "currents."

The newspapers fed them with stories of how those cunning Germans smeared their cheeks with sensitising ointment so as to detect the "currents". The ideas of most of the aviation people were equally wide of the mark. They persisted in telling each other that there must be something peculiar about the Rhön mountain range which might not be found anywhere else. They could not conceive that any steep slope would do.

The flights of one, two and three hours in the "Vampyr" by Martens and Hentzen in August, 1922, got such world-wide publicity that the *Daily Mail* sponsored a week's soaring competition on the South Downs in October that year. The Royal Aero Club, which organised it, chose Itford Hill because it had slopes facing nearly every direction. But each beat was very short, and nobody had Orville Wright's hovering experience. I am sure that, if the wind during that week had been southerly or westerly and had never blown as fast as any glider's flying speed, nobody would have soared and the experts would have continued babbling about the uniqueness of the Rhön.

As it was, during most of the week the wind was either northerly, blowing up a five-mile escarpment from Itford to Firle, or north-easterly up another long ridge stretching from Firle towards Eastbourne. So quite a lot of soaring was done by some of those entrants who had already flown aeroplanes, including Gordon England—some, but not all. The others wandered upwind out of the lift, hoping to blunder into something called a "current" which would suddenly jerk them up a few feet as they passed through.

The winner, Maneyrol of France, put up a world record of 3hrs 21min on the last day. He spent the time virtually hovering and was never once seen twisting and turning in search of "currents"; yet some experts had to attribute his success, not to the fact that the newly arrived glider could be got ready for flight by the early afternoon, but to the fact that each of the four wings of his tandem monoplane had a control surface along the whole length of its trailing edge, thus making it a lot more manoeuvrable than its rivals in the perpetual search for "currents".

The Itford meeting led nowhere. To most aviators, slope-soaring was an amusing gimmick which ultimately became boring. One of the gliders was taken away to start a soaring group in the RAF, but a fatal accident at Pewsey cut that short. To Gordon England, however, the lesson of Itford was that a gliding school should be established as a means of getting "youth" into the air.

As to the lesson for me, I have just rediscovered it in an old family magazine which, started in 1908, gave me the editorial experience that enabled me to take on S&G without too much trepidation. In the issue of September 1927, in an article beginning "Gliding is of no practical use whatever", I wrote that soaring is too difficult and dangerous to be attempted by any but highly experienced aeroplane pilots.

About this time I was becoming worried by the inability of anyone, including myself, to produce any convincing reason why soaring should be pursued for its own sake. Would it never again be practised in England? Even in a booklet I picked up on a first visit to the Wasserkuppe in 1927, a quasi-philosophical article on "The meaning (*Bedeutung*) of soaring flight" merely recommended it as a cheap and instructive preliminary to flying areoplanes.

Then at the 1928 German Nationals I saw Robert

Kronfeld disappear and reappear but only learned afterwards that he had been first in the world to use upcurrents under clouds for going across country.

But the spectacular year was 1929. Kronfeld put up world records of 93 miles distance and 8320ft height gain; and there were other cross-countries too. These events roused the aviation world to a realisation that soaring had taken its place among the many forms of getting about in the air; true, it could be hampered by unsuitable weather, but so could the others, if to a lesser extent. So on December 4, 1929, a "Gliding Lunch" was arranged at which the British Gliding Association was provisionally formed. I missed it through getting behindhand in reading *Flight* while writing music for St Thomas's Hospital Christmas Show, but caught up with events in time to join the London Gliding Club at its inaugural meeting.

In view of what happened later, please note that the demonstration that gliders can fly long distances away from hills and up into cloudland, plus a wish to do the same in Britain, were the *only* motive for creating the BGA, and that this alone could have induced Lord Wakefield to give £1000 to start it off, and others to give further money and trophies for competition. I attended its official inaugural meeting and remember recognising several well-known aviators and reading their thoughts as "Is there anything in this for me?" and thinking sourly that the rest of us unknowns would have to do the hard spadework for which more publicity-minded figures would take the credit.

News from Germany was that it had 400 C pilots, nearly all trained *ab-initio*. So it was safe after all to learn without having first mastered aeroplanes. Also, I found that the would-be gliding people here were almost completely ignorant of all I had learned from three years' reading of

Safe after all without having first mastered aeroplanes.

Flugsport, edited by Oskar Ursinus who founded the German gliding movement. So I felt entitled to become the first British *ab-initio* "A" pilot, and went to the Rossitten Gliding School in East Prussia to do it in May, 1930.

Gordon England became BGA Chairman and installed as Secretary a former employee of his named Waplington (with whom I was disturbed to find it impossible to carry on an intelligent conversation about soaring), and set to work to try and obtain a government subsidy for a gliding school. The BGA was set up in an expensive West End office, apparently (we assumed) to give the impression that it was a flourishing concern eminently fitted to administer a subsidy.

At the beginning of 1933 I was asked by the previous editor, Frank Entwistle (in charge of meteorology at Itford, 1922) to take on *The Sailplane & Glider*, having already written a lot to help him to fill the paper. Just then I met Thurstan James, its founder, in Piccadilly. Over coffee he gave me some excellent advice, and before we parted I asked him whether or not he would advise me to take it on. He replied: "Do nothing till you hear from me." I haven't heard from him yet.

I realised that there were three urgent needs for the magazine to fulfil: to convince readers that they were doing something worthwhile; to inform them of advances in soaring technique and glider design in every country, especially Germany; and to get them to learn about meteorology as applied to gliding instead of regarding it as too abstruse a subject to tackle. And internationalism: in drawing a map of any flight from one country to another I would omit the inter-state boundary as being a mere administrative convenience and of no meteorological significance. But it was a "losing battle": at that very moment Hitler had been wangled into power by Chancellor von Papen in spite of his party getting a declining minority of votes at elections. His one good deed was to give German gliding an enormously increased subsidy.

Also in the magazine I included subtle quips at the BGA such as "those of us who actually go so far as to fly", and published a letter from Sebert Humphries (the only gliding man I had known before gliding began) likening the BGA to "a hippopotamus in a hip-bath, being every whit as cumbersome, top-heavy, voracious, and inept".

Just as I started editing, the BGA went bankrupt, having spent the remainder of Lord Wakefield's money on its

The Rossitten Gliding School in East Prussia, where the Primaries soared the sand dunes. Photographed by Doc during his visit in 1930.

glorified office. So it raised £500 by allowing a Derby sweepstake promoter to use its name. The Director of Civil Aviation and the Public Prosecutor, who were both on the Council, immediately resigned ("pressure of work") and the police visited the office but went away satisfied. The Council was persuaded to vote for a "gliding school" to be added to the National competition being held at Huish on the Marlborough Downs, to continue throughout June. Youth were going to flock to it and the Government would see that it was good and offer a subsidy to make it permanent. But no steps were taken to inform the prospective flockers of its existence, so nobody flocked, and the sweepstake lucre followed Lord Wakefield's little lot down the drain.

Now there blew up the first squall of a mighy storm: the London Gliding Club resigned from the BGA. This was the first step in a clandestine scheme which, it was hoped, would end with the Royal Aero Club withdrawing its delegation of the control of gliding from the BGA. Philip Wills had come into gliding early that year, and now wrote to S&G asking why the London Club had resigned. The BGA sent a letter for publication saying that "the Council regrets" that I published Wills's letter. This was a blatant lie: the Council had done nothing of

the sort. In the BGA office Waplington explained why they wanted the letter suppressed: "If the Ministry knew the London Club had resigned, they wouldn't give the BGA a subsidy." But in fact the Ministry of Civil Aviation already knew: the London Club saw to that.

In 1934 the Ministry published the report of a commission it had appointed to advise it on Civil Aviation. Gordon England was a member of the commission, which recommended *unanimously* against giving a subsidy to gliding. By then the BGA Chairman was a regular flying member of a gliding club—Espin Hardwick, who would, of course, use a subsidy to help the gliding clubs. But the Ministry, in a preface, said it *would* give gliding a subsidy —£5,000 a year for seven years. Gordon England's unrelenting efforts to get that money for his pet scheme makes far too long a story to be told here.

A gliding subsidy of £5,000 a year for seven years.

The Ministry finally said they would not give the subsidy until the two "sides" had made up their quarrel; the London Club refused to rejoin the BGA unless its constitution was altered to allow it to be run by the gliding clubs; the BGA was broke and had to give in or wind up.

I felt an overwhelming sense of elation, liberation, or whatever is the right word, at the departure of the Old Gang, for soaring has been described as "not a sport, not a hobby, but a way of life". This feeling was to be repeated two years later when I gave up medicine and went to live cheaply on a farm overlooking the London Club's soaring ridge. In the absence of any clear evidence for reincarnation, it was clearly ridiculous to spend one's only lifetime doing the wrong job.

I reckoned on earning, from gliding, £50 the first year, £150 in the second, and making ends meet with £250 in the third. The actual figures were £59, £143 and £282. I tried retrieving for profit, but could not make anyone understand why they should pay more than the cost of the petrol. And a high-minded lady pilot thought it disgusting to make a retail profit from selling Wolf Hirth's "Art of Soaring Flight".

So, exactly halfway through its 80 years' history, British soaring began to guide itself into an era of spectacular progress: where there were a few hundreds of flyers, there are now many thousands; odd shapes have given way to sleek glass-fibre water-carriers with half the gliding angle and twice the speed, and hundreds of pilots from dozens of clubs are equalling and surpassing the performances once made by one or two early pundits from a single club.

And—what is specially pleasing to me—lots of people from many nations are visiting each other's countries in search of good soaring and are made welcome wherever they go. The world's population is now of two kinds: on the one hand, those who cannot imagine why anyone should want to fly without an engine when it is so much easier to fly with one; on the other hand, those who know the answer to that question but cannot put it into words.

ANN WELCH reports on

THE CIVV MEETING

October, 1974

- ★ **Revision of the FAI Sporting Code**
- ★ **The Introduction of New Records**
- ★ **Modifications to World Championship Rules**
- ★ **Talk of an International Restricted Performance Class**

New World and National records are among the changes to the next edition of the FAI Sporting Code for gliders due out early next year. Both 750 and 1000km speed record triangles are being introduced in World and National categories, and a change is to be made to the 28% rule to cover these new records so they will be more possible to achieve in funny shaped countries—like ours.

The new rule will read:—"When the flight is made to obtain a record of 750km or more no side of a triangle may have a length of less than 25% or more than 45% of the total distance of the course."

Also in the World and National category a new record is being established for distance around a triangular course. This record will be activated with the first triangle to be flown in 1975 of 750km or more, and thereafter may be beaten by increments of 10km. There was a long discussion on whether the 100km triangle for records should be deleted, at least in the world category, but this was not agreed, though it will be necessary in future for the glider to remain within sighting distance of the Official Observer controlling the record attempt between the time of release and of crossing the start line.

Two new records

Two FAI recognised records are being introduced in the National, but not the World, category. These are for speed over a 300 or a 500km out-and-return course, and they are intended to add stimulus to record flying in countries whose geographical shape make it impossible to fly the new big triangles. In Britain these two records could also increase the number of clubs from which bigger records would be possible.

There are a number of changes in the general layout of the revised Code, mainly to make the rule book easier to use. Chapters one and two have been combined into a section to contain, as far as possible, all the definitions, and chapters three and four have been combined to carry evidence and control requirements. This new chapter two (as it will be) is designed to help Official Observers carry out their work correctly. During the revision work input from Official Observers highlighted some ambiguities in the present rules, and these will be clarified in the revised Code.

Included among the modifications will be a new paragraph entitled—"**Evidence of Point of Release.** Only the evidence of the pilot of the tug or the person launching the glider is acceptable. If such persons are not Official Observers the certificate of point of release must be countersigned by an Official Observer." In conjunction with the present Official Observer control over the start line, this strengthens the CIVV principle that start and finish lines for record and badge flights shall be controlled by human Observers and not merely by the miracles of the modern camera.

For badge flights using declarations of turning points it was confirmed that the declaration has to be adhered to if the flight is to be valid. So, for example, if after the first turning point of a declared triangle the pilot flies straight on, the flight will not qualify, even if he has exceeded the required 300km or 500km; he should have declared a zig-zag instead. The only exceptions to this rule are the provision for the failed triangle in the existing Code, and the fact that for free distance only no declaration is required.

If it seems hard that a flown 300km may not be recognised, it should be realised that the abandonment or alteration of part of a declaration can open the way not only to a number of abuses, but to different interpretations of the rules in different countries and even by different Observers in the same country. A further slight tightening up of the rules will require that a new film is to be used for each new flight or task, but a clarification towards easement confirms that the P2 on a record attempt does not need to have a competitors' licence.

The World Championship rules will contain a number of minor modifications and the addition of a complete new section on penalties. The mods deal mainly with clarification of permitted radio equipment, what constitutes damage to a glider, photographic evidence requirements, and the introduction of a new and simple "day factor"

to the scoring—which has the additional effect of increasing the percentage of gliders needing to fly a marking distance of 100km from 20% to 25% to make a championship day.

The penalty section introduces the concept of points loss for infringements instead of the all or nothing disqualification that has been general up to now. The section is intended to give guidance to the Championship Director by first grouping infringements into three categories, and then indicating the minimum penalty which should be imposed, and over which the Director has no discretion, as follows:—

Group a. Technical errors and failure to comply with the requirements, such as inadvertent incorrect photo procedure, crossing the finish line incorrectly, etc. Penalty, a minimum deduction of 20pts.

Group b. Dangerous or hazardous flying, including airspace infringements and flying outside the limitations of the glider's airworthiness certificate. Penalty: a minimum deduction of 100pts or, if the infringement has to any extent advantaged the pilot, disqualification of all flights on the day in question.

Group c. Cheating, falsification of documents, use of forbidden equipment, etc. Penalty: a minimum of disqualification of all flights on the day in question.

During discussion suggestions were made that there should be, additionally, a maximum points penalty above which the Director could not go, but this was discarded, partly to avoid an undesirable "supermarket price list" which could enable competitors to decide when it paid to break a rule, and partly to enable a Director to be able to really clamp down on the very rare, regular offender.

Championship Classes

The next part of the Code to receive attention was the chapter on Championship Classes. This did not have quite the same urgency since although manufacturers obviously want to know about future changes as soon as possible, any new rules for World Championships cannot come into force until the Championships of 1978. The discussion was based on the results of a questionnaire sent out earlier in the year to top pilots and manufacturers concerned with building competition gliders. Fifteen pilots and five manufacturers replied in time for their answers to be included in the paper, with one pilot and two manufacturers replying too late.

There was only one point on which the majority thought the same way, and that was to continue with just two Classes. With regard to other questions, and to the Standard Class rules in particular, the answers showed an almost 50/50 split in views on almost every point. After lengthy discussion at the meeting it was agreed that the simplest way to make the present rule acceptable would be to permit the linking of flaps and ailerons, but retaining the original requirement of one control lever only in the cockpit. The rest of the rules concerning the simple fixed hinge flaps would remain as at present.

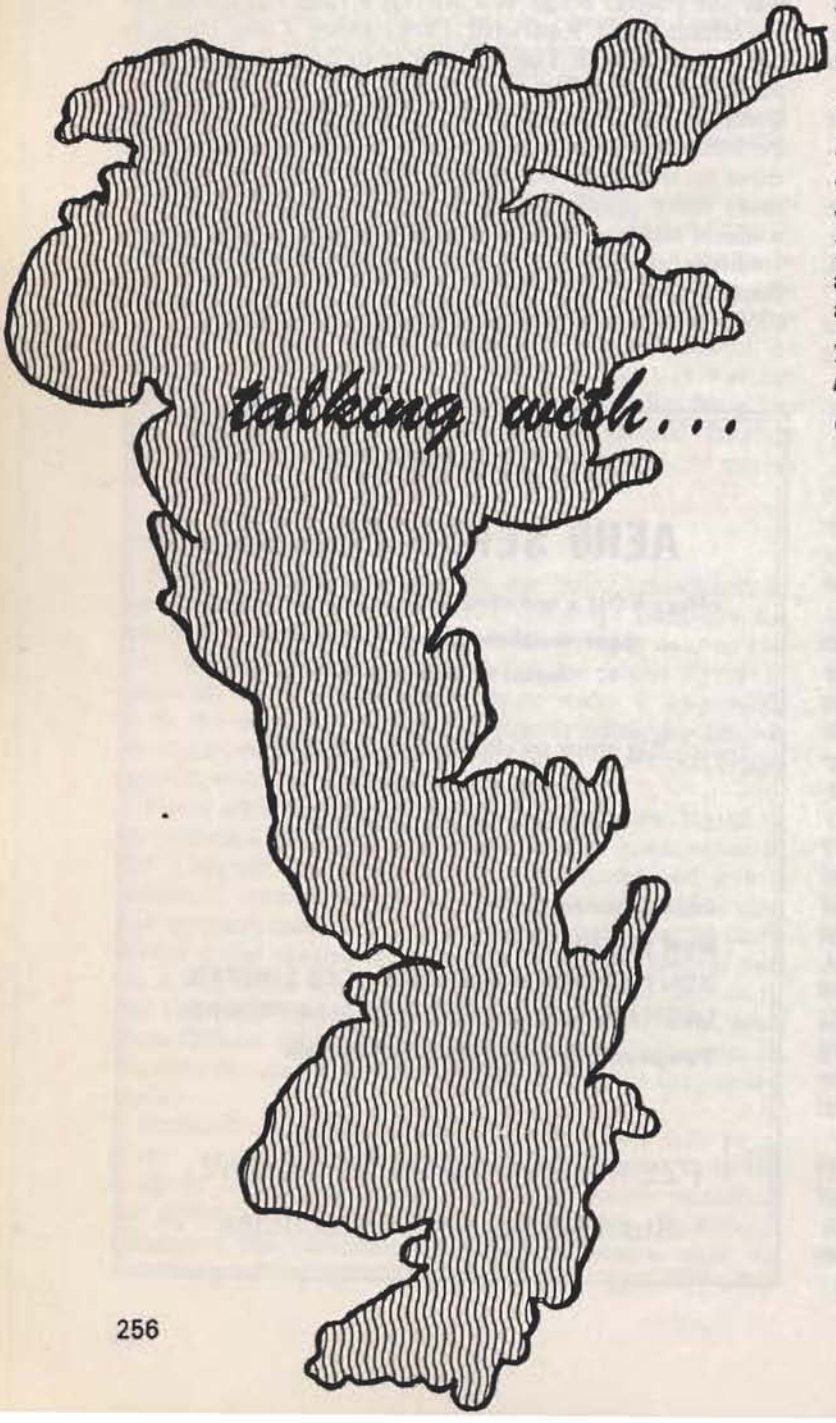
In the Open Class there were a number of advocates to limit the span in an effort to help reduce the rate of rising prices, but it was decided not to impose any limitation on the Open Class at present. For both Classes it was agreed that interchangeable components (other than those permitted by the damage clause) would not be permitted; only the structural entity that flew on the first day being counted as the competing glider.

Concern over expense

There was general concern among delegates that competing in World Championships, particularly in the Open Class, was becoming too expensive, and there was also concern about devaluation of the many currently excellent Standard Class aircraft, and of the lack of suitability of some competition gliders for future use outside international Championships. It also became apparent that a recognised international "Club" Class would be popular for National and Continental Championships, and even for completely international competitions outside World Championships. Since the Code chapter ten contains provision for Championships Classes in general—including a Motor Glider Class which is already listed—it was felt that this chapter could well provide a rules framework for an International Restricted Performance Class (such as the "Club" Class). The job now is to draw up clear proposals to put before the Spring 1975 CIVV meeting. Certainly the recognition of an International Restricted Performance Class might well be the greatest single move to encourage competition flying within the reach of many more people than at present. It could also provide a useful stepping stone for up and coming pilots, and for countries entering the international competition field for the first time.

CIVV October 1974 was a stimulating meeting.

'Q'



Whenever S&G prints an article by, for or about pundits, we are always inundated with letters from peasan—sorry, from less experienced pilots who will never be champions and who want to hear about the struggles and triumphs of ordinary chaps. This month our reporter "Q" interviews Platypus who, practically singlehanded, has made British coarse gliding what it is today—a blood sport second only to ratcatching.

Platypus, in 1972 at Issoire you came in 69th, but in 1974 at Bad Freidegg you came in 45th. What explains the difference?

I think I can confidently attribute that vast improvement to the fact that at Issoire there were 69 pilots competing, whereas at Bad Freidegg there were 45.

Oh.

Pass that tube of Fosters', there's a good lad. Ta.

Do you think pilots of your calibre should be recommended to fly at Angers and Hahnweide?

Well, the people at Angers recommended me to fly at Hahnweide, and the people at Hahnweide said I should fly at Angers, and everybody in Britain says the more I fly abroad the better. So I guess you're right.

Tell me how your mind works when you're really keyed up on a competition day.

On the ground. I can say without fear of contradiction (I

platypus

smash their teeth in if they do contradict) that my mind works faster than anyone else's. Especially on the old pilot-selection take-off times: when it comes to switching those discs around the board, my gamesmanship is designed to fox the competition completely—the disc is a blur in my hands as I shift it from nail to nail. You should see the others panicking!

Is this because the other pilots want to launch the same time as you?

On the contrary, mate (Pass the Foster's, I hate stretching), the chaos is due to the other blokes all desperately switching times so as not to take the air within half an hour either side of me. That, and my skill in asking questions at briefing, has been known to cause other pilots to fly round triangles the wrong way and get disqualified.

"...my adrenalin begins to flow and my brain switches of totally..."

Fantastic! But what I was really interested in was how your mind worked in the air.

I can tell you, the moment that towline goes taut an amazing transformation comes over me.

Go on.

I will if you don't keep interrupting. (Pass the Foster's, lad. Ta.) Yes, at that electrifying moment—my adrenalin begins to flow with the speed of frozen treacle and my brain switches off totally. The old CFI noticed that very early on in my training in the T-21. Sent me solo in no time as a result.

? ?

Well, he had a wife and kids, I suppose. Better you than us both, he used to say. What a card he was.

Longevity is the better part of valour, I dare say. But getting back to contest flying, don't you find this inabil.ty to think once airborne something of a handicap?

Not in the slightest. It accounts for my being so relaxed and without a sign of strain. The other pilots think and worry too much and get worn out, poor devils.

Quite amazing. Now, Platypus, on the finer points of closed-circuit racing: what is your inter-thermal speed-to-fly philosophy?

I have two speeds: 40kts and 140kts. The transition between the two I make on the spur of the moment. My mind may work slowly but my arm muscles work fast.

Isn't that inefficient from the point of view of optimising cross-country performance?

Theoretically, yes. But it means no other pilots dare fly within a height band of 500ft above or below me.

Are you a loner, or do you like gaggling?

Gaggles? I don't remember seeing one ever, except occasionally at a distance. Why they all leave such lovely thermals in so much of a hurry I can't imagine, but I blame those damn silly calculators.

You mean John Willie computers. You don't use one?

Pah. If you can see it you can reach it, I always say. (Hell, who's been keeping food in the 'fridge? Panic over, lad—I found another six-pack.) If you can't see it, keep good and high, then do a kamikaze on the place when it comes into view.

Isn't that, er, inefficient?

Yeah, **theoretically**—but I've seen other competitors pull out their brakes and land short in six foot high maize rather than cross the line when I'm finishing.

One up to you Platypus: Now, what are your views about water?

Never touch the stuff. Next question.

What do you see as the major obstacle to your future as a competition pilot?

The insurance companies, definitely.

It says here that your gliding career started in earnest after you went solo at Castle Bromwich in 1949?

