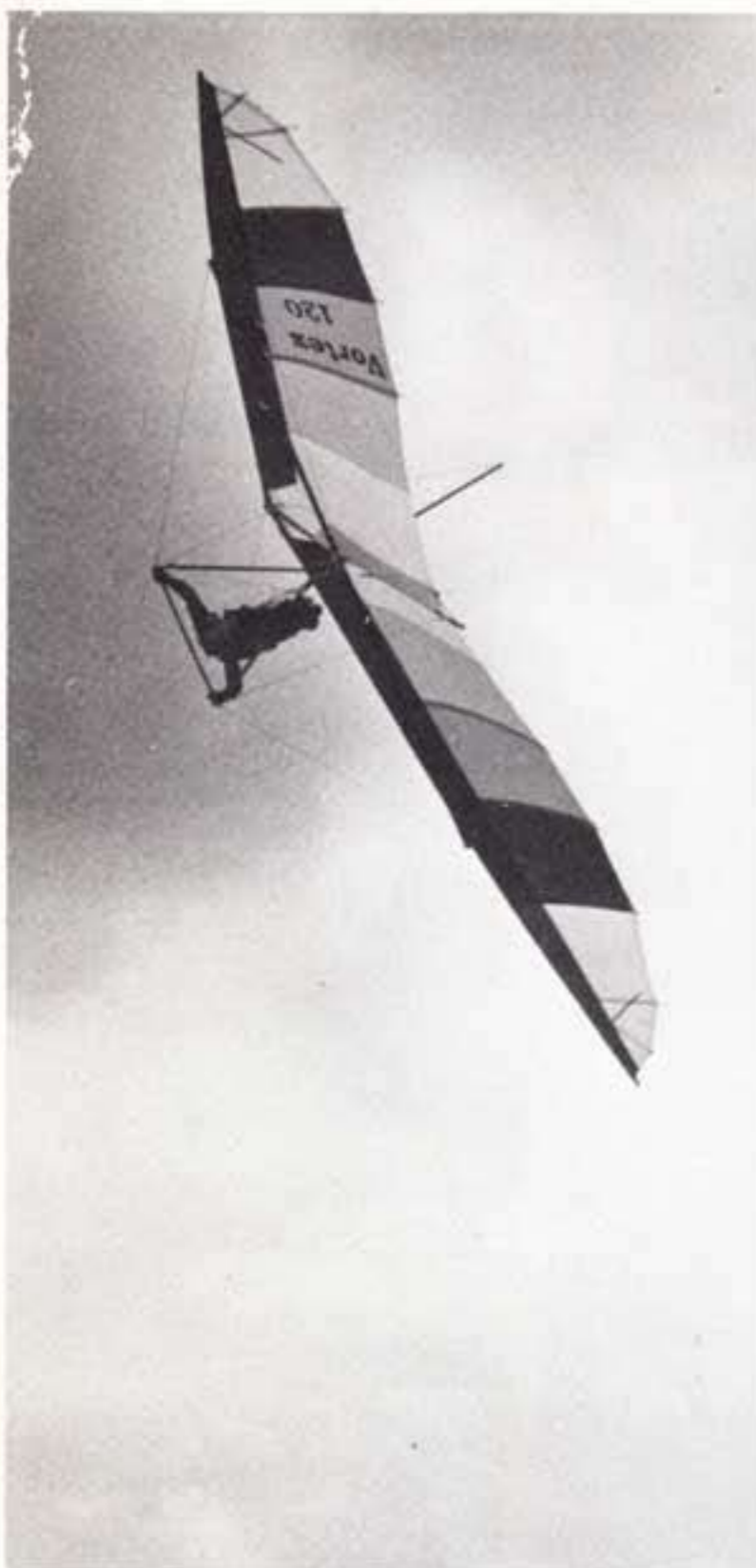


# WINGS!

AUGUST 1978

MAGAZINE





## Cost

'VORTEX' 110  
£397.00 including  
bag and VAT

'VORTEX' 120  
£415.00 including  
bag and VAT

Richard Kenward Photography



The 'VORTEX' 110 and 120 herald the advent of a new breed of high performance hang gliders and incorporates two totally unique features, 'VORTEX' generators and a permanently attached minimum washout control, known as the 'Bow String'. The 'VORTEX' takes a step up in performance and a step down in cost/complexity. No wing wires mean no tuning problems, the tuning is built into the sail and stays there.

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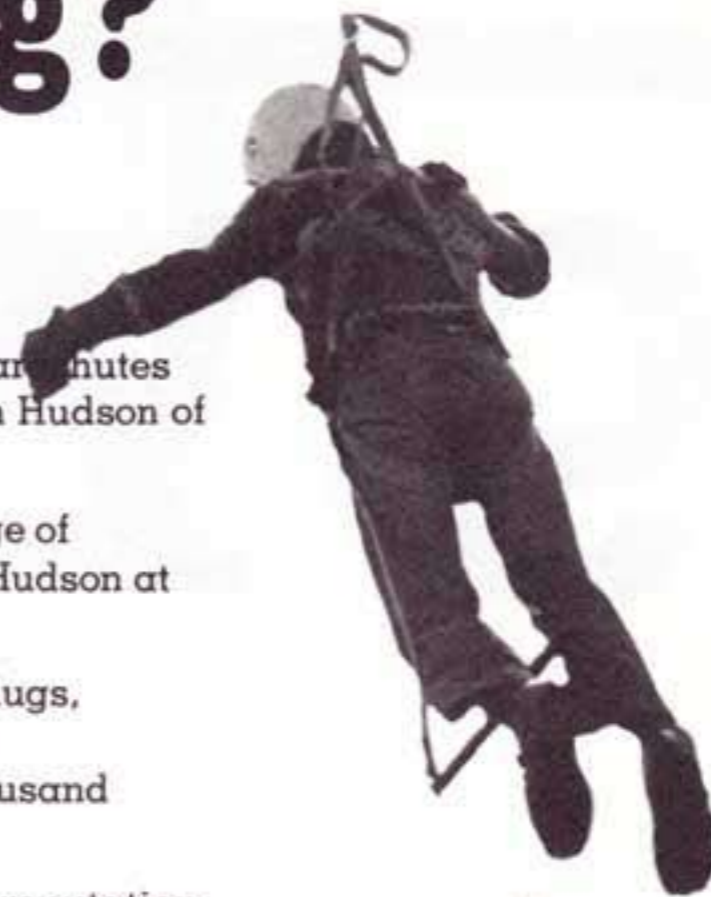
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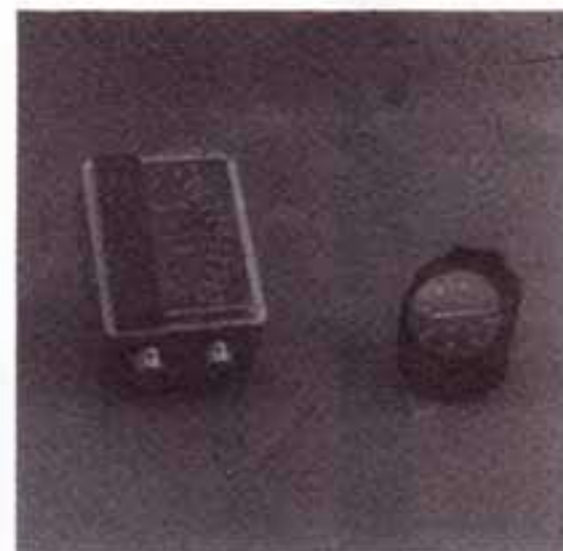


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# WINGS!

The official magazine of the BHGA

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Cover: Kev Cowie executes a past 90 wingover on his Super 2 (Note kite at top of picture) Photograph: Roger Wates

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*Wings!* is published by the British Hang Gliding Association. The views expressed in it are not necessarily those of the BHGA Council, its Officers, Members or the Editor. Contributions are welcome. Articles should be typewritten if possible; photographs and cartoons should be accompanied by the appropriate captions and any material which is to be returned should be accompanied by a stamped and addressed envelope. The Editor reserves the right to edit contributions where necessary. *Wings!* may be obtained, either by joining the BHGA, or on subscription from The BHGA, 167a Cheddon Road, Taunton, Somerset at a cost of £7 per annum. All enquiries other than to members of the magazine staff should be sent to the Taunton address.

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## ET TU BRUTUS

Dear Sir, For a short period, a mere year or two, he was well and happy, then his friends noticed that he had grown drawn and bowed as though carrying some intolerable weight, but we all thought it was a passing thing, that he would once again return to his former bloom; "you can't keep him down" we said, failing to recognise just how frail he had become, then the inevitable happened, while we all stood around arguing about sites among ourselves.

As he died, Jonathan Livingstone was heard to murmur faintly "Et tu Brutus" and a blood stained copy of *The Official Organ* (June edition) slipped from beneath his suddenly lifeless wing. It lay open on the ground, a steady eighteen rippling the pages, seeming to pause briefly at 'Council Matters' before turning the pages to the equally iniquitous piece by Brian Milton on powered flight.

At the inquest the coroner said that the Post Mortem showed the blood was from tears of sheer frustration, wept as he was being crushed to death under the weight of obstructive and restrictive rules and regulations heaped on him by the very organisation he had raised and nurtured, in the vain hope that as it reached maturity it would breed true and in its turn raise others with the freedom loving spirit, which was the start of it all.

Disappointment, shame and finally hopelessness had all sapped his will to live, as he watched each eggshell crack and a greater crested bureaucrat or a lesser spotted money grubber step forth, he knew in his heart that this regression to type was irreversible.

The Verdict? — *Murder by persons well known*

Jonathan's Will: to my brothers the flyer, the home builder, the modifier and the experimenter, I leave all that I have, this being no more than a love of freedom. Look after it well, help it grow ever stronger and fight to the death ANYBODY who would attempt to take any part of it away from you, for it is precious beyond words. In particular be vigilant against my murderers the bureaucrats and money grubbers, for in their greedy pursuit of position, prestige and finance they would destroy you. In the end you have the ultimate sanction against them and many of your brothers have already taken this step.

J.S. Cousin  
Chairman Northampton HGC

## KITE PREFERENCES

Having seen the kite reports in *Wings!* it is interesting to note that in the reports those machines which have more than one report are so different. What this illustrates is that choice of hang gliders is a matter of personal taste. We've all heard how Joe Bloggs on his Sky Cloud MKX was on top of the stack and the Hookrakers MKVI are rubbish and impossible to handle whilst Fred Smith says just the opposite. As I do not yet own one of the latest



# AIRMAIL

gliders, my views are quite neutral and to me they all look very similar, some turning slightly faster than others, some slower than others etc.

Surely the best pilot will get the best performance out of the glider he likes best. I think the American best glide competition illustrates this point admirably. Although as the commentators said, certain machines were better suited for a glide angle competition, it was the pilot that counted in the end.

In conclusion I would say when buying your next machine, survey the market, test machines, but the one you like the best and enjoy it, ignoring any comments from Joe Bloggs or Fred Smith.

David Smith

## BELIEVE IT OR NOT

Dear Sir, I have never written to a publication before, for many reasons, and I hope this will be the last!

It's about misinformation — and possible effects on gullible readers. Before getting heavy I would like to apologise to Stephen O'Brien because I don't know him from David Worth but I do know that he knows enough about parachuting and any relevance of parachuting practices to kite flying to keep it all to himself — sorry Stephen.

For Stephen's benefit on any further parachute descents the "fast approaching ground" slows down if you look forward rather than straight down between your boots.

"Rolling on my backside" is hardly "tried and tested" except by students. Stephen has misunderstood or been badly taught the Parachute Landing Fall (P.L.F.) "giving way . . . knees, buttocks and backs," play no part . . . "muscular relaxation" will only result in brown boots and a bent coccyx. The essence of the P.L.F. is a compact position, nothing sticking out like elbows, head, legs etc., and a tense

musculature but *not* rigid. As I recall this position is achieved thus — feet and knees together — feet flat — knees slightly bent — slightly bent at the waist — shoulders rounded — chin on chest elbows in. The theory then is that the tensed, bent legs take the brunt of the landing and the P.L.F., which is a roll, applies the body to the ground, taking the remainder as say in judo. The points of contact then are; the flat feet — the side of the legs, the rump — the round of the shoulder and the other side of the body — the compact position maintained throughout. Any extremities such as knees and buttocks will terminate any efforts to "roll". Sorry to be so long-winded but if Stephen's instructor had taken the time I would not be writing this.

Having conducted my lecture on the P.L.F. I can now say that in *no* way is it relevant, helpful or advisable to a stricken hang glider pilot!!!

In a routine landing the parachutists hands are above his head because that's where his steering lines are located. In a tree landing his legs are crossed and his arms are crossed in front of his face for maximum protection. In a water landing his hands will probably be hovering over the leg-strap buckles, the last to be released on touchdown. What I would like to illustrate is that one cannot take things out of context without thinking. In Stephen's diagram what is the pilot doing with his hands? What's he holding?

I would suggest that he hold the control frame high at the heart bolt with his feet firmly on the control bar. Jim Handbury, an American flyer and parachutist, who helped develop U.P.'s parachute system, used this system on some films I have seen. It seems to me more than logical to use the frame if it is intact, in an emergency.

So back to my reason for writing. If this letter is printed I would like to ask your readers to think carefully about what seems like well meant important

advice — people and publications are all too fallible.

V. Cotano  
Southampton

*Ed: I am sorry that you find writing to Wings! a chore to be avoided. It adequately illustrates the problem facing the editor of a non-commercial magazine.*

*As an editor of such a magazine, I try to ensure the reasonable accuracy of articles published, but with a limited time schedule, budget and personal expert knowledge of wide varieties of subjects, some articles cannot be thoroughly checked and verified. It is, however, my experience that for every contributor to Wings!, there are one hundred armchair critics who very quickly rectify any misleading statements.*

## TRANSMITTING COST

Dear Sir, I was disturbed to see the IBA warning in the May edition of *Wings!* that they would hold anyone responsible for both the cost of repairs and loss of revenue if a flyer knocked out a transmitter aerial.

Knowing the cost of adverts, is there a case for raising the third party insurance cover even if it is a hopefully very unlikely occurrence?

Keith Morgan

*Editor: The advertising revenue is an integral part of the magazine budget, without which the quality of the magazine would have to be considerably inferior.*

## 100 CLUB

Dear Sir, There must be quite a number of us who have now logged over 100 hours on hang gliders and been through all the phases of under confidence, over confidence, switched on, switched off, terrified, exalted etc., etc.. We have come to know ourselves, the parameters of our aircraft, the conditions in which we can fly and the limits of our skill. We respect and do not exceed them.

This does not deny that there is a place for *pushing the limits* but *test flying* is for *test pilots!*

I think there is a valuable contribution to be made to the sport by simply identifying ourselves — here is a bloke with a lot of experience, ask him, watch him". The best way to teach is by example.

It could be useful to anyone, who has to deal with "authority", to be able to say there are over 200 pilots with over 100 hours that's over 20,000 hours of safe flying. (or words to that effect).

The very existence of such a club would influence attitudes without having to preach a gospel.

It could become international. — Would anyone who has over 100 hours and some sympathy with the concept of forming such a club, please drop me a line. Perhaps we could have an informal get together at Mere and see where we might go from there.

Why 100 hours? — well it's a nice round figure.

Bob Mackay, 83 Wern Road,  
Skewen, West Glamorgan, Wales

## AREA REPRESENTATION

Dear Sir, Could I through *Wings!* put an idea forward.

On the formation of BHGA it was intended that Council Members should be elected on an area basis. However, this has proved impractical and currently there is no one person on council who a BHGA member or member club can regard as their particular representative. This is unfortunate and must be a restriction to easy and useful communication between local level and council.

I would request that consideration be given to each council member being allocated a share of the clubs and becoming their representative. Council could decide on the most convenient method of allocation. Each club would then provide honorary membership for its council representative, thereby giving him club information, magazines, site data, etc.

If fellow chairmen or secretaries would pass their club comments on the idea to Reggie Spooner then it could possibly be discussed at the next council meeting.

**Chris Freeman**  
Chairman Mercian HGC

## NOT GUILTY

Dear Sir, Blatant Disregard? No Rob! As you well know, ever since 1974, when I and a few others developed and perfected the way to take-off safely from, and fly, the cliffs at Rhossili, I have never had any regard for the "No cliff take-offs" rule. This rule was imposed because fliers who were not competent to take-off from the cliffs had a series of accidents which endangered the general public and their property. When I fly; wherever I fly, I do so with a deep sense of self responsibility. This makes me a

very careful flier. I do not endanger people or their property. I do not land in farmers crops, break their fences, or worry their livestock. This way I enjoy the freedom of free flight; subject only to air law. I do suggest that if more fliers could develop this sense of self responsibility, they might enjoy a greater freedom in their lives.

You are quite right Rob, I'm not a member of the S.W.W.H.G.C. and as you well know, I've never been a member. The club has never had anything to offer me.

I must apologise here for flying in the lambing season. I did genuinely forget. Strangely enough, in your letter you fail to mention the fact that after my one flight (down), I suddenly realised, while walking back up, that it was the lambing season. I then ceased my flying activities. The whole story was told to you, Rob, by me, on the boat to Ireland that night.

Concerning flying during the lambing season; did you notice that in Ireland we were flying in the lambing season? The farmers there had no fears at all for their sheep when hang gliding was taking place. My friends and I did happen to discover an advantage of hang gliding in the lambing season. On a bare hilltop we found a new born lamb deserted and dying of exposure. We took it down to the farm where it was received with grateful thanks.

I wonder if any more fliers have noticed the compatibility of hang gliding and sheep (whether lambing or not) in as much as the sheep take no notice of us at all. Perhaps it's time the S.W.W.H.G.C. proved to their local Rhossili farmers that his fears for his sheep are groundless.

I'm sorry to have had to write this letter. It really was unnecessary for you Rob, to have written yours. You have always known that I am an individual, independent flier, who accepts his own responsibilities. I know you resent my freedom; but I'm always in hope that one day you will develop the sense of responsibility that will enable you to attain your own.

Painfully penned by  
**Nick Regan**

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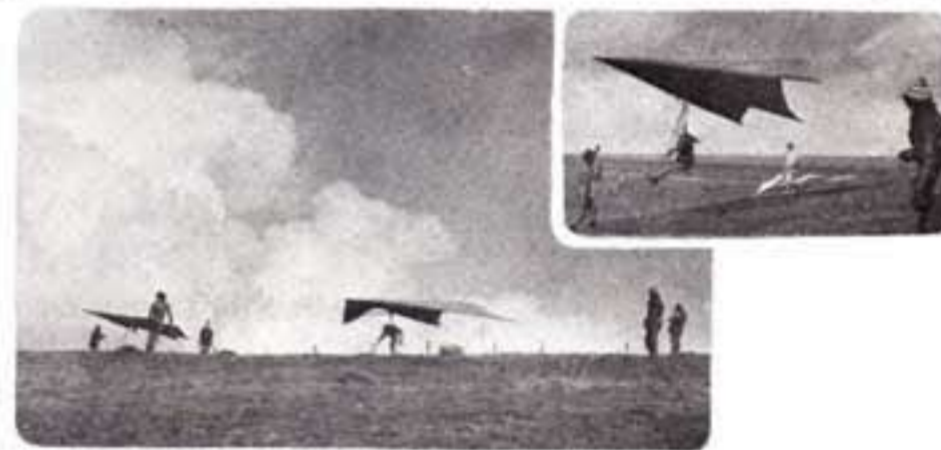
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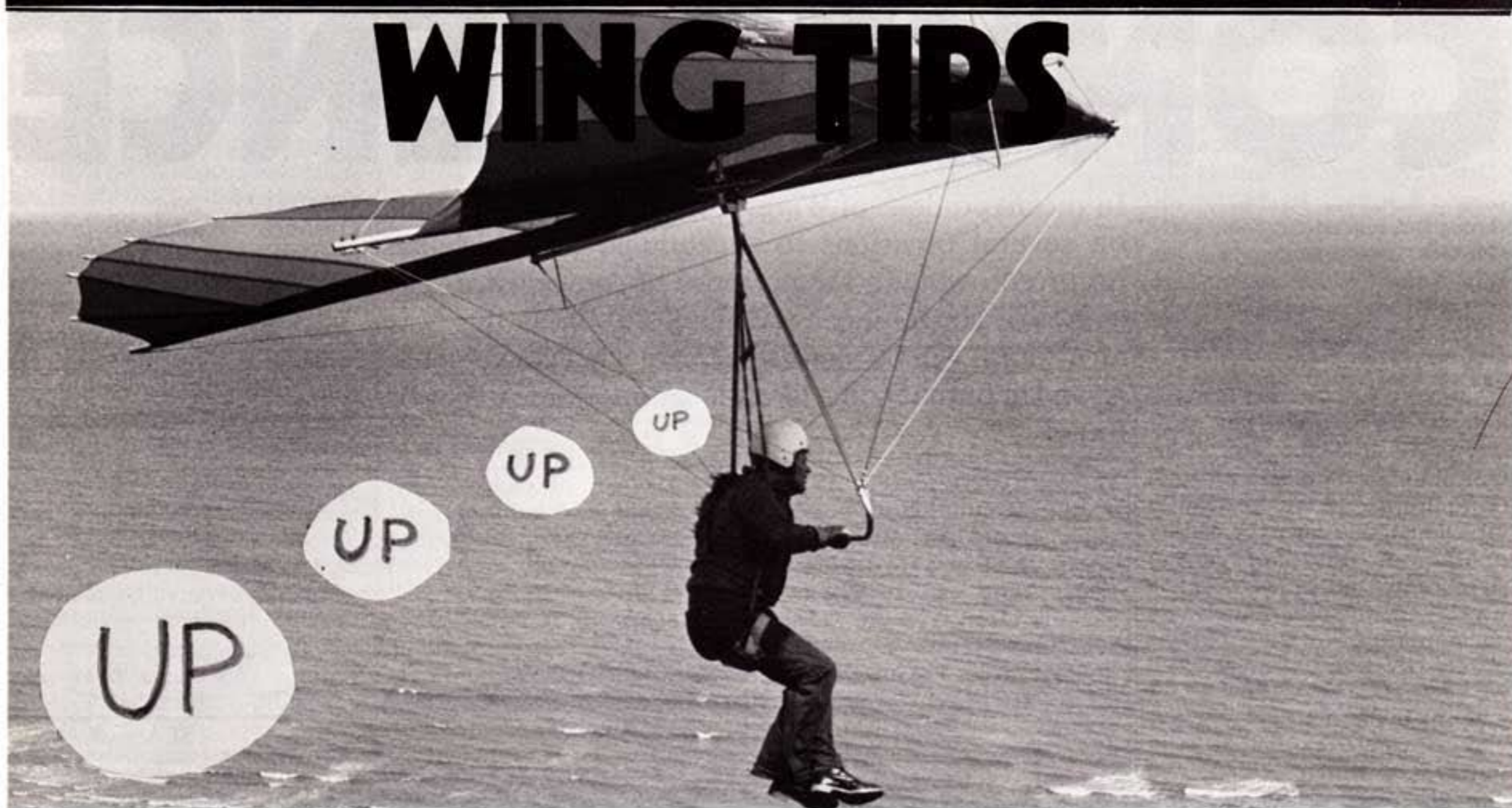
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# WING TIPS



Photograph Peter Leggett

It's a standard hang gliding Sunday — it's raining stair rods! However my wife observing withdrawal symptoms and knowing that these can be overcome by the simple means of actually travelling to a site even if I don't fly, encourages my immediate departure.

Right then, I load up, strap on the kite, pick up Gilbert, a fellow club member, and set off for Mere. The rain gets heavier, I change the car down to third and the wipers up to fourth.

As we arrive the unbelievable happens, the rain stops, the sun appears and most amazing of all the wind blows from the right direction. Already a couple of gliders are soaring. We rig my Firebird S as more people arrive. Here's Glen Harvey, C.I. of the High School of Hang Gliding. He's always happy to see his old pupils on the hill and has often given me advice and assistance (and confidence!)

While I get ready the thought of soaring doesn't occur to me. This is a situation I have been in before. Plenty of people staying up while I cruise to the bottom. At least there's plenty of room at the bottom I reflect, that field is enormous. Somebody wanders over; "You aren't allowed to land in that field you know."

"What happens if I do?"

"We fine you £2 and break your arms when you get back to the top".

GULP "Where do I land then?"

"Behind those trees at the base of the hill."

"Won't that involve landing cross wind, parallel to the slope and in turbulence?"

"Yes, yes and yes, but if you land close to the trees the air will probably be dead."

So will I, I think.

## THINK UP

by Martin Trickett

This calls for a reassessment of the situation! I watch further flying with interest. Everybody is soaring but I know that's not what I'll be doing. Ahh, there's somebody going down. He turns parallel to the slope and begins to flare — he's really moving — he lands and does a forward roll with pike through the A frame. Hmm, well, that wasn't totally unexpected.

Come on stop hanging around. You came to fly and even if it's going to be a tricky landing it will be a good experience. I move the kite to the take-off area and strap in. Gilbert is on the nose wires. Wind about 22 m.p.h. Glen Harvey appears as if by magic (I told you he keeps an eye on his old pupils).

"Don't fly it too fast, make your first turn along the ridge fairly quickly. Don't think down, think up!"

"OK, I say, but I still reckon I'll end up at the bottom."

Now I concentrate on making a good take-off, amazing how the watchful presence of your old instructor does wonders for your technique.

Bar in — two paces and I'm airborne and turning along the ridge. YES, it feels different, a look to the right — I'm *not going down* (I'm not going up either mind you) Christ — keep calm now, approaching the end of the ridge. I consciously try to turn well, avoiding too much height loss, and head back along the ridge. It's true, I'm definitely not going down. In fact I'm miles high (at least thirty feet above the ridge). For the first time in my hang gliding

career I see white upturned faces looking at me! Gilbert is waving his arms like a windmill — of course, I mentally kick myself, I'm flying much too far out. Get closer you fool or you'll blow it. I crab towards the hill and the Firebird S rises in response.

A few more beats and I begin to relax. I really am thinking up and not down. The kite feels fantastic, it's tight and together, and I've got time to let it fly rather than set up a landing as I've always had to do in the past I discover that I have been flying far too fast on my previous flights, the bar is now a good six inches further away from me than I usually have it and there's no sign of stalling. As I slow it down I go even higher. This is unbelievable, there's so much time to experiment and sort things out. Even though I'm seated I'm now above some other machines which are being flown prone. (and they are not just standards either).

Time to think about a return to earth — both physically and mentally — That bottom landing didn't look all that easy and besides I've plenty of height now, why not try a top landing. Steady boy, steady, a first soaring flight and a first top landing on one flight, is this wise? Well the top landing area is large and I've seen several other fliers landing on top this afternoon, both from the ground and from the air.

I'll have a go. The glider drifts behind the lip of the hill and I turn into wind and begin to descend. Ahha, I project my flight path down to ground level and realise that I will be landing

quite close to the front of the hill. Gilbert is there ready to grab something (anything!) as soon as it comes within range. As I sink lower the lip gets closer. I reach down with my feet. One foot touches the ground right at the edge and then, you've guessed it, I'm airborne again.

Does this count as my second soaring flight?

Gilbert is doing his windmill impression again. Yes I should have gone further back before turning into wind. OK try again, this time no problems. Feet down, and touch down, Gilbert catches the nose and lowers it — thanks. I unclip and he looks at me (he's yet to soar himself) we are both grinning.

"You lucky devil", he says.

I feel elated and slightly shaken.

That day two more soaring flights and on two other days during the week more soaring. How my outlook has changed, I hesitate to fly now if it means a quick descent followed by a long carry up.

Looking back and analysing that day what factors made the difference? Why did I soar then as opposed to previous occasions. Well previously:

I was flying too fast.

I was making my first turn too late, and most important of all I was convinced I wouldn't soar because I was seated and there was something wrong with the kite. These last two factors I now know to be complete and utter rubbish. In other words I was thinking down before I ever left the ground.

If, like I was, you are an E.P.C. holder with lead boots, who just can't seem to get it together, then stay with it, be patient, it will happen and above all *think up*. ☺

# CONVERGENCE

Metric units are invariably used throughout this article. Some useful conversion factors are:

1m = 3.3ft

1km = 3,280ft = 0.62 miles

1ms<sup>-1</sup> = 200ft per min = 2.2 mph.

Convergence occurs whenever there is a *net horizontal flow* of air into a vertical column. This means that more air flows into a region than flows out (in horizontal directions), and since the density of the air does not change significantly there must be some way of preventing an accumulation of air. This is effected by *vertical* motions which we know to be responsible for lift and sink in the atmosphere. Fig. 1 shows three examples of wind patterns which lead to convergence. A notable point illustrated in example (b) is that two wind systems do not necessarily have to *oppose* each other for convergence to be generated.

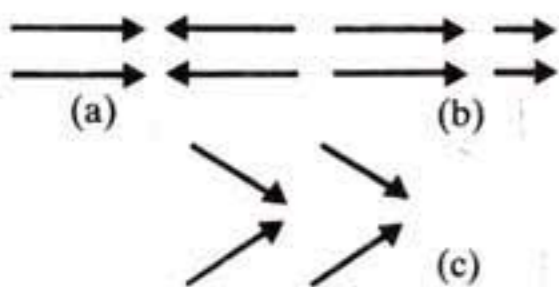


Fig. 1: Horizontal wind patterns responsible for convergence. (The arrows represent wind direction and speed).

The vertical motions due to convergence near the ground must of necessity be directed upwards, but convergence in the upper troposphere (10 km) generally leads to downward motions. Fig. 2 shows how the circulation patterns tend to align themselves through the troposphere, with convergence at the ground accompanied by *divergence* aloft, and vice versa.

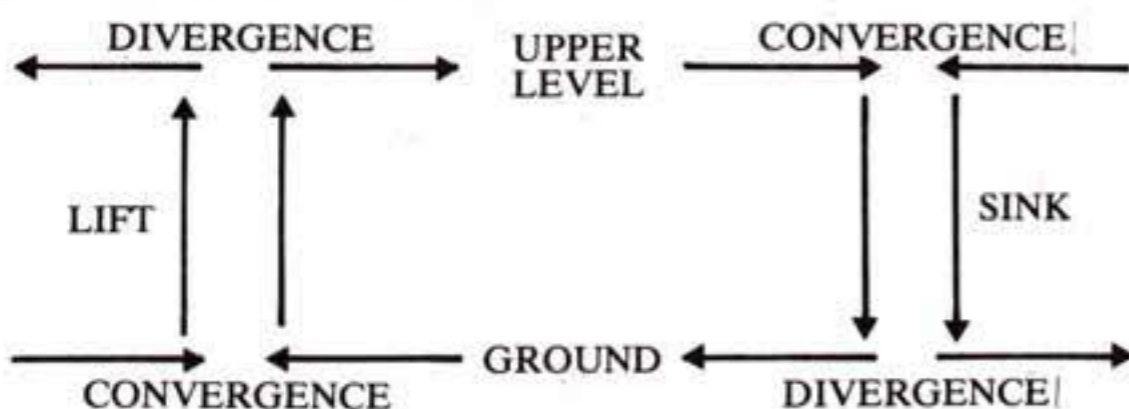
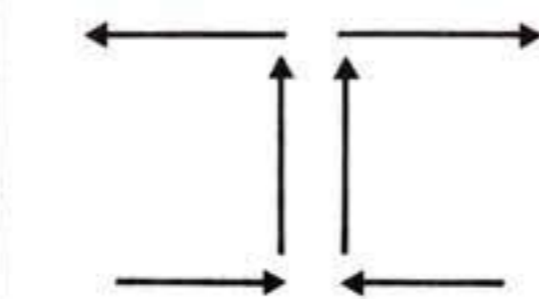


Fig. 2: Convergence and divergence patterns with their corresponding vertical motions.

In recent editions of *Wings!* reference has been made on several occasions to exceptional lift which has occurred owing to the presence of *convergence*. The causes of convergence are manifold, but in this note an attempt will be made to explain what convergence is, and to outline some likely locations where it may be found.

## Extensive convergence

The circulation patterns schematically illustrated in Fig. 2 can be set up on a variety of scale sizes. The most extensive example involves the low and high pressure centres as seen on weather maps. The low pressures are created by convergence at the ground, ascending air, and divergence aloft. (The low pressure is formed because divergence *exceeds* convergence, and there is a net loss of air from a vertical column). Although the observed surface winds blow around the low centre, they cross the pressure contours at a small angle to produce the net convergence, see Fig. 3.



(a) Vertical Section

(b) Horizontal section at surface.

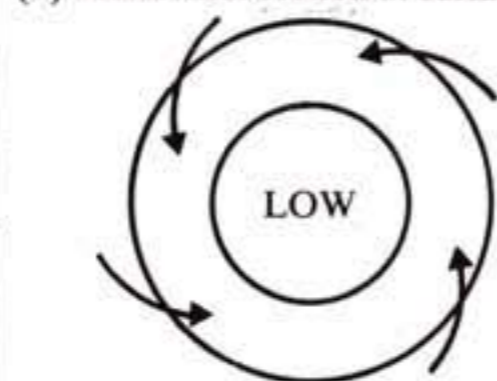


Fig. 3: Air motion through a low pressure centre.

## Coastal convergence

Onshore winds produce convergence as the increased friction over land (compared with the sea) slows down the wind, and there is an effective "pile-up" of air, Fig. 1(b). The wind speed observed over the sea may be halved well inland, so it is possible for substantial upward

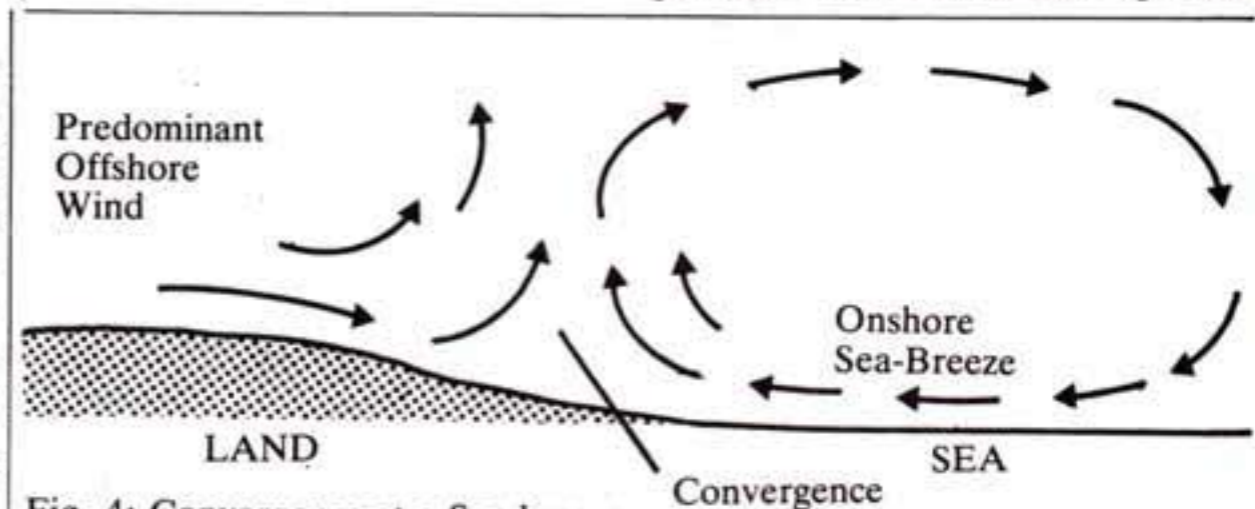


Fig. 4: Convergence at a Sea-breeze front in the presence of an offshore wind.

Conversely, anticyclones are associated with descending air, but in both of these instances, the vertical velocities are invariably weak (only about 0.03 ms<sup>-1</sup>, or a few feet per minute); so whilst regions of low pressure might help to prolong flights to a certain extent, the vertical motions are inadequate to sustain flight. However, the importance of these weak upward and downward motions to weather developments stems from the fact that they can extend over thousands of square miles and they may persist for several days.