Yes, but my expulsion from the Air Cadets put an end to that, regrettably. Really the 1950's at Dunstable were the formative years of my life in all ways except one, though I believe it has remedied that deficiency recently. Hey, you know, I've heard—

Er, yes, fascinating, but what I was really interested in was whether you feel age and experience are more important than youth and vigour.

Well, that was what I was on about—

In competition gliding, I mean.

Oh. Well, I am the only pilot I know who was ever grounded for senility, but I think that was just a dirty manoeuvre by the Flying Committee.

"...it was though I had taken the elixer of youth"

What makes you say that?

I was only 21 at the time. However, when I bought my own ship, it was as though I had taken the elixir of youth: they said I could fly as far from the site as I liked, preferably downwind.

Platypus, where are you flying in 1975?

Oh, Dunstable, France, Gobi Desert, that sort of thing. Hey, Q, where are you off to?

Australia—on the next jumbo!

coaching corner

BILL SCULL, Senior National Coach, takes a look at one of the possible contributory factors in a particular category of fatal accident.

NEGATIVE *g* AND THE PILOT

I mentioned in an earlier Coaching Corner (August-September) problems that might arise for a student who has been encouraged to make very gentle movements of the controls. Over emphasis of this point may mean that he has never used the control sharply and may be unaware of the consequences of doing so. The problem already mentioned was that if a student or pilot moved the stick violently then the change of attitude, especially in pitch, might be sufficient to disorientate him, with dire results if near the ground. There will be other effects.

The Effects of *g*

Another possible effect which may worsen matters is to do with negative *g*. Most pilots are aware of the effects of *g* in the positive sense. The most obvious experience of it is in executing a loop and few people seem to find the positive sensation unpleasant. But the degree of susceptibility to the effect may vary quite a lot from day-to-day, changing as it does with the state of health and self-induced factors such as hang-overs.

An instructor may be aware of another variable; whether you are carrying out the *g* inducing manoeuvre yourself or sitting there whilst your student does it. The increased sensitivity is due to the fact that in pulling *g* one tenses muscles which restrict or delay the downward flow of blood from the brain and so lessen the sensations. When you are not carrying out the manoeuvre yourself, *ie* flying as passenger or instructor, failure to anticipate the manoeuvre will allow a greater downward flow of blood and therefore increase the effects and sensations. It is almost possible to calibrate oneself. Loop the glider yourself (maximum positive *g* 3-3½) then let your co-pilot do one. If you are confident enough in his ability to relax—really relax—then the sensations will be much more marked. On occasion in these latter circumstances 3½*g* will just start to cause the effect called greying out.

Greying out is due to the effective reduction in blood pressure in the brain and hence a reduction in oxygen supply. The first symptom is a progressive loss of peripheral vision.

Most of the references available to me discuss negative *g* in terms of inverted flight and the execution of manoeuvres such as outside loops. In these circumstances *g* is −1 (minus 1) in inverted flight and will increase in a negative sense with the manoeuvre. This is probably not even of academic interest to the majority of glider pilots, but wait; pilot susceptibility is not only a function of *g* but the time for which the load is applied. Seating position is also significant and a pilot in an upright position will be more susceptible than one who is reclining.

Although a reliable reference work* suggests that one should be able to withstand −2*g* for up to ten seconds before loss of consciousness, this probably applies to a pilot whose sensitivity has been reduced by aerobatic experience. Accepting then that people have varying degrees of sensitivity and that this may vary from day-to-day, who is in a position to state categorically that +½*g* (*ie* −½*g* from the normal 1*g*) will not, at least, be unpleasant?

The real and risky situation is when the small amount of negative *g* is mistaken for a symptom of the stall, that momentary feeling of suspense before the nose drops. There is evidence to support the suggestion that this confusion has arisen in the case of fatal accidents, in which the aircraft or glider has plunged steeply to the ground. However, without the principle witness the case is difficult to prove, but many specialists in the accident investigation field are convinced.

To make pilots aware of their sensitivity to this effect is simple, it requires a manoeuvre called a "push-over" (the opposite of a pull out). I know that many clubs include this in the training syllabus usually as a part of the stalling exercise—if you don't you should from now on! Even if you are an experienced pilot—don't we all like to think of ourselves as that—why not just try it, but preferably in a two-seater. It might be that to have experienced the sensations once or twice will be sufficient protection to avoid confusion in an inadvertant case. (Note that all the usual airmanship factors prior to stalling or aerobatics apply; extra emphasis should be placed on loose articles.)

Many years ago, as part of an accident investigation, I undertook to find out the behaviour of a Swallow in response to rapid stick-forward movements at speeds near to the stall. With a little imagination I would have started at 1kt above the stalling speed, however the first attempt was at 40kts. Moving he stick forward sharply to simulate a frightened pilot produced the first third of a bunt (or so it seemed). Certainly the glider went beyond the vertical and to think that I took a stopwatch to try and determine the pitch rate!

*Reference—Modern Airmanship edited by N. D. van Sickle and published by van Norstrand Reinhold Co, New York.
Recommended reading: Aeromedicine for Aviators by Keith E. E. Read (available from BGA, price £1.20 incl postage).

HUMPHRY DIMOCK writes about the French International Mountain Gliding Competition.

THE NIMBUS IN THE ALPS

As is normal at Vinon, nearly every day was wonderful compared with the best English weather, and even on the two non-competition days most of the pilots flew up to 200km just for fun. As crew I had my friend John and niece June, and we arrived six days early to get some practice.

Sunday June 30. The first competition was a very difficult start because the thermals were weak, broken, and limited to 4500ft above the site. I saw a glider ditch water while still on aerotow, and ditched mine when I saw that all the gliders were below launch height, 2400ft. I crossed the line at 1500ft and it took me an hour to get to St Auban aerodrome, 25 miles away, eventually I landed at Gap, 60 miles away. It was declared a no-contest day because of the new rule that 50% of the gliders have to fly 50% of the task to make it a competition day.

Monday July 1. The same task was set again. A triangle via Gap and the Fort at Mount Dauphin, 264km. Gap is in a large alluvial plain surrounded by mountains, and Mount Dauphin is in a narrow valley 6000ft deep, to mountain tops mostly 9000ft. At the second turning point I was down to 1500ft above the Fort and very apprehensive as there was no landing place to be seen. The Mountain tops were 4500ft above me. However, after a long and tedious struggle I eventually found the best thermal of the day which lifted me to 9500ft right above the lake at Savines where the Kestrel was broken two years ago. I looked upwards and literally said thanks to the Good Lord, and smiled with relief down at the dangerous lake where there was no landing place. The scenery around here is so wonderful. I felt privileged at being able to see it, and yet exhilarated and humble at the same time. From this point, 70 miles away, there were no problems, and the task was completed in 5hrs 35mins. I was most surprised and delighted to learn later that I had won the task.

Tuesday July 2. To-day a 229km triangle was set round La Baume and the Barrage Dam across Lake Savines. During the second leg I was caught out in a valley with no escape, but a good field for landing. I ditched my water and lowered the wheel above a ridge which I had to cross, but I did not have to land after all. After an hour soaring the ridge and looking into the eyes of the people on the ridge, a thermal lifted me to 7000ft and from there it was a lovely flight home. My time was 3hrs 47mins and I was third.

Wednesday July 3rd. There was no contest because thunderstorms in the mountains were threatening and so we went swimming and sightseeing and generally enjoyed ourselves. Most of the competitors flew, and the thunderstorms did not come near us. It would have been a good competition day.

Thursday July 4. A 347km triangle was the task, via La Baume and Plampinet village. This was another optimistic hope. It was a struggle to reach the first turning point, and I failed to reach the second turning point at all, landing with six others at St Crepin aerodrome, 3000ft asl. On this day the mountain currents were particularly fractious. Most of the ridges ended 6000ft above the narrow valley, and in climbing one would get a 15kt upcurrent in one place and if one turned back to the place it was often a 10kt downdraught.

Sometimes it was not possible to make the summit at all, and it was necessary to fly round the end and try the next one. At the end of one ridge there were two people attending to a trigonometrical point, and when I finally fought my way to the summit my wingtip was less than a span away from them. They must have heard the glider doing 60kts, but they did not look in my direction. I felt snubbed because most mountain climbers wave and shout in the most friendly fashion. When slope climbing the ridges it is necessary to fly between 60 and 70kts in order to have plenty of control. When an adverse gust hits the glider, the application of full rudder and aileron sometimes has little effect. One just has to wait. Since 25ft is supposed to be the optimum distance to fly from the rocks, it is rather hairy at times.

Friday July 5. This was one of the best days. It was a lovely task of 259km with turning points at Monetier Alemont and the Fort at Mount Dauphin. The first turning point was in an alluvial plain 2000ft asl, and the second in a valley 6000ft deep, 3000ft asl. At the start the thermals were well organised, and where three or more gliders were gathered together one could expect to get a 6kt thermal to 6000ft. However nearing St Auban aerodrome, the thermals seemed to disappear as soon as each group of gliders was approached, and I was losing height and could not reach the mountains which would help me on my way. With two others I was held to a spine at Sisteron slope soaring until a 5000ft thermal came along. Then another loss of height over the alluvial plain to remain within gliding range to a gliding site brought me an 8kt pure thermal 7000ft. From here I was able to take my turning point photographs and make for the south-west slopes of mountains to get the lift to the only cloud in the sky.

This cloud was about 20 acres in extent, flat, and not very thick. Here the lift was in excess of 10kts to 11,500ft cloudbase where there were many other gliders, and most amazingly two eagles which had kept me company for the last 5000ft of climb. These birds then joined my friend in another glider when I increased my speed and they disappeared into the cloud with him. It amazes me that birds should want to fly that high anyway, it must be pure joy flying, which has nothing to do with feeding. I have seen swifts flying in a thermal at 13000ft, and assume that they are feeding on the insects carried up. It must take them a heck of a long time to get down again. My friend told me later that the eagles often enter cloud with him, explaining that although he cannot see them, they can fly close enough to see the wingtip, and are still with him in formation on leaving the cloud.

To resume, under this cloud I increased my speed to 120kts while circling to avoid entering the cloud and give me a good start towards the second turning point. From here I was able to get back to the cloud and start my final glide from 55 miles away, relying on my John Willie (the John Williamson calculator) to get me home. I could recognise the Montagne de Lure 30 miles distant and it seemed ridiculous to believe my John Willie which said that I should do 85kts all the way home, so settled for 75kts. However as each check point was reached John Willie said "go faster", and for the last 20 miles my speed had to be increased from 100kts to 120kts to get down to the 500ft over the finish line as requested. In schoolboy fashion I ditched my 30 gallons of water over the crowd at the finish line in sheer joy and hoped they liked the rain. It was clean water anyway. My crew were there to greet and congratulate me on completing this joyous final glide.

Saturday July 6. No flying to-day, thunder threatened.

Sunday July 7. The task was a 234km triangle via Lourmarin and Gap. On this day the Met forecast was for thermals only up to 4000ft which was not enough to give us speed on our way to the mountains 25 miles distant. The course was along the south side of the Montagne de Lure to the turning point 34km distant, and then to Gap 105km. It was the usual lovely day and the thermals around Vinon before starting were 2000ft higher than forecast up to 6000ft. There was a strong north-west breeze blowing across the Montagne de Lure and everybody's spirits rose with the extra height and set off to the west looking for the usual wave in these conditions. Most of the field found no thermals at all and the wave non-existent. A huge gaggle landed around the first turning point.

For myself, I managed to get half way back to Vinon, being unable to get to the windward side of the Montagne de Lure, and finding no thermals whatever. All around on the plain were vineyards and orchards with no grass fields anywhere. At last I spotted a wheatfield about four spans wide and 200 yards long with trees and wires all around. The approach at minimum speed over the boundary was followed by a dive to the wheat where it had been cut half way across, about two spans of my wings. With full airbrake and tail parachute I failed to clear the crop completely, the starboard wing held back and an airborne ground loop started. The wheel came down on a cushion of combined wheat-straw with a horrible bump, and I ended up facing where I had come from.

I remember saying aloud "Dear Mother, why do we do this?", expecting to find serious damage, but there was none. The Nimbus must be very strong. It was the Sunday gathering at the farmhouse with 17 persons in four generations sitting round the table, ages three to 90. Two pairs of grandparents were there. Three bottles of champagne were opened, with cold pork and salad, fruit and ice cream. After that three cars set off to find my crew, and when found they were led in like Royalty, and after de-rigging with plenty of help we all had more refreshments in another farmhouse. The grand hospitality that we received made up for the very disappointing flight. For the Standard Class it was a no-competition effort since too few succeeded in scoring. In the Open Class only three completed the course and the day was devalued to 360pts.

Monday July 8. An out-and-return race to Plampinet of 318km was to-day's task. This was another trip along the deep valley, and there were no real problems, one could just settle down and enjoy the wonderful scenery. My time was 4½hrs. Maybe I enjoyed the flying too much, not flying fast enough, because I was only sixth in this race.

Tragedy Strikes

Tuesday July 9. A task of 362km with turning points at Chatillon en Dios and Val des Pres was announced. For me it meant a long detour instead of a 60 mile stretch across some inhospitable but very beautiful mountains with no landing place. It was a lovely day, and I probably covered nearly 500km in order to keep near aerodromes and plains. My time was 5hrs 40mins, and I was only fifth. On return there were sad faces everywhere. Two German pilots had collided at 9000ft above a mountain of the same height, a Std Cirrus and a Std Libelle. The Libelle lost a wing and the pilot Vincenz Gross died when the fuselage hit the ground. Apparently there was no time to bale out. I do not know any more details. The Std Cirrus returned to Vinon with a bruise under the fuselage below the trailing edge of the wing.

The final task was cancelled, and of course the barbecue party too. We returned home two days early feeling very sad It was a tragic ending to the most (I think) fascinating competition in the world.

SPIN RECOVERY

DON SPOTTISWOOD

Chairman of the BGA Instructors' Committee

Yet another spinning accident highlights the need to continually discuss stalling and spinning recovery techniques.

A great deal of time and space has been devoted to this matter on instructor courses and instructor re-categorisation tests, in this magazine and in news letters to CFIs. Despite this considerable amount of publicity it is clear from this and other accidents that misconceptions still arise, even with experienced glider pilots and instructors.

In this issue the National Coach, Bill Scull, deals with the effects of negative *g* on the stall and recovery, so I will therefore content myself with the correct recovery techniques from an incipient or fully developed spin.

The correct recovery technique for a fully developed spin is to apply full opposite rudder to correct the yaw which is always present in a spin, *ie* glider spinning to the right full left rudder. Having applied full opposite rudder to the direction of the spin, one must check that the ailerons are neutral and then *move the control column steadily forward until the spinning stops.* As soon as rotation stops, the rudder must be centralised and the glider returned to its normal gliding attitude. Easy you will say; every solo-pilot knows that! I have little doubt that this is so, but nevertheless people are still being killed or seriously injured as a consequence of the correct recovery technique not being taken.

Quite a lot of instructors practise their craft in British designed two-seat gliders whose spinning characteristics are innocuous, to say the least. Indeed on aircraft such as the T-21 a developed spin is virtually impossible to sustain in all except the most extreme centre of gravity positions. In aircraft such as these the application of even a small amount of anti-spin rudder and a relaxation of the back pressure on the elevator may well be sufficient to ensure a recovery.

Both instructor and pupil become accustomed to such docile spin characteristics and may well claim to know and practise spin recovery techniques, in fact a full trial is rarely used or required. When this same pair find themselves in one of the higher performance Continental two-seat gliders, they may find for the very first time that they are flying a glider on which the full spin recovery technique is required and, to effect a recovery from a spin, a very considerable amount of height is lost in the process. The Bocian is one such aeroplane.

Recovery from the fully developed spin in the Bocian can, in extreme circumstances, take up to two or three turns in the spin and requires considerable forward movement of the control column. So remember, spin recovery action is:

Full opposite rudder.
Check ailerons are neutral.
Control column steadily forward until the spin stops.
Centralise the rudder when spinning is stopped.
Recover smoothly to the normal gliding attitude.

I hope those CFIs whose clubs operate two-seater gliders capable of fully developed spins, ensure that their instructors are fully aware of the way in which the spinning characteristics of gliders can vary, dependent upon the method of entry into the spin and particularly how much pro-spin control was used to effect an entry, the centre of gravity of the aircraft and its configuration at the time of entry, *ie* flaps down or clean, air brakes in or out. I also hope that regular spinning checks with all instructors and solo-pilots are a common feature of the club's training routine.

NEW POWER FOR GLIDERS

BOB RODWELL

The SG-85 during flight testing aboard a leased Blanik

A lightweight ducted fan propulsion unit, designed for easy bolt-on mounting to numerous sailplanes, is marketed from this autumn by the West German company Rhein Flugzeugbau of München Gladbach at a target price of DM 6000 (about £1000).

Rheinflug has been working on ducted fans continuously since 1960 and at the Hanover air show in April unveiled the prototype of a two-seater ducted-fan light aircraft, the Fanliner, which it hopes to put into production in 1976. The Schubgondel—literally: thrust pod—SG-85, shown in the photograph being flight tested aboard a Blanik, is the outcome of a ground rig which was originally built for noise tests.

Quick installation

The SG-85 weighs 123lb complete with starter, 12v generator, silencer and mounting pylon, and delivers a static thrust of over 90lbs. Two 21hp Fichtel and Sachs Wankel-type rotary engines are mounted behind the five-blade glass-fibre fan which operates in a 2ft 5in diameter glass-fibre duct. Company engineers told me that the only structural alteration to the leased Blanik on which it was tested was the installation of a small plate beneath the foot of the mounting pylon, and that installing the pod, together with its plastic fuel tank and battery, or removing it, took less than 30 minutes in each case.

Fuel consumption is less than 3gal/hr at the red-line maximum speed of 5200rev/min and only about 2.2gal/hr at a cruising figure of 4800rev/min. At München Gladbach an SG-85 demonstrator was run for me on the ground and proved to be remarkably quiet. There is considerable sensitivity in Germany now about the noise of motor gliders and tugs, which are limited to a ground reading of 68 decibels when flying at full power at 1000ft. Overflight tests with the SG-85 at full throttle and 1000ft gave a ground reading of no less than 11Db lower than the limit.

"This is a very practical auxiliary powerplant for gliders, though it is equally applicable to light aircraft, hovercraft, hydroplanes, snow buggies and the like," said Rheinflug's technical manager Hanno Fischer, himself an active soaring pilot. "At the present price of fuel, it's the best possible trailer for retrieves or positioning flights there is. It's easily bolted on for training and removed for soaring when conditions are right and, say, one Schubgondel could easily be used among a club fleet of several diverse aircraft.

"Simply by selecting a particular throttle setting you can obtain any L/D ratio you want for a particular training exercise. With the Blanik, for instance, you can easily simulate the performance of the Nimbus 2 and give your student training in high performance cross-country techniques.

Project engineer Dietmar Schönfelder said the glide performance of the Blanik with the SG-85 stopped was, however, "bad". In the gliding context the thrust pod is seen essentially as an aid to quicker training and, perhaps, to explore distant airmasses, rather than as a powerplant for competition self-launching sailplanes.

Interest shown in the SG-85 at Hanover was such that after marketing it later this year, Rheinflug plans to launch a larger version incorporating a single Wankel engine developed from that of the NSU-Audi Ro 80 car. This is the unit used in the Fanliner prototype and as a Schubgondel will deliver a static thrust of about 225lb.

SG-85 in detail

Improving the mini PZL turn and slip indicator

GEORGE BURTON

The miniature PZL turn and slip indicator is the cheapest of the turn indicators on the market in the 2¼in face diameter size, even so it costs £65 odd and has a reputation for being somewhat temperamental. The basic reason is that the instrument is designed to work from a 4½ volt dry battery supply so there is not very much excess voltage about to break down oxide films or other causes of poor electrical contact: these oxide and dirt films can occur at different points in the electrical circuit of the instrument.

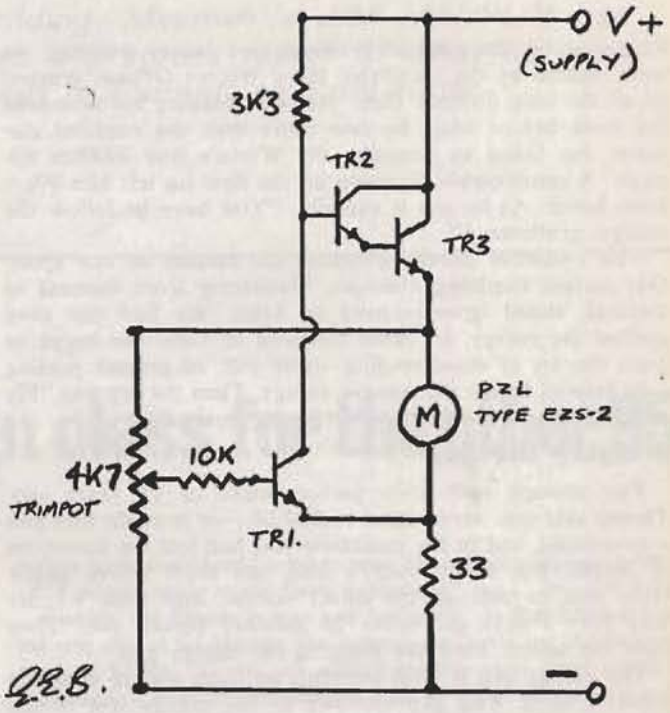
The speed of the rotor of the instrument is governed by two electrical contacts which open up by centrifugal force when the rotor is up to speed, and there are two other brush contacts on to the three segment commutator. When the centrifugal contacts open up there is a tendency for a small arc to occur and so a bad contact to be formed for when they close again. The opening and closing of these contacts is also a source of electrical interference noise which manifests itself as a crackle in the loudspeaker of the glider radio.

One way to solve the difficult starting of the instrument is to wire a three position switch into a supply from two 4½ volt batteries: for starting, the batteries are placed in series which applies nine volts to the instrument and generally ensures a good start. Once the armature is turning, then the supply can be switched back to a single 4½ volt battery.

There is a more elegant way of doing this electronically and at the same time eliminating the two centrifugal contacts as a source of trouble. The idea is to sense the speed of the armature of the instrument electronically and then to use this information to control the supply of current, so that the speed is controlled to the desired value. The way this is done is very simple.

When current flows through the armature a voltage is present across it simply due to its own resistance: this is present whether the armature is rotating or not. However, when the armature rotates then an additional voltage is generated: this voltage is called the "back EMF" and is directly proportional to the speed of rotation of the armature. Hence all that one has to do is to separate out these two voltages and to use the "back EMF" to control the flow of current to the armature and thus control the speed.

The effect of the resistance of the armature is eliminated by incorporating it as one arm of a bridge circuit: when this bridge is balanced no voltage appears between the two centre junctions, no matter how much current flows, so that the only signal remaining is the "back EMF". This signal voltage is applied between the base and emitter of a small silicon transistor, and this in turn controls the impedance of two further transistors connected as a "Darlington" pair, which control the flow of current to the bridge.



"Constant Speed" circuit for the PZL turn and slip indicator.

The circuit is shown in the diagram. The transistors TR1 and TR2 can be any small signal NPN silicon transistors and TR3 should be a medium power silicon NPN transistor capable of dissipating about ½ watt. The resistors can be ¼ watt types.

The small potentiometer is used to set up the speed of the armature on test. The centrifugal contacts in the armature have to be by-passed by soldering a small piece of copper wire across them and since this is a delicate operation, it should be entrusted to someone used to handling instruments. The best way of setting the speed of the armature is to use a stroboscope, however, it is near enough just to measure the voltage across the instrument when it is running and to adjust the potentiometer until it oscillates about the four volt value. The supply to the circuit should be between 11 and 15 volts.

On switch on, the voltage applied across the instrument will be between eight and nine volts and it will speed up rapidly. When up to speed the voltage will quickly fall to a maintaining value of about four volts and the current consumption will be about 30 milliamperes. The circuit can be mounted on a piece of printed circuit board bolted to the rear case of the instrument with 8BA screws.

The brush contacts on the armature still cause some radio interference but this is very much reduced.

"Follow the Energy, Gentlemen!"

JOHN WILLIAMSON

Lingering by the pool at Waikerie one balmy evening, we were regaled by the inimitable Hans Werner Grosse, greatest of all the long distance fliers. He was recalling his near-miss the week before when he flew more than the required distance, but failed to complete the World's first 1000km triangle. A considerable diversion on the final leg left him 90km from home. As he put it ruefully, "You have to follow the energy, gentlemen!"

This evocative phrase embraces the essence of our sport. Our earliest fumbling attempts, blundering from thermal to thermal, ended ignominiously in fields. We had not even spotted the energy, let alone followed it! Later we began to learn the art of cloud-reading—later still, of ground reading —to help us follow that elusive energy. Then the cry was "Fly straight! Don't build drag by moving controls!"

Bridging the gap

Fair enough with glide performances of 15 years ago. Theory said you were bound to find lift—or it might find you —eventually, and in the meantime you had lost the minimum of height. But watch today's aces, see them weave gently from side to side of the direct course, and then wonder why they always get home 20 minutes before you. They have the secret. They are bridging the energy gap.

The energy gap is what prevents us from gliding non-stop from A to B. The gap narrows as the energy lost in the glide becomes an ever-smaller proportion of the kinetic energy stored in the wings. Kinetic energy is the product of weight and speed. Energy lost can be represented by the sink-rate and a modern glass ship weighing more than half a ton with waterballast, may sink at little more than 2kts, at 80kts airspeed. If we are able to find even a dribble of lift—say 1kt of air movement—as we fly beneath the clouds, the energy gap is halved and the effect on our progress is astonishing.

The very best days have above all a well organised cloudscape which provides many opportunities for stealing miles by such extended gliding. The drain on the energy bank can be cunningly minimised and only the very best thermals need be used for topping up. Such a day in 1974 was May 29. All 44 Nationals pilots got round a 300km triangle without difficulty; the first English 600km triangle was flown; and several 500km, including the first ever in a Skylark 3. The day was good not because of the thermal strength—rarely more than 4kts—but because the lift distribution was so clearly marked by cloud.

Theory demanded that a fully-laden Kestrel should have expended about 25000ft of height on the Nationals task that day. I found I needed to stop and use only eight thermals in my three-hour flight. The longest climb was 1300ft and the aggregate around 9000ft. Add 3000ft for the start and the balance of 13000ft was gleaned along the way, by careful routeing and dolphin flying. Much of the time it was possible to cruise between 60 and 90kts, near cloudbase, weaving either side of track to "follow the energy!" The visibility was good and it was possible to judge the clouds ahead by their shadows. Silly to blunder into a blue hole when a little diversion three or four miles earlier would ensure a steady stream of lift.

It was important to stay near cloudbase so that the lateral relationship between the observed cloud and it's lift was "tight". More than 1500ft below cloud and the thermals tended to be old-fashioned and round, and not always where they should have been. At cloudbase, even if the hard core had gone, there was always the residue, the well-mixed trail of the original thermal, still lightly buoyant and enough to tickle the keel of the Kestrel and hurry us on our way.

There are many such inputs to speed flying but proper use of dolphin-flying probably heads the list. The moment to convert the speed into height must be finely judged, as must the rate of conversion. A sudden strong thermal gust calls for a swift pull up, to the stall and almost beyond, to loiter in the strong core as long as possible. Weaker lift calls for gentler action but in each case flap must be lowered exactly in step with the airspeed, until full thermal flap is selected to buoy one through to the far edge of the thermal. Dolphin-flying is a technique which gains much enjoyment from being practised in company, but be sure to keep that company at a respectable distance. One glider directly chasing another is liable to be suddenly presented with a plan view of his quarry, rocketing up into his own flight path.

Simplicity and Reliability

When playing porpoise with the thermals it is essential to have a true and trusted variometer system. The ideal should indicate the movement of the air mass regardless of the glider's speed when flying straight or following the energy, and the climb-rate of the glider when circling. Commonly this can be achieved with complex electronics and at considerable expense. The systems available are admirable in their way but *anything* complicated is the more likely to go wrong, and once wrong, requires all sorts of expertise to put right. Simplicity with reliability is the key.

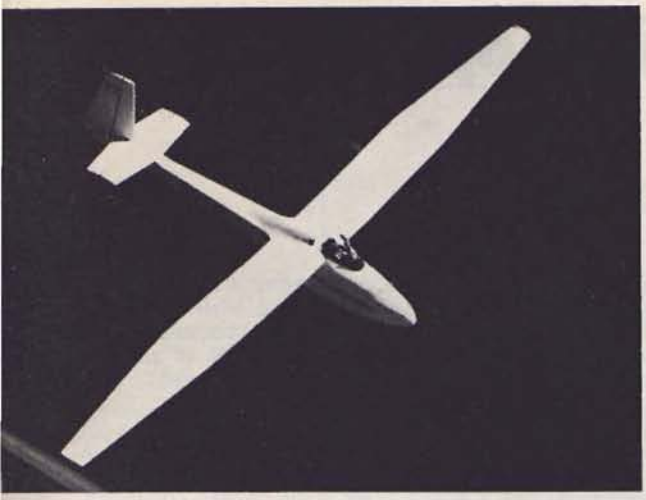
For my money the ideal system was proposed 20 years ago by the 1956 World Champion, Paul McCready. Subsequently largely overlooked, it has recently been revived in Germany. Briefly, the system employs a calibrated leak into the variometer flask which, in still air, maintains the pressure equilibrium of the flask as the glider flies downhill. The leak is taken from pitot so that, as the glider goes faster more air is bled in to compensate. A valve in the system shuts off the leak for circling flight. With the valve open, and given good total energy compensation, any lift or sink is that of the air mass. Thus a ½kt burble can be spotted, even when boring along at 80kts, with some certainty, and the appropriate dolphin selected to take care of it! The leak cannot be accurate at *all* speeds but it can be made to be as accurate as the instrument it controls, across the working speed range of, say, 60-100kts.

So much for the ways and means. Modern gliders, new techniques, clever ideas, have meant startling advances in the speeds and distances possible, even within the confines or our generally modest weather. Perhaps we too will soon be seriously thinking of following the energy along the 1000km trail.

Nordic Star Produce GRP Trailers

When Nordic Star Marine, yacht builders, acquired the former premises of Torva Sailplane Ltd in Outgang Lane, Pickering, earlier this year in order to increase and extend their activities. they inherited moulds for the 15 and 19m sailplane trailers.

A large number of these GRP trailers had been built and sold previously by Torva, and Nordic Star decided to continue production of the trailers. A spokesman for Nordic Star says that laminating production is now again in full swing on the Pickering site using both hand and spray lay-up stock. Delivery of either 15 or 19m trailers can be offered within 6-8 weeks from ordering.



In the last issue Ann Welch made the point that a highly enterprising look was needed at the field of kits and home-building. Meanwhile JIM MAUPLIN has sent a progress report of what he contends is a simple to build glider.

International one-design class for the other 95%

While the debates rage all over the world about Standard Class sailplane rules, and the frontier continues to be pushed forward by expensive technology in construction and instrumentation in our sport, perhaps a quieter thing is starting at the other end of the cost spectrum. In the United States, at least, only 5% of soaring pilots appear to be seriously interested in competition; the other 95% in other aspects of soaring.

The "Duster" BJ 1B, is designed specifically for the "other end", *ie*, for the home builder. Simple, easy to build, compact and light, it is making inroads around the world.

Duster "factories"

Since its introduction by the international design team of H. Einar Thor of California, and Bengt Jansson of Sweden, the number of Dusters being built around the world has steadily grown. There are Dusters being made in France, South Africa, Canada, Germany, Australia, and New Zealand. Some 200 sets of plans have been sent out world-wide, and the Dusters are coming from "factories" in garages, barns, basements, and at least one out of an apartment in New York City.

DSK Aviation (formerly Duster Sailplane Kits) has shipped complete woodworkers kits, partial kits, and components all over the world. An interesting fact is that the ocean freight on a Duster kit from the Los Angeles area to Australia, for instance, is cheaper than land transportation to Chicago.

The reasons for the acceptance of the Duster are not hard to find. First, both Ben and Hank are long-time soaring enthusiasts, and both are aeronautical engineers. Ben's speciality is aerodynamics, and Hank ran all the stress analyses. The Duster meets OSTIV requirements for both aerotow and ground launch.

Competent observers have expressed unqualified approval of the detail and completeness of the drawings. They come with a 40-page booklet on how to build the Duster.

Second, kits are available from a complete Woodworkers kit, down to just the set of wing-attached hardware.

Third, construction is easy and simple. With the three-piece wing it can be built in a minimum of space. John Sinclair built his in a room 8ft by 20ft. The only power tools necessary with the woodworkers kit, are a = /8 inch electric drill, a disc sander, (often homemade), and a saber saw. The whole sailplane is built on a simple table made from a plank 2" x 12" by 18ft long.

Finally, the Duster is easy and fun to fly. As Ben Jansson told me one day at El Mirage, the summer he captained the Swedish team at Marfa, "If you are willing to turn away from absolute maximum L over D, you can put a lot of things into a little sailplane!" Big control surfaces give beautiful response, like a roll rate of 2½secs. You can slip the ship radically right down to the ground under full control.

It is a fine first solo sailplane, yet Walt Mooney, flying the second prototype at the Region 12 Championships at El Mirage, finished number 22 out of 34 sailplanes. He flew the only 13m sailplane, and finished ahead of twelve aluminium and glass machines, all 15m and up.

Let's encourage the top competitors, contribute to our world teams, crew for them, and applaud the progress on the frontier (at whatever cost?)—but perhaps also we can build up something the other 95% of the soaring fraternity can enjoy.

Information Pack, $1; **Plans,** $75. California Sailplanes, Box 679, Huntington Beach, California, 92648.

Kits, Components; DSK Aviation, 12676 Pierce Street, Pacoima, California, 91331.

Jim learned to fly on Primaries in North Texas, as a high school student in the 1930's. He soared the Western spurs of the Himalayas as a DC-3 "Hump" pilot during World War II, and flew Grunau Babies in Java while a civilian technical advisor to the Indonesian Air Force. At present he is a history teacher in Los Angeles, and co-owner with Norman F. Barnhart, of DSK Aviation.

Calculation of Glider Competition Speeds

IAN STRACHAN (Chairman of the BGA Flying Committee)

This article analyses the factors that go to produce a glider's theoretical cross-country (XC) speed in UK thermal conditions. It suggests formulae for comparing glider speeds, and is primarily devoted to describing the revised BGA handicap system that will operate in 1975. But more than this, it is an attempt to calculate cross-country speeds in a practical way and should be useful in flight planning, task setting, and in the theoretical analysis of cross-country flying.

It is a comprehensive review of speed calculations and its length is regretted. However, such an article should only be needed every five years or so! You may not wish to read it all. It's sections are: History, Principles, The 1975 System, Datum Thermal, Jettisonable Ballast, 100% Datum, Wind Factor, 1975 BGA Contest Handbook, Conclusion and References.

HISTORY

Handicapping in gliding has always been based on assessing the relative performance of the *GLIDER*, not, as in some sports, the ability of the participant. The first BGA handicapping system gave bonuses of marks in 10% blocks for glider characteristics such as: struts, 15m span, two seats, pre-1950 design, etc. Latterly the block interval was refined to 5% and gliders placed in "performance groups" on the basis of the views of contest pilots and starting from the values established previously in the older 10% system.

In 1966 Tony Deane-Drummond proposed that handicaps be put on a sound quantitative basis by relating them to a mathematical formula. The system devised by Ian Strachan in 1967 used cross-country (XC) speeds as a handicap criterion. These speeds were scientifically based and produced from known formulae, as opposed to previous handicap figures which were based on arbitrary intervals. At the same time, the scoring formulae were adjusted so that they fitted in with the concept of handicaps reflecting ratios of glider speeds.

In the "1967 system", the speeds were inverted and related to that of a datum glider so that the magnitude of the handicap figures was in the same sense as the older "handicap bonus" system, *ie* numerical increase of handicap percentage with *DECREASE* of glider performance. A glider whose XC speed was 1.25 that of the datum was handicapped at 1/1.25, or 80%.

The assumptions made in the calculation of XC speeds were designed to be similar to average UK competition task conditions. No wind was allowed for, on the basis that in the late 1960s the few closed circuit tasks that were completed would be balanced by other downwind tasks. It was thought right to allow for differing thermalling abilities, as in 1967 a superior thermalling performance was thought by some to override (in UK conditions) glide performance in importance. A mathematical model of the "average thermal" was therefore required, and a calculation method had to be devised which turned this into different achieved climb rates for each glider.

The datum thermal taken in 1967 was one which had been used by Nick Goodhart in his 1965 OSTIV paper (see references). This had a peak vertical speed (V_0) of 4.6kts and a radius at zero vertical speed (R) of 600ft, the vertical speed of the air reducing away from the centre according to a square law. From this theoretical thermal, a graph of actual glider rates of climb (*ISOCLIMB* lines) was prepared. To obtain the isoclimb for a given glider, its performance at thermalling speed had to be fed in to the graph, and for simplicity the Min sink point on the polar curve was taken. The effect of this procedure was, in line with real conditions, to give gliders such as the K-8 a high rate of climb from the datum thermal compared with, say, a Foka 4.

The figures of achieved climb were inserted into the standard equation for XC speed, using the correct speed to fly found by drawing a tangent to the glider's polar from the appropriate climb figure. The glider XC speeds so produced, when compared with the datum glider's (Skylark 3) at 28.3kts, constituted the handicap figures. The question is, was this degree of elaboration worthwhile and should it be continued in the future?

PRINCIPLES OF HANDICAPPING

We should now examine whether cross-country (XC) speed is a relevant criterion for handicapping. Let us say that glider A (high performance) has a speed index in the chosen conditions of 120% relative to the datum at 100%, Glider B.

Taking speed tasks first, if A finishes at 120km/h and B at 100km/h, we can immediately see that it is likely that this result is due not to pilot abilities but to glider performance. The scoring formula should give equal marks. It should do this for all other results for which the relative speeds are also 1.2, such as A at 60km/h and B at 50km/h.

In tasks involving out landings, if A goes 120km, then if we assume uniform soaring conditions and equal flight times, B will cover 100km. The relative speed index of 120% is therefore reasonably valid for distance flying too. The scoring formula should give equal marks for all other results where the relative distances are also 1.2, such as A at 240km and B at 200km.

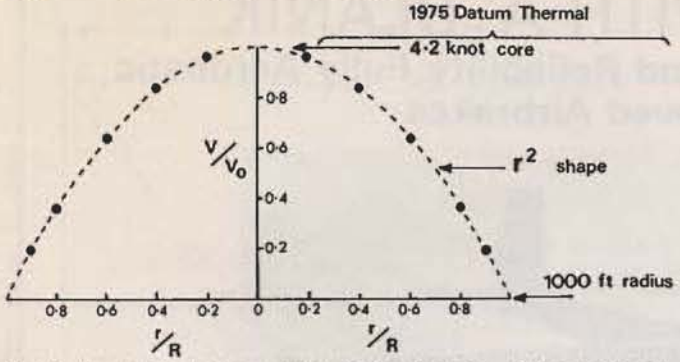
Turning now to the process of calculating the XC speeds, there is no doubt that these can be accurately produced, once the datum conditions have been defined; and an accurate series of glider polar curves agreed at suitable intervals across the performance spectrum. Other gliders with less accurate performance data can then be fitted in to the list by comparing their flying performance with better known types.

One may argue about the validity of the assumptions made in deciding the datum conditions, but if they bear reasonable relation to reality, their lack of exactitude on a given contest day should not matter because it is *RELATIVE* speeds that we are after. These should not vary too much even if conditions change from the datum ones. This same fact covers the point that nowadays much flying is done by high performance gliders without circling, just pulling up in lift. Some theoretical work has suggested that, in uniform thermal conditions, *RELATIVE* speeds derived from this mode of flying are similar to the classic "climb and glide" case that is taken in the handicap speed index calculation. Of course the higher performance glider will always have an advantage because the pilot samples more thermals in each glide and so can select stronger ones than his lower performance counterpart. Maybe in the future this could be formalised by making an assumption about a mixture of thermal strengths in the datum conditions. Mathematically this would be straightforward—time will tell whether such a refinement is called for.

THE 1975 BGA HANDICAPPING SYSTEM

It has been decided that the basic principles of the 1967 system will be retained, but with changes because of shortcomings revealed over the years.

Fig 1 THERMAL'S VELOCITY PROFILE



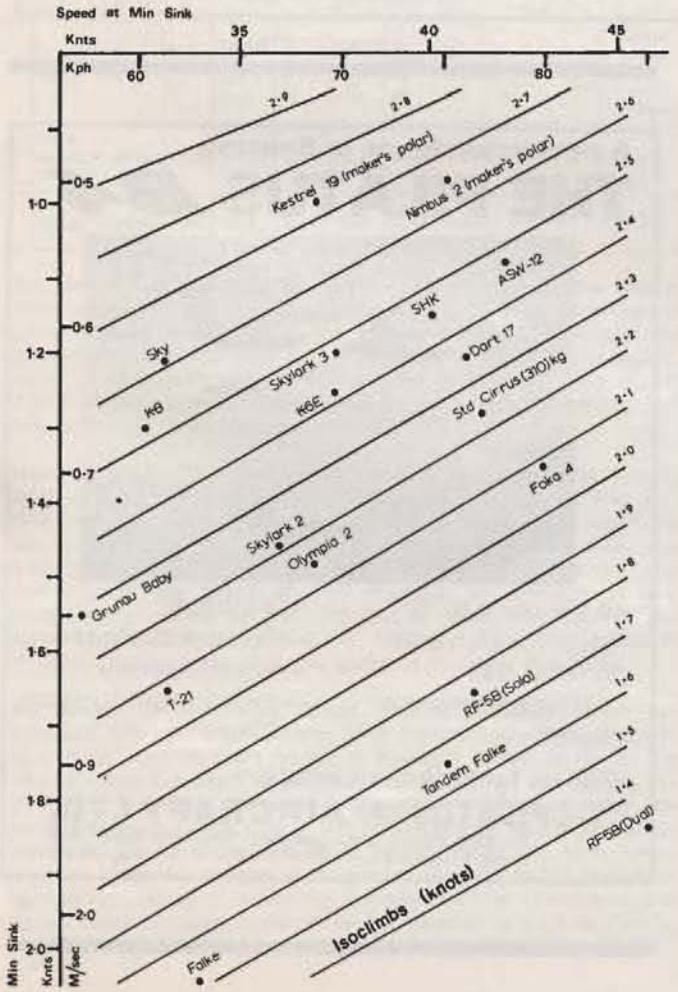
V=Vertical speed at any point in the thermal, of the rising air.
V_0=Core vertical speed (at zero radius) of the rising air.
r=Any radius.
R=Radius at zero V (maximum radius of rising air).

$$V = V_0 \left[1 - \left(\frac{r}{R}\right)^2\right]$$

BGA DATUM THERMALS		
1967		1975
600ft	R	1000ft
r^{2*}	Profile	r^{2*}
4.6kts	V_0	4.2kt

* as the above formula

Fig 2 ISOCLIMBS—DATUM THERMAL (1975—BGA SYSTEM)



The changes are listed below.

1 The wind factor (W). In the scoring formulae, wherever the handicap symbol H occurs, this will be replaced by H x W (HW). HW will be, in effect, the handicap adjusted for wind. W will be 1.0 in nil wind conditions, will be over 1 (*eg* 1.01 or an additional 1% speed index) for high performance gliders, and will be less than 1 (*eg* 0.99, or a reduction in speed index of 1%) for low performance gliders. W will be varied day by day in accordance with the actual wind conditions on the task flown.
2 The 100% handicap datum. The 100% datum, against which all other handicaps are compared, will be a cross-country (XC) speed of exactly 34kts (about 63km/h). This closely, but not exactly, compares with Std Cirrus performance, and so the Std Cirrus will be a 100% glider and may be loosely thought of as a datum glider.
3 Jettisonable ballast. A speed increment will be added to the basic XC speed calculated for any glider possessing the facility to carry and to jettison ballast. This will be calculated from the C of A weight figures, using ballast weight ratio W_2/W_1 where W_2 is the fully ballasted AUW and W_1 the no ballast AUW. The calculations are fully explained later. The speed with ballast so produced will be used for all contest days for all gliders capable of carrying jettisonable ballast, whether ballast is actually carried or not.
4 The datum thermal. The revised datum thermal has a core velocity (V_0) of 4.2kts (2.1m/sec), and a radius at zero vertical speed (R) of 1000ft (300m). Horizontal shape is assumed circular, and the vertical speed reduces from the core to the edge in accordance with an r^2 law. The datum thermal is shown in Fig 1.
5 Handicap speed index. The system will list gliders in accordance with handicap speed indexes, which will be in direct proportion to calculated XC speeds when compared to the 34kts 100% datum. They will be in numerical intervals of two, and be expressed as percentages.

The system will now be described in more detail, in the sequence in which calculations are made:

THE DATUM THERMAL

The figures for R (radius, 1000ft), V_0 (core velocity, 4.2kts), and velocity profile (proportional to r^2), have previously been stated. They were chosen for the following reasons:

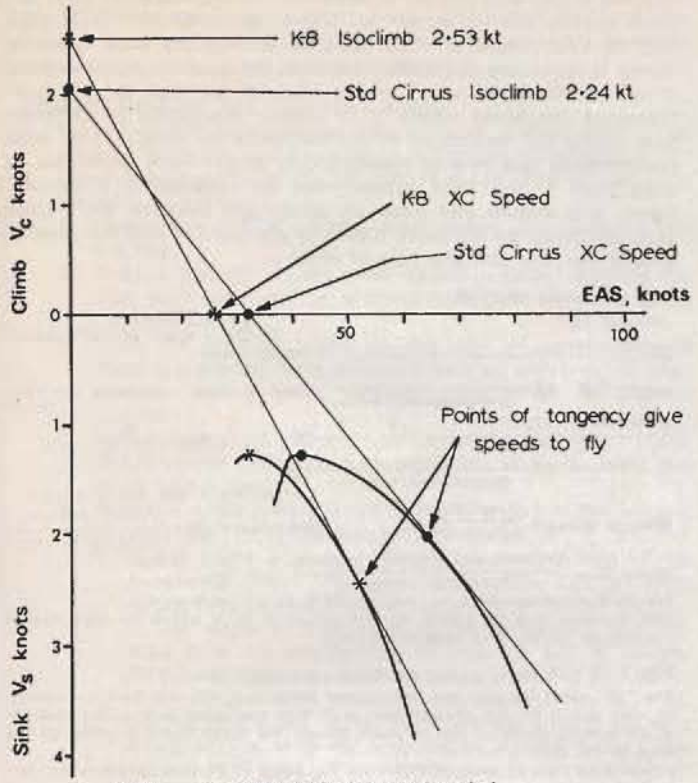
Radius. Work by Reading University based on flight tests using instrumented gliders gave an average radius of close to 1000ft (300m) over a sample of 588 thermals. Flights were made from Lasham, and from Defford (Nr Worcester) in "average soaring conditions".

Velocity Profile. Much theoretical and practical work has been done on this in the past, but only a few projects have involved flight test instrumentation recorders with a sufficiently small time constant to sample the shape of the velocity gradients across a thermal. Work by Konovalov in the USSR (see references) suggested two basic thermal types. His results have been averaged and plotted out, and indicate that one type has a profile that reduces away from the core according to an r^1 law, the second type in proportion to r. An average graph of these is close to an r^2 law.