## Local convergence

Sufficient lift to maintain flight (i.e. vertical velocities in excess of 1 ms<sup>-1</sup>) can be achieved in smaller scale convergence systems, of which the thermal is a classic example. The predominant wind superimposed on the horizontal convergence pattern (Fig. 1(a) tends to create a wind pattern similar to Fig. 1(b) as the thermal passes through) The horizontal wind velocity changes are an indication that vertical motions are present.

The formation of thermals and their morphology has been dealt with elsewhere in *Wings!* Some other examples of convergence situations are onshore coastal winds, sea-breeze fronts, and lee wave rotors. Other examples could be found.

velocities to exist; but their magnitude is usually reduced as the velocity transition occurs over several miles either side of the land-sea boundary. Again though, this convergence effect should ensure that flights are prolonged significantly over coastal sites. (Another factor of importance to coastal soaring, apart from convergence, is that whilst friction can reduce the wind speed to below strength inland, the greater speeds impinging on coastal cliffs and hills may provide sufficient *orographic* lift at these places).

## Sea-breeze front convergence

The light rising air currents over coastal regions which initiate sea-breezes are insufficient in themselves to maintain flight, but the onshore winds which are established provide welcome breezes on coastal sites. The most effective lift produced by the sea breeze, however, arises when it is set up in the presence of a light offshore wind, and a broad line of convergence is formed parallel to the coast, along the *sea breeze front*, see Fig. 4.

The Sea-breeze can become established in offshore winds less than about 3-5 ms<sup>-1</sup>, and may penetrate inland against such winds. Strong sea-breezes have been observed over 70 km inland! and they regularly propagate 15-20 km in the summer months. The

sea-breeze front heads inland leaving the coast at about 10 a.m. and travels at about 6 km hr<sup>-1</sup>. Thus, the convergence line might be expected 30 km inland at about 15.00 hrs. This type of lift must be a delight to fly in as some pilots can testify to (see Johnny Carr's report of flying on 3rd June, 1977 at Ditchling, *Wings!* July 1977). It is unfortunate that this effect occurs relatively infrequently.

#### Lee wave rotor

This is a small scale circulation system and its vertical extent is limited by the height of the obstruction forming the lee waves. The formation of lee waves and the rotor are shown in Fig. 5. Convergence at the upwind end of the rotor, at A, is accompanied by upward motion, whilst divergence to the rear of the rotor, at B, is associated with downward winds. The rotor is unsteady and the lift is often very turbulent.

It is possible that the convergence flying described by

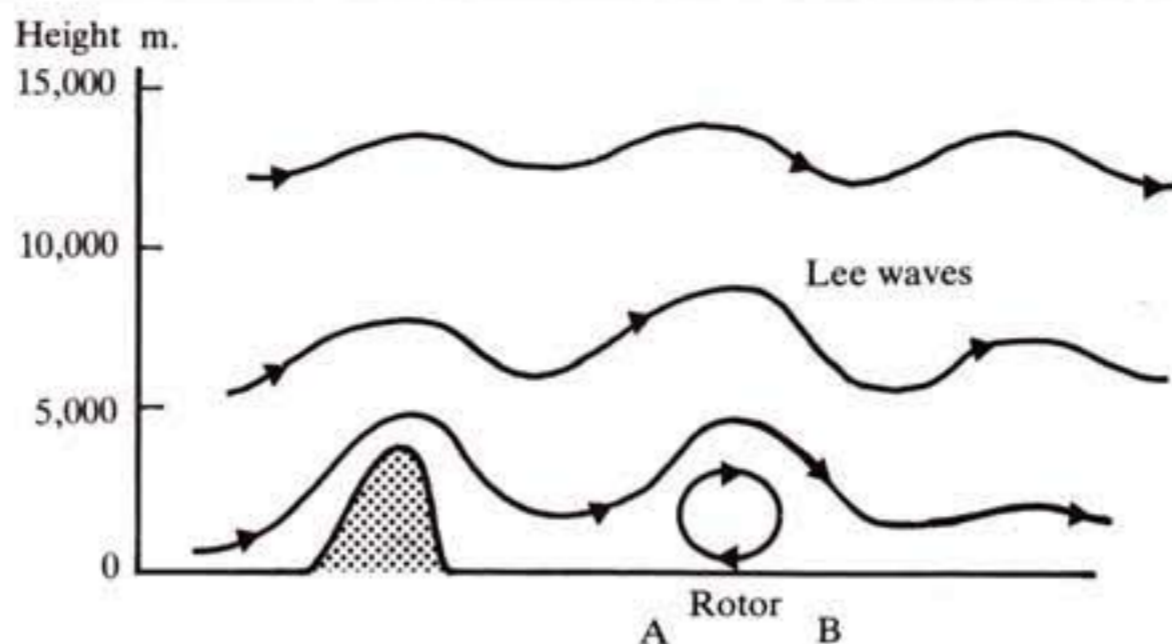


Fig. 5: Lee waves and rotor produced by an airstream over a mountain.

Dave Weeks in *Wings!*, April 1978, resulted from this form of convergence as the observed wind reversal at the take-off area on that occasion rules out coastal convergence as an explanation, but there is no firm evidence in the Meteorological Office archives to confirm that lee waves were formed in the Whitehaven area on 8th March, 1978. It is unusual that the air should be so smooth if this

was in fact "rotor convergence" considering how unsteady this feature usually is. In circumstances such as this, local orographic effects are probably most significant.

The uncertain explanation of this latter convergence example highlights the importance of the less-well understood small-scale meteorological phenomena to the effective practice of hang gliding.

My impression is that the majority of participants are extremely well-informed about the *basic* relevant meteorology. But we do fly in places where no aircraft have flown before and some conditions will be totally unproven. I would encourage pilots to write up to *Wings!* whenever they experience any unexpected or unusual flying, and to document these flights clearly with dates, times and map references. This will allow other flyers to compare their own experiences, and the meteorologists amongst us will be able to investigate records to interpret the causes of these unusual and special phenomena.

#### Acknowledgement

I should like to thank Mr. R. A. Ebdon of the Meteorological Office for assisting me with an examination of available data in an attempt to explain the convergence reports of Johnny Carr and Dave Weeks. ☺

Photograph: Bettina Gray



## Rigid Wings v Rogallos

I have already discussed many aspects of the differences between rigid wings and rogallo. However, there are a few more which I would like to mention. One of the most important is comfort. When I fly 4-1/2 hours in a rogallo (I fly prone) my neck gets tired and my shoulders and arms are weary. But 4-1/2 hours in my Mitchell Wing is relatively untiring, because I do not shift weight at all while flying. I simply move the rudder and elevon control mechanisms which move very easily. I sit in a hammock and there is no more effort required than resting in bed. The result is a tremendous lessening of fatigue and body discomfort. So, if I can fly further, and do it more comfortably, why don't I mostly fly the Mitchell Wing? The answer is "sociability". Only one Mitchell Wing can be carried on a car or pick-up truck, whereas 10 or 12 can be loaded if they are all rogallos. I like to fly with other people and there are many sites where I fly rogallos that are a bit

"chancy" for landing the Mitchell Wing. Also, I have not yet been able to solve one vital problem with the Mitchell Wing. I refer to the beating I feel the machine receives when being transported up a rough, washboard, dirt track in the mountain. The Mitchell Wing is light, it must be light. It is plenty strong enough, I feel, for all air roughness, but it is fragile and weak when it comes to mounting it physically and firmly on a vehicle. So, I find myself pondering the question "how many thousands of car jolts can the machine absorb before a weakening occurs to some vital structural part"? This is not a problem flying a site like Torrey Pines with only about 200 yards of dirt road, but it is something to think about. Rogallos on the other hand are not normally damaged at all on rough roads when attached to a proper car rack.

This Summer, like the Summer 77, the rogallo and the rigid wings are classified in one group for FAI World Distance Record purposes. It is universally recognized that this is unfair. It will be changed for the Summer of 79, when there will be 2 groups; (A) weight shift only and (B) moveable control surfaces.

I am enthusiastic about all motorless flying machines. Once the machines are tested to some extent, I very much enjoy flying the new "hot ones". However I feel there should be some "goal" associated with buying a glider. Either it should be the best in a category recognized by the FAI for record purposes, or else it should be a

ship that can participate in national or international contest. For me, the goal can be obtaining a World Record or it can be having a good chance to win a major competition. However, please let me say that I appreciate and respect all other goals, including the pure joy of participating in what I like to call "the Wind Song of the Sky". I fly mostly for pleasure, but I also usually work toward some flying goal, as I find doing so to be highly stimulating and rewarding. I fly about twice a week at good mountain thermal sites, and about five times a week at Torrey Pines. When the wind is really promising, (straight in toward the cliff, and over 20mph). I dash home, and get the Mitchell Wing, and race back to Torrey. The rationale is that I need the practice of landing the Mitchell Wing and also because, once in a while, it is fun to be the only one at the cliff with such a superior flying machine. When I do fly the MW at Torrey, the mental worry grows about 100%. For one thing, it would be sort of a burden if the wind died suddenly, forcing me to land on the relatively inaccessible beach. For another I'm much more used to flying rogallos and so I worry about making a landing mistake in the Mitchell Wing, (with everybody watching!). So far I've been lucky.

I do want to retain the World Distance Record, and for anyone desiring to have the record, I feel, at

# The George Worthington Column

this time, that it is essential to own a Mitchell Wing. I know of no other hang glider which can be landed "with the sole use of the pilots legs 100% of the time" and which has such a good performance. (I have no financial connection with the Mitchell Wing people) My Personal Plan of Action During June and July 1978:

As I write this, I am on my way to the Cerro Gordo area. I will fly every other day (and rest and exercise at the 8500 feet level on alternate days). I will first try for a World Record distance of 105 miles in the Mitchell Wing. Unless someone has exceeded that distance, between now and the day I fly, I will purposefully land after 105 miles regardless of the good lift conditions that might still prevail. The reason for this is that in the event that it should be a super good day, and send me on an obtainable 180 miles or so, I'd have nothing to do the rest of the summer. Yes, I could try for an even better day, and that would be exciting. But it would not be half as much fun as trying to beat the record in 5 mile increments on each good day.

As soon as I've gone 105 miles (assuming good luck!) then I'll put the Mitchell Wing in the garage and get

out my Seagull 10 meter rogallo and try for 110 miles. Regardless of whether I make any new records before then, on July 7, 1978, I will have been among the 50 to 60 pilots participating in what I believe was the World's first truly (exclusively) cross country hang gliding championships at Gunter Canyon near Bishop, California. If it's, in fact, was not the first, it will be, I believe, the best, because it takes place in a truly great cross country area of the World, at the best possible time of year for that area.

The contest lasts 8 days. At its conclusion, I will have resumed my quest for 105 miles and 110 miles, as outlined before above, until approximately August 7, at which time I will consider the "best time of year" to be past, and will go back to my activities in San Diego.

I was very surprised last summer (77) that in the Cerro Gordo area I did not see one rigid wing. I saw 200 rogallos but not one rigid. I expected to see some Easy Risers, some Icarus II's, some Icarus V's, some VJ's and maybe one or two other Mitchell Wings. I saw none. — Now I'm wondering if it will be any different this summer.

As you probably know, nearly all rogallos have a triangular control bar and nearly all rigid wings have the parallel horizontal control bar. They are vastly different in one respect as far as landings, and therefore performance and "operational freedom" are concerned. With the triangular, a pilot can create a much faster nose pitch-up at the right instant, while landing, so that his forward speed diminishes to near zero without a resultant climb. When properly done, even in zero wind, this allows the pilot to stop in the air at about 2 feet altitude, and come gently down on his feet with little or no forward motion. The Easy Risers can come very close to doing this, and that is a nice bonus. But the Mitchell Wing does not seem able to perform this trick. Instead, in zero wind, the pilot has to run very fast indeed with good timing and skill, to make a good clean landing. One pilot tried a triangular bar on his Mitchell Wing. He says it didn't work for him but in theory I sort of like the idea. I will, alas, leave it to others to try it further. As I said, I'm not an innovator, or even a test pilot *100 Miles in Britain?*

In a recent issue of *Wings!* John Hudson made the enthusiastic prediction that his Summer (78) there will be hang glider flights in Britain of 100 miles. I hope so, but my experience and logic tell me that it is not likely in a purely foot launched and foot landed vehicle, and especially not likely in a rogallo. Time will tell, and of course, I might be wrong in my guess. Generally speaking, I believe you can take the Sailplane distance record in Great Britain and divide by 6 and have a pretty fair "rough-estimate" of the maximum distance a rogallo hang glider is likely to go there this year. It will be fun to see if my guess is any good or not. 🐼



Photograph: Roger Wates

## POETS' CORNER

Freedom found  
look at you  
so small and still  
I'm looking down  
and higher still  
I soar and wing  
on thinning air  
to find my feet  
do not belong  
to you.

**B. Foyster**

### First Flight

The country, still, below him;  
breathless, waiting.  
Then the rush of air, the boots bruising  
the earth  
and then  
heart and earth drop together  
but the wind stays, humming and  
thrumming  
past bar-taut wire and tight white silk.  
Fear, like a sharp-clawed kitten  
held at arms' length  
and the fields suddenly swinging  
below.  
How strange; a moment hung between  
past and future.  
But already his boots beckon the  
earth  
and it rises to him like a faithful dog.  
The voice in his head, "Push out",  
a solid, reassuring bump,  
nose down, unclip, he stretches.  
How marvellous the good earth feels!  
But something in him stirs, and when  
he turns  
and looks back up the hill to where  
the watchers wave, his eyes are full  
of light.

**Peter Halliday**

### Hang Gliding

Soaring all around,  
looping the ground,  
all around,  
soaring so high in the sky,  
I am going cross-country,  
once again.  
Through a cloud,  
over some sheep,  
whoops!  
I have landed in Neath.  
**Emma King aged 9**  
soft unseen force  
to you this song  
played on aeolian harps  
transfixed in space  
holding like hawks within the  
airstreams heart  
then turning  
swift as thought  
along smooth curves drawn by the air  
itself  
windmovement music of the sun  
breath of our life  
it is a single song, a sigh, a shout  
unborn and endless  
lending us joy within immensity

**Richard Lawson**

Wild with fright  
yet rigid and still  
neath silken wing  
on soaring air  
I challenge the Gods  
to take me now  
for I am King  
and Lord of the sky.

**B. Foyster**

### Birdman

Can you fly from my hollow, Icarus,  
From here on the edge of the cliff  
Could you catch the wind's drift  
For a flight or two,  
Would you sail overhead and look  
down on the view  
While I sit in my hollow and write  
words to you.  
Could you fly from my secret nest,  
Icarus  
While I stay earthbound with words  
And watch you play tag with the birds  
For half an hour or more  
See you glide, twist and soar  
On whatever the winds have in store.  
Don't fly too close to me, Icarus,  
You'll feel the heat in my eyes  
Which will burn in your soul and give  
rise  
To passions unknown, and loves  
painful stings  
You'll learn of the danger this brings  
When you burn your beautiful wings.  
Will you land at my love hollow,  
Icarus,  
You must leave the winds on a clear  
day,  
Come down, let me show you the way.  
"Pasiphae"

# NEWS ROUNDUP



## Kenilworth Fair

The Mercian HGC staged a Static Display at Kenilworth fair, Warwickshire and provided general information on the Sport and the Club. The fair organised by the Kenilworth Lions for charity was well attended and a good deal of interest was shown by members of the public. Needless to say, the attitude varied from disbelief to genuine interest and enthusiasm.

## PENNINE NEWS by John Hudson

### April Fliers

Somehow, sitting in my office it seemed as though the whole world was out flying cross country.

Being a strictly weekend flyer (pressure of work it began to become a little annoying to hear these excited, chirpy voices going on about how good it had been.

As it turned out there were not too many flights, but I say that with 1978 in mind. Less than a year ago this number of flights would have been considered extraordinary.

Geof Ball and Paul Maratos took a hold of something early in the month, but the lift was weak and they lost it after a few miles. Later in the week, Geof hooked a good one and flew off Winter Hill to land in Boothstown 10½ miles away. He had a couple of separate thermals with a maximum gain of 1700ft. and took great pleasure in my disconsolate face as I picked him up.

Five days after that he went from Nonts to Todmorden, a trip of 10 miles, gaining height in two thermals to eventually reach 4,300ft. above sea level, a gain of 2,800ft!

On the same day, Dave Leach, also flying a Scorpion took a similar trip from the same site. Dave found himself tracking under a cloud street which gave him 9 miles. He couldn't shake off 1,000ft. down until he came to a small town which gave him a bubble up to 1,300ft. He eventually lost this as it died and wound off height in 360s, so as to land in a populated area, rather than an open moor. Dave reckon, it looks like 11 miles on his Esso map, but I've heard it's nearer 13.

John Bridge had been without his Gryphon for a few weeks and when he got a nibble on Parlick, he went with it from sheer frustration. The sink at the back of the ridge had him scuttling back, but a second try later in the day gave him 4½ miles, before this one too, faded out.

Up in the Lake District the Cumbrian Club have been quietly notching up the miles.

Martin Fortune followed the fells around Keswick for 13km in a large "D" flight path (point to point distance 7km). He was feeling pretty pleased with himself and his Scorpion when the bubble burst as he saw Roy Richards Super E'ing his way on the same route, but 1,000ft higher. Roy got a point to point distance of 15km, but had to fly over 23km around the Shiddaw range to make it. (Notice how these Common Market Cumbrians give their distances in km — makes it sound further!) Dave Weeks, the Secretary also had a pleasant trip among the fells of about 7km, but felt a bit unsure about "jumping" Latrigger, one of their sites and a psychological barrier to a distance flight.

Naturally, Bob Calvert was in there

## Peak News

The PHGA is still here and ticking over nicely. Nothing extra ordinary has taken place in our area compared with reports seen in *Wings!*. Correspondingly our safety record is still intact with no major accidents to our credit? We have suffered the usual run of the mill stalls resulting in pilots turning into the hill side and sustaining minor fractures and bruises with similar damage to the gliders. Like similar accidents reported these occurred at take off, soaring in marginal conditions, or top landing in unsuitable conditions.