The Reading work suggests a mixture of r, r^3 and r^4 profiles, with once again r^2 being a reasonable overall average. Finally, a questionnaire on thermal structure was circulated to all 1974 Nationals pilots, the result being that 27% preferred the "r" type, 55% the r^2 and 36% the r^1 as being the typical UK 2kts thermal. Of course, the pilots were picking drawings of *SHAPES*, they did not overtly pick the corresponding mathematical equations. The overall result of this mass of evidence was that a square law (r^2) was picked as being a reasonable average velocity profile. No claim is intended that the majority of thermals are of this shape—they may indeed all be either r^4 or r shapes (if Konovalov is right), but the claim *IS* made that r^2 is a good planning assumption for a large sample of thermals.

Core Velocity. Having fixed a 1000ft radius and an r^2 profile, a 4.2kts (2.1m/sec) core velocity was chosen. This, of course, is

Fig 3 WIND FACTOR



$$\text{XC Speed} = \frac{V \times V_c}{V_s + V_c}$$

V = Speed to fly (tangent to polar).
V_s = Sink at speed V.
V_c = Achieved climb (isoclimb).

Glider	Polar AUW	Min Sink Kt	Speed at Min Sink	Iso-climb V_c Kt	Speed to Fly V Kt	Sink V_s Kt	$V_s + V_c$	$\frac{V V_c}{V_s+V_c}$ = XC Spd	Speed Index % (100% =34kts)
Unballasted Std Cirrus	BGA Average 310kg of 4	1.28	41.25	2.24	63.0	1.95	4.19	33.65kts	98.8%
K-8	Maker's 280kg	1.30	32.5	2.53	52.0	2.40	4.93	26.65kts	78.3%

the rate of rise of the *AIR* at the thermal centre, not the rate of climb of any glider. It was chosen simply so that when actual glider figures were used in the resulting *ISOCLIMB* graph the achieved climb rates were in the 2.2-2.5kts bracket. The questionnaire to 1974 Nationals pilots resulted in a mean estimate of 2.3kts as the average rate of climb in UK competition flying and this was used to fix the core velocity.

Isoclimb Graph. The isoclimb graph was produced from figures generated by a computer programme run by Frank Irving and Nick Goodhart as part of other research. It appears as Fig 2. To use it, find your glider's Min sink and speed at Min sink and enter the graph with these values. Scales both in knots and metric units are provided. For example, an average of four independent polars on the Std Cirrus, when reduced to the same weight (310kg) gave a Min sink of 1.28kts at a speed of 41.25kts. You can see that this gives an isoclimb of 2.24kts.

XC Speed. Cross-country speed is then calculated from the standard formula which refers to a thermalling climb followed by a glide back to start height at the best speed to fly for the rate of climb achieved. A diagram and specimen calculation are in Fig 3. Note that, relative to the 100% datum of 34kts, an unballasted Std Cirrus comes out at 33.65kts or 98.8%. It should therefore be handicapped at a speed index of 98% when rounded off to the nearest even interval. The K-8 in the specimen calculation, although achieving a higher rate of climb from the datum thermal, does 26.65kts which relative to 34.0 is 78.3%, or 78% when rounded off.

JETTISONABLE BALLAST

Gliders with ballast tanks carry ballast on all but the weakest thermal days, and this gives a significant and calculable speed advantage in moderate, strong or wide thermal conditions. This, combined with the fact that the pilot can drop all or part of the ballast to extricate himself from awkward conditions, means that, in fairness to non ballast carrying machines, a method of allowing for ballast effect has to be found and incorporated into the speed index.

For the purpose of the ballast calculation, the assumption is made that on one in four contest days, an average rate of climb of 4kts (2m/sec) is achieved. This is not at variance with the concept of the datum thermal of 2.2-2.5kts rate of climb—some days will be very weak and balance out the present assumption that one in four contest days are in strong thermal conditions (for the UK). The XC speed in a glider ballasted fully up to its C of A limit is compared with the XC speed in the same glider without any jettisonable ballast. The difference between these two speeds is assumed to be demonstrated in competition flying on a one day in four basis, so for the purpose of the speed index the speed difference is divided by four and added to the basic XC speed already calculated. As a "rule of thumb", it has been established that for most ballast carrying gliders, each 10% ballast weight increment ($W_2/W_1 = 1.1$ or 110%) gives an increase of XC speed of 2½% in 4 kts lift. This rule of thumb works *pro rata* up to large ballast increments such as 50% ($W_2/W_1 = 1.5$) as long as flap settings are not changed as a result of the ballast additions.

Most gliders capable of carrying jettisonable ballast have a speed index two points more than the same glider without the ballast facility. A glider with a large ballast capability would be handicapped four points more in the scale of speed indexes. A typical ballast calculation is at Fig 4.

Fig 4 BALLAST CALCULATION

Glider	*W_1 AUW without ballast*	*Ballast weight*	*Ballast weight ratio W_2/W_1*	*V_b extra speed with ballast**	*$V_b/4$*	*No ballast XC Speed*	*XC speed + $V_b/4$*	*SPEED INDEX 100% =33kts*
Std Cirrus with production ballast	680lb (310kg)	120lb (55kg)	118%	4.5%	1.12%	33.65	34.03	100.1
Std Cirrus with modification for more ballast	680lb (310kg)	160lb (70kg)	123.5%	5.9%	1.46%	33.65	34.14	100.4

Notes: *The extra speed with ballast can be calculated either from separate XC speed figures using a 4kts climb rate, or from the rule where 10% of ballast increment (*ie* $W_2/W_1 = 1.1$) gives 2½% extra speed in 4kts lift.

The two speed index figures show why, when rounded off to the nearest even figure, the ballasted Std Cirrus is given 100% on the handicap list.

The no ballast XC speed of 33.65kts was derived from the isoclimb and speed calculation done previously (Fig 3).

THE 100% DATUM

The reason for changing the definitive datum to a speed (34kts) from a glider performance is because, if later modifications to the chosen datum glider were to change the XC speed, the whole speed index list would have to be shifted up or down in sympathy. This would be undesirable. It was tempting to pick a higher speed which would allow for increase in performance from the Std Cirrus level in the future. This was resisted because as the new system is introducing many other changes, it was felt that pilots would like a clearly defined and easy to compare 100% level to fix the system on and so a speed was picked compatible with Std Cirrus performance.

SPEED INDEXES

The reason for listing handicaps as speed indexes is to make them easier to understand and envisage. The various calculations produce XC Speed as their end result, and the list of speed indexes may well also be an aid to task setting, flight planning, and any field where it is useful to have a list of relative performances. Naturally, the BGA scoring formulae will be adjusted to take speed indexes into account. The provisional 1975 list is at Fig 5.

Fig 5 PROVISIONAL HANDICAP SPEED INDEXES FOR 1975

1 Column 1 shows a few of the previous handicaps for reference.
2 Column 2 shows previous handicaps inverted so as to be speed indexes, and reproportioned to Std Cirrus at 100%. They should thus correspond approximately with the new (1975) figures.
3 ***Asterisks indicate that the speed index applies to gliders with the ability to jettison ballast. Reduce the index by two if ballast cannot be carried.
4 Increase the speed index by two if jettisonnable ballast can be carried by gliders in the list for which no allowance has been made (*ie* no asterisk).
5 Very large amounts of jettisonnable ballast capacity may increase the speed indexes given below for gliders so modified. This will be notified to contest organisers by the Handicapping Sub Committee.

1967 System H'caps	*1967 figures inverted and Std Cirrus 100%*	*PROVISIONAL 1975 SPEED INDEXES*	*Gliders (***include Ballast)*
		120%	Nimbus 22m*, ASW-17*
		118	Nimbus 20m*, Kestrel 22m*, Jantar*
74%	119%	116	Kestrel 19m*, ASW-12
		114	
		112	Calif A-21
		110	Kestrel 17m
80	110	108	Diamant 18m, BS-1
		106	
		104	
		102	Cirrus 17m, Phoebus 17m
88	100	100%	STD CIRRUS*, ASW-15*, LS-1*, SHK, Diamant 16.5, HP-14 18m
		98	Std Libelle*
		96	Phoebus 15m*, Cobra 15, Motor Cirrus, KH-1
		94	Dart 17, Foka 5, IS-29D
		92	Pilatus B-4, Torva
94	95	90	K-6E, Foka 4, Vasama
		88	Dart 15, Olympia 419, SF-27M
		86	Skylark 4
100	88	84	Skylark 3, K-6CR, Olympia 403
		82	Pirat, Olympia 463, Fauvette, BG-135
		80	M-100s, K-14
108/106	82/83	78	Skylark 2, SF-26, K-8, Jaskolka
110/112	80/79	76	Sky, Weihe, Eagle, Blanik, K-13
		74	Mücha Std, Bocian
		72	K-7, K-2, SFS-31 Milan
124	71	70	Olympia 2, Meise, Kranich
128	69	68	Tandem Falke, ASK-16, RF-5B Sperber
150	59	52	Falke

Notes: Nimbus and Kestrel calculations have used the K-6E isoclimb of 2.42kts, as the makers' claims for Min sink appear optimistic.

Differences between columns two and three are because isoclimbs differ in the new, wider datum thermal. Also the Std Cirrus has nearly 2% added because of ballast capacity.

WIND FACTOR

Since the majority of competition tasks are closed circuit races, it was considered important to make a wind allowance that was theoretically correct for this task. The simplest closed circuit is the out-and-return, and the easiest vector diagrams to draw are for a direct into wind leg followed by a downwind leg. The basic assumption is made that the relative performance of gliders on closed circuit tasks will be similar to the upwind/downwind case, and this is used in the calculation of the wind factor W.

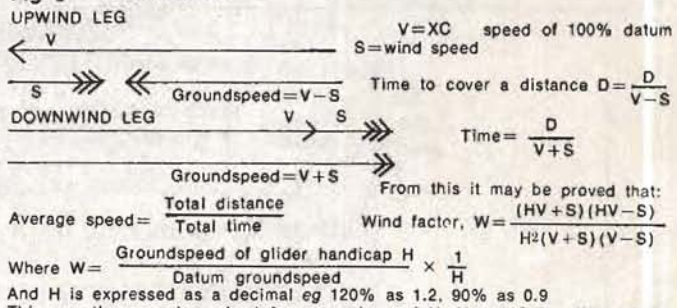
The numerical values of W are derived from the groundspeeds in Fig 6. W is the multiple to be applied to your speed index to compensate for your performance in a wind.

The table of wind factors (W) is Fig 7. For the speed index of your glider, and the actual contest wind strength of the day, find the appropriate W value. For gliders over 100% this will be a number over one. If you had a glider with a speed index of 120%, and the day wind factor was 1.03 for your glider (*ie* an addition of 3%), what this infers is that under these conditions you would score 3% more marks than you deserve and so your speed index has to be changed. In effect, your speed index is made to be 3% more adverse and becomes 120 × 1.03, or about 124%. From the table you can see that this refers to a 10kts case, which for a 120% glider gives W=1.029. This comes from an elementary computer programme based on the vector diagram of Fig 6, and inicates that in a 10kts wind in datum thermal conditions, you have a further 2.9% speed advantage over a 100% glider than is given by your listed speed index.

Conversely for gliders with speed indexes *LESS* than 100%. An 84% glider in a 10kts wind gives W=0.960. This indicates an XC speed reduction of 4% in this wind relative to a 100% glider. In effect, your speed index is more favourable to you and becomes 84 × 0.960 or about 81%.

The fundamental point to make to pilots at this stage is that, if pilots all fly with the same ability in these conditions, your relative speeds will be as 124 — 100 — 81, *AND YOU WILL ALL SCORE THE SAME MARKS* because all that the wind factor is doing is adjusting the speed indexes for wind. It is not making it more difficult to score marks (except perhaps for low performance machines where it is almost impossible to compensate fairly for reduction in performance in wind). The high performance machine is handicapped much more adversely in wind than in the 1967 system, but on (hopefully) a rational basis, and should still have an advantage because the higher your performance the more thermals you sample and the greater should be your average rate of climb.

Fig 6 WIND FACTOR



And H is expressed as a decimal *eg* 120% as 1.2, 90% as 0.9

This equation may be solved for any values of H, V and S by slide rule or computer. In the BGA system V=34kts

Fig 7 TABLE OF WIND FACTORS "W"

The "W" value for each handicap speed index is to be read from the column of wind speed for the contest day. W is then multiplied with speed index H in the scoring formulae and in effect adjusts the speed index to allow for the wind of the day.

The wind factors are calculated on the basis of an upwind/downwind out-and-return, which approximates to any closed circuit task.

Scorers and other interested parties will be provided with a more comprehensive table giving speed indexes at 2% intervals and wind speeds at 1kt intervals where W is already multiplied by H. This table will be the definitive one for scoring purposes.

The left hand column is for information only and gives some gliders through the performance range so that you can see the effect of W in practical terms.

Glider	*Handicap Speed Index 'H'*	*Wind Speeds (kts)* 5	10	15	20 and above
ASW-17	120	1.007	1.029	1.074	1.162
Kestrel 19	116	1.006	1.024	1.062	1.136
	112	1.004	1.019	1.049	1.107
Diamant 18	108	1.003	1.014	1.035	1.076
	104	1.002	1.007	1.018	1.040
Std Cirrus	100	1	1	1	1
Cobra 15	96	.998	.992	.979	.955
Pilatus B-4	92	.996	.983	.956	.904
Dart 15	88	.994	.972	.930	.846
Skylark 3	84	.991	.960	.899	.779
	80	988	.947	.864	.702
Sky, Weihe	76	.984	.931	.823	.613
K-7	72	.979	.912	.775	.508
Olympia/Meise	68	.974	.890	.719	.5
Falke	52	.947	.757	.5	.5

Notes:

1 W is not allowed to fall below 0.5 to avoid anomalies in scoring if low performance gliders are flying.
2 Above 20kts the W figures are not considered reliable because they become more extreme as the 100% datum of 34kts is approached. 20kts is picked as the cut-off because the handicap differential HW has doubled at 20kts from its nil wind interval of 2%.

SELECTION OF THE WIND TO APPLY FOR SCORING PURPOSES

The contest Met man will be asked to quote the Geostrophic Wind (2000ft wind to pilots) for 1400hrs local time. It will be an average wind for the area over which the leading glider flew on task. Contest pilots' wind estimates are not to be used, the wind is to be assessed from the synoptic situation. The Met man will be briefed on the relevant area and time by a contest official.

To put likely wind conditions into perspective, an average UK contest wind for closed circuit tasks over the seasons 1971-73 was about 11½kts. Taking the days in these three years on which closed circuit tasks were set and flown (but not necessarily completed), an analysis of wind records was made by Ron Cashmore. Taking the 3000ft wind well inland over Southern

England (free of coastal effects), the results were averages of 11.2kts (1971), 10.8kts (1972) and 13.0kts (1973). The overall three-year mean was 11.44kts. On individual days the contest wind varied from 2kts to 32kts, and for entire contests the average wind varied from 6 to 20kts.

APPLICATION OF THE CONTEST WIND

1 *Closed circuit races where one or more gliders finish.* The table of W values will be used as described previously.

2 *Other than completed closed circuit races.* The scorer is to proceed as follows:

a Obtain the official contest wind speed and direction for the day.

b Draw a line 90° to the wind direction (true) through the task start point on the scoring map (line b). This is the "crosswind line".

c Take the leading glider on the day in unhandicapped scoring distance. Note either its landing point, or its most upwind turning point rounded, whichever is furthest upwind.

d Join this leading glider's position to the task start point. This line will define by how much the W factor table will apply to the day.

e Note the angle from the crosswind line (b) to the leading glider's line (d) to the nearest 5° interval.

1 If this angle is zero, or is on the upwind side of the crosswind line (b), then apply the official wind strength to the wind factor table in the normal way.

2 If this angle is downwind of the crosswind line (b) then it is not appropriate to use the full W values. Reduced W figures will be applied from Fig 8.

An allowance is made on Fig 8 for downwind conditions where the higher performance gliders are at a disadvantage with an unadjusted speed index. The indexes for gliders over 100% are therefore reduced for downwind conditions and those for gliders below 100% are increased.

Fig 8 WIND FACTORS IN A DOWNWIND SITUATION

DOWNWIND ANGLE (Crosswind line to line of leading glider on the day)	*DOWNWIND FACTOR (To be multiplied by Contest wind for the day)*	
5°	0.9	
10	0.8	
15	0.7	
20	0.6	
25	0.5	
30	0.4	
35	0.3	
40	0.2	
45	0.1	
50	0	
55	0.05	With speed index used in table W used such that the difference from 100% is in the opposite sense to normal, *eg* for 120% actually use 80% and for 90% use 110, in table W only.
60	0.1	
65	0.15	
70	0.2	
75	0.25	
80	0.3	
85	0.3	
90	0.3	

BGA CONTEST HANDBOOK

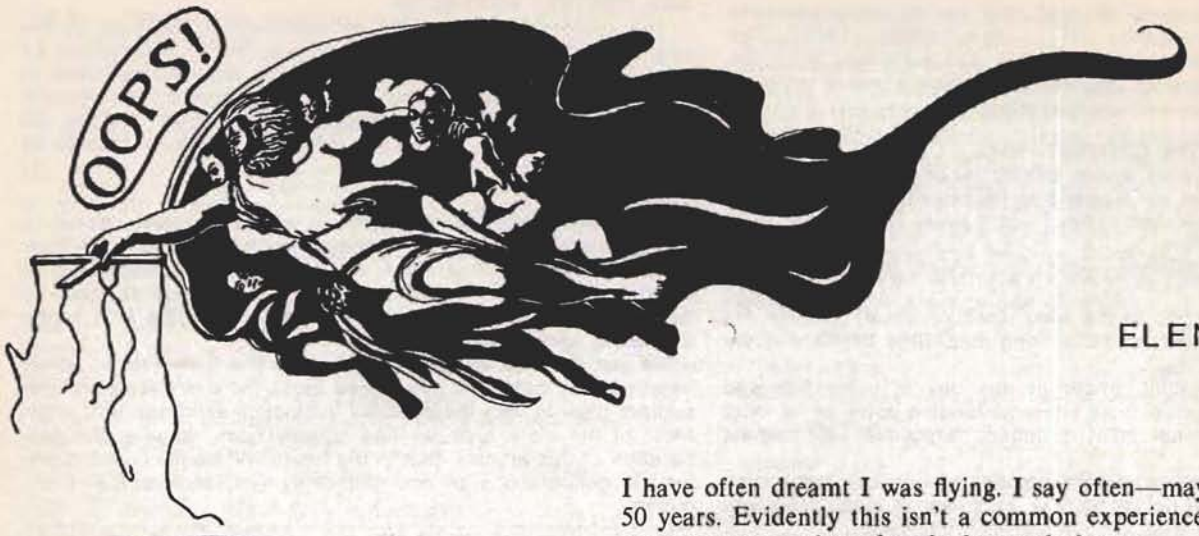
The contest handbook will be amended in the light of the new scoring system. In addition, instructions to scorers will be issued, which will contain the definitive wind factor table in intervals of 2% speed index and 1kt wind speed. The scorers' table will contain the wind factors already multiplied by the speed index (H × W) so that this calculation does not have to be repeated.

CONCLUSION

The new system does not claim to be the complete answer to the problems of modern competition handicapping. It may appear complex at first sight, but most of the complexity is in the theory and not the execution of the system. It is designed to be fair to both high and lower performance gliders in a range of soaring conditions.

To put the system into perspective, the only future action required is to publish a new speed index list every year; and the scorers have to vary the effective handicaps each day with wind. Most of the work required has already been done in the preparation of this article—that in the future will be minimal but will include deliberations on new gliders by the Handicap Sub Committee.

References: Handicapping for British Contests—S&G 1961 p45.
Glider Performance, A new Approach—H. C. N. Goodhart, presented at the tenth OSTIV Congress, South Cerney, June 1965.
Glider Handicapping—A. J. Deane-Drummond, S&G 1966 p260.
Structure of Future British Competitions—J. Delafield and I. W. Strachan, S&G 1967 p46.
BGA Handicapping System—I. W. Strachan, S&G Dec 1967 p459.
Thermal Structure — V. Konovalov (Leningrad Institute of Sciences), OSTIV Congress 1970.
Suggestions on Handicapping—M. Wells, S&G 1973 p168 (comment p170).
Handicap System Questioned—M. Wells, S&G 1974 p91 (reply p93).
Rating and Handicapping—A. J. Watson, S&G October 1974 (reply p236).



ELENA KLEIN

From Greek Mythology to the Low and Slow brotherhood of hang gliders, the vision of flight has persisted in the dreams of men. And even in the dreams of women—though they are more reticent about it. But reticence isn't my bag. Flying is.

A Bird's flight

"... the only reason I'm telling it is because I think it should be...

I have often dreamt I was flying. I say often—maybe ten times in 50 years. Evidently this isn't a common experience; that is to say, not everyone, male or female, has such dreams.

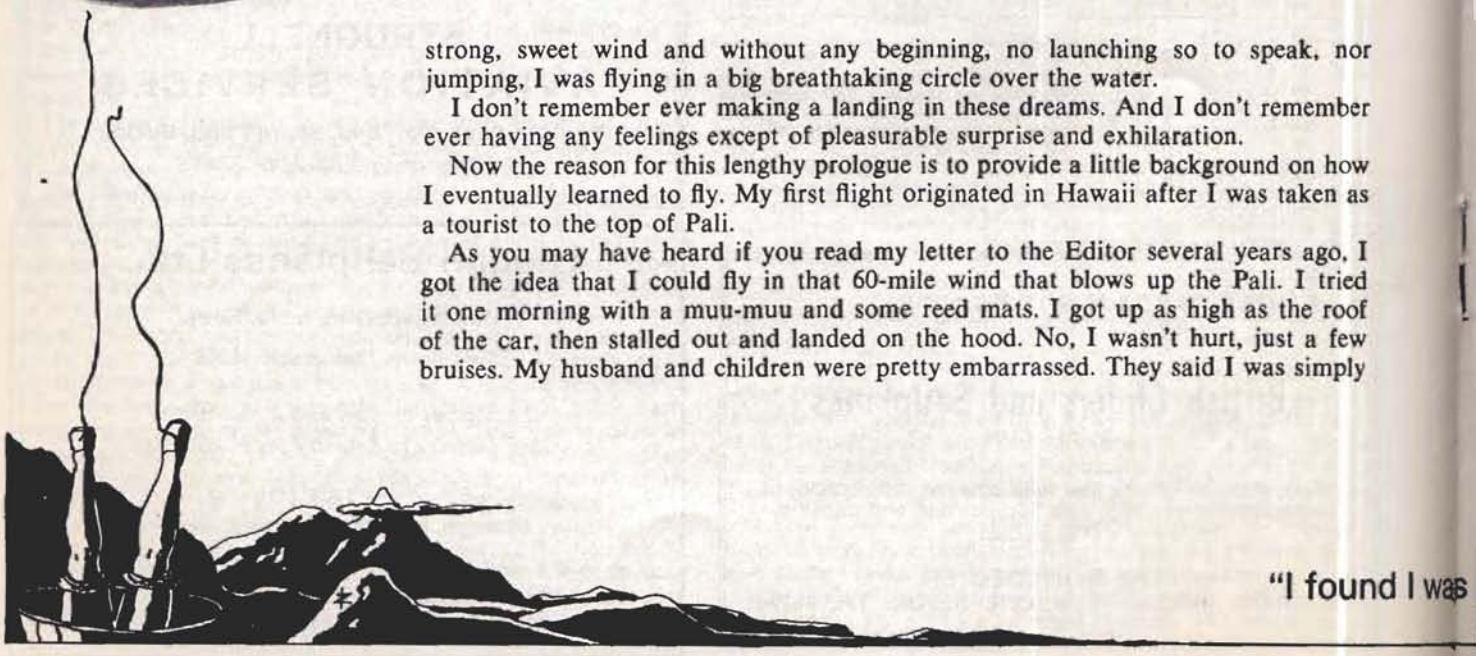
The first time was when I was in high school. I dreamt I was in the balcony of the gym. I leaned over too far and started to fall, then found as I relaxed that I was floating, face-down, about 10 feet off the floor. I "swam" a bit, though it was more the way fish swim than people, and found I could "zoom". I put my nose down to pick up speed, pulled up and soared over the basketball basket and . . . the dream ended.

Another time, this was after I married and had several children, I dreamt I was on a cliff at the seashore. I remember feeling a strong, sweet wind and without any beginning, no launching so to speak, nor jumping, I was flying in a big breathtaking circle over the water.

I don't remember ever making a landing in these dreams. And I don't remember ever having any feelings except of pleasurable surprise and exhilaration.

Now the reason for this lengthy prologue is to provide a little background on how I eventually learned to fly. My first flight originated in Hawaii after I was taken as a tourist to the top of Pali.

As you may have heard if you read my letter to the Editor several years ago, I got the idea that I could fly in that 60-mile wind that blows up the Pali. I tried it one morning with a muu-muu and some reed mats. I got up as high as the roof of the car, then stalled out and landed on the hood. No, I wasn't hurt, just a few bruises. My husband and children were pretty embarrassed. They said I was simply



"I found I was

too old and fat to be making a public spectacle of myself. I'm not all that heavy and I didn't think anyone was watching.

This was after I had read quite a bit about hang gliding and Rogallo wings. It seemed a lovely way, but my husband thought it was dangerous and wouldn't hear of my trying it. Of course, he thinks *any* kind of flying, except in sailplanes, is dangerous, and only uses the airlines because he has to go to New York on business.

As a matter of fact he was in New York the first time I did this thing. I had gone to the opera alone. It was *Tristan and Isolde*, and you know how long and dull it can be. I finally fell asleep during the last act. There was Tristan and Isolde bellowing and dying way down there on the stage (I was in the next-to-last row in the balcony) and I just dozed off.

I heard the roar of applause at the end and I recall thinking I would sit still until the crowd thinned out. Well, when I woke up, the crowd had disappeared and there was no one but me left. The lights were beginning to go out, though they were still on in the orchestra. I stumbled down the steps to the railing and looked over. The boxes and grand tier were also deserted.

"Oh, hell," I thought, "why don't I just fly down before I get locked in?" So I did. Now, I *wasn't* asleep. Granted I wasn't fully awake, otherwise I'd never have had the nerve. I was in that groggy state when you've had a nap and feel like you're floating, you know? So I just floated

— or fantasy

.. well, ***shared.*** And scientifically researched."

over the grand tier and boxes down to the middle aisle of the orchestra section.

I remember thinking, "Oh gosh, how do I land when I fly?" When there I was flat on my face with my skirts up to my waist and my purse open and lipstick and wallet spilling out everywhere.

An usher came running down the aisle and helped me to my feet and started picking up all my junk.

"Did you fall, madam?" he asked.

"Of course I fell, you idiot," I answered.

I grabbed my purse from him and walked briskly to the exit. All I could think was, my God, what if they had seen me? But then it struck me as funny and I was alternately laughing and being astonished. *How* had I done it?

I wasn't really sure. And I still can't explain it in terms of physics or aerodynamics. In fact, it is against all the laws of aerodynamics. I've read plenty since then about all kinds of flight—birds, insects, aeroplanes. Did you know that aerodynamically-speaking bumble bees can't fly? And of course people can't. Only I did. But I never told anyone until now. And the only reason I'm telling it is because I think it should be . . . well, *shared*. And scientifically researched. I know perfectly well that if I could do it, then it's been done before. Take levitation. Saints, mystics, possessed people levitate, rise up several feet into the air in defiance of gravity. So if it can be done under some kind of spell . . . but that isn't flying or gliding *through* the air.

Naturally, it was very much on my mind following this first experience. I even wondered if it had really happened, at the same time knowing it had. And of course I wanted to do it again. But I wanted to be alone and I wanted plenty of room.

Our apartment simply isn't big enough and it's too cluttered. I did give some thought to the church, but it's practically impossible to be sure no one will come in and I wouldn't want the Bishop to get involved in the question of whether my "gift" was a sign of sanctity or the work of the devil.

But there should be plenty of places outdoors, so I began taking drives down the peninsula and over to the coast, always with an eye to a good take-off spot. It seemed as though it should be high and not too wooded and not over water as I don't swim. I finally decided on a place where the land falls off into gently rolling grassy hillsides towards the ocean.

I parked the car on an unused looking dirt track. It was a clear, pleasantly cool day with some high cirrus clouds and a roll of fog towards the horizon.

I felt agreeably excited. I had done a lot of thinking and bird-watching since *Tristan and Isolde*. You know about *Peter Pan*? I figured James Barrie must have known how to fly. And Shakespeare, of course. Little Puck "putting a girdle round the earth". But none of them said anything about how to land.

Watching seagulls had given me some ideas. They tuck their tails under and spread their wings kind of vertically as a brake and gently drop in on both feet. It looks easy but then I don't have any tail feathers for braking. I thought nostalgically of those dolman sleeves we wore before the war, sleeves that draped from the wrist to the waist in a sort of batwing. But they are dreadfully passé. I was wearing slacks and a long-sleeved shirt.

My experience at the opera made me realise that I was not doing a physically feasible thing. It was more in the realm of *ESP*. I was using a facility that was outside the laws of aerodynamics, but not necessarily in the province

s heading right into a rocky outcrop and I just hadn't enough experience manoeuvring."

"... but then I don't have any

tail feathers for banking!"

of faith because it was in no way connected with religion or ecstasy or whatever makes people levitate. It was in some way related to the subconscious . . . if I had been fully awake at the opera I wouldn't have dared.

Now, here on the knoll near the skyline, I was a little puzzled how I was going to achieve the proper state of subconsciousness. I walked down the dirt road to where it skirted the knoll, both to achieve subconscious control and to survey the area. I started jogging and leaping just a little over the ruts and generally began feeling quite bouyant. So bouyant that when I came around a curve of the road and the hill fell away abruptly, I simply leapt into the air and there I was swimming more than flying, skimming over scrub, zooming up over an oak tree and rolling over on to my back on a palpable cushion of air. Divine! You just can't imagine.

Well, I got carried away. When I rolled back on to my belly, I found I was heading right into a rocky outcrop and I just hadn't enough practice manoeuvring. I'm sure now that if I had arched my back and twisted my shoulders in just the right way I would have made it round the rock. But, as I say, I was simply too inexperienced.

I must have put out my hand to protect my head. I think that must be why my wrist was broken. Then when the rest of me thumped into the rock there was nothing to hold on to and I rolled or slid down to a sort of broad shelf.

The view was breathtaking but my wrist was killing me. I had lost my glasses and both knees were sticking out of ragged holes in my slacks. But I was able to walk. I made it back up to the skyline at dusk only to discover that I was at least a mile south of where I had left the car.

I didn't feel I could walk another mile and I wasn't going to try to fly there. So I staggered on with my hand in a sling made by tying my shirt tail to my collar. I didn't hesitate a minute when a car stopped alongside. I just climbed in and flopped.

"Cheeze! You're hurt!" the young man said. He had a blond Afro, kinky blond hair that frizzed out like a sleazy halo, and a wispy fuzzy beard and round blue eyes. He looked like something that lived under a toadstool. But I didn't care so long as I could get to my car and get my wrist to a doctor.

Would you believe it? I had lost my keys. This hippy kid was trying to wire the car when the sheriff's deputy drove up in a county patrol car. I had a terrible time convincing them I hadn't been kidnapped or robbed.

My husband, too. He *knows* I never go hiking by myself or with anyone else. He still thinks I was trying to protect the kid, but of course he, the kid, couldn't be arrested if I wouldn't file a complaint.

So I haven't made any more attempts, but believe me, I'm not through with this. My wrist is still stiff, but I have undertaken a course in gymnastics and I'm practising (when I'm at home alone) jumping off chairs. I keep wishing our house was bigger and that we had a long flight of stairs. But there are some old mansions in the Mission District with very steep outdoor stairways . . .

Measured Glider Performance

RICHARD FORTESCUE

A number of reports on glider flight trials have been published in the last decade and, despite a few puzzling discrepancies, sink rates in still air are now established a lot more precisely than they used to be. Readers of S&G may find the summary given in the table below useful, though it is as well to remember that the influence of turbulence in the atmosphere through which one flies may be more for some gliders than for others.

Speeds and sink rates, of course, depend on the weight at which a glider is flying. The figures given are generally representative of the empty glider plus 200lbs for pilot, parachute and instruments: in practice wet batteries, oxygen cylinders, waterballast, etc are quite likely to lead to an appreciably higher all-up weight.

This does not have a great influence on the glide ratio, but the tabulated speeds and sink rates should be corrected by multiplying them all by the factor "square root of new weight ÷ weight given in table." (Since the "4kts" in the last column but one also has to be corrected, this system does not give a new 4kts sink speed directly. A good approximate method of deriving this is to increase the 4kts speed given in the table by one quarter of the percentage increase in flying weight. Thus a 20% increase in flying weight will increase the speed for 4kts sink by about 5%).

The measured polar curves all seem to follow the shape predicted by simple theory as closely as their probable accuracy would allow, except at speeds near, or below, the speed for best glide ratio. The curve can therefore be drawn out on squared paper for any glider, using the tabulated figures and the following procedure:—

1 Correct the tabulated figures for the glider concerned for any change in all-up weight, as outlined above.

2 Select three or four convenient speeds (above that for the best glide ratio) at which the sink rate will be calculated, *eg* 60, 80 and 100kts. For each of these calculate the square of its ratio to the weight-corrected "basic" speed. Denote this ratio by k, *eg* if the corrected basic speed is 55kts, k for 80kts is $(80 \div 55) \times (80 \div 55) = 2.1$.

3 Then calculate the glide ratio for each of the selected speeds by dividing twice the best glide ratio by $(k + 1/k)$: *eg* if the best glide ratio was 35:1, the glide ratio at 80kts with $k = 2.1$ is given by $70 \div (2.1 + 0.475) = 27.2$.

4 Finally, derive the sink rate for each of the chosen speeds by dividing that speed by its glide ratio. In the example given, the sink rate at 80kts is therefore $80 \div 27.2 = 2.95$ (to the nearest 0.05).

5 By plotting these speed and sink figures, together with the weight-corrected minimum sink and best glide points obtained from the table, the polar is defined. (The smooth curve drawn should, of course, finish parallel to the speed axis at the minimum sink point: what happens at even lower speeds is too uncertain to be of much significance).

The "basic" speeds used in this procedure differ slightly from the measured best glide speeds. They have been chosen to fit the measured polars at about 4kts sink rate, and slight departures from the assumed form for the curves, at lower speeds, account for these differences.

Indicated speeds on the ASI and vario may differ from those tabulated owing to instrument errors. The true speeds will also be higher than the tabulated figures at high altitudes, though this should not influence the glide angles. The correcting factors are quite large, the table speeds and sink having to be multiplied by 1.08 at 5000ft, 1.16 at 10000ft and 1.37 at 20000ft.

Glider	Best Glide Ratio at Speed (kts)		Weight (lbs)	Wing Loading	Min Sink at Speed (kts)		Basic Speed	4-down Speed	Ref
Nimbus 2	46	51	955	6.15	1.0	43	50	95	1
Diamant 18	41	50	880	5.75	1.1	42	46	86	1, 2
Kestrel 17	40	54	835	6.7	1.25	46	55	96	2
Cirrus	38	48	805	5.95	1.2	43	46	84	1, 2
Phoebus 17	38	50	790	5.25	1.25	44	47.5	86	1, 2
Dart 17R	36	45	780	5.25	*	40	44	80	3
Skylark 3F	32	39	750	4.35	1.2	36	37	69	4
Std Cirrus	36	50	650	6.05	1.25	40	47.5	84	1, 2
ASW-15	36	49	670	5.65	1.25	42	47	83	1, 2
Std Libelle	35	50	625	5.95	1.3	43	46.5	82	1, 2
Pirat	30	46	760	5.1	1.4	38	45.5	76	1
K-6CR	29	42	605	4.55	1.3	36	40.5	70	1
K-8	25	37	615	4.06	1.35	31	36.5	62	4
Olympia 2	22	42	630	3.9	1.6	35	38.5	61	5
K-13 (400lbs load)	26	48	1040	5.5	1.65	39	* 45.5	72	1

Wing loading lbs/ft^2. All speeds in knots EAS (*ie* corrected for ASI error). If two references differ, a mean has been taken. *The report gives 1.15, but 1.2 would conform much better to the figures given for the other gliders.

BGA & general news

Christmas 1974

A message from Chris Simpson, Chairman of the BGA

The demands of the publishers of S&G compel me to write this message almost before the end of the summer soaring season. When writing it a year ago I did not foresee that before publication the energy crisis would be upon us in the meantime. Consequently I embark upon the present task with a certain amount of trepidation.

1974 has shown a marked increase in both the quantity and quality of UK cross-country flying and in soaring, both in competitions and otherwise. There is no doubt that the sponsorship given to us by *The Daily Telegraph* has helped our top pilots, by means of the foreign competition in Euroglide, to master the techniques of high-speed flying at a greater rate than if they had had to learn them on their own. The financial help given by *The Daily Telegraph* to the BGA as a whole has, of course, helped to keep down costs and thus to benefit our clubs.

The energy crisis has made its impact on clubs but, such is the resourcefulness of those who glide, the cut back has been much less severe than in other fields of aviation.

Christmas is not a time for gloom, but the current economic crisis must surely have an adverse effect on gliding in 1975. The BGA's landlords at Artillery Mansions propose to increase our rent between three and fourfold. A decision to move from London has been taken and by the time you read this I hope a firm decision will have been taken as to our destination.

The CAA propose in 1975 to increase the size of the London TMA and to discontinue the right for gliders to penetrate it in VMC. Negotiations to improve the situation are being strenuously continued.

On the brighter side, eight pilots have been chosen to form a "squad" from whom four will ultimately be chosen to represent Britain at the World Championships in Finland in 1976.

The air traffic census taken in 1973 and published this year shows that at weekends the greatest number of British airspace users are gliders. Long may this continue.

Whatever the future may hold, I am confident that gliding will continue to give to its participants the individualism and freedom which they seek.

Let me again thank all those who make our sport possible.

A HAPPY CHRISTMAS and a successful NEW YEAR.

THE BRITISH TEAM

Eight pilots from whom the British Team will be chosen for the World championships in Finland 1976, have been approved by the BGA Executive at their meeting on October 2. Listed alphabetically, they are George Burton, John Delafield, Bernard Fitchett, Barry Goldsbrough, Ralph Jones, George Lee, Ronald Sandford and John Williamson with Roger Barrett as the Team Manger.

There will also be a reserve list, not announced publicly, which will be used to bring forward additional pilots if any of the eight are not available for Finland or cannot take part in team training.

The Championships are from June 13-27 at Räyskälä airfield, 80km NW of Helsinki, with the practice week from June 5-12.

BGA MOTIF COMPETITION

The BGA is holding a competition for the design of a BGA symbol or "motif". The design should be suitable primarily for printing in a single colour on letterheads and other literature. It should also be suitable for use on ties, scarves, blazer and car badges, where up to three colours could be employed, including the background as one colour.

Designs should be entered as reasonably finished drawings, actual size, showing use as letterhead *and* as blazer or car badge.

Please apply to the BGA office for an entry form which should be returned by the closing date of 31 January 1975. No one entrant is permitted to submit more than 5 designs.

The winning entry becomes the property of the BGA to use or not at their discretion. Other designs will be returned to the entrants only if accompanied by a suitably sized SAE.

The winning design will be awarded the prize of £25 plus 1 year's free subscription to S&G.

NEW BGA TECHNICAL OFFICER

R B "Dick" Stratton C Eng, FRAeS, FSLAET, MCASI, has been appointed the BGA Chief Technical Officer on a part-time basis, and will continue with his other consultancy activities in the general aviation field.

Dick Stratton served in the RAF as Flight Engineer on Sunderland flying-boats, before transferring to the Technical Branch, and joined Saunders-Roe Limited as Chief Flight Engineer on the ten turbine-powered 140 ton "Princess" flying-boat. He claims to hold the UK record for most in-flight engine failures in any one aircraft at any one time, when they abandoned their flight to the SBAC Show in 1952, with 40% engines "out" on one wing alone! In 1953 after this experience, he took up gliding and attended the Home Command Gliding Instructors' Course at RAF Detling in 1955. He received his BGA category from Ann Welch at the Isle of Wight Gliding Club in 1956 and has been instructing with the RAFGSA Clubs at Andover, Upavon and Bicester ever since.

Dick holds unique qualifications in the general aviation sphere of activities, with PPL's rated for single, twin and helicopters, and CAA Maintenance Engineer's Licence in categories A and C for light aircraft and helicopters. He is also a Class 1 PFA Inspector and Senior BGA Inspector with all ratings.

He pioneered the new maintenance of airworthiness philosophies, culminating in the publication of CAA's General Purpose Maintenance & Certificate programmes and is currently trying to argue the case for sizeable extention of overhaul life for Gypsy Major engines, since he has been instrumental in certificating 14 ex-RAF Chipmunks in the last 18 months!

Based at Kidlington, Oxford, he will be readily available to the BGA, both in London and in the field.

RADIO FREQUENCIES CONFIRMED

Further to glider frequency changes as reported in the August issue of S&G (p182), CAA has confirmed the following:

1 In addition to the exclusive use of 130.4MHz, as from November 1974 glider operations may also have the exclusive use of 130.1MHz.
2 From the same date for a trial period of one year, 129.9MHz, which is currently shared with other users, may only be used by glider operations for ground/ground communications, *ie* in prelaunch activity and during recovery. The frequency will remain shared with other users.
3 If the trial period is satisfactory, the use of 129.9MHz for ground/ground communications will be confirmed and the present ground/ground frequency 121.65MHz will no longer be available for glider use.

LATEST ON LONDON TMA CHANGES

The London TMA changes are a cloud over many clubs and at the moment the whole matter is very much under discussion. However, John Ellis, Chairman of the BGA Airspace Committee, is writing an article for the next issue explaining the proposals and progress made in the negotiations, and to give the current position he has issued the following statement:

"On October 14 we had a meeting with the Director of NATS, Air Marshal R. G. Broom, and he promised to look at our proposals for alterations to the north east of the new TMA. He also said that we would be able to discuss a modification of the current Rule 22 exemption."

CHRISTMAS COMPETITION

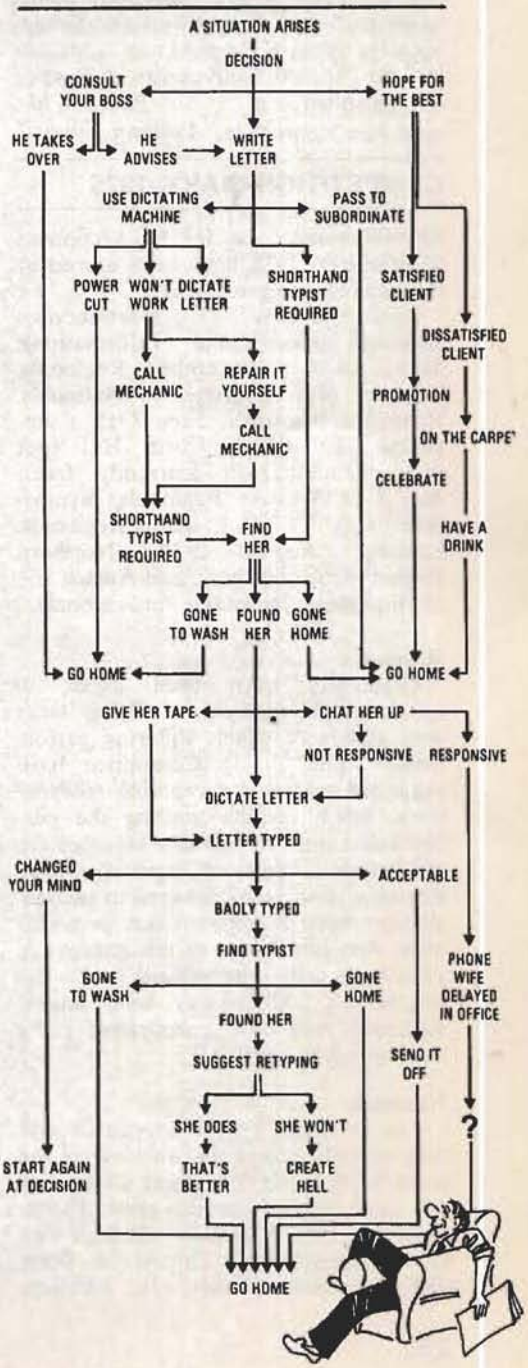
It is well-known that glider pilots find the weather forecasts given on the television service of the United Kingdom Broadcasting Corporation frustratingly incomplete and irrelevant. Mindful of this, the British Gliding Association has infiltrated the service with a forecaster whose one ambition is to convey as much useful information to glider pilots as is possible in the limited time allowed for a forecast.

Since he cannot be seen to favour a single sport openly, he has had to resort to subterfuge: he has persuaded the Director-General that in each forecast the needs of a particular sport will be catered for, and in this way every sport will get a forecast oriented towards it once a month or so. But unbeknown to the Broadcasting Corporation, our infiltrated forecaster will in fact always be addressing himself to glider pilots whilst pretending to be referring to cricketers, judo enthusiasts, potholers, and so on.

A prize of a year's subscription to S&G will reward the author of the best such forecast, ostensibly for a sport other than gliding, but in fact conveying information to glider pilots. We will print the best entry, and others if their standard warrants it. Send your forecast to 281 Queen Edith's Way, Cambridge CB1 4NH, to arrive by first post on Monday, December 16, in envelopes marked "S&G Christmas Competition".

ARM-Chair Pilot

THE BGA SYSTEM ANALYSIS



LONGEST NATIONAL LADDER

Richard Aldous (Airways) heads the longest National Ladder list since the scheme began with four flights which include a 500km triangle and two 400km triangles flown in August alone.

Leading Pilots	Club	Pts	Flts
1 R. Aldous	Airways	5801	4
2 A. Purnell	Surrey & Hants	5459	4
3 C. Lovell	Surrey & Hants	4598*	4
4 S. N. Longland	Cambridge Univ	4543	4
5 P. Loewenstein	Surrey & Hants	4337*	4
6 G. S. Neumann	Cambridge Univ	4318	4

*Flights in club gliders

AVIATION COUNCIL

Following the retirement of Kenneth Davies, Ann Welch has been elected Chairman of the FAI Committee of the Aviation Council. She has been nominated to follow Kenneth as the British Vice-President of the FAI and is attending the Annual Conference in Sydney in November. *Philip Wills,*

Chairman, Aviation Council.

COMPETITION DIARY, 1975

The following dates for BGA contests in Britain in 1975 have been agreed at the time of going to press.

April 30–May 11, Inter-Services Regional (provisional information); May 10–18, Wycombe Regionals, Booker; May 24–June 1, Nationals, Husbands Bosworth; June 7–15, Competition Enterprise, North Hill (not rated); June 21–29 (currently free); July 5–13, Western Regionals, Nympsfield; July 19–27, Lasham Regionals, Lasham; August 2–10, Northern Regionals, Sutton Bank, and August 16–25, Euroglide, Dunstable (provisional).