Without pointing a finger it is fair to say that all these accidents were due to pilot error. Hang Gliding is a very unforgiving sport and there is no room for error. Only this week two more deaths have been reported in the press and I wonder how narrow the line between life and death was in those cases and how many warning signals these pilots were given before the point of no return was reached. Anyway enough of such serious talk.

The Peak still have monthly meetings at the Mitre Hotel in Derby and since self generating news and information is leveling off we are now importing guest speakers. So far we have had Malcolm Hawksworth and our next guest will be John Hudson. We are looking into the possibility of obtaining Shell Aviation Films and other guest speakers — any volunteers?

Sunday 14th May, saw the annual competition for the Peak Silver Regallo Trophy. A much coveted

prize. However, until this year I did not realise just how coveted it is. The turn out was quite poor really considering the ideal competition weather. The course was quite simple with two pilots and a target. I am pleased to report that the quality of landing has improved since last year when one or two members including yours truly missed the landing field altogether.

There were no classes of machine so the course was designed to take first and second generation gliders. This was achieved by making the pylons non compulsory and the bulk of points being scored on the target. After paying the entrance fee of 50p competitors could have as many attempts as possible. The first attempts were really nothing more than testing out glide angles and approach tactics for landing. It was a popular opinion that the standards had the advantage on this short course but I felt that the Class II gliders had more time to survey their approach before making the final descent. Any way things improved on the second and third attempts with competitors landing within the length of our 33ft. tape measure. By this time there were three clear contenders, John Clarke, P.H.G. School; Alistair Geldart, P.H.G. School and Alan Pearson, Site Officer, P.H.G.A. Up until this time last years holder had not turned up. Unbeknown to us he had a previous engagement. However at 5.10 p.m. he arrived rigged and off he went. First attempt he rounded both pylons,

straight onto the target on a standard rogallo much to the disgust of all other competitors.

1st Bob Bails, Kustom Kite  
2nd Alistair Geldart, S.S.T.  
3rd Alan Pearson, Spirit.  
4th John Clarke, S.S.T.

### Site News

With the reorganisation of the Manchester ATZ Cuts Tor and Shining Tor are once again flyable only at the time of writing the farmers had not been approached.

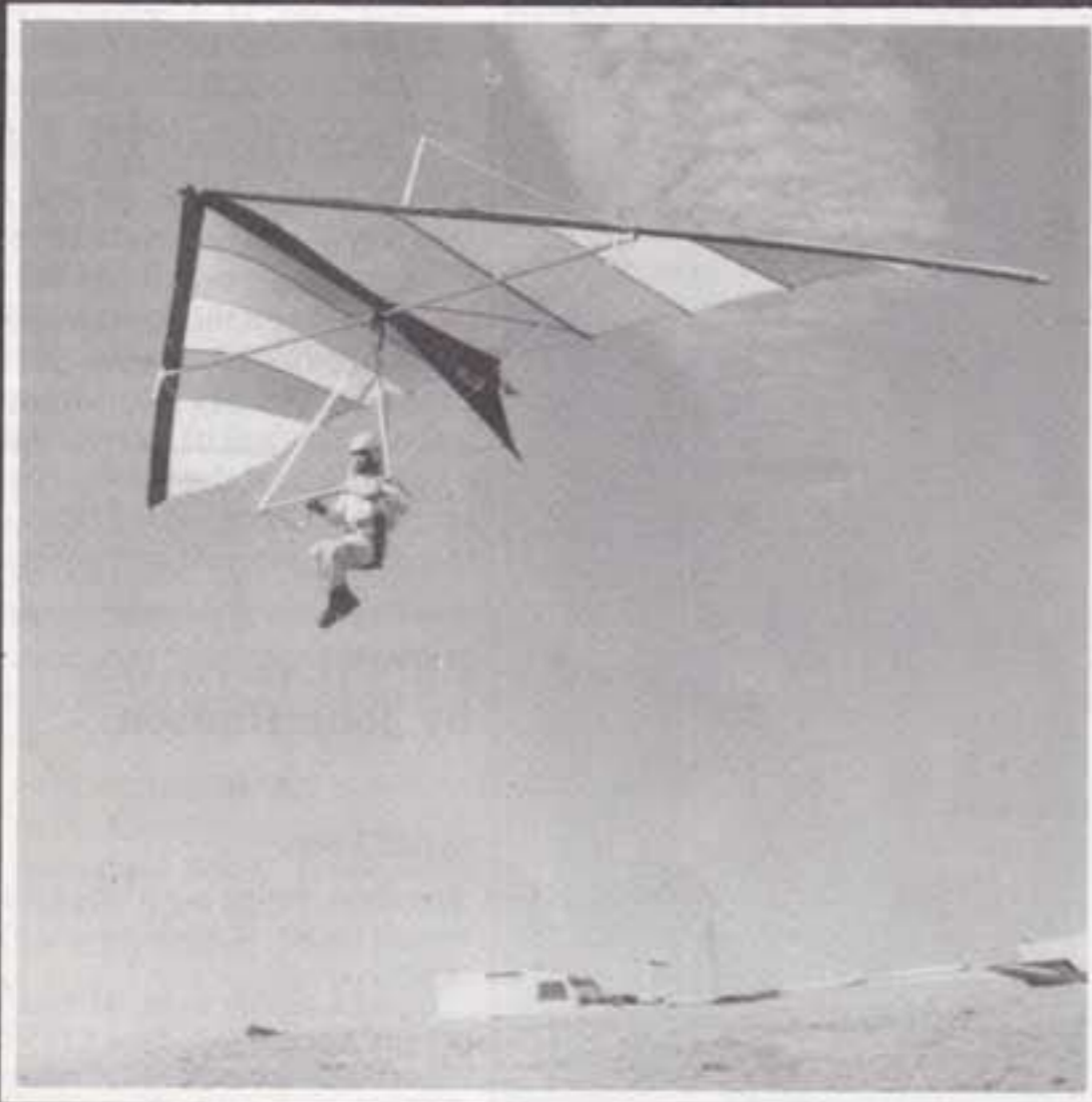
Bosely Cloud unfortunately has moved inside this area but Malcolm Hawksworth is looking into that. Bunster Hill is off Sundays 1100-1700 Spring Bank Holiday to August Bank Holiday.

### Late News

Having just seen the latest issue of *Wings!* I would like to confirm Mike Adam's fears about power Hang Gliders. One of our members has been experimenting with power which immediately drew hostilities from the locals and land owners and resulted in the action been brought to the attention of the local police.

As the person concerned pointed out — in the fields nearer his own home these problems do not prevail, but it is not a local beauty spot like the Peak District. I would tend to agree with him on this point and shall watch his progress with interest, as Leicestershire is not the best hang gliding country.

David Smith  
Chairman PHGC



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chasing the record. He nearly had it with a flight from Parlick to Arnside near the Lake District. He caught 6 thermals and described the thermals as being at times "horrific!" At 1,700ft above Lancaster, holding onto the wires with his feet to stop himself from being thrown out of control he decided to buy a parachute! It eventually smoothed out and he carried on to fly across Morcambe Bay. At Arnside after a flight of 23½ miles the cumulus went as the weather filled in.

Parlick was Bobs "April" site since all his cross country efforts have been associated with it. He flew from Totterage to Parlick (a first) in practically zero wind. He also followed a sail plane out and ended up winding at the same height. He reckoned this to have been a mistake, since he lost it 5 or 6 miles downwind and ended up walking back! He repeated this a few days later and again lost the lift after 4 miles — In each case he had 2000ft + over the top before he left, but it seems to be a problem with the site in that in its best direction, thermals always seem to break up after a few miles.

Bob Bailey's April entries in his log book make interesting reading.

Early in the month he centred on a good thermal form a site in Yorkshire at 3500ft he found himself below the cloud and since it was gently lift decided to rise into the

and was amazed when it didn't happen. He managed to "work" a couple of villages but got nothing workth having.

Once again both Robert Bailey and Bob Calvert have been eating up the cross country miles.

Bob knocked up about 160 miles during April/May and in fact flew past Roberts 24 mile record, but only by about one tenth of a mile and so he is unable to claim it.

Most of his flying has been in still air and convergence conditions and during one flight over Lancaster at 6,000 ft. he was delighted when some sail planes who were circling in the same thermal had to leave it to return to their airfield, whilst he could carry on over the town.

He has finally cracked his height gain goal with his barograph recording the details.

#### Notable flights

- 24 miles and 6,000 ft.
- 14 miles twice over the same route.
- 5 miles and 2,000 ft. gain.
- 23½ miles and 21½ miles on convergence.
- 18 miles and 3,300 ft. gain.
- 4,500 ft. gain and FAI Silver "C" height gain award.

Obviously he must now be rated as the most experienced cross country flier in the UK, which just proves that there is no substitute for air time.



Bob Bailey sets off again

bottom just to see what happened — He was in for about 10 minutes and by strong concentration flew a straight compass course through it. Bob says that he was mentally and physically shattered when he came out, primarily because of the concentration needed. He knows Air Law and reasons that it is only by extending our limits that we can become experienced enough to cope with problems that may occur.

When he came out he flew up the "sunny" side of the cloud to about 4000ft ASL, but as he lift died, headed off towards another cloud, which unfortunately he could not reach.

A couple of very light lift areas extended his flight a little, but he landed 16 miles beyond his take off, disappointing when you already hold the record at 25 miles.

Steve Ward was also in the air as Bob was flying upwind at the start. They both flew out a mile or so upwind and to cludbase before Bob made his move to "go with it" Steve elected to stay on the ridge and so lost his chance.

Bob also had a height gain of 4300 feet during Mid April, to put him 6300 feet above sea level. He went 15 miles from this one, and spent some of the time clicking away with a camera. He was confident of picking up another thermal from that height

#### May Fliers

Robert Bailey had found it almost impossible to concentrate on his new hang gliding school in the past few weeks, owing to the good conditions we've had.

He had Bob Calvert jumping around with frustration on one occasion when he flew 20 miles from one site, arriving at another below the top. Whilst Bob could only stand and watch when he worked his way back up to 4,000 ft. and disappeared into the distance. Robert too had the pleasure of seeing sail planes having to leave their common thermal as they drifted beyond a safe distance from their airfield.

He has had several 10 mile flights, two 12's and a 13 miler, but has spent a lot of time concentrating on flying the thermals rather than going for distance.

He had one very hairy moment when he was punched out of the side of a thermal and found himself falling fully vertical, hand standing on the bar. The glider headed straight for the deck and although Robert has experienced this "going over the falls" before, he says that this was the longest and most severe he had ever experienced. Just as he thought about his parachute, the glider pulled out, shot up vertically, whipstalling, nose down back into another dive.

It pulled out a second time, and this time he was able to turn the vertical climb into a



Great! The more Bob Calvert talks about his thermalling, the more practice I get with mine.

wing over, and so recovered.

The conditions were strong and thermally with readings of 10 both up and down. Anyone who says the UK cannot generate glider breaking thermals should talk to Robert Bailey. He reckons he has never been as near inverted and fervently hopes that, that was his first and last "big nasty."

Geof Ball has also had a few "milers" around the 12-13 mile mark. His best gain was 3,700 ft. to put him 5,100 ft. ASL, but his most heart stopping flight was an unscheduled 4 mile one in the company of Bob Calvert.

Flying in thundery conditions, Geof flew along the ridge (900 ft. high) to inspect an interesting looking cloud as he got there, it was noticeably bigger, blacker and turbulent looking, so he flew away again, stopped and looked back at the cloud. To his consternation it had followed him and now looked about 500 ft. in diameter.

Both he and Bob high tailed it to the end of the 2 mile ridge, only to find, as they got there, that the cloud was right behind them, 2,000 ft. in diameter and quite obviously a fully fledged thunderstorm cloud.

I had just finished rigging on top of the fell and had to point my glider up hill and sit on it to hold it down. I was petrified by the sudden wind shifts and constant lightening flashes.

I could not decide which was the best action to take; run and leave my beautiful wings to the mercy of the storm or put my faith in Big G and sit on the nose. I compromised and sat in the centre of the sail, my feet tucked in away from all that

metal.

My fear was nothing compared with Geof and Bob's. Both had tried to out run the storm but found themselves being carried up in front of it, unable to make any ground headway.

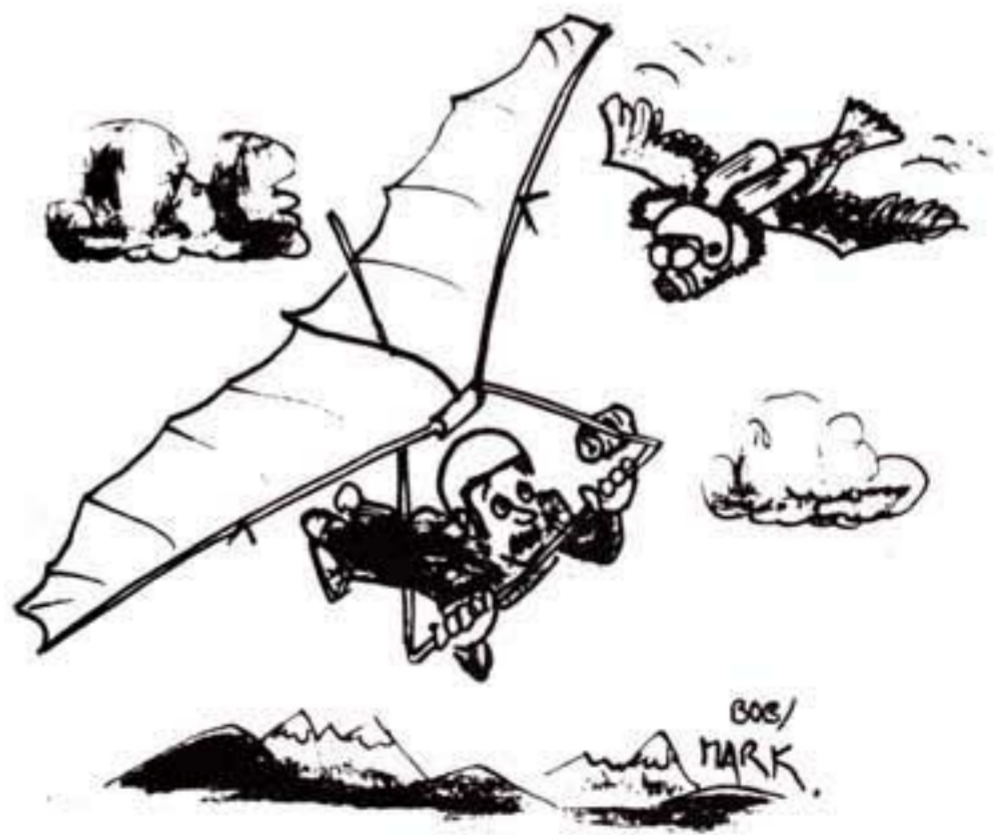
They flew in the most horrific turbulence either had experienced, their gliders screaming skywards with the varies against the straps, and then suddenly dropping at the same rate. Both found themselves only just in control and just holding on, but eventually managed to fly into the ground. I believe the sigh of relief could be heard a mile away.

Dick Clegg had also launched shortly before the storm and although he missed the mass of rising air in front of the storm, he too caught some real rough air. After being bounced around down to 100 ft. he prepared himself for a landing, only to find the bar almost pulled out of his hands as the glider was sucked up to 500 ft. Dick too had a hard time and once down had to hold his glider down in winds estimated at 50mph.

I reckon I got down off, that fell in the best way — I carried down.

All in all that was an experience no one would wish to repeat. The speed at which the cloud and storm formed was astronomical — Moral-If thunder is around, don't fly.

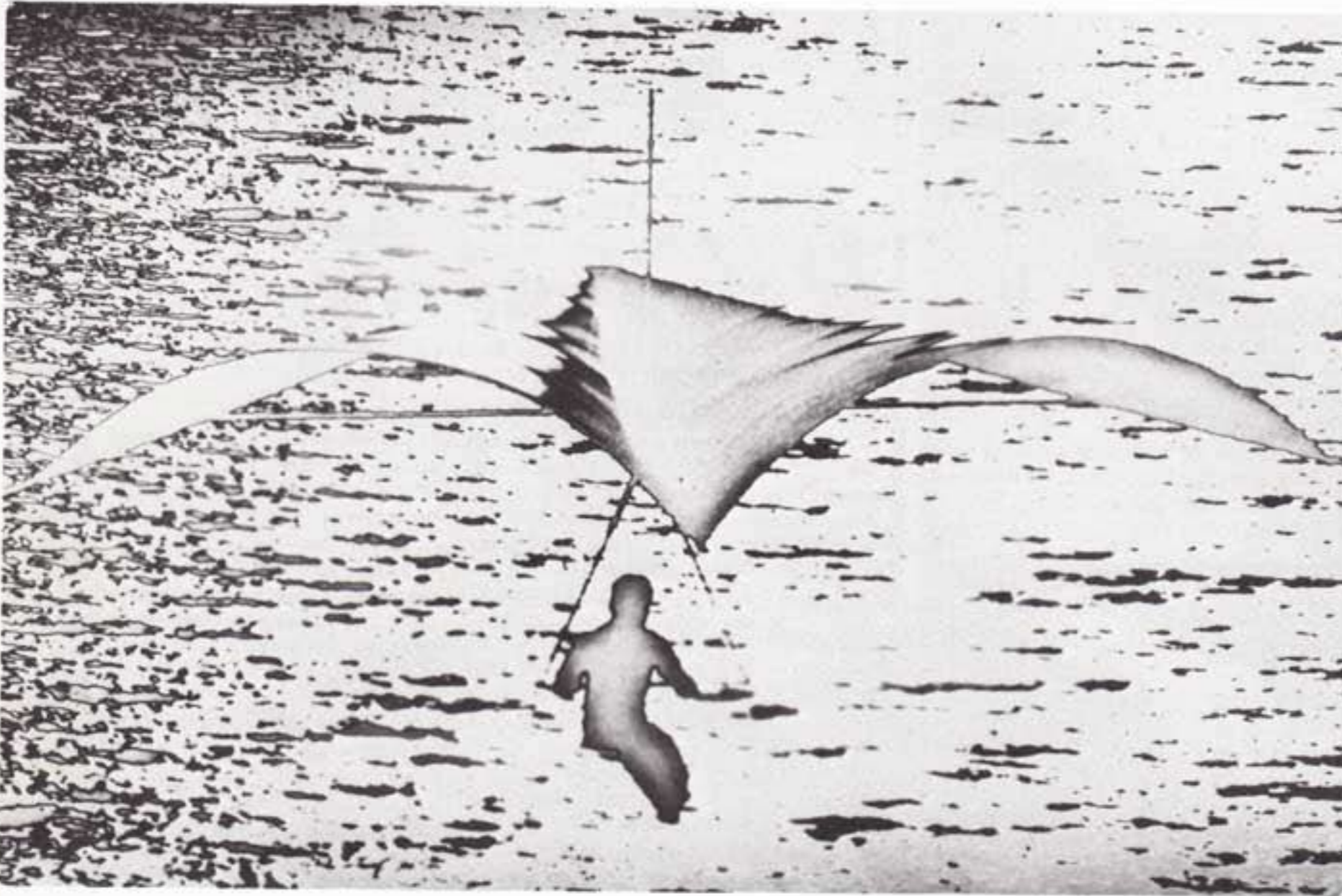
Quite a few other pilots have had good gains and fair distances, but with the sort of cross country efforts being made country wide, 10 miles is the minimum worth talking about, and next year I'll lay odds the figure will be nearer 25.



Jesus! My altimeter was right.

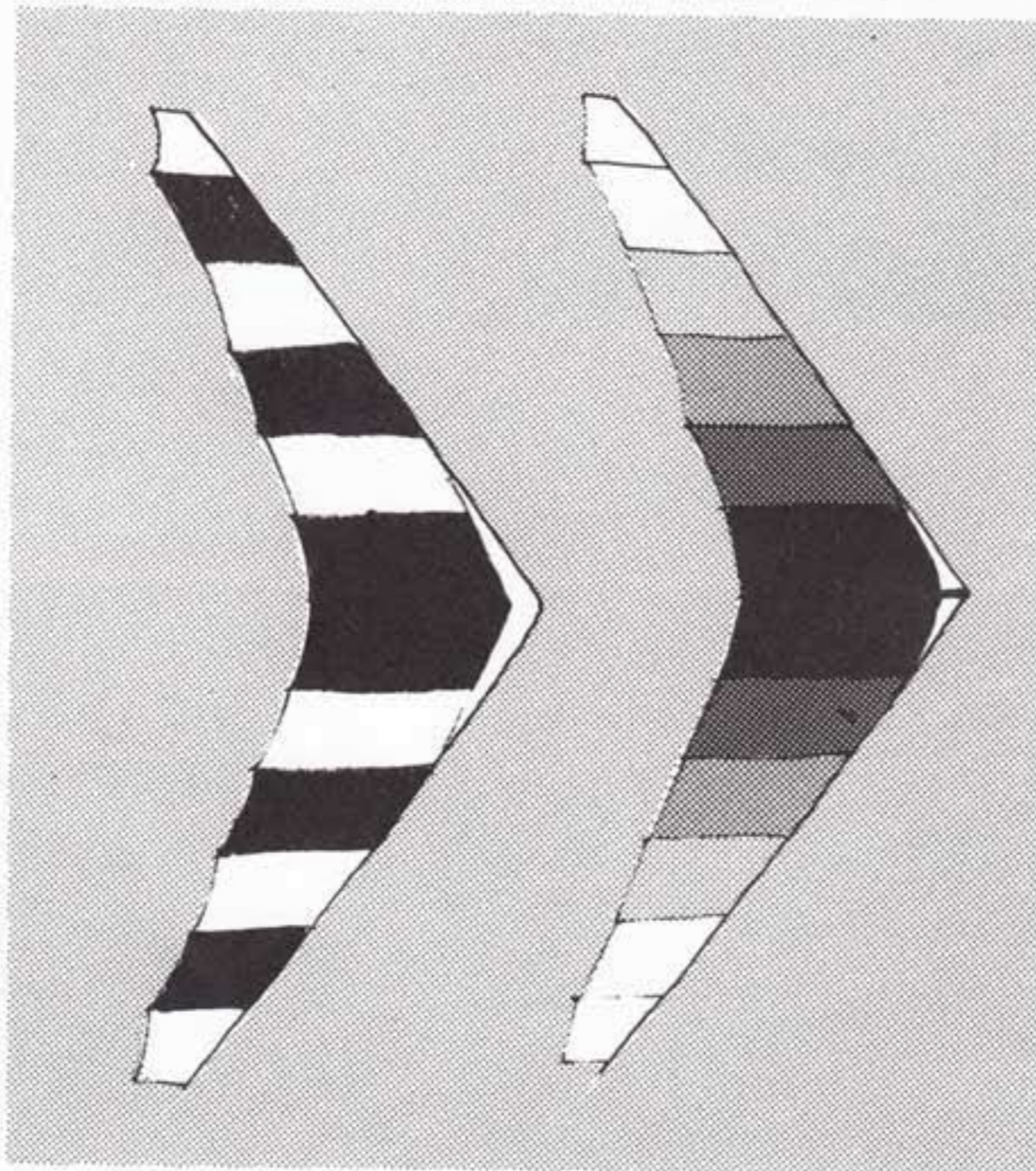
# Glider Colours and Safety

by John Lythgoe



In 1944 when the war in Europe was more or less over a group of scientists, newly released from more warlike activities, took up the argument first started by Charles Darwin in 1889 as to whether seagulls were white in order to be camouflaged to the fish or whether they were white to show up to other gulls. The reason for the new interest was that anti-submarine aircraft had white painted undersides to make them more difficult to see from a surface ship. It turned out that in some conditions seagulls are nearly invisible, whilst at other times they show up very brightly. Hang gliders, especially white hang gliders, are exactly the same; sometimes they show up well, but at others they are difficult to see and, therefore, are a collision hazard.

A colour can be camouflaged or conspicuous depending upon the background it is seen against. The amount of contrast against the background is an indication of how likely you are to notice it. The white sail shows up brilliantly in some situations, for example when the observer is looking down on it and has the sun behind him. Against green fields and woods nothing could be more conspicuous. But suppose the background is now snow or white chalk cliffs, the white glider and the white background blend together and there is potential for trouble. More common is the situation on light-overcast and slightly misty days when a glider low in the sky can look almost



the same colour and brightness as the sky.

Other colours have their problems too. Black shows up well in silhouette against the sky, but just below the

horizon with a low sun — the sort of situation you get on a scratchy day late in the afternoon — it is virtually impossible to see it even when you know it is there. Red is generally good

and so is orange. However, 10% of the male population is red-green colour blind and will not see much colour difference between the red sail and green grass. On a crowded day on a popular site it is more than likely that at least one pilot is colour blind. Yellow and green don't show up too well against a farm landscape. Blue and purple may be hard to see against the sky.

So all the colours of the rainbow plus black and white can be difficult to spot at one time or another. Obviously the best plan is to have kites of many colours because they carry their own contrasting colours with them and there is less danger of sudden unexpected camouflage effects. The eye detects a contrast when the edge between two areas is strong and sharp. There is a popular sail pattern that has, for example, a dark blue centre, grading in progressively lighter blues to pale blue and white at the wingtips. Dark blue against white would be a good strong pattern for visibility, but in a graded sail each panel contrasts little with its immediate neighbour. There are no strong edges for the eye to fix with the result that the worst possible use is made of the sail colours.

Sometimes late in the afternoon, it suddenly becomes soarable and four or five kites take off into the fading light. Surprising things happen to colours as twilight deepens into night. At about the light level of a three-quarter moon, we stop seeing colours and see only differences in brightness. Blues and greens look brighter than they do in daytime; reds and oranges look darker. A sail that has good dark and light contrasts in the daytime may look quite uniform and dull in twilight!

If I were choosing a sail purely for visibility it would be alternating red and white panels. In the daytime the red and white colour combination would show up well. At night the impression would be of a black and white sail that again would be relatively easy to see.

One of the most worrying situations is when another glider is at the same height and closing head-on. In this attitude the other glider shows the minimum sail area and to make matters worse there is little apparent movement to catch the eye. Also it can take an appreciable time to decide whether it is in fact coming or going. There might be a case for some standard colour pattern on the forward facing surfaces of the glider. Perhaps the leading edges and shoulder straps of the harness and the crown of the helmet could be dayglo orange, or black and white stripes. The best colours could be decided by trial and error.

In the choice of sail colours let's hope we never have to choose between pretty and dangerous, or safe and boring. It would be a shame if the hill was covered with red and white striped gliders; but some colours could be dangerous, and these it may be better to avoid.



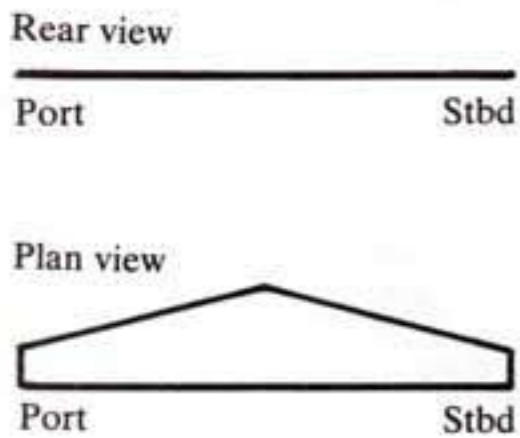
# Turning, Turbulence and Flexible Wings



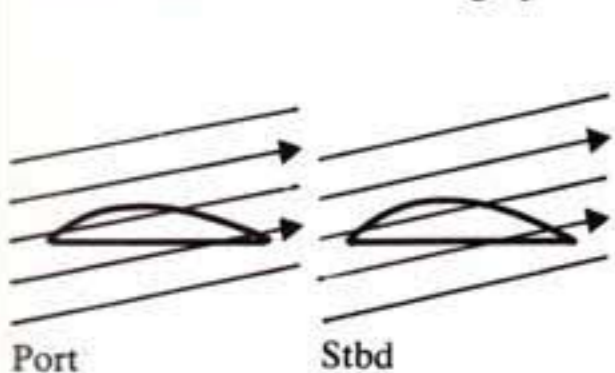
The following analysis first considers a rigid wing, the effect of wing flexibility is taken into account further on.

by Everard Cunion

## 1. Straight and level flight



The diagram below shows chordwise sections taken near each wing tip.



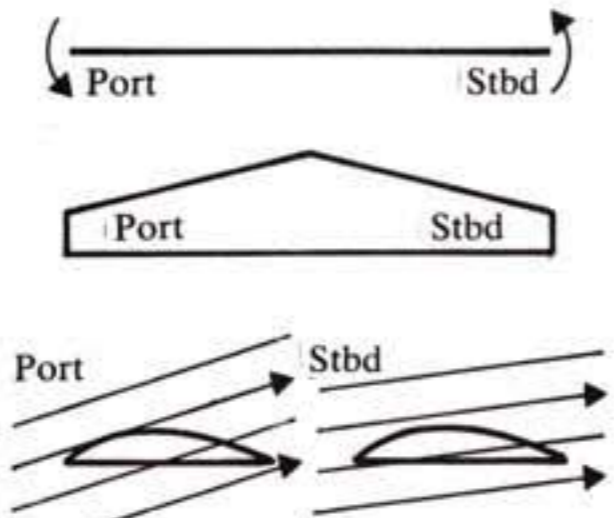
The arrowed lines denote the local angle of incidence and air speed (the greater the number of lines the greater the air speed).

Note that in the above example of straight and level flight the airflow on both sides is identical.

## 2. Independent roll

Independent roll is roll unaccompanied by yaw. Roll is usually accompanied by yawing but it is useful to analyse the effects of roll by itself.

When the glider is rolling one wing is going up, the other down. Therefore the velocity with which the air meets the wing is given an additional vertical component, this being greatest at the tips and zero at the keel. The added vertical component will be *up* on the wing going *down* and vice versa. This will appear as a "twist" in angle of incidence (with twist as in washout "washout").



Note the increased angle of incidence on the port side and decreased angle of incidence on the starboard side (exaggerated in the

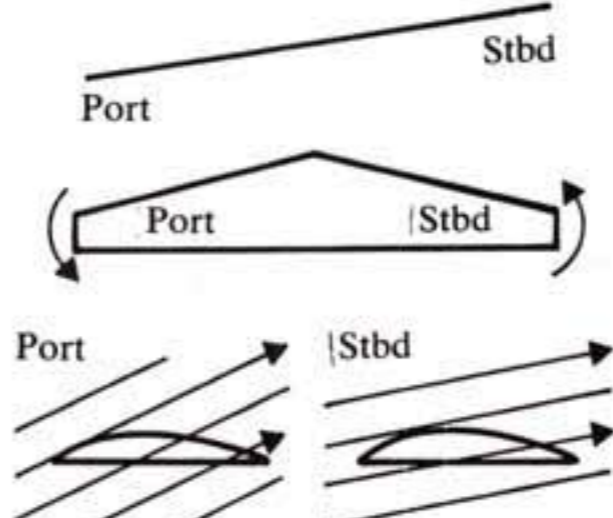
diagrams). Both sections are at the same angle (because they are part of the same rigid wing), it is the local air flows that have changed.

This produces a lift differential opposing the rolling motion of the glider (roll resistance).

## 3. Independent yaw

As occurs in a stabilised turn, i.e. no rolling, constant angle of bank. (The change in pitch control in this situation is irrelevant to this theory as it affects all parts of the wing equally and so cannot cause span-wise differentials).

Yaw is by and large proportional to angle of bank.



Note the decrease in air speed on the inboard wing and vice versa. This in turn causes an incidence differential because although the horizontal

components of the local air speeds have changed the vertical component of each wing stays the same.

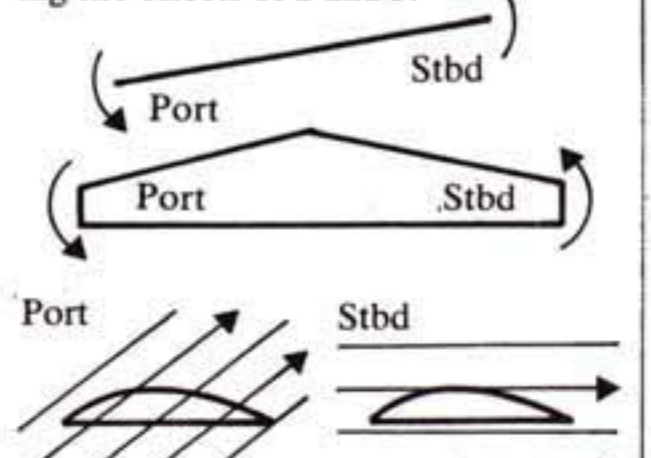
Since aerodynamic force is proportional to the square of the air speed while its dependency on angle of incidence is roughly linear, it is probably safe to assume that the air speed differential has the greater effect.

The net result then, is a lift differential which tends to add to the roll (increase the angle of bank).

(Note that dihedral can nullify this effect as it causes a rotational force tending to roll the glider out of the turn, the greater the angle of bank the greater this stabilising force).

## 4. Turn being initiated:- combined roll and yaw

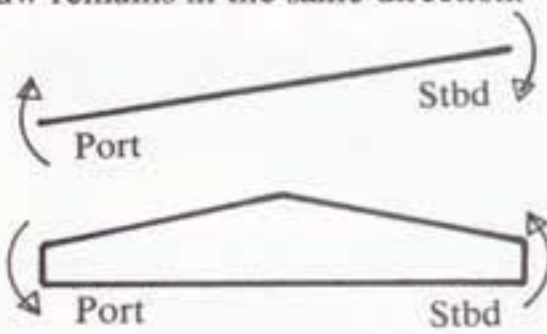
The analysis of this is a matter of adding the effects of 2 and 3.



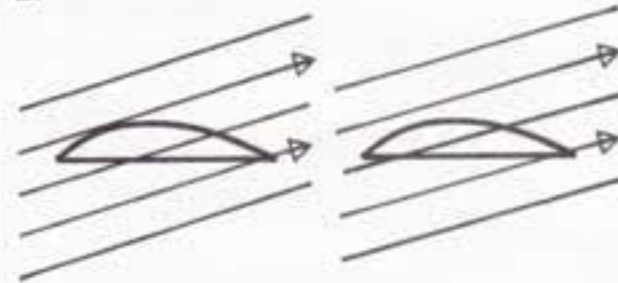
Roll resistance, and lift differential due to yaw (tending to add to roll) both being present.

**5. Turn being terminated:- combined roll and yaw**

The difference between this and the roll is in the opposite direction, while yaw remains in the same direction.



The analysis of this is a matter of adding the effects of 3 to the reverse of 2.



The yaw effects stay the same while the roll effect is reversed, i.e. the lift differential due to rolling now opposes rolling out of the turn (in the same way that it opposes rolling in, hence the term roll resistance).

The lift differential due to yaw (if it is not nullified by dihedral) is still trying to increase the angle of bank, i.e. it is resisting rolling out the turn, in a similar way to example 4 where it was tending to roll the glider further into the turn.

This tendency for the wing to want to go further into the turn and resist

pulling out is turn instability, hence the need for dihedral.

Now consider the effect of making the wing flexible (by sail tension alone or enhanced by batten supported area floating tips, or pulley system). In other words the washout is variable, the greater the pressure the greater the washout.

When local air speed or angle of incidence (or both) increases, increasing the local aerodynamic pressure, that part of the wing will flex, trailing edge up. The greater the increase in air pressure the more it will flex up against the spanwise tension in the sail. This flexing will reduce the angle at which the air strikes this part of the wing, i.e. the increase in pressure is reduced due to flexing. That is not to say that the increase in pressure is reversed to a decrease in pressure (which is physically impossible in an automatic situation such as this) it is just that the increase is not as great as it would be if the wing were rigid.

Similarly when local incidence or air speed decrease, the trailing edge is pulled down by the sail tension, increasing local angle of incidence, lessening the reduction in pressure.

So variable washout dampens lift differentials.