Regionals

Organisers have been asked to consider the problem of flying tasks with gliders of widely differing performance. The Flying Committee have suggested various acceptable alternatives, which include limiting the performance spread of gliders accepted for the contest, and in particular one Regional is being encouraged to exclude gliders above Standard Class performance. Any limitations of this nature are voluntary (by agreement of the organisers) and in any case several Regionals will have unrestricted entry as in previous years.

Nationals

The structure will be similar to that used in 1974 except that in view of the small support for the Sport Class, this will now not be handicapped. Essentially the 1975 Nationals will be a two Class unhandicapped contest for Open and Standard Classes. In addition, gliders in the performance bracket Cirrus 17m and below (from the BGA Handicap List 102% and below) may enter and fly with the Standard Class unhandicapped — this list, which will include the Standard Class, will be the Sport Class.

Entry priority will be from the published rating list up to a total of 45 gliders. The minimum numbers from the Open or Standard Classes will be 15, achieved by limiting the entry in the other Class.

Euroglide

About 15 European pilots will be invited to fly in this Championship, which, as in 1974, will be unhandicapped and consist of Open and Standard Classes. Entry priority for British pilots will be from the rating list up to a total of 40 gliders. British pilots will get a "rating" for 1976 from this contest which for this purpose will have equal status with the 1975 Nationals. Placings used for the 1976 rating list will include the European pilots—ie a pilot placed fifth overall but third amongst the British pilots, would be rated fifth.

General

1 Pilots may enter both Nationals and Euroglide if they wish. Pilots wishing to fly in only one of these contests may apply for both but indicate a preference for one. Pilots applying for only one contest will be given precedence over pilots already accepted for the other contest. Team entries will not be accepted for Nationals or Euroglide.

2 The four Nationals status classes will be merged for the 1976 rating list in an order of precedence based on the total gliders flying in the class. For the British Nationals, the Open and Sport lists will be used.

3 Entry Forms. For Regionals, apply to the Organisers. For Nationals and Euroglide, apply to the BGA office and these must be returned to the office by January 31.

Ian Strachan,

Chairman, Flying Committee.

GLIDING CERTIFICATES

ALL THREE DIAMONDS

No.	Name	Club	1974
40	J. D. J. Glossop	Bicester	2.8
41	J. J. Ellis	Airways	27.8

DIAMOND DISTANCE

No.	Name	Club	1974
1/69	J. D. J. Glossop	Bicester	2.8
1/70	P. N. Loewenstein	Surrey/Hants	2.8
1/71	R. F. Aldous	Airways	2.8
1/72	J. J. Ellis	Airways	27.8

DIAMOND GOAL

No.	Name	Club	1974
2/561	P. S. Whitehead	Cambridge Univ	4.6
2/562	C. D. Rowland	Bath/Wilts	19.5
2/563	R. G. Pitman	Kent	4.6
2/564	C. D. Street	Surrey/Hants	5.8
2/565	J. R. Osborne	Four Counties	6.8
2/566	A. Kay	Thames Valley	6.8
2/567	D. C. R. Pearce	Cambridge Univ	4.6
2/568	D. E. Schofield	Swindon	4.6
2/569	P. A. Blacklin	Derby/Lancs	18.8
2/570	A. F. G. Clutterbuck	Surrey/Hants	21.8
2/571	C. V. J. Heames	Anglia	17.8
2/572	E. R. Smith	Eagle	12.5
2/573	M. J. Cowburn	Surrey/Hants	27.8
2/574	R. R. Pilcher	Airways	21.8
2/575	P. A. Brooks	Oxford	28.8
2/576	R. F. Whittaker	Surrey/Hants	20.8
2/577	R. A. F. Terrett	London	2.8
2/578	D. S. Watt	Airways	23.7
2/579	T. P. Docherty	SGU	28.8
2/580	T. G. Bobbin	Bannerdown	22.8

DIAMOND HEIGHT

No.	Name	Club	1974
3/201	T. Wilson	Clevelands	21.7
3/202	J. F. Crawford	in USA	8.4
3/203	T. J. Ward	644GS	21.7

GOLD C COMPLETE

No.	Name	Club	1974
432	C. D. Street	Surrey/Hants	5.8
433	B. Murgatroyd	Four Counties	30.6
434	J. R. Osborne	Four Counties	6.8
435	D. E. Williams	Bannerdown	21.7
436	P. A. Blacklin	Derby/Lancs	18.8
437	A. F. G. Clutterbuck	Surrey/Hants	21.8
438	E. R. Smith	Eagle	12.5
439	M. J. Cowburn	Surrey/Hants	22.8
440	D. Lidbury	Oxford	18.8
441	P. A. Brooks	Oxford	28.8
442	K. J. Cadman	Coventry	18.8
443	H. Cook	Thames Valley	17.8
444	Anne Walker	Cambridge Univ	13.9

GOLD C HEIGHT

Name	Club	1974
B. Murgatroyd	Four Counties	30.6
P. G. S. Jackson	Lakes	20.7
D. E. Williams	Bannerdown	21.7
D. Lidbury	Oxford	18.8
J. W. Robertson	SGU	20.7
K. J. Cadman	Coventry	18.8
H. Cook	Thames Valley	17.8
Anne Walker	Cambridge Univ	13.9
I. R. Cook	Inkpen	18.8
R. G. Mortimer	Ouse	21.7
C. Gildea	Humber	17.9
T. J. Ward	644GS	21.7

GOLD C DISTANCE

Name	Club	1974
C. D. Street	Surrey/Hants	5.8
J. R. Osborne	Four Counties	6.8
A. Kay	Thames Valley	6.8
D. E. Schofield	Swindon	4.6
P. A. Blacklin	Derby/Lancs	18.8
A. F. G. Clutterbuck	Surrey/Hants	21.8
C. V. J. Heames	Anglia	17.8
E. R. Smith	Eagle	12.5
M. J. Cowburn	Surrey/Hants	27.8
R. R. Pilcher	Airways	21.8
A. B. Adams	Shropshire	12.8
P. A. Brooks	Oxford	28.8
R. F. Whittaker	Surrey/Hants	20.8
R. A. F. Terrett	London	2.8
D. S. Watt	Airways	23.7
Pamela S. Roberts	Midland	16.8
T. G. Bobbin	Bannerdown	22.8

SILVER C

No.	Name	Club	1974
3768	A. G. Gordon	Surrey/Hants	4.6
3769	W. J. G. Lewis	Blackpool/Fylde	25.7
3770	R. Surtees	SGU	25.7
3771	J. Lister	Surrey/Hants	2.8
3772	P. Kerrigan	SGU	20.7
3773	G. Lawley	Burton/Derby	3.8
3774	C. T. Bailey	Cranwell	29.7
3775	D. R. Smart	Thames Valley	3.8
3776	J. Stafford	Borders	26.5
3777	G. P. Austin	632GS	3.10
3778	R. W. Whiting	Surrey/Hants	11.8
3779	A. S. Maclean	Wrekin	6.7
3780	D. A. Reaves	Yorkshire	12.8
3781	J. A. Kane	Yorkshire	14.7
3782	J. D. Sorrell	S Wales	6.8
3783	Marion Toft	Burton/Derby	6.8
3784	C. F. Robinson	Thames Valley	3.8
3785	R. H. Midwinter	Bath/Wilts	3.8
3786	M. E. M. Cook	Devon/Somerset	3.8
3787	A.L. Mackay	Oxford	6.8
3788	R. Greason	Blackpool/Fylde	14.7
3789	H. G. Williams	Stratford-upon-Avon	11.8
3790	G. J. Bowley	Eagle	14.8
3791	E. J. Foggin	Swindon	18.8
3792	F. W. Archer	Bicester	29.6
3793	E. E. F. Giles	Enstone	14.7
3794	G. E. Wright	Clevelands	18.8
3795	D. R. Campbell	Airways	20.8
3796	A. D. Betts	London	21.8
3797	S. G. Olender	Hambletons	17.8
3798	R. C. Bridges	Enstone	11.8
3799	C. J. Aldis	Midland	3.8
3800	C. Chappell	Kestrel	11.8
3801	J. E. Cruttenden	Imperial Coolege	9.8
3802	A. S. Black	Angus	17.8
3803	R. P. S. Montague-Scott	Surrey/Hants	20.8
3804	A. H. Tobin	Surrey/Hants	11.8
3805	A. N. Maxted	Kent	20.8

No.	Name	Club	1974
3806	C. Hyett	Yeovilton	20.8
3807	J. Worth	Coventry	18.8
3808	J. P. Heslop	Cambridge Univ	17.8
3809	J. E. Thorn	Inkpen	20.8
3810	B. F. Wilson	Doncaster	18.8
3811	C. A. Baines	Kent	17.8
3812	R. Wain	Burton/Derby	18.8
3813	A. Tubby	Lincolnshire	18.8
3814	P. Whitt	Avro	5.8
3815	A. R. Hyett	Heron	21.8
3816	J. T. Wallis	Essex/Suffolk	24.8
3817	D. K. McCarthy	Kestrel	24.8
3818	P. B. Candy	Stratford-upon-Avon	17.8
3819	Susan Rothwell	Heron	21.8
3820	Jane James	Norfolk	28.8
3821	G. A. Steel	Fenland	21.8
3822	S. P. Grant	Fenland	24.8
3823	A. V. J. Figg	P'boro/Spalding	6.8
3824	J. F. Adams	Dorset	27.8
3825	R. T. Milner	Humber	18.8
3826	J. H. Walters	RAE	27.8
3827	D. Clewes	Buckminster	20.8
3828	R. L. D. French	Lakes	27.8
3829	E. J. Titman	Norfolk	28.8
3830	D.R. Griffith	Coventry	17.8
3831	J. A. Mace	Inkpen	27.8
3832	R. E. Perry	Dorset	27.8
3833	T. H. Eggleston	Cranfield	24.8
3834	G. F.Horne	Oxford	21.8
3835	A. Henderson	Oxford	11.8
3836	A. A. Priestley	Yorkshire	27.8
3837	S. A. Sheridan	Yorkshire	16.8
3838	R. J. Washer	Eagle	31.8
3839	B. J. Lamb	642GS	13.7
3840	H. W. Clayton	Cambridge Univ	17.8
3841	G. R. Bobbin	Fenland	28.8
3842	A. E. Jones	Shropshire	3.8
3843	P. Brimelow	Hambletons	27.8
3844	B. J. Thomas	Dorset	27.8
3845	C. Wales	Bristol/Glos	6.8
3846	B. T. Loftus	P'boro/Spalding	17.8
3847	G. A. Nash	Airways	23.4
3848	D. J. Freeman	Thames Valley	6.8
3849	R. A. Slade	Bath/Wilts	17.8
3850	Eve Dent	Bristol/Glos	20.8

NATIONALS ENTRY LIST 1975

The following list will be used to determine the priority of entry to any of the British National and Euroglide Competitions for all classes in 1975. This list is, however, subject to continuing amendment and although revisions will not necessarily appear in S&G, the actual list used by the BGA for 1975 will be frozen as from January 31, 1975.

The 1975 Entry List has been compiled on the same basis as published in S&G for April-May, 1973, subject to amendments subsequently agreed by the Flying Committee. The principal changes are to include Euroglide results, increase the relative weighting of European National results (*eg* Angers), and the process of integration of the classes within the Inter-Services Competition.

In accordance with the above amended rules, the 1975 Entry List has been compiled from the results of the four 1974 National and Euroglide Competitions, the 1974 Angers Competition, the 1974 Entry List, three 1974 Regional Competitions, and the Open and Sport Classes of the 1974 Inter-Services Competition. The results of one of the Regionals have not been included as they had not been made available to the BGA at the time of going to press (*ie* 25.10.74).

Any prospective Nationals pilot whose 1974 Competition result (including Hahnweide) does not appear in this list, or who believes his position in this list to be incorrect, is asked to write to the BGA giving details of the competitions in which he competed in 1974, his position and the total number of entrants, his glider number, and his full name, as soon as possible.

A. J. R. DEACON,
Flying Committee

No.	Name
1	SANDFORD, R. A.
2	LEE, D. G.
3	GOLDSBROUGH, J. B.
4	FITCHETT, B.
5	SHEPHERD, E. G.
6	WILLIAMSON, J. S.
7	DELAFIELD, J.
8	CARDIFF, J.
9	JONES, R.
10	REDMAN, S. J.
11	ALDOUS, R. F.
12	GREAVES, C. M.
13	GARROD, M. P.
14	MEDDINGS, E. J.
15	WHITE, S. A.
16	BROWN, H. F.
17	GLOSSOP, J. D. J.
18	ROLLINGS, C. C.
19	ORME, H.
20	HOOD, L. S.
21	LYSAKOWSKI, E. R.
22	JEFFRIES, J. R.
23	McLUCKIE, R.
24	BURTON, A. J.
25	CAMP, G. W. G.
26	GOUGH, A. W.
27	ALDRIDGE, K. R.
28	HALE, R. J.
29	ROBERTSON, D. J.
30	BURTON, G. E.
31	INCE, D. H. G.
32	POZERSKIS, P.
33	WISHART, R.
34	PIGGOTT, A. D.
35	STONE, A. J.
36	WATSON, A. J.
37	FARMER, A. T.
38	AUSTIN, D. C.
39	WELSH, J. H.
40	GAUNT, T. R.
41	LIVESAY, M. H.
42	WINNING, E. J.
43	HARDING, R. W.
44	DAY, C. G.
45	GARTON, C.
46	SIMMS, J. A.
47	FIELD, S. E.
48	COLE, R.A.
49	TANNER, L. E. N.
50	WILSON, F.
51	WALLER, C. J. N.
52	KNIPE, F. H.
53	ZEALLEY, T. S.
54	BURNS, Anne
55	WOODIER, C. J.
56	ROUSE, J. E.
57	WOODHOUSE, I. C.
58	WEBBER, D. C.
59	BOWDEN, D.
60	CARTER, M. E.
61	DIXON, R. T.
62	DAVIS, A. J.
63	CAWTHORNE, T. R.
64	THROSSELL, M. G.
65	DEANE-DRUMMOND, A. J.
66	FOOT, R. A.
67	JAMES, D. B.
68	TULL, V. F. G.
69	KEOGH, B.
70	STEVENSON, J. N.
71	WRIGHT, R. D.
72	WATSON, Patricia
73	LILBURN, D. W.
74	VANN, E. J. C.
75	WILLS, J.
76	POPE, M. H. B.
77	SEARS, P. L.
78	SHARMAN, R. C.
79	PRZEWLOCKI, J. K.
80	SUTHERLAND, M. N.
81	VENNARD, D. A.
82	BRINDLE, G. F.
83	ST. PIERRE, A. H. G.
84	ELLIS, J. J.
85	KRZYSTEK, T. J.
86	ORTH, W. T.
87	COOK, R. A.
88	BENOIST, J. D.
89	COOK, P. G.
90	WELLS, M. D.
91	DIXON, R. J.
92	WRIGHT, R. H.
93	STAFFORD ALLEN, P. R.
94	WYNCH, J. W.
95	SIMPSON, C. R.
96	CARLTON, M. R.
97	DOBSON, B. F.
98	SETH-SMITH, M. P.
99	BROWNLOW, J. B.
100	NORRIS, M.
101	COUSINS, R.
102	ADAMS, A. B.
103	KIELY, K.
104	WARMINGER, A. H.
105	MILLER, A. S.
106	BECK, P.
107	CARROW, D. D.
108	MARRIOTT, S. H. C.
109	PAUL, I.
110	GAUNT, N.
111	WILKINSON, K. G.
112	YOUNG, J. R.
113	SHEFFIELD, R. J.
114	EASTON, S. J.
115	DIMOCK, H. R.
116	COSTIN, M. C.
117	BUTLER, D. J.
118	KRONFELD, W. J. R.
119	STRACHAN, I. W.
120	HOGG, A. J.
121	BIRD, M.
122	BROOK, G. F.
123	ANDREWS, P. R.
124	STREET, C. D.
125	ATKINSON, G. B.
126	LYNDON, R. J.
127	MURGATROYD, B. W.
128	CRAWSHAW, G. H.
129	HARRISON, K. A.
130	GRENET, P.
131	PURDIE, P.
132	BISHOP, J. M.
133	HANSON, D. F.
134	HANFREY, A. W.
135	ELLIOT, E. G.
136	DUFFIN, E. R.
137	SHEPPARD, F. J.
138	BACON, G. MacA.
139	STAINES, R.
140	CHARNELL, P. S.
141	MAKAY, N.
142	DAVIS, D. W.
143	ELLIS, C. A. P.
144	BRISBOURNE, R. P.
145	HART, J. E. B.
146	GOODHART, H. C. N.
147	BEST, E.
148	JOHNS, H.
149	TORODE, H. A.
150	LUSTED, E. J. F.

overseas news

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

Two-seater triangular flight in Samedan

KLAUS HOLIGHAUS

Janus on take-off

As in many previous years my family and I again selected Samedan (Switzerland) for this year's annual holiday.

Because we took our new two-seater Janus along our established holiday pattern of 50% flying and 50% mountaineering, walking and just doing nothing, tended towards a greater amount of flying, although that was not our principal wish. Even so I couldn't satisfy all the requests for a trip in the Janus, and had to disappoint many pilots.

Those who have flown from Samedan know that unlike other sites in the Alps there is not quite the same cross-country fever among its members. Launching starts late (11 o'clock, often later) and it is by winch, aerotowing not being allowed. This in fact has many advantages; the biggest one being that even a glider pilot has time in the morning. He doesn't have to throw overboard all other plans and leave the breakfast table in a hurry in order to get everything ready for an early start the moment he sees the first cu's developing—often at 7am. Normally there is enough time between breakfast and launching to go for a walk on the mountain or take a cable-car to the top.

Long cross-countries are seldom flown from Samedan. Most pilots are happy to stooge around cloudbase between 3500 and 4200m asl over the fantastic Bernina area and it is for me, like for many others, always again a very special experience when late in the afternoon using all types of lift one can overfly the top of the Bernina which is 4049m high .

This year it showed me how much more satisfying it is to fly two-up and to be able to share the experiences on the spot. The beauty of Nature is felt more intensively, and also to be able to discuss and pass on any decisions gives a great amount of pleasure, especially if the correct ones were taken. One does not have to wait until after landing to share all this, a time when everyone else is also keen to talk about his experiences and one feels it is best to keep quiet about one's own.

Many people have asked about my record flights so for those interested here are a few details:

After the passage of a copybook cold front on August 11, 1974, cloudbase rose from 3200m on Monday to 4200m on Wednesday and I decided to have a go at the 100km triangle taking Herbert Brunner as co-pilot.

In contrast to my tactics last year, when I flew the Nimbus 2 practically without circling at about 3200m following the mountains, this time we tried seven startline crossings (1000m over site) like a few years ago at Marfa—to try and find a climb immediately after crossing of at least 4.5m/sec. This succeeded after the eighth crossing in front of the Crasta-Mora, a local mountain.

Within 5.5min after the start we had climbed from 2800 to 4250m and thus achieved in ideal time the ideal departure height. On course were three dark, healthy-looking clouds which we approached with certain confidence at 210km/h so that in gliding flight to the 1TP we would keep to the necessary height of 4100m. But as so often happens in gliding none of the clouds gave more than 2m/sec and even the usual strong source over Piza Nuna near Zernez let us down. So we had to fly the triangle with moderate speed and weakish lift and then had to take a risky final glide over the Bernina pass to return an average speed of 132.6km/h; 1.8km/h faster than the current world record held by Makula of Poland in the Calif A-21 and flown in the USA.

[2km/h is needed to break a speed record. Ed.]

Disappointment was naturally great, especially for my co-pilot. The decision to try again next day was not difficult, and as the weather looked quite promising at 11.30 we declared the same task once again, Uli Plarre occupying the second seat this time.

Starting was much more difficult then the day before because of little heating over the site and only 3.5m/sec was found. The sixth startline crossing gave initially 4m/sec and five minutes later we reached 3700m which was somewhat worse than the previous day. We started on course, however, and lost relatively little height over the Inn valley while over Zernez in the middle of the valley we found 3.5 to 4m/sec lift and reached cloudbase at 4200m after 15.5min, 25km out.

This height was maintained to the 1TP. Uli took the photos and then in level flight towards the 2TP pulling up in lift under the clouds, turning the 2TP in the 35th minute at 3400m. For the final glide of 28km we only needed 1700m which allowed us a speed of 220km/h which we could maintain right past the finish line. Time taken 00:42:45—average 142.9km/h.

With hindsight one can say that all in all it was not the optimum possible.

The excellent start of the previous day coupled with the good progress on the second (record) day, for example, surely would have meant an average of 150km/h. But the pattern seldom fits together as one would wish.

We were all, however, content with the day's result and celebrated with plenty of wine, many grilled escalopes and chops around the camp fire of our caravan.

WORLD RECORDS

During a visit to the USA, Edward Makula (Poland) and John Serafin (USA) broke their own 300km triangle world two-seater record on August 24. It is assumed that the flight was made in the Calif A-21 although this is not stated in the FAI bulletin.

A report in *Flugsportzeitung* mentions a new 100km triangle world feminine record for Adele Orsi of Italy who flew her Kestrel 604 round this distance on August 2 at 127.8km/h. (Subject to homologation.)

Obituary—CHARLES LINDBERGH

The aeroplane Spirit of St Louis, in which Charles Lindbergh made the first solo flight across the Atlantic, was designed by Hawley Bowlus, one of the earliest American soaring pilots who also designed the Albatross series of sailplanes. He took up gliding, and an issue of *Popular Science Monthly* in mid 1930 shows him helping Bowlus to repair and rig gliders at Lebec, California, and states that on one of his first flights he flew 15 miles over the Tehachapi Mountains. He died aged 72.

A.E.S.

Book Reviews

After Solo: Edited by W. E. Doherty Jr. Published by Schweizer Aircraft Corp., Elmira, New York, U.S.A. Price $2.95. Obtainable from the BGA mail order £1.65, personal callers £1.50.

This pleasant little book is a collection of pilots' experiences with the Schweizer 1 – 26 sailplane from its inception in 1954 until the present time. It is very easy to read and shaped well with the natural progression from solo flight through cross-countries to competition soaring. All the stories are linked well and introduced by editorial notes which inform the reader but do not intrude.

Of all the contributions, that from Richard Bach, author of 'Jonathan Livingston Seagull", is outstanding. He writes an entertaining tale of a flight as opposed to other contributors who write tales of entertaining flights with varying degrees of literary ability.

Although there are no 1 – 26s flying in this country there is a lot of interest in the concept of the "one-design class". To date over 600 of these aircraft have been produced by Schweizers and they are still going strong—sure evidence of the love affair between pilot and glider which is related in this book.

BARRY ROLFE

Gunther Groenhoff und die Goldenen Jahre des deutschen Segelflugs. Edited by Walter Zuerl. Published by Luftfahrt-Verlag Walter Zuerl, D-8031 Steinebach-Wörthsee, West Germany. Price DM21.

The "Golden Years of Soaring" were 1928 to 1932, when three outstanding pilots, Kronfeld, Hirth and Groenhoff, laid the foundations of cross-country soaring away from the influence of hills, and every such flight brought new knowledge of the vagaries of the atmosphere and the techniques for dealing with them.

The first part of the book, written by various authors, deals with the pre-Groenhoff era—one learns that the use of bungey for launching was first proposed in 1920 by Wolfgang Klemperer who, in 1921, was first to beat Orville Wright's 9¾min record of 1911 (not 1910 as stated in the table of records). One realises from the book how nearly the interest in soaring petered out between Hentzen's three hour flight of 1922 and Kronfeld's first use of cloud currents in 1928—an uninspiring period broken only by Kegel's unwilling cross-country in 1926 when he was sucked into a thunderstorm.