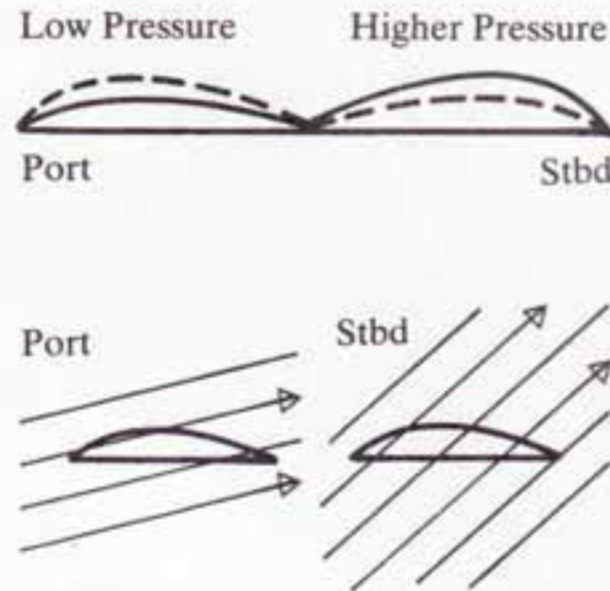
The turn effects described here are therefore reduced in proportion to the degree of flexibility of washout. As the effects (lift differentials) generally detract from ease of handling the greater the flexibility the easier it is to control in turns (especially where low, zero or

negative amounts of dihedral are present).

But that is not all.

In a similar way when turbulence causes a lift differential the wing flexes to lessen the lift differential thus reducing the effect of turbulence.

Example: Glider hit by turbulence causing an angle of incidence differential:



(Note that in the left hand diagram the sail tension is pulling the trailing edge down).

However, looking at the example where one wing flexes down (for instance the inboard wing in a turn) it becomes clear that if it flexes for the angle of incidence will become so great that the section in question will stall. Therefore the greater the amount of flexibility the greater the risk of stall-

ing the inboard wing tip in a right turn.

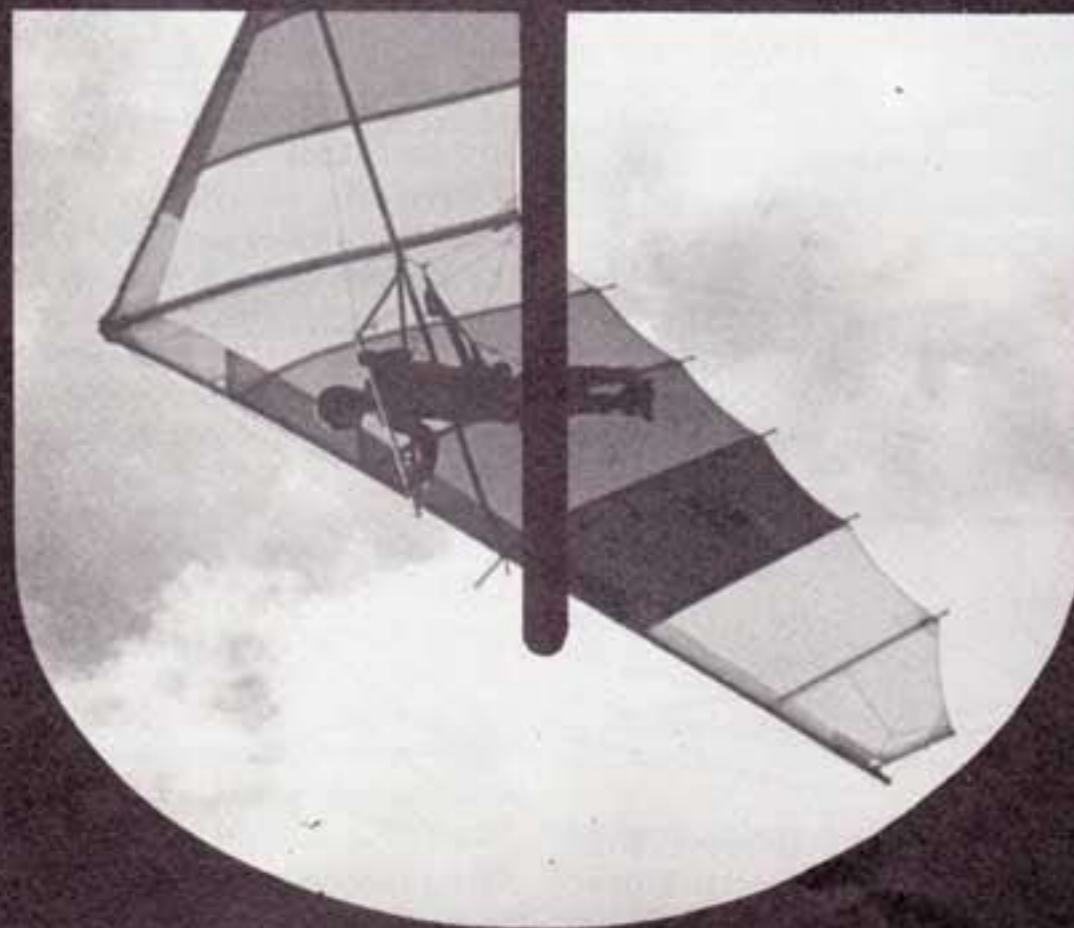
So, increasing the flexibility of a hang glider wing gives better control and a smoother ride but with a greater risk of tip stalling.

Obviously a compromise is required giving a reasonable amount of flexibility for smooth handling characteristics without undue risk of stalling a wing too frequently.

This compromise can be improved with fixed or limited travel floating tips which limit the amount the washout can be reduced near the tips, thus allowing greater flexibility without increasing the tip stall characteristic (as well as giving dive recovery assistance).



# ULTRA SPORTS



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We are now training with the new '78 HiWay Spectrum, Harrier and Chargus Vortex.

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Windhaven chutes in stock — light and compact. The new Everoak crash helmet especially designed for hang gliding. As worn by top league pilots. **Coming soon** — new compact vario, altimeter ASI or digital stopwatch combination in small instrument pod.

Don't wait for your '78 superships, we have HiWay Super Scorpions, Spectrums, Chargus Vortex, Electra Fliers and Cirrus 5's **IN STOCK**. Ring us for test flights.

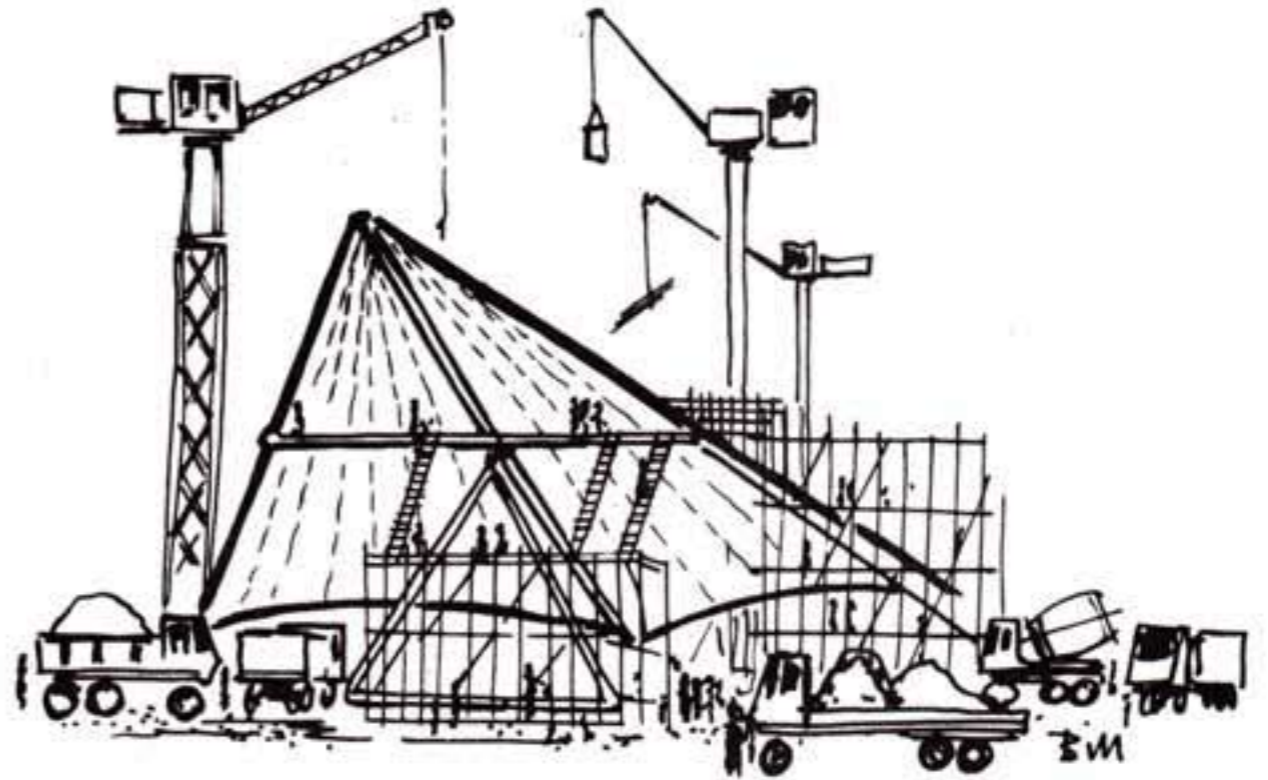
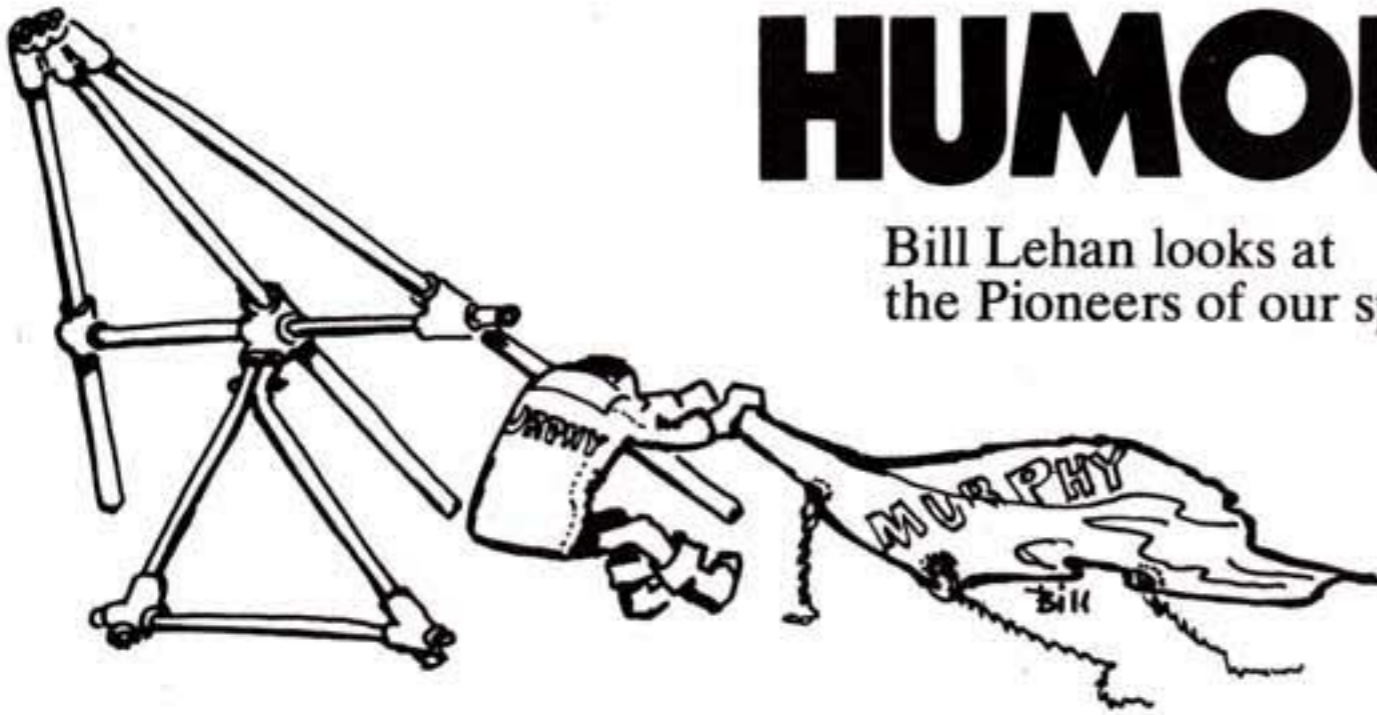
### SECOND-HAND GLIDER BROKERAGE

WE buy and sell any and every glider — phone for details.

Midas E's — £370-£420, Vega IIA's — £330-£380, Scorpion C — £385, Vega IIB — £370, HiWay standards — £50 plus.

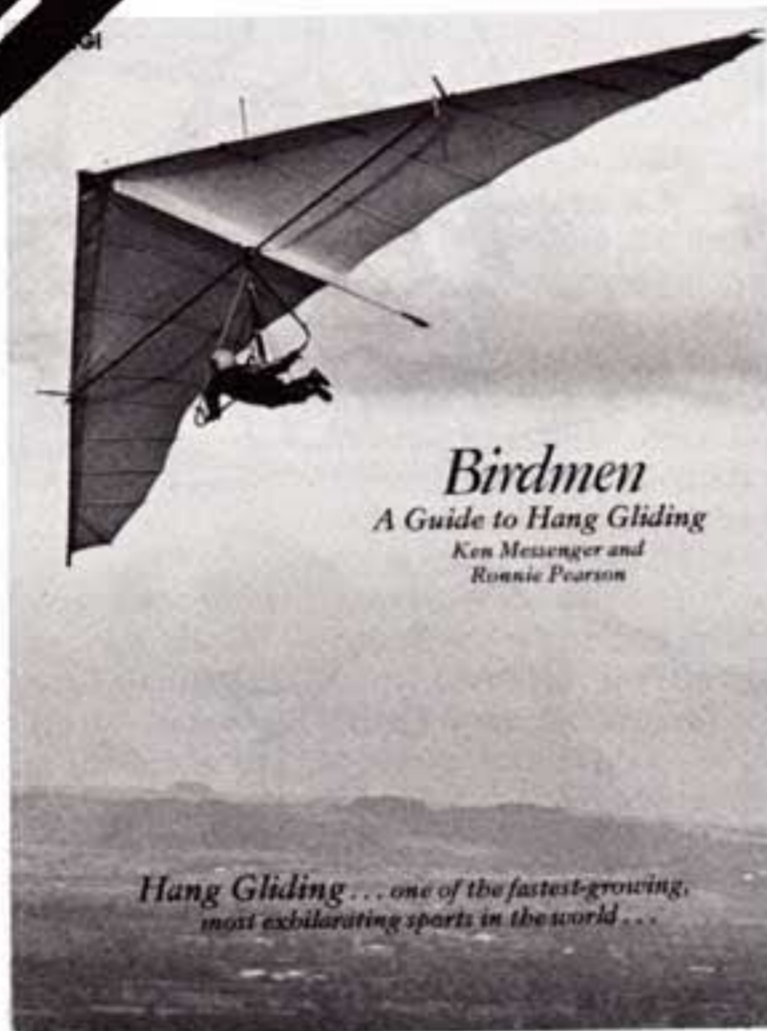
# HANG GLIDING HUMOUR

Bill Lehan looks at  
the Pioneers of our sport



"That, my little friend, is Smiler Blandly's new Biffin.... fully battened, cambered sail... ..no crossboom, ... 360° nose angle and rigs in under 3secs ... fantastic eh?"

UMBRELLIEVABLE!



**Birdmen.** A Guide to Hang Gliding by Ken Messenger and Ronnie Pearson. Published by Corgi Books. £1.50

Your usual reviewers in *Wings!* found this book so awful they could't bring themselves to write about it, so I was asked to do it. Actually I don't think it's as bad as all that. Admittedly it's all one big advert for Birdman (without even actually mentioning Birdman Sports Ltd.), but this is what I'd expect from Ken Messenger; he is and always has been, a professional.

The books' contents in six chapters can be summarized as follows:

#### Chapter One

An all too brief historical survey of the evolution of flight to the present day hang gliders. Interesting to start with, but from the middle of the chapter on, growing wildly inaccurate. A sad lack of real research and interpretation. At chapters' end, the early pioneers of hang gliding in the UK are given a mention, but, quite unforgivably the historical sense, no mention is made of Gerry Breen or the Haynes brothers.

#### Chapter Two

An interesting autobiographical account of Kens' earlier life and exploits up to and including his hang gliding. Also a brief but sometimes inaccurate account of early organised hang gliding in the UK.

#### Chapter Three

A wishy-washy account of aerodynamic principles with contradictions in and between text, associated with poor diagrams. The

author (not Ken I'm told) displays a slight lack of understanding of aerodynamics which could be rather confusing for the hang gliding beginners. The advantages and disadvantages of flying in different wind speeds over various terrain is, however, useful.

#### Chapter Four

An interesting account of Ken's cross channel flight.

#### Chapter Five

A fair account of how to get into hang gliding, with comparisons of the advantages and disadvantages of the different types of hang gliders and harnesses. The chapter is completed with an informative question/answer interview explaining training methods in a hang gliding school.

#### Chapter Six

A reasonable appraisal of the future for hang gliding, though naturally many of the predictions have already happened since the book was written.

This book really is rather mediocre. Just *another* book on hang gliding, though reasonably priced at £1.50. It really is in the proof reading stage and should have had many corrections and improvements made before it was published. The best parts of the book are those of an autobiographical nature. It's a pity Ken didn't write a complete autobiography, it would have been well worth reading.

**Nick Regan.**

# KOSSEN DRAW



Above: Wendy Hill dips in for the lucky winner. Right: Bob Calvert looks on anxiously — but to no avail.

The Kossen draw was a huge success and we must thank all those people who bought tickets to raise the sum of £2,000 net. John Dransfield, the main prize winner was overjoyed with his good fortune after it had taken five minutes convincing him he had really won. Roy Hill reports 'whoops' of joy emanating from the earpiece of his telephone. John hasn't yet decided which glider he will finally settle on. Mick Cussans, winner of the parachute, has just completed a course at a school so hopes to sell his parachute to pay towards a glider, which up until now, he has not been able to afford.

A special thanks should be made to all the manufacturers who offered a glider at cost price including Chargus whose name was left off the ticket. Also to John Hudson of Mainair Sports for the parachute and altimeter and the Facks and Ray Willis for the Willis Variometer. Their generosity has enabled our team to be the best equipped ever.

The results of the draw were:-

#### 1st Prize: Hang Glider

John Dransfield, 66 Kingston Road, Poole, Dorset.

Ticket no. 14330

#### 2nd Prize: Parachute

Mike Cussans, 25 Link Road, Springhead, Oldham.

Ticket no. 15279

#### 3rd Prize: Variometer

Eric Gibson, 7 South Row, Isabella Colliery, Blyth, Northumberland.

Ticket no. 10373

#### 4th Prize: Altimeter

Len Turner, Hambledon House, Cotham Road, Bristol 6.

Ticket no. 20982.

**STOP PRESS:** Major Sponsor backs British National League Final, 1978.

ATLAS EXPRESS, the freight carriers, are sponsoring the final competition of the British National



League, September 16-18, 1978 for £6,000.

The ATLAS EXPRESS NATIONAL FINAL, which will be covered by BBC Grandstand, will take place on sites managed by the Long Mynd Hang Gliding Club in Shropshire and Central Wales, and features the 60 top competition pilots in the country.

The ATLAS EXPRESS NATIONAL FINAL follows the EUROPEAN CHAMPIONSHIPS, and precedes the AMERICA'S CUP.

### Hang Gliding Guide

Which Hills? Which Kite?

Which School? etc.

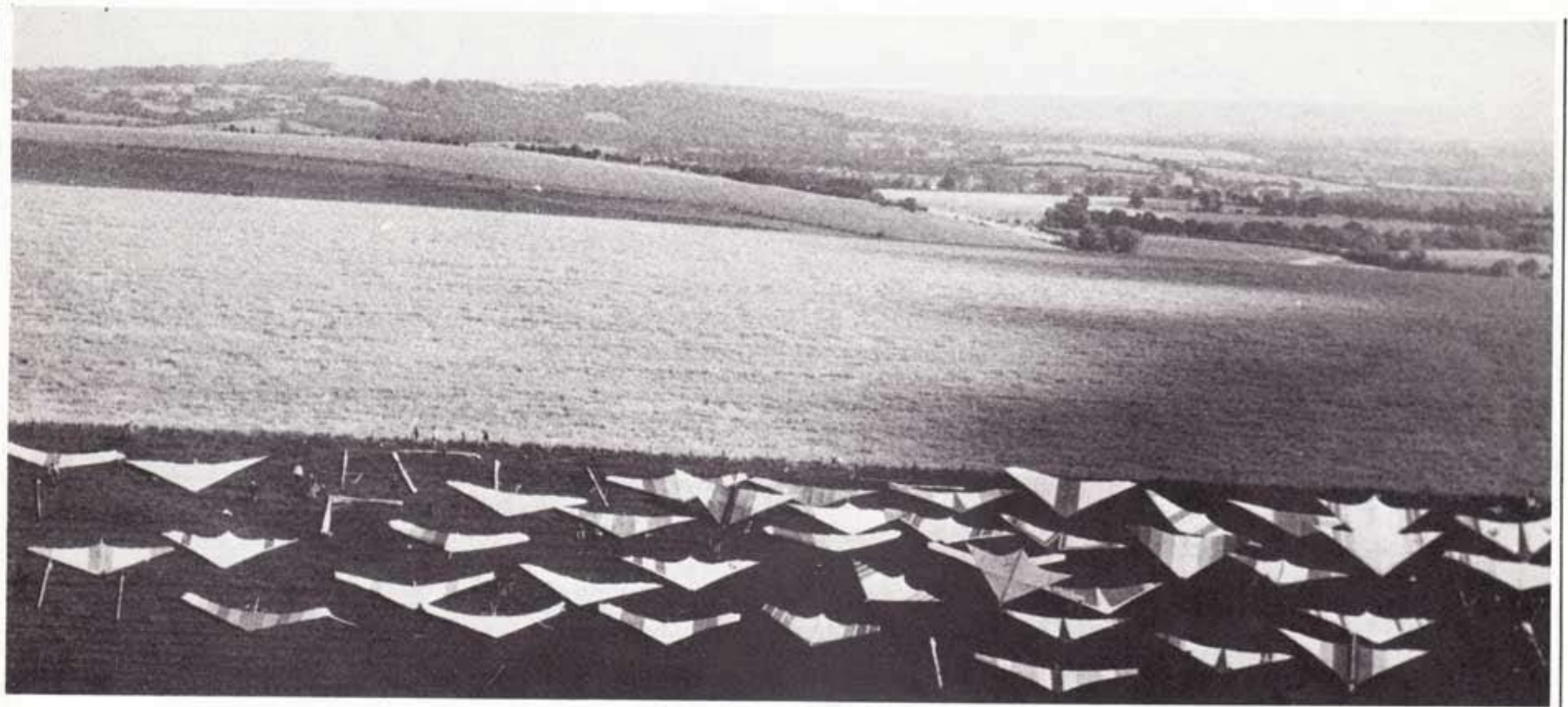
By Mike Adam 50p

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# MERE '78

Rally, Fly-in. call it what you will . . . BHGA will be holding a members' event at White Sheet Hill, Mere, Wilts. on September 2nd/3rd 1978. "Mere '78" will be unlike previous meets held there as: it's purely a BHGA event (we do not have a sponsor to underwrite the costs of a public meeting); it's not the venue for the British Open (which will have been held the previous weekend) and it's not on August Bank Holiday (since the site is not available then). "Mere '78" is planned as a fun event for fliers of all abilities from E.P.C. to League. Flying will be divided into 5 sections: fliers may take part in any or all.

1. *Soaring*. From 4 p.m. on Friday 1st September to 6 p.m. on Sunday 3rd a Soaring Marshall will be on duty. According to conditions he will advise pilots as to the area to be used and any restrictions. Pilots must have his permission before taking off and (in order to control numbers) they will be given a maximum flight time, when necessary, that they may remain in the controlled air space. It goes without saying that we will keep restrictions to the minimum, consistent with safe flying. BHGA Observers will be on hand to sign pilot forms.

2. *K.O. Distance event*. This is a Class II only event and will be run concurrent with other events over the two days. Just sign in for this event as soon as you get to the site on Friday evening or Saturday. Ties will be flown either over a "dog-leg" or over a straight distance in a limited time.

3. *Timed Precision Flight Event*. This

is Chief Marshall Bob Mackay's special baby! We'll give you full details on site but briefly this event involves taking off with an opportunity of height gain, then simulating a difficult approach and landing such as might terminate a cross country flight. This event will accommodate all classes of kite, including "ancient standards" and rigids. Bob plans to divide this entry between the very skilled pilots (i.e. league and professionals (i.e. manufacturers' employees) and the not so skilled (we "cabbage-patch" fliers!).

4. *Cross Country Event*. Pilots must take off from the Soaring area take-off and must have a messenger at the Phone-in Check Point (on site) during the flight. Winner will be the pilot who reaches the furthest point in any direction from the Control Tent. The landing must be witnessed by a reputable citizen having no connection with the pilot (trusting, aren't we!). The Phone-in Check Point number will be handed to all entrants for this event.

5. *Powered Flying*. There will be periods when powered flying will be encouraged. It is planned that this will not restrict other events taking place. Pilots with -powered machines are asked to contact the Chief Marshal, Bob Mackay, at 9.30 on Saturday to discuss their requirements.

*Note*. At the absolute discretion of the Chief Marshall flying may be suspended at any time. Suspension of Flying will be indicated by the display of a Red Flag at the Start/Take-off area for each event. When you are airborne and see the flag displayed, land as soon

as you can safely do so.

Bob Mackay says, "Ladies (we hope) and Gentlemen. Our aim is to give you as much flying enjoyment as possible. Please help the marshalls to help you."

Entry fees for the event will be £2.00 for the first event (this includes a fabric Commemorative Badge) and £1.00 for each subsequent event. You will be allowed to enter some events more than once.

We also hope to include manufacturers' demonstration flights, parachute demos and stunt flying while on the ground there will be displays, a mock Training school and a "Kite Mart" where you can offer your old glider for sale.

*Remember*: This is a BHGA members event so that there will not be the facilities that there were at previous, public, events. Come prepared to cater for yourselves . . . and don't forget to bring your own booze! Make sure you have your BHGA membership card and your pilot rating cards, otherwise we'll have difficulty fitting you into the events. Scrutineering will be on a "spot-check" basis and fliers on unairworthy kites will be immediately and totally disqualified.

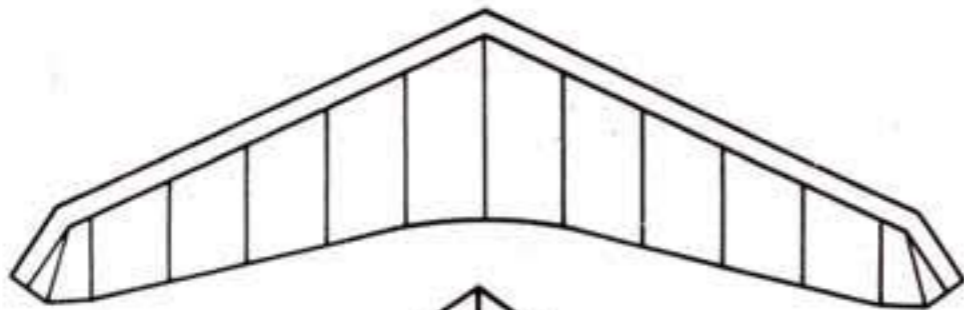
Our hosts at Mere, Mr. and Mrs. Rodney Coward, have kindly allowed us to site the display area, etc. adjacent to their farm close to the landing area. To reach the site take the road which runs north from the centre of Mere itself (by the "Talbot") and continue until you see the signposts. You are warned that Mere Carnival takes place on September 2nd so be patient when

seeking to enter or leave the site.

*Accommodation*. Members with caravans are advised to go to the campsite at Wincanton Race Course. Members intending to camp, especially those with children, are advised to use Dr. Hart's site at the eastern end of the Mere by-pass. Book by letter to Dr. Hart, Willeybrook, Ashwell, Mere or phone Mere 697. For details of guest houses, bed and breakfast and hotel accommodation in Mere area send 25p (stamps or postal order) and a large stamped, addressed envelope to Salisbury District Tourism Information Centre, The Square, Mere, Wiltshire, Wilts. (Telephone Mere 341). Overspill camping will be available on site but facilities will be minimal.

The flying site at Mere is restricted by standing crops to the westerly-facing ridges. Because of this Chris Corston has arranged for a special 3-day weather forecast to be made available to us on the previous Thursday. If weather conditions are unsuitable arrangements can be made to "fall back" to either of the following two weekends. Fliers belonging to BHGA member clubs are asked to contact their Club Secretary on Thursday evening for information. BHGA members who are not members of a local club can ring Taunton 88140 after 2 p.m. on Thursday (till 7 p.m.) or on Friday from 10 a.m. to 7 p.m. Make sure you keep your call brief as there may be others trying to get through.

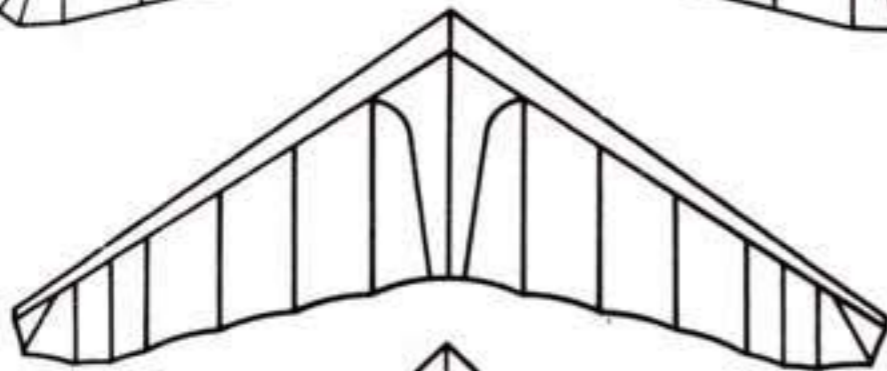
SEE YOU AT "MERE '78". ☘  
Garth Thomas



#### **Moonraker '78**

The latest in our line of high performance cross country gliders. The '78 is for experienced pilots who demand the best in handling and performance.

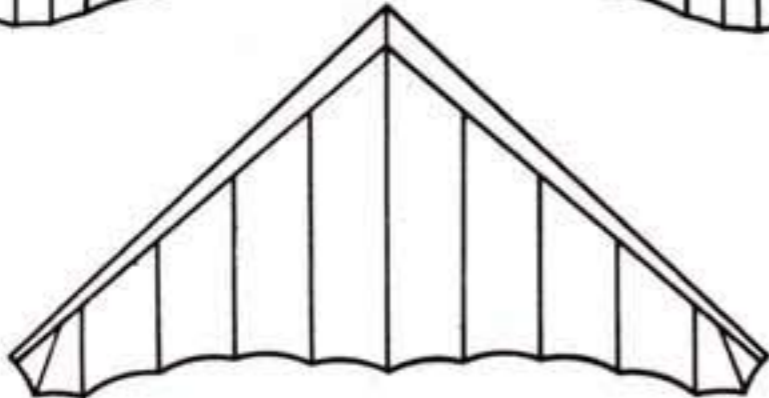
Nose angle 130°    Aspect ratio 7    Span 35ft    Two sizes available



#### **Moonraker '77**

The '77 is well known for its smooth responsive handling and extremely good performance over a wide speed range. For intermediate to advanced pilots. The first hang glider to cross the English Channel releasing from a balloon at 18,000ft.

Nose angle 108°    Aspect ratio 5.38    Span 32ft



#### **Firebird 'S'**

The 'S' is for new E.P.C. holders to intermediate pilots. A very easy handling glider that will inspire confidence when it is needed most. Performance is as high as possible whilst retaining the forgiving characteristics essential for this grade of pilot.

Nose angle 96°    Aspect ratio 4.12    Span 28ft    Two sizes available

All Birdman gliders are constructed to the highest standards and we invite close inspection of all our products. Howe and Bainbridge Dacron is used throughout.

## **Birdman Sports Ltd**

Mildenhall, Marlborough, Wiltshire,  
Telephone: 0672 53021

Birdman Sports is one of the pioneer glider manufacturers in the U.K.

Very wide experience in all types of hang gliding including the early mountain flights in the U.K. (Snowdon 1973) and the successful first crossing of the English Channel (Moonraker 1977). If you want to take advantage of our experience, consult us for full details.

# **THE NORTH WALES BRANCH OF THE WELSH HANG GLIDING CENTRE IS NOW OPEN**

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TEL: 08242-4568 (OR CONTACT S.WALES BRANCH ON 0873-810019).

## **NOVICE TO ADVANCED COURSES**

**BHGA REGISTERED SCHOOL.**

**FLIGHT DIRECTOR: GERRY BREEN**

# INFORMATION



## Hang Gliding in the vicinity of the Mod Rifle range at Mere

I have received a complaint from the Military authorities that on several occasions, hang gliders have drifted within the range danger area while firing was taking place.

I do not know from whose land the gliders took off, so I am writing to all the local landowners to request that if they allow hang gliding from their land that they warn those persons participating in the sport to avoid the area around the range especially when the red flag is flying as this could be in considerable danger.

M.I Constable  
for Defence Land Agent Durrington

## OVERSEAS EXTENSION OF BHGA PUBLIC LIABILITY COVER

Our policy covers members against claims from Third Parties throughout Europe. It is now possible to extend this cover to most countries throughout the world, at small extra cost. If you are going further afield than Europe write to the Secretary giving your name, BHGA number, profession, capacity in which going overseas, country, glider type and dates. We will then send details.

## AERODROME TRAFFIC ZONES

A recent incident has pointed out the need to remind you that all aerodromes have Aerodrome Traffic Zones (ATZ) which extend 1½ nautical miles from the boundary and to 2000 feet above aerodrome level. Aircraft, including hang gliders, should only use this airspace with permission. In the case of military aerodromes the zone extends for 5 nautical miles from the centre of an airfield and extends to 3000 feet above the surface. These zones also have a stub 4 miles wide

aligning with the main runway approach. Likewise you must not fly within an MATZ without permission.

In addition, many aerodromes have Special Rule Zone or Area. These are shown on air charts and in Rules of the Air and Air Traffic Control Regulations 1976, as amended, Section VII, Rule 36 (Statutory Instrument 1976, No. 1983 available from any HMSO.)

## MIDLANDS HANG GLIDING FEDERATION

The Malvern, Northampton and Mercian Hang Gliding Clubs have formed a Midlands Hang Gliding Federation. However, each club will retain its autonomous state with regards to membership, direct member communication and site control.

The Federation would like to point out that there are no restrictions to visitors, providing the local club's site rules are observed and the visitor is adequately insured, i.e. there is not the necessity for temporary membership or similar. If however a site fee is involved, that person may rest assured that 100% goes to the landowner concerned.

If other clubs would like to form a closer working relationship with us, we should be grateful for the contribution and look forward to hearing from them.

The Officials of the Federations are as follows:-

Hon. Chairman: Theo Willford, 276 Worcester Road, Malvern Link, Worcs.

Hon. Treasurer: Roger Smith, 12 Southwood Avenue, Northampton.

Hon. Secretary: Paul Winteringham, 12 Southwood Avenue, Northampton.

## APOLOGY

"Ian Trotter wishes to apologise to Jim Somerville for describing him, in the

Glenshee report as 'relatively inexperienced' (3 years) and 'recently converted to prone' (1 year). The trouble is that Jim's a modest, unassuming competent pilot, and very helpful on the hill and, to tell the truth, I envied him his flight."

## CLOSER CONTACT WITH CLUBS

The Secretary and Council wish to establish closer ties with non-Member Clubs. The Secretary has recently written to Secretaries of all non-Member Clubs known to him. Some of the names and addresses to which letters were sent may be out of date. Will the Secretaries of all non-Member Clubs who have not received the letter please contact the BHGA Secretary giving a current address.