The largest part of the book is from Groenhoff's long-out-of-print autobiography, "Ich fliege mit und ohne Motor", which was reviewed at length in *The Sailplane and Glider* for April 15 and May 2, 1932. Near the end of that review occurs the passage: "One realises from this book how comparatively little in the way of cross-country soaring has been done even by the 'aces', and if so much about its possibilities has been discovered already, what may we not look forward to in the future?"

Groenhoff's interest in soaring first showed itself in 1923 when, at the age of 15, he walked all the way from Frankfurt to the Wasserkuppe, sleeping in the open. He took a gliding course at Rossitten in 1926, then went into commercial aviation. But his heart was in the motorless kind, and in 1929 he got his C at the Wasserkuppe school, became an instructor, then put up a world's two-seater record in the first Rhönadler. His ebuillient but excitable nature was shown when, after side-slipping into a wood during a steep turn, he was found picking berries, with no memory whatever of what had happened. In 1930 Lippisch designed for him the beautiful Fafnir, and in 1931 he flew it from Munich to Kaaden in Czechoslovakia, a world record of 169 miles, in a cold front storm, giving rise to the belief that future records could only be done on cold fronts. (The world's first 1000km flight was made partly along a cold front.)

A fast descent from the Jungfraujoch, with half the Fafnir's elevator knocked off during the launch, was a foretaste of what was to happen in 1932. On July 23, during the German Nationals on the Wasserkuppe, the Fafnir's tail was again damaged on the launch; the machine went into a gradually steepening dive, and Groenhoff jumped out far too low for his parachute to open. The Fafnir continued into a wood, where its cockpit was found to be undamaged. In this wood is a memorial to him (shown in the book, with also a photo of the "Groenhoff Haus" administrative building, named in his memory).

There are a great many photographs, three-view drawings of the machines he flew, and a final chapter by Groenhoff's brother Hans, still living in America and himself a noted sailplane photographer of the early days. The text is in German.

A. E. SLATER

VINTAGE CLUB AUTUMN RALLY

A. E. SLATER

While Chris Wills was soaring his Kranich over Dunstable Downs after casting off into slope lift from an aerotow from Booker, John Jeffries, the London Club's Manager, was briefing the other competitors on that horrid Zone close behind the hill and those features by which the site differed from a simple flat airfield. A notable arrival on this first day, straight from Munich by surface transport, was Peter Fletcher's all-yellow Mü-13 labelled D-1489.

Much of the weather was atrocious, but interfered more with the flying than with the characteristic activity of rigging and admiring each other's entries. However, the following day, Saturday October 5, was best of all, with a bit of northerly in the west wind and, under an overcast sky, not enough convection for anyone to spoil the spectacle by going away. I went up with Ron Dodd in the semi-vintage two-seater with swept-forward wings designed and built by Vic Ginn; but, after a third of a century's soaring on the site exclusively in open cockpits, found it unexpectedly difficult to locate the top of the hill, since the formerly bare Downs were, due to Myxomatosis, now hidden by a rash of bushes. This was the only competition day, a spot-landing being set.

That evening 48 people sat down to dinner at Knebworth Hall in a beautifully renovated vintage barn, followed by hopeful speeches on future vintage activities and films.

Next morning, after much time had been spent rigging, polishing and glamorising for a Concours d'Elegance, a prolonged downpour prevented it being held. However, much talk and more showing of films and slides prevented anyone being bored, especially when a deteriorating Kirby Kite in a dilapidated trailer was found in the trailer park, its owner not having been near it since he put it there: the assembled do-gooders were "almost in tears"; could they do nothing to restore it to health?

The final Monday brought more rain. Ken Crack, the highly efficient chief organizer of the Rally, could only collect everybody's dues and clear up.

Here is the list of entries: Petrel (from Ireland), white Minimoa, yellow Kirby Kite, red Olympia, white-and-blue Grunau, white-and-red Grunau, white-and-blue Prefect, yellow Rhönbussard, Weihe, Scud II and Kranich.

You can join the Club for £1 a year; Secretary: Frances Furlong, Otford House, Otford, nr Sevenoaks, Kent.

your letters

WHY NO BRITISH KITS ?

Dear Editor,

I feel I must air strong support for the views on kit constructed gliders advanced by Ann Welch in your last issue. The almost complete lack of British activity in this field is really quite surprising in view of the rapid rise in the price of imported gliders, and the reasons for this inactivity are worth examining.

One can find quite a lot of people who will express interest in building a machine but in the absence of any British designed and produced kits, nothing actually gets done. Foreign kits are available but anyone buying a kit is still very much in the hands of the designer if any problems arise during construction, and it is not helpful if he is a long way away.

I think it unlikely that the established firms will be interested in producing low price kits, so one must turn to amateurs to get things done. And it is the almost complete absence of amateur glider designers, rather than constructors, that seems to be at the root of the impasse. Outside the slender ranks of the Technical Committee and a few professional aero engineers, the art of design seems dead. Need this be so? Is it such a vastly technical subject as to be beyond any but the super egg-heads? I think not.

All the necessary information is known and set down in books, and the mathematical ability required is mostly not beyond O-level standard. There are, however, several good reasons why it is difficult to get started in the design field.

1 The information required is not in any single book but is scattered over a wide variety of text books, research reports, British Standards etc. For a beginner it is necessary to work out what information one is going to require and then set out to try and find it. This can be a long process with much back-tracking and wasted effort. In the field of manpowered aircraft, where the main interest is in the technical rather than the flying side, an excellent little book has been published on basic design—"Manpowered Aircraft" by K. Sherwin. A book on glider design at about the same technical level, setting out the steps in the basic design procedure and including a good list of references, would be a huge help to anyone trying to get started.

2 Amateur designers tend to work in isolation and do not have much opportunity for the discussion and informed argument that can be so very helpful. I feel sure that a register of designers and people interested in design, and possibly a designers' annual conference, would help to break down the barrier of isolation and promote the exchange of all sorts of useful information.

3 The problems of inspection and airworthiness approval may seem daunting. There is a widespread idea that the BGA frowns on amateur work on anything more major than simple maintenance. From personal experience I can say that this idea is quite unfounded. In fact the Technical Committee has a most progressive and understanding approach to amateur enterprise in either design or construction, provided, of course, that one does not try to go behind their backs.

The design of a glider is not such a vast work as to be beyond one man's abilities. I am inclined to think that although discussion of problems is invaluable, the best results emerge when all the threads are finally gathered together in one mind. Not so with construction. Here a team is much superior to one man.

I have often wondered why we persist in trying to glide through the wind and rain of the British winter. How much more pleasant and productive to retire to a nice heated workshop and set to work on a kit with a dozen or so of our club mates. With a kit designed for simplicity, a decent workshop and some organisation, one could look forward to emerging in the spring with a brand new ship to add to the club fleet. A pipe dream? Well I'll know the answer to that when my new design flies.

Malvern, Worcs. LYN BALLARD

WATERSHIP DOWN by Richard Adams: a review!

Dear Editor,

Many will remember how at the end of the last war all the best pilots flew at Dunstable, later they moved to Lasham and finally ended up at Booker. This migration is celebrated in this famous allegorical novel set in the region around Whitchurch in Hampshire.

Although the characters are rabbits, the disguises are all very thin and well known gliding personalities like Ann Welch, Philip Wills, Wally Kahn and Frank Irving are instantly recognisable. The book is required reading for all who hope for a successful career in gliding politics.

Marlow Common, Bucks. BRENNIG JAMES

CRITICISM OF THE PROGRESS BOOK

Dear Editor,

Roy Hubble's terrifying article, "The Flying Progress Book", in the last issue of S&G (p206) inspires me to write about a side of British Gliding that has worried me since I came back to flying in this country. Selected quotes—"psychological results of a pupil being told he is below average"—"those who find it difficult to accept discipline tend to be critical of the system"—"the senior duty instructor checks the confidential grading cards (with a photograph of the pilot) paying particular attention to the box containing the cards of the problem children"—"The CFI's newsletters include information on the . . . problem children, and any disciplinary action taken against particular members". (I bet some of these notes are actionable).

Gliding is supposed to be fun—right? We do it because we love it, not because it is some ghastly form of national service, with green cards for the goodies and "remedial treatment" for the problem children.

Too often in this country, it seems to me, beginners are made to feel guilty as a basic part of their training. Some years ago I remember a group of *ad-initios* who dared to thaw their frozen limbs in a hangar, being read a lecture that would not have disgraced the Salvation Army.

Flying in Finland with a band of joyous friends I had a Gold C and one Diamond, and was within 25m of two, when at Kent I would have been in fear of Roy Hubble's black card, if not his brown. OK, so I'm a walking accident waiting for somewhere to happen, but at least I have the sense to know it, and Bill Scull has promised to help. And at least I know what it is to sweat it out at 600ft over a Finnish lake, or to hang at 20000ft above the Swedish mountains.

Doubtless the get tough system produces good pilots; but if it also produces automatia who do not enjoy themselves, then what do you gain? And if it produces nervous novices who are frightened of the pundits, then it can be positively dangerous. I wonder what sort of training had been given to the girl in your other report who was too scared of the big boys to shout stop and get a parked glider moved out of her way?

I am sure that Roy Hubble is a super CFI, and I know that Kent has flying and safety standards second to none. But to me his photograph looks a bit too like Big Brother.

Oxted, Surrey ANDREW STUART

WHAT'S IN A NAME

Dear Editor,

Bill Scull's two recent articles in Coaching Corner make me wonder if many of the difficulties which bedevil the would-be aviator stem from the misleading names given to the control surfaces—ailerons, elevator and rudder.

These words give no indication of their primary functions which are to control the basic movements of the aircraft, namely roll, pitch and yaw; movements which apply no matter what attitude the aircraft is in at any given moment.

Admittedly we call a spade a spade but no great harm would be done if we called it a digger.

Ailerons sound delightfully French. "Si les belles meres avaient des ailes, je ferais chasseur". Why not call them "bankers" or "rollers"? After all that is what they do.

The elevator does not elevate and indeed can produce a disconcertingly opposite effect. Our American cousins must be equally baffled; "angle of track adjuster" might be rather a mouthful in time of crisis, so why not call it the "pitcher"? Little pitchers have long ears.

The word rudder conjures up something one hopes to find under water at the blunt end of a boat; used for steering . . . We might call it "swisher" or "skidder", but better still "yawer". Instructors might risk inebriation from answering the inevitable questions from starry eyed hopefuls, but bar profits would soar.

Of course there will be protests that such simplification will remove some of the aura of mystery which sets the aviator apart from his earth bound fellows, and that anyway it is too late to change. But heavier-than-air aviation as we know it is only about seventy years old. It is in its infancy. (Oh no I'm not. I'm nearly an old age pensioner).

Camberley, Surrey J. F. F. LATHBURY

AN IMPORTANT "INSTRUMENT"

Dear Editor,

I gather from Bill Scull's article on aileron/rudder co-ordination (October S&G, p213) that you do not use what many of us here in Germany consider to be the most important "instrument—an ordinary piece of wool mounted on the canopy or, preferably, in front of the cockpit". The piece of wool must always point at the pilot and, if it does not, aileron and rudder are not properly co-ordinated.

On my Spatz, which has a glass-fibre nose, I drilled a tiny hole into the fuselage, about 20cm in front of the cockpit. Under the hole I glued a slice of bottle cork and stuck a piece of wire, about 10cm long, into it through the hole. The wool is, of course, attached to the top of the wire, which I can push in when I cover the Spatz up. Some people simply stick the piece of wool onto the canopy with a piece of sticky tape, but it is better for the wool to be in the free flow of air.

In our club K-6 we have a bank indicator which, in my opinion, does not respond half as quickly and is not as sensitive as the piece of wool.

Augsburg, West Germany WOLFGANG W. EISERMANN

SCARCITY OF GLIDING FACILITIES

Dear Editor,

There is a frightful lack of gliding facilities in the south of England. Those clubs that are within reasonable travelling distance have waiting lists of up to a year, very high membership fees of up to £30 and such long flying lists that one is required to return the glider within 30-40 minutes.

These factors combined, I have found that my gliding costs me more than £13 per hour. Similarly frustrated aviators are invited to contact me on Portsmouth 817001 for constructive debate on the possible alternatives.

The problem of instruction and sites is solved. This leaves only finance to be overcome and this could be solved by sufficient pledges—and this would be a fraction of what is actually being spent at present on gliding.

Clearly the answer to happy flying for everybody lies in making their own contribution to the effort required. Looking to other people to provide the club, airfield and machinery not only cancels half the fun but is tantamount to asking for one's flying as a social security benefit.

Southsea, Hants. J. STEVENS

club news

The Cairngorms Gliding Club. Photo: Denny Wilson

Copy and photographs for the February/March issue should be sent to the Editor, S&G, 281 Queen Edith's Way, Cambridge CB1 4NH, tel Cambridge 47725, to arrive not later than December 4 and for the April/May issue to arrive not later than February 11.

October 18, 1974

GILLIAN BRYCE-SMITH

AQUILA (Civil Service)

Early this year we entered a contingent of three aircraft in the Enstone task week. A great time was had with the Olympia 2B flown by Reg Curwen winning and the Skylark 3F and Cobra being well placed in the top six of a field of 13

During the winter five members became assistant instructors and our beloved Fred received his full category rating, so instruction has proceeded at a greater pace. A new aircraft arrived, a rather elegant Weihe, but its wingspan caused some hangarage problems until a solution was found. The Olympia and Skylark also changed hands within the club during the spring.

With mechanical assistance from a local plant hire owner, the runways were cleaned and a large amount of soil removed from the end of the main runway to give us almost a mile for launching. This radically improved the flying conditions—1800ft winch launches at 35p. Our new tug has arrived from RAF Bicester and we are now savouring the luxury of aerotows.

Our airfield has no buildings so we were delighted when offered the loan of a clubhouse. The christening party on September 28 was a great success and the day after we had the 3000th launch of 1973-74, this being a record number in one year.

The annual club expedition was to our friends at Camphill, the Derby & Lancs Gliding Club. Five gliders were taken and the 22 members completed 52hrs flying. Silver C durations were gained by 'Liz Clarke, Chris O'Neill, Ken Jarman and Len Holden; Tricia Stackhouse and Dick Sargeant obtained their second Bronze C legs.

We are now settling down to our usual intense winter training for our *ab-initios*.

R.S.

BLACKPOOL & FYLDE

Our training fleet now includes a T-21, K-13 and K-4, carefully chosen to meet our needs. The K-4 will be used for first solos, and is achieving good soaring flights in modest hill lift more easily than we had expected. Divebrake feel will be then shown in the K-13 before moving on to the Swallow. Alan Bibby and Mike Larvin were the first to take advantage, and Mike must have broken all records for solo to Bronze. These flights were within our September camp week, when we flew every day and soared hill and/or thermal, with four of the days giving very strong conditions.

We entertained the Cranfield Club, and showed them what can be done from winch launches costing only 40p. The traffic was heavier than ever before, but spread out so well we think we will be able to handle a much bigger fleet than expected, since the gliders do not tend to bunch at the very top of the hill lift. We also packed the hangar almost to its limits for the first time, getting nine gliders into 60 x 60ft, including their Bocian.

On August 26 multiple tornados were coming off the sea at Lytham St Annes, starting as waterspouts and then continuing across the land. I saw three under one cloud and phoned the airfield, but as members didn't see any signs of cones or pipes, conditions must have been tied to some local coastal feature and didn't reach 20 miles inland. Previously we had only twice seen single tornado pipes.

K.E.

BRISTOL & GLOUCESTERSHIRE

After the hustle and bustle of a successful Euroglide, the club rapidly returned to its more normal appearance, which for the first few days seemed strangely quiet and empty in contrast. The weather was dismal and there was little flying.

One sad point—our Blanik was substantially damaged and may be a write-off. The pilot landed several fields short of the airfield underneath some telegraph wires. Unfortunately he overlooked that telephone wires are supported with the result that the wingtip caught a pole. Happily nobody was hurt and another Blanik should be with us before the end of the year.

A rustic looking Mike Harper, Chairman of the Bristol & Gloucestershire Gliding Club. Photo: Rob Robinson.

The great day approaches when the Jones/Pentlowe Kestrel has its first flight after almost two years of constant work by Doug and Tony (mostly in unheated hangars). The large case of glass-fibre mouldings and associated nuts and bolts now looks like a beautifully finished Kestrel 19. They've even got a spare fuselage as the first one was damaged in the fire last year.

The Shobdon wave weekend planned for October 19-20 is just around the corner and many C's of A are being completed in anticipation of Gold and Diamond heights in the Welsh mountains.

R.A.R.

BURTON & DERBY

Another season has gone by since our last report and, without question, this has been the most successful in the relatively short history of the club.

First the bad news—we had the misfortune to lose one of the two Blaniks when an early solo pilot hit a tree with a wingtip on a field landing. Thankfully he wasn't injured.

The good news—the months and years of training have born fruit with so many achievements they are too numerous to list. However, we should congratulate Ernst Specht on his Diamond goal.

Silver Cs have been gained by Messrs. Dawson, Johnson, Lawley, Wain and Ward as well as Marion Toft, the first woman in the club to reach this standard. Ken Lawrence and Peter Ward are now fully rated instructors.

Our Auster J2 tug has returned after a lengthy C of A, resplendent in a high visibility red and white colour scheme and, we hope, a "good neighbour" exhaust silencer.

The East Midland Airport control zone boundary now established lies two miles south-east and will impose a new discipline on our local and cross-country flying. P.A.W.

CAMBRIDGE UNIVERSITY

Like most clubs we have had something of a record year with hours, badges and cross-country kilometres in abundance and keen competition.

Sigfrid Neumann at last managed to fly a 500km triangle from our site, the club's second this season, Anne Walker became our first woman member to complete her Gold with a climb at Shobdon. The most notable "not quite" was David Evans' Diamond distance attempt when he landed after 456km. And this year saw Desmond Pearce entertaining Aboyne by climbing to 27000ft in *their* Swallow.

After our aged Oly 2B was dashed to pieces at the bottom of a pit earlier in the year, we bought an excellent K-6CR.

However good the year has been though, ardent pessimists will realise that next year is not likely to be all sunshine and occasional showers Apart from the economy, which affects everyone, there is a particular monster making inroads into the south and east—the revised London TMA which will soon reach to within a mile or so of Duxford. Whether it will stop there is another matter altogether: these "sacred things" have a habit of getting larger and larger. To those clubs more seriously affected, our deep but apparently impotent sympathy. S.N.L.

COTSWOLD

As a shocking winter drew to a close our membership, funds and morale were at the lowest ebb for years. Who could possibly have foreseen the dramatic changes wrought in the truly vintage summer.

Early soaring began to raise hopes and these were consolidated by a successful task week with Bristol & Gloucestershire at Nympsfield in May. Flying nearly every day brought Silver C legs and good cross-countries.

Evening flying during the season has been at unprecedented levels—often every night and always at least three nights so that 80/90 launches were in the bag before the weekend flying began. We have broken all previous records for monthly launch rates, have the largest bank balance in the club's history and our membership figures are back to where they should be.

Total achievements for the season are 12 first solos, 12 Bronze Cs and innumerable legs, 11 Silver C legs, four Silver Cs, one Gold C and two Diamond goal flights.

Larry Bleakin's persistence in organising the annual expedition to Portmoak in September was rewarded. Taking four privately owned gliders and our K-7, we had a total of 135hrs and 77 flights were logged for the week including six durations. Larry hit 17000ft in wave and Dave Roberts managed 7500ft, but in general it wasn't good for wave.

Perhaps the most surprised member of the expedition was Mark Madan whose longest solo flight had been ten minutes. He went to Portmoak to get aerotowing experience, was passed out on his first flight and went off for 1½hrs to get his first Bronze leg and double his total soaring time. Later in the week he gained his Silver duration and second Bronze leg on what was his 12th solo flight.

Congratulations to Gary Fryer and Tim Macfadyan on their Diamond goal flights and all those others who carried on the traditions of going cross-country whenever possible . . . even 17-year-old Jonathan Holland who, flushed with the success of his Whitbread Bursary, flew his Silver distance, did his first field landing and then found he hadn't switched on his barograph. J.D.H.

DONCASTER & DISTRICT

The gloom of the end of season circuit bashing and consolidation of training is lighted only by those rare days of raised cloud ceilings allowing a decent winch launch and possible wave.

The highspot of the social calendar was the annual dinner-dance in October when the Senior National Coach, Bill Scull, was the guest of honour and the trophies were presented by our Chairman, Frank Thompson. G.D.W.

DORSET

Twelve gliders took part in our August task week when four more Silver Cs were completed. Three visiting teams added their now customary challenge to the event and there were five competition days. Joe and Terry Linee (Std Cirrus) had the highest overall score with 238pts, the visiting Pirat flown by Ray Bowden and Anthony Beckton came second with 160pts, closely followed by Mike Bryan and Brian Povey (Oly 2B) with 157pts.

On the best day, Tuesday 27, a dog-leg task finishing at Lasham was reached by four gliders. Two had over five hours whilst others had nearly as long.

The otherwise poor weather of the summer, plus the fact that only the K-13 of our two-seaters has been continuously available for training, has severely limited the scope of our newer recruits. However, all three are now in service and a new instructors' course is under way, so potential pilots can look forward to a busy winter if the weather permits.

At the time of the tremendous September gales we discovered the potential of our hangar when every glider at Tarrant was squeezed in—including the trailers. It was something of a puzzle but everything survived as a result and only the windsock was torn to shreds. M.L.B.

DUNKESWELL

Within five weeks of the closure of the Devonshire Soaring Club and our decision to continue gliding from this superb site, we are now fully operational, using an autotow launching system and with the prospect of aerotowing by early spring.

We must be one of very few clubs fortunate enough to commence operations with a ready-made aerodrome and a brand new purpose-built clubhouse at its disposal!

We are delighted with our two-seater, which was christened by carrying our CFI, Dave Bindon, and our youngest member, five year-old Rupert Fairclough, on the club's inaugural flight. Needless to say, visiting pilots will be made most welcome. B.H.F.

ESSEX

The club's future was under intense debate this month after the CAA dropped its London TMA expansion bombshell on our 204 members Their plans would lower our ceiling to 2200ft. We are having talks with the CAA this month.

On the bright side Essex has just completed a bumper gliding year. We have a club record of nearly 10000km cross-country flights. Three Golds were completed and three Diamond legs gained.

The harvest season has produced a crop of seven new solo pilots and a six glider/eleven pilot prospecting expedition crossed the border to Aboyne, in September. We

won no honours but had a thoroughly enjoyable week.

The club has rented the wartime control tower at North Weald and is "doing it up" under the expert supervision of Brian Murphy. It should blossom into a magnificent multi-level clubhouse by Christmas. S.M.

ESSEX & SUFFOLK

Our task weekend in late August didn't produce the same crop of badge flights as last year, but there were many attempts to go places. Mike Bailey (Pirat) and John Wallis (SHK) both reached Seething for Silver C distance.

John Masters went to Sutton Bank for his assistant instructor's rating and our instruction staff is further strengthened by the promotion of Pete Wilby, who has gained his full rating.

We are now the proud possessors of a brilliant red and white chequered mobile caravan for the duty pilot. Fabricated by Cedric Vigar and his merry men, it is complete with a flashing light on top for dusk landings.

Our CFI, Elvin Hibbard, made an October pilgrimage to Aboyne and final preparations are now being made for a club expedition to Usk. C.C.S.

FENLAND

Fenland now boasts seven solo female pilots and two more are awaiting their 16th birthdays. Since our last report, 10 members have gone solo including Richard Caillard, our Station Commander's son.

There have been six Bronze Cs and 11 Silver legs, two of the distance flights being of more than 90km. Also, one distance of 66km was gained along with Silver height in questionable weather conditions.

We have been busy with club expeditions with two this summer to RAF Swanton Morley when five members were converted to aerotowing. Our two longest Silver distances, coupled with two durations, were accomplished on the latter visit.

Floyd Svrko, a USAF member, got the loan of a low-loader from RAF Mildenhall to transport one of our winches to Swanton Morley. Our latest expedition on October 6-13 to Sutton Bank was led by Paddy Hogg, deputy CFI. Fourteen members braved the elements to achieve 33 soaking wet minutes of flying time on the Bank itself. Thanks to our friends at RAF Dishforth (Clevelands), we had 39hrs flying time during that week and three more were qualified for aerotows.

We gained three new instructors in July, Pete Matthews, Ray Hudson (USAF) and Allan Webster, but soon after Allan was posted to RAF Bicester where Mick Hall is now flying.

Meanwhile at our club the number of launches and hours are climbing rapidly on the CFIs charts. J.E. and C.B.

HAMBLETONS

Although not appearing in these columns recently, we are still extremely active but with so many changes in the fleet you may not recognise us. The Swallow has been replaced with a K-6CR and this has proved very popular as has the Oly 419 replacing the Oly 463. We have also acquired a Blanik which is generously equipped with instruments, radio and plumbed for oxygen.

No fantastic heights have been achieved during the year but we now hopefully await our wave season. Whilst the summer could have been better, there have been five new Silver Cs, plenty of Bronze legs and lots of first solos, both winch and aerotow, including Steve Saunders who soloed the Blanik on his 16th birthday.

Two members have qualified as instructors during the year, George McClean, our Chairman, and Steve Olender whose father, Roy, is already an instructor. It has also been pleasing to see five of our lady *ab-initios* gaining their A and B on the YS-53.

Our best day? Undoubtedly June 22 when, in conjunction with the Clevelands Club, we flew from dawn at 3.30am until dusk at just after 10pm to total 411 launches from the site. A.J.S.

HEREFORDSHIRE

In only our second season of operation we have almost doubled our activity. The summer courses have been fully booked, and it was encouraging to see many faces from 1973 returning for another "holiday" this year. Course bookings were up by 78% in 1973, the Blanik utilisation was 75% and the Falke which flew 300hrs last summer, logged 500hrs in the same six-month period this summer, a 66% increase in utilisation. This very encouraging growth has enabled us to keep our prices down—an average 20min flight in the club's Blanik costs exactly the same as it did when we started in April 1973 (before VAT and the October war), quite an achievement when 20%pa inflation has become normal.

Our own *ab-initio* pilots have been spreading their wings this season and Keith Whitney, who was one of the first pilots trained from scratch by the club, is now well on his way to his Silver C, with his height and duration completed in August.

The Blanik has landed out for the second time in its history, this time by an instructor who became "uncertain of his position" at 3000ft and two miles from the airfield! There being no trailer for the Blanik, the retrieve lasted until after midnight in pouring rain (we all make mistakes). A.N.M.

IMPERIAL COLLEGE

August and September were generally spent painting trailers as the soaring days did not coincide with the weekends. However, on one of the weekdays Christine Walker got her duration in the K-8 and the small group who spent a week at Shobdon in September, taking a private Dart 17R and the Club Skylark 4, were rewarded with a varied week's flying in wave and thermals. Although the wave wasn't high enough for any Gold or Diamond heights, Anthony Porter finished his Silver C by taking the Skylark 4 to Nympsfield. Shobdon is accessible enough to warrant us leaving the Skylark there for the last couple of months for our members to fly on odd days.

This year's intake of students are very keen and, spurred on by a reduction in launch fees for early morning flights, are reviving the Imperial College tradition of flying before breakfast. A.P.P.

LONDON

The bungey enthusiasts have, again, been hurling a variety of wooden sailplanes from the hill—with varying degrees of success. The most exciting part seems to be the spot landing on the top of the hill.

The weather has been quite good for this time of year, especially at weekends, and most private owners have been making continual use of the end of season thermals. Towards the end of September Rob Harding flew a 200km out-and-return, and on the last day of the month John Jeffries and Geof Love nursed the club K-13 to Lasham to collect the ever popular plate. The frequency of westerly winds has helped in the completion of several five hours, notably Alan Kirkley, completing his Silver C on a marginal day during the Vintage Gliding Club rally weekend when up to 15 slow-flying sailplanes were struggling with him on the hill.

Winter improvements and extensions to club buildings are already under way. The workshop and offices now have the luxury of central heating, which was installed by

enthusiastic club members led by Geof Love. It is hoped that this may eventually be extended to the clubhouse in the near future. Our new spray booth should soon be in operation, and a long overdue children's playground and beer garden (!!) is planned outside the clubhouse.

We are eagerly awaiting the arrival of the high performance two-seater IS-28D, which should supplement our high performance instruction courses. Several new privately-owned machines are due this Christmas, including the first Nimbus and Jantar to be on site. The privately-owned two-seater situation is already highly competitive. The Stafford Allen Capstan has been bought by a new syndicate led by Mike Bird; a Blanik and a K-16 are already on site and another Caproni is due next spring. It is hoped that a purely two-seater competition might be run here next year. D.Y.

MIDLAND

The few good days in August were well used for cross-country flying. On the 16th Pam Roberts (K-6E) and Bob Scarborough (Dart 17) both achieved 314km on completely different tasks. There were good cross-countries on five other days of that month but nothing much in September.

We broke new ground on the Bank Holiday weekend by holding an open day. Conditions were good and about 130 air experience flights were given as well as the principles and mechanics of the sport being explained. Several new members joined as a result and others became interested in the 1975 courses.

This season has shown some of the benefits of the land we bought earlier in the year. We can use a new position on Asterton Knoll for crosswinds on the south winch run—a few degrees to the west of the normal run, but sufficient to give easier and higher launches and to be sure that a drifting cable stays out of the forest.

On one day with a strong easterly we got more than 800ft into-wind launches starting from the bungey point, which was sufficient to catch the east wind wave. We don't look upon this east run as a normal operation yet as it requires more investigation and experiment, but it will mean flying on days when previously we couldn't get off the ground. W.J.T.

NORFOLK

Reasonable weather conditions on September 15 helped to make our open day a great success. Star of the day was our oldest club member, 103-year-old James Chapman, who opened the show by taking a ride in the Falke with CFI Joe Podolski. During his public address he mentioned his next ambition—to fly in a helicopter—and sure enough, before the day was out, he had ticked one more from his list.

Three members of the Karhula Aero Club in Finland whose ship was docked for eight hours at Felixstowe, took a 50-mile taxi trip to Tibenham to sample English gliding conditions, each making a quick circuit in the rain and gales.

The new clubhouse is virtually complete and a party was held on October 5 to mark the official opening. Next year we hope to be able to offer accommodation to visiting pilots and course members.

As a result of another visit by Bill Scull, Eric Titman was given two well-deserved full category ratings, one for pure gliders and one for motor gliders. C.E.H.

OXFORD

Our three weeks of flying gave some fine soaring weather. The distinction of being the first member to complete a Gold C was hotly contested during this time. First, on August 20, Peter Brooks flew 300km in his Phoebus to add to his height but unfortunately the turning point photographs were disallowed. Nothing daunted, he flew the task again on the next available day but meanwhile David Lidbury (Phoebus 666) found a large enough cloud to give him the required height and thus he became the first.

George Horne completed his Silver C in his Olympia 2 with duration on Monday, distance on Tuesday—but the barograph left no trace—so distance again on the Wednesday. Both trips were to Husbands Bosworth. Tom Lamb also flew the Skylark to Husbands Bosworth but failed by 11 minutes to get his five hours.

From August 23-26 there was a task weekend when pilots from Booker visited Weston. Two tasks were set with many club aircraft competing. The into-wind task of Chedworth and return on the Saturday proved hard work but several pilots completed it with Mike Randle (Phoebus 666) coming second. A very successful barbecue in the evening was organised by Anita Cox.

Norman Woodward, our Secretary, had two valiant attempts at Gold C distance in the Skylark 3. On the second, August 27, he was accompanied by Jane Randle in Phoebus 666 when they attempted Weston - Dunstable - Shobdon - Weston. Norman turned back at Pershore to return to base, Jane got caught out by wave sink and had to land at Shobdon for the aid of a mechanical thermal. She then flew back to Weston, a day's total distance of 337km. New Zealander, Ian Grant, on his second cross-country and flying his Olympia 460 did well to achieve Hereford and return. J.R.

SCOTTISH GLIDING UNION

On almost the final week of a successful season of courses we had an accident in which the club Falke, caught in the curl-over of Benarty, hit the hill and was substantially damaged, perhaps even a write-off. The helicopter from nearby RAF Leuchars was on the scene very promptly. Both occupants escaped serious injury, the instructor sustaining a back injury, meaning six weeks in hospital.

This season was also the last for Ansgar Sambale, our resident instructor, well known to all visitors for his meticulous briefings. Ansgar is leaving us after many years steady service, and was a club member in pre-Portmoak days when he would cycle from Glasgow to Balado for a weekend's circuits.

Bill Scull made another visit to the Norfolk Club.

We now have a new entrance, largely due to the devotion of Jimmy Rae, who likewise organised the removal of the earth bank at the east end of the grass strip and the subsequent reseeding. All this in between spells as our resident grass-cutter. Also, we now have a second windsock, clear of the trees and turbulence.

As has been the custom in the past few years, we laid on a good wave day for our Lasham visitors. This time, however, on Saturday, October 5, we excelled ourselves with over 45 climbs to above 10000ft, including two-seaters, 14 Gold and 8 Diamond claims, a 390k, 310k and 247km triangle, serenely smooth from as low as 1200ft to the 26000ft maximum set by Frank Reilly in the SHK.

The Lasham tug and our own Super Cub, which happily survived a pirouette on to its nose, managed a sufficiently high launch rate to prevent a riot among the large queue in the early morning. By midday, hardly a glider was to be seen on the ground or in the air. Much credit must go to Richard who was inundated with barographs and worked well after midnight in calibrating each trace, a mammoth task.

Our heartfelt sympathy must surely go to our friends at Aboyne who on such a memorable day were at zero feet because of turbulence R.P.

SHROPSHIRE

Eight aircraft totalled more than 120hrs at our comp week in mid-August at Chetwyn, RAF Tern Hill's satalite airfield, despite two washed-out days. Tony Adams flew to Great Yarmouth in the K-6 for his Gold distance and Rod Watson gained his Silver distance.

Other creditable performances included Ian Paul's 417km in his Std Cirrus, chasing that elusive 500km, and a wave flight to 12400ft over mid-Shropshire.

Since then the weekend weather has largely been a dirty word with Vick Carr's 14500ft wave flight in his Kestrel at Sleap being the only encouragement. D.V.

SOUTH WALES

The regular Barry Summer School was again held at our site near Usk with eight newcomers instructed by Peter France.

Ivor Shattock has gained a second Diamond and now has more than 1000 gliding hours. Partial and completed Silver Cs have been obtained by, amongst others, Les Chimside, John Sorel, John Barry and Malcolm Uphill

There were a number of interesting flights during our flying week. Tim Barton, Max Horton and Ivor Morgan went solo and Lyn Jones gained his first Bronze leg in the club Swallow. Bob Raser, Skylark 2, and Steve Field, K-6E, completed their Bronze Cs then joined Brian Wood, Oly 463, for five hour durations. Eric Duffin, aged 18, completed his Bronze C flying the tug pilot's *bête noire*—his own Cumulus.

Ron Hook flew the Oly 463 to Church Stretton for a Silver distance, just missing five hours. And the first Silver distance from Usk in a club glider was flown by Ian Kennedy who took a K-13 to Worcester and collected a Silver height *en route*. Following a more gentlemanly regime, Ivor Shattock and Miles Baddely went by K-13 to Shobdon, took afternoon tea and then flew back to Usk.

Resident members were thankful for the catering by Lynette David and Jane Parfitt, whilst our President, Dennis Bryan, and volunteer barman, wilted under the demand for celebration drinks.

At present all eyes are directed westward to predict hopefully the establishment of wave for the October wave week at Usk. B.J.E.

STAFFORDSHIRE

Our main news is that we have purchased a K-13 to improve our training facilities. The K-4 will continue to play its vital role in the early stages of training. A K-7 has been procured by the former Skylark 4 syndicate, so we might be seeing the sky full of two-seaters in the future.

Joe Malkin flew an expensive Silver distance from Shobdon in the Olympia 403. He was required to hand over £20 before he could retrieve the aircraft from his landing field. F.B.

STRATFORD

We finally got off the ground at Long Marston Airfield in early April, marking the end of a six months' gliding famine in this part of the world and the culmination of the efforts of a dozen determined enthusiasts.

After the collapse of the Worcester Gliding Club at Bickmarsh, the prospects for the remaining members and private owners looked bleak. However, salvation was at hand in the form of local landowner and personality "Farmer" Hodges who offered us the use of his airfield at Long Marston some four miles south of Stratford. Unfortunately operations could not commence until planning permission for 365 days a year flying had been granted and this took some five months. Eventually after the irrepressible Glyn Rogers had pitched his tent outside the County Council front door for two nights we got the go-ahead and became airborne two days later.

The airfield has been the home of the University of Aston Gliding Club for several years and will be known to many competition pilots as a turning point. The University pilots were extremely helpful, despite their little corner of Warwickshire being invaded by tractors, caravans and trailers.

Clear flat approaches and long well surfaced runways make the site almost ideal and the completion of the new hangar has cut out the necessity for frequent rigging and derigging. The local countryside produces some excellent thermals and wave can occasionally be contacted from an aerotow to about 25000ft. The club fleet at present consists of a K-2 and a Grunau Baby 2B and in these sophisticated days, it's easy to forget how much sheer enjoyment can be derived from such basic machinery. Launching is by reverse pulley autotow and launches of 1500 and occa-

sionally 2000ft are not uncommon. Not bad for 60p. The pride of the tow car fleet is a Rolls-Royce engined Van den Plas.

There are invariably a few light aircraft buzzing round and one or two exceutive twins occasionally come steaming in, so it pays to keep a look out if you are heading this way. But all visitors are welcome although powered aircraft are strictly PPO. H.F.H.L.

SURREY & HANTS

It's time to take stock of this very variable soaring season. There were good days with many 300km and nine 500km flights completed. We flew a record total distance cross-country—64000km—and Surrey & Hants' gliders went 26000km round Britain. The season in general ended suddenly in the last week of August with no mellow fruitfulness at Lasham since then.

Portmoak has provided the only recent excitement and how! Saturday, October 5, was the day of days with eight Diamonds resulting from 13 gains of over 5000m and numerous 3000m climbs. Paul Loewenstein, our Treasurer, with his climb becomes only the second pilot to complete three Diamonds in our club gliders. Alan Purnell flew round a 400km triangle to Loch Awe and Aboyne on the same day —mostly above Gold C height.

Plans for 1975 are rather difficult to form due to the uncertain financial scene next year. Replacement of our oldest gliders for newer machinery will probably be shelved and an increase in subs and fees substituted instead—a rather bitter pill to swallow but sweetened by remembering that our costs and increases in fees have not kept up with inflation.

Until then a great programme of parties, bonfires and otherwise will take place with stone and flint gathering from the recently cropped area of the airfield prior to its return to regular pounding from Falke and K-13 wheels. C.L.

TRENT VALLEY

Since our last entry in S&G great progress has been made in all spheres at Trent Valley. Our hangar is now completed and our clubhouse well on the way to being finished—for this our thanks to George Nelson and helpers. On the social side, we have held two barn dances organised by Georgina Sewart, which boosted club funds.

We would like to thank our retiring Secretary, Patricia Pratt, for her hard work over the last few years. Bob Baines takes over in her place.

Gliding would appear to be increasing in popularity in this area and our CFI and instructors are kept busy in the T-21 with the increasing number of recruits. Congratulations to the following on going solo: Rosemary Farthing, Chris Lines, Richard Dove, Stephen Fletcher, the Newsomes (our first married couple to go solo on the same day), Mick Hewitt and Adele Slater; and to Peter Fillingham on his Silver height

As our Chairman, John Rice, said—he's heard some weird reasons for people falling out of the sky when trying for their five hours, but Neville Wilson's excuse "takes the biscuit". On landing after three hours and being asked why he came down, Neville replied "I've got to go home to milk the cows. . . ." J.P.N.

WYCOMBE AIR PARK

Our visit to Weston-on-the-Green was thoroughly enjoyed by us all As an all aerotow site at Wycombe, it makes a pleasant change to visit a winch site, especially when you can get 1800ft on the wire as we did at Weston.

When the summer courses finished we regretfully said goodbye to Graham, the courses' resident tug pilot throughout the summer.

Despite the bad start to the year caused by the petrol crisis, we recovered well during the season with both the number of Gold and Diamond flights going into double figures. We closed the soaring season in style by making the earliest ever entries for the National Ladder with flights by "Rocky" Stone and our CFI, Chris Rollings, who has made many notable flights this season.

We look forward to the 1975 season with some trepidation as we wait to see whether our insular CAA overlords will permit us to continue successful gliding operations from this site. It is a cloud which throws a far greater shadow over our future than any petrol crisis ever will. J.M.C.W.

YORKSHIRE

Soaring conditions recently haven't been good but there was one superb weekend late in August which gave plenty of cross-country flying including Gold distance for Bob Addis and several attempts for Diamonds.

We usually make strenuous efforts to keep the public off our airfield, but we actually invited them to come and see us on August Bank Holiday and, in spite of uncertain weather, they came in thousands. The result was a substantial profit from the venture and lots of fun for our members and the visitors. Thanks are due to the organiser, Barry Gregson.

Flying continues throughout the year at Sutton Bank and anyone wishing to sample our ridges and wave conditions is welcome and will find every facility with a clubhouse, dormitory accommodation and caravan parking. P.L.

SERVICE NEWS

ANGLIA GSA (RAF Wattisham)

More changes have taken place with Dick Cole and Dave Cyster leaving for CFS. Eric Richards has taken over as CFI with Ken Stedman as deputy.

During August we visited the local BGA club for three weeks' flying, the K-6E and Std Cirrus doing some 35hrs in spite of indifferent weather. Dave Sillett in the K-6E had two unsuccessful attempts at a 300km out-and-return but, nevertheless, covered some 500km.

Congratulations to Phillip Sillett who completed his Bronze just before his 18th birthday, Dave Cyster for his Silver duration and height, Chris Heames for his Gold distance and Diamond goal and Ron Lamb and Mike Faulkner for their first solos in the T-21 and Blanik.

Once again we shall be represented at Aboyne by the K-6CR, K-6E and Std Cirrus during October and November. E R.

BICESTER (RAFGSA Centre)

As the soaring season draws to a close we look like breaking all records in terms of hours, launches and cross-country kilometres flown. Although the weekend weather has not always been ideal, we have been able to take full advantage of the excellent summer during our instructors' courses, soaring and task weeks.

John Delafield and John Glossop returned from Nympsfield, having flown Kestrels 66 and 29 into second and fifth places in the Euroglide Open Class. Our congratulations to John Delafield on being included in the possibles for the British team for Finland.

At the time of writing two parties of club members are visiting Aboyne. We hope to be reporting on enjoyable flying and badge flights in our next notes.

With the days now drawing in, the staff are hard at work servicing ground equipment and aircraft, and preparing the winter flying programme. This important part of the Bicester activities should produce more potential soaring pilots, ready for next season. J.D.J.G.

CHILTERNS (RAF Weston-on-the-Green)

At the time of writing most of the "hard core" are at Aboyne on one of our bi-annual wave soaring fortnights. It's a sign of the times that out of the 14 who made the journey, only five need Diamond height.

Reflecting over the season, it has been

Chilterns' best—more than 12 Gold legs and 11 Diamonds, Silver, Bronze and A and Bs galore, a Sport Class Inter-Service Champion (Frank Wilson) and plenty of new faces.

Of all those achievements one in particular deserves more than just a passing comment. Eddie Wright completed his 300km in the K-6E only to discover the shutter had jammed open on his camera. So one week later he went round again and this time it all worked. The rumour was he did it to get more cross-country kilometres than anyone else—but that distinction goes to Bob Lloyd who had several 300km attempts, none of which were on "good days". G.M.

CRANWELL (RAFGSA)

There were no Silver height gains claimed from this site in 1973 but this year has been much better with several successful climbs recently, including one by Dave Aram who has completed his Silver C. After several near misses, Rob Farman gained his Bronze on the last soarable day of the season.

David Whittingham has left us temporarily for University while Keith Watson, our Diamond height pilot, has been lured away by the vast sums of money offered to ex-RAF men by the Middle Eastern sheiks!

A Tutor syndicate has been formed. The Cadet owners, not to be outdone, are now thinking of "going glass". Our SF-26 has continued on its wanderings around the GSA and the Pilatus B-4 has at last arrived to take its place. Its trailer is taking shape next to the recently completed K-7 box. We hope they will soon be making pilgrimages to northern ridge and wave sites. S.T.E.W.

623 GLIDING SCHOOL, ATC (RAF Tangmere)

We broke with tradition this year and took our week on the Halesland ridge during the first week of September. This proved to be a good move since the Mendip site with Cheddar Gorge a mile or so along the ridge provided some copybook ridge lift. With two T-21s, one serviceable Prefect and a Swallow, we were able to obtain seven Bronze legs, mainly in the Prefect.

The CFI, F/O B. Newman, tried yet again for his duration, this time in the comfort of the T-21. The attempt was rained off after 2½hrs which we thought was slightly preferable to another 4hrs 55min. J.A.R.

PHOENIX (RAF Brüggen)

This has been a year of change and incident. We welcome our new Chairman, Sdn Ldr Bob Jones, who joined us when Sdn Ldr Tom Hughes was posted back to the UK. We wave goodbye to our CFI and his deputy, leaving only Jerry Wallace of the original team, and welcome Neil Stagg and Peter Bryant as CFI and deputy, plus nine other instructors.

Although the weather has been poor and despite problems previously reported, there has been an increase in flying statistics compared with last year. We had 104 flying days (ten less than last year), have logged 7995 launches (a 50% increase), there have been 1102 flying hours (a 25% increase) and a 50% increase on cross-country flights with 2018km. In addition, 24 members have gone solo, 11 gained C certificates and there have been five Bronze Cs, eight Silver heights, eight Silver distances and two Silver durations.

The K-7 (515) is having its major and our new Std Libelle has adopted the usual Swallow pose (upside down in the workshop) due to troubles with the tail wheel. However, we hope to have them both ready for the new season as well as having given all other gliders and ground equipment a face-lift.

The erection of our hangar has been delayed yet again due to the extra commitments of the Army who, at one time, thought they would be able to erect it as an exercise. Wally Lombard has taken on the task and hopes to make it a club project.

We have an average of 75 new members this year but say goodbye to Rob and Gloria House who have left a big gap in the club. And our congratulations to Simon and Janet Martin on their marriage. A.M.

WREKIN (RAF Cosford)

This year is a milestone in the club's seven year history with nearly 1100 launches and a total of almost 6000km, plus a fleet comprising two K-8s, T-21, K-6E, Pilatus and a syndicate Blanik, Skylark 3B and a Dart. Our most notable flight was Ben Goodman's 300km triangle in the K-8, Ben's final effort before joining Gary Moore in leaving the service.

We are delighted that Frank Kenedy and Jerry McCormick are making good progress after their Bocian accident. And we wish well to the last group of apprentices who have been staunch supporters—the clubs that receive them will indeed be fortunate. K.M.R.

classified section

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