## FAI AWARDS and the FAI Sporting Licence

As most of you will know, there are three International Hang Gliding Awards, Delta Bronze, Delta Silver and Delta Gold. Many of you have completed the Delta Bronze tasks and are awaiting news of the availability of the Delta Bronze badges. These have proved technically difficult to produce because the FAI requirement was for a badge 1.5cm in diameter. Production of the badges is now proceeding and they should be available by the end of 1978. An announcement will be put

into *Wings!* when the price is known so that those who have qualified may write in for one.

The FAI Sporting Licence is not to be confused with any of the International Awards. The Sporting Licence is a passport to national and international competition entry and is only available to those who have completed the necessary task for the award of the Delta Bronze badge. Competition entry at national and international level is not possible unless you hold a Sporting Licence, which is stamped with an FAI stamp for the current year. These stamps are available from the BHGA which is a member of the Royal Aero Club and FAI. Sporting Licences are available from the Training Officer for £1.00, which includes a current stamp. Stamps for each calendar year subsequently are available at 50p. If you wish to claim a British National or International Record you must hold a current Sporting Licence.

## INSURANCE CLAIMS

Council have instructed Reggie Spooner to send out an accident form to all who claim against any of the BHGA Policies arranged by the BHGA Broker.

## MEMBERSHIP RENEWAL

Membership numbered 8118-8458 are due for renewal on 1st September 1978.

# VECTOR



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**New Gliders**

Chargus VORTEX now in stock, '110' and '120'. FREE full fairing set with every new glider, Chargus, Skyhook or Hiway bought from us.

Part exchanges welcomed

**BHGA registered HIA instructors**

**Tuition** — We run mid week and weekend courses for beginners with special emphasis on low pupil to instructor ratio. Our instructional techniques are second to none and we normally expect Elementary Pilot Certificate standard to be reached within 3 or 4 days. Fees credited in the event of unsuitable weather.

**Secondhand Gliders— Stock constantly changing**

Super 'E' ex demonstration, immaculate	£450 ono
Midas 'E' clean, good condition	£365 ono
Vega I 'special', excellent	£210 ono
Breen Hi Fli good condition	£160 ono
Flexiform Spirit, sound	£210 ono
Argus } for spares only	Offers
Arion }	invited

**Accessories**

Electra flyer Theotek vario	£110 inc. VAT
Stratus vario	£65 inc. VAT
Fairings — details available on request	
Dunstable prone harness	£44 inc. VAT

**Glider Hire (EPC holders only)**

Midas 'E', Sunspot, Vortex	£14.00 per day
Vega IIA & B	£12.00 per day

**Spares and Repairs**

We offer a full 24 hour spares service for all Chargus gliders and many more. Our glider repair service will have you back flying promptly and economically.

Instructors and trainee instructors are required for weekend and mid-week courses, part or full time. Must be sensible, reliable pilots with Pilots Wings or near. Generous rates; ring us anytime if you're interested.

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# small ads

For your own safety, if you are purchasing a second-hand glider, check that it is a registered BHGA model, see it test flown, test fly it, and inspect it thoroughly for damage or wear to critical parts. If in doubt seek advice from the Club Safety Officer.

All small ads should be sent to Lesley Bridges, Commercial Editor, Wings, Yard House, Wentnor, Nr. Bishops Castle, Shropshire. Ads sent to any other address will be redirected and therefore delayed.

**Sunspot**, tuned to perfection. Pale blue with distinctive wing tips. £375. Sheffield (0742) 53204.

**SPIRIT**, medium size, good condition, £256. Doncaster 855700.

**Breen Hi-Fly 19ft Up to 12½ stone**. Red, blue, black. Dual rigging for seated or prone. Complete with seated and prone harness. Ideal kite for beginner to intermediate £195. Phone Sheerness, Kent 5322.

**SPIRIT** — medium. Excellent condition. 5 months old. £310 ono Skelmersdale (Lancs) 20601.

**Chargus Midas E** in beautiful condition, blue and white sail. Excellent handling glider, complete with pre-formed battens. £375. Contact Kelvin, on Ashted (Surrey) 74041.

**Hiway Scorpion D**. Excellent condition, three wing deflexor wires, spare cross boom, carrying bag, £360. Tel. Crawley 33817.

**Falcon IV**, complete with prone harness. Green and white sail, performs exceptionally well in light winds and is nearly always top of the stack. Phone Chris Ashman, 0604 858098 (Blisworth, Northampton).

**Phoenix 8 Jnr**. Immaculate condition. Pilot 9st to 12st. Soars in 8 & 38mph. Instruction provided if necessary. £475 (including bag). Phone or write to Paul at 2 Heol Dolwen, Whitchurch, Cardiff. Tel. (0222) 613776.

**Wasp CB240** with bag and seated harness — little used. Moving house forces sale so only £100 ono. Wells, 29 Elsham Road, London W14. Tel: 01-602 0130 evenings.

**Gryphon III** for sale. The actual kite is seen on the front cover in June. Beautiful flier, break down, pretty sail. £575. Phone Steve Goad, Horsham 731392.

**Simpson** prone harness, suit 5ft 8in to 6ft 2in pilot. £35. Phone Graham Driscoll at Telford 55216.

Must sell! **Midas E**. flown less than 1 hour. Good reason for sale. Best offer over £300 secures. Home Surbiton 01-399-6584, work 01-954-2311, ask for Simon Johnson.

**Midas Super E**, excellent condition. Flies and handles superbly. Need money urgently (buying house) hence £390 ono. Phone Nick Beach, Rayleigh 779573.

**Argus 18ft**, blue and white. Complete with bag and seated harness. £70 ono. Tel. Cardiff 496266 Ext 236 (office) 498568 (home).

**McBroom Argus**, strong frame, very forgiving kite for beginners. Stainless rigging — must sell cheaply — £60 ono harness included. Contact Dave Lane, 10 Toll Bar Road, Swinton, Mexborough, South Yorkshire, S64 8HL.

**Wasp 229 B3**. red/white/blue. £60 ono. Good flying condition. Jeremy Walke, 2 Ettington Road, Coventry or phone Coventry 452152 ext. 3716 office hours.

**Wasp C5**, perfect, quiet, multi-coloured terylene sail. Reversible rigging for prone or seated. New bag and seated harness. £180 ono. Must sell, moving house. Phone 01-778-2434 evenings or 01-854-2226 evenings.

**Scorpion C deluxe**, all Bainbridge sail. Tasty colours, dark blue, fading to white on tips. Real floater and thermaller. £350 ono. Lewes (Sussex) 77183.

Kenya trip forces sale of beautiful **Midas Super E** thermal eater, under 10 hours airtime, dk. blue, lt. blue, gold yellow and white. Inspection welcomed. £450. Tel. Glen Harvey, Maiden Bradley (09853) 561 (near Mere).

**Birdman Albatros 240** sq. ft. Red/blue. Very strong 'belly bar' A-frame. Seated harness. Adjustable top rigging. Pin-pin nose fitting. Good beginners, very stable. £110 or reasonable offer. Warne, Oxford 739778.

**Spirit 22ft A** high flier in good condition, breaks down to 13ft. Gold anodised fittings and pulley system, with Scotkite proneweb harness or seat. £300 ono. Alan Pearson, Tel. 0782-85658 (Work), 0782-657160 (Home).

**Hiway Scorpion D** for sale. In good condition. Blue and white Bainbridge Dacron sail. Extra strong cross tube. For pilots 12 stone plus. £365 ovno. Ring Bruce Hudson at Hiway — Brighton (0273) 681278 Daytime.

**Wasp 229 B3** — new 2 piece cross boom, large control frame, prone/seated — Wasp prone harness — very good condition — sail white/red — zipper kite bag, 3 spare edge booms. £75, 01-319-0144.

**20ft Cloudbase**. Good condition, flies well, beautiful plumage. £220 ono. Contact Matt Jayne, Bristol (0272) 563092.

**Swift**, multi-colour. Large, breakdown. Seated harness and carrying bag. Immaculate condition. £280. Ring Roger Full,

St. Ives (Cornwall) 7651.

**Midas E**, good condition and very clean, sunburst colour scheme. Flies seated or prone. £350 ono. Tel. Holmes Chapel 37334 (Cheshire).

**SST90** Red, orange, yellow, white. Excellent condition. Complete with bag and seated harness if required. £400 ono. Tel. Doug Werts, Sittingbourne 24444 (work) or Sit. 74728 (evenings).

**Cobra 200**. Orange with black and white tips, fly seated or prone. Two seated harnesses. Good condition. £250 ono. Phone Tunbridge Wells 22458 anytime.

**Wasp Falcon III**, excellent condition, red and green with white wing tips. Financial circumstances force sale. Bargain £295. Tel. N. Eleini on Brighton 553177.

**Avon Swift**, large size, gold and purple sail. Only flown 15 times on 5 sec. flights. Immaculate condition. Owner giving up hang gliding. £170 ono. Phone Markfield 3466.

**Birdman Albatross** in excellent condition, with bag and seated harness. Beginners kite. £135. Fareham 281631.

**Scorpion B** dacron, immaculate condition. New October 1977. Reluctant sale @ £425 ono. Contact Alex Butterworth, Leeds (0532) 450601 (work) or 061 643 3706 (home). This is one scorpion you won't get stung by!

**Kingpost**: This UK Club Magazine is now available by annual subscription @ £2.50 inc. (4 issues). Sample copies available @ 50p, send cheque/P.O. payable to Pennine HGC Ltd., c/o John Wadsworth (treasurer), 62 Grosvenor Road, Urmston, Manchester, M31 3AQ.

**Large all black Swift** fully tunable. Quick rigging, seated or prone, good sink rate and excellent soarer. C/w bag and seated harness. £260 ono. Tel:

Didmarton 688 or write to Steve Moss, Pool House, Hawkesbury Upton, Badminton, Avon.

**MOONRAKER** in excellent condition with bag. 10 months old. Red, white and blue sail. Superb all-round kite £400. ono. Hiway prone harness £30. Tel: 01 283 3671 (day) or 01 736 5628 (even) Roger Willbourne.

**CHARGUS VEGA II** Seated harness and bag, harvest gold, yellow and white sail, blue tips, 6 months old, never flown. Tel: Balmore 324, Mike Flatters.

**WASP FALCON 3**. Good safe soarable glider with nice multi-coloured sail in as new condition. £365 J. Sealey, 25 Western Hill Clos, Astwood Bank, Redditch, Worcs. Tel: Astwood Bank 3297.

**SUNSPOT**. Light blue, red, white and blue tips. Seated harness, bag and ventimeter, immaculate condition. £375 Also brand new Skyhook prone harness £38. Tel: Guiseborough (0287) 33845.

**BIRDMAN GRASSHOPPER**, with factory fitted A-frame. With seated harness and bag. Very stable beginners kite, but has been soared. £55. Pete/Derek/Bob, Coventry 456782.

**HIGH performance** bargain. Cross-tube less high aspect ratio prototype. Superb handling, eats everything, a joy to fly. Bainbridge yellow and blue tailored sail. Fibreglass battens. £340. Tel: Martin Farnham, Hemyock 580.

**21ft super de luxe**, pale blue CLOUDBASE with bag. £300 Tel: Nutley 2977.

**MIDAS SUPER E**. Assymetric sail in top condition. This excellent machine has several 2 figure flights to its credit. Factory tuned. Changing to '78 therefore must sell. £420. Stephen Hicks. Tel. 0485 26202.

**Phoenix 6B**, Excellent condition high

performance glider. White dacron sail, anodised frame, reversible seated/prone rigging. New **Highway Prone** Harness, cotton flying suit, helmet. £300 the lot. No offers. Tel. Leeds 657899.

**Surplus to requirements**: L/E boom for Bennett Phoenix 6, Bennett knee hanger Proneweb harness (very comfy) and ex RAF altimeter. Offers to Tony Burgan, Shrewsbury 61791.

**17ft Cloud Nine** pre-battened with fitted deflexors. Suit 9-10 stone E.C.H. pilot. Complete with bag and seated harness (have acquired a Midas E) £200 ono. No prangs. J.A. Briggs, 92 Grafton Street, Kingston upon Hull, East Yorks.

**XC flown** less than a dozen times, in immaculate condition. Bad knee forces removal of temptation. £500. Phone Graham Driscoll, Telford 55216.

For Sale **Moonraker**. Very good condition, with bag. £380 ono. Can be seen at Birdman Factory. Terry, Tel. 067-25-2766.

**Hiway Scorpion C**. Excellent condition, flies beautifully. Colours Black L.E., keel and fin, sail blue, yellow, red and white. £440 ovno. Phone Ecclesfield 64800 between 9.30 and 5.30.

**SST 100 C and SST 100 B**. Both gliders in excellent condition. To the latest specifications and both under 12 months old and perfectly tuned. With all white dacron sails. £425 ono Each. John, Burton (0283) 43879.

For sale **Hiway 220** glider. Excellent condition, ideal for young/old beginner. 20 flights only. £125 ono. Ring Presteigne 319.

**Midas C**, two flying hours only, coloured sail, prone/seated wires. B.P.V. flying suit, choice of semi-supine or prone harness. Genuine reason for sale. Can deliver. £350 ono Tel. Edinburgh (031) 441 4531.

**Moonraker** — very good condition, complete with bag. First offer £350 secures. Brian Griffiths, Ipswich 473-72222 Ext 265 or 0473-50232.

**Wasp Falcon III** 16 months old. White sail. Light/dark blue tips. Seated harness and helmet. £280 Tel: Slough 41964.

**Midas Super E**, never pranged, spectrum colour scheme. Three months old and all for £395. Tel. Northants (0604) 858098 or 858274 ask for Ben.

**Quality binders for Wings** — handsomely bound walnut simulate leather binder with distinctive gold block design. Sizes: A4 at £2.95 and A5 at £2.50. Takes 12 issues. Cheques payable to Livingstone Promotions, 2 Timberyard Cottage, Herstmonceaux, Sussex.

**New Bowland Altimeters** 2in. x 1in. x 2oz. Clear scale 4,000ft. or 8,000 £15 cash. New training receivers. 4oz. chargeable crystal tuned 129.9 m/c £55 cash. Electronic 'Grayland' vario £50. 'Streamline' A.B.S. Fairing protects all instruments £10 c.w.o. Charlwood Park Lodge, Horley, Surrey. 02934 6611. "DRAGON HOTEL", Crickhowell. Central for all South Wales best soaring sites. Already popular with hang glider pilots. Tel: Crickhowell 810362.

**Propeller Making** for the Amateur. The complete do-it-yourself book for propellers of all types. £2.50 incl. post. Eric Clutton, 92 Newlands St, Stoke-on-Trent. ST4 2RF

**7in. 5in. Hang Glide** car sticker (see last September *Wings!*) 30p. incl. p & p. M. Hanson, c/o The Caravan, Muirston Farm, Sinclairston, Oghiltree, Ayrshire.

**Tee Shirts** for sale. Attractive colour hang glider design on white shirt. £2 post free. R. Bayliss, 9 Corunna Crescent, Cowley, Oxford.

**Several second-hand Moonraker '77** and Firebird 'S' available to clear. Ring Ken Messenger, 0672 53021

**Galaxy Flier Helmet** now with the new British standard 5361. £16 plus £1 p & p. Frank Acton, 53 Royston Park Road, Pinner, Middx HA5 4AB. Tel: 01-428 2686.

**Instrument** — vario mounting stalks — fully anodised — 'kick up' feature — secure instant fixing. Send SAE for information or £9.45 incl. p & p and VAT. Money back guarantee. Mainair Sports, Shawclough, Rochdale, Lancs.

**Pellet Variometer.** We are the UK agents for Makiki Electronics. Self-contained variometer model 2 is only 4in. x 5½in. and weighs 15ozs. Just as sensitive as electronic variometers. £36 incl. p & p and VAT. Dealer enquiries invited. Mainair Sports, Shawclough, Rochdale.

**Flying at White Sheet Hill, Mere?** Good Bed & Breakfast available £3.50. "Hill View", Castle Street, Mere, Wilts. Mere 557.

**Clearance Sale.** Avon Swift, Miles Gulp, McBrook Cobra, Breen Hifli, Toucan, Midas C, Hiway 260, 240, 200. Phone quickly. Merthyr Tydfil (0685) 3780. Wanted Falcons, Scorpions, Spirits.

**Spirit, Vector, Skyline.** One of our gliders is right for you. Contact us first, for the best. Flexi-form Skysails, 061-707 1389.

**The Ultimate!** Diplex wrist altimeters are available through the following authorised dealers:— Chiltern Glider Supplies, Dunstable; Main Welding, Rochdale; Bertie Kennedy, Newtownabbey, N. Ireland; High School, Bristol; £48.60 + VAT. Simon Murphy, Turfhouse, Luppitt, Honiton, Devon.

**Visual Vario** indicators — for the D.I.Y. pilot — add two picnic flasks, tubing to make a very sensitive ball-type vario. Full instructions. Money back guarantee. Send £15. Ann Collis, 90 Oval Gardens, Gosport, Hants PO12 2RD. Tel: Gosport 21961

**Stolen** An all yellow Spectrum. £20 reward for information leading to recovery of this beautiful kite, or to a prosecution. It is the only all yellow Spectrum made. Contact Twickenham Police or Barrie Annette tel: 01-894 6374.

**For Sale: Lancer 2B**, ideal for pilots interested in aerobatics. Floating truncations, anti-cuffing wires. No faster kite around. £390 ono. Mark Woodhams, 60 Compton Road, Brighton 501043.

Variometer and Altimeter £50 ono. Exchanged for harness on holiday in Hungary. Vario: compact flask type, 3in. x 3in. x 5in. plus or minus 5 m/s. Altimeter: Ex-glider type, very accurate outer dial 0-1000m, inner 0-20,000m. Atmospheric pressure adjustment (Russian made) 3in. x 3in. x 4in. Will not split. Phone Dave Worth 01-659 2270 (London).

**Wasp 229 B3** Excellent condition. Spare control bar, soaring bar, seated harness, ideal beginner's kite £100. Derek Austen, 17 Harmon Ave, Lympne, Kent. Ashford 21522 Mon-Fri 9am-5pm.

Gryphon III for sale. A reliable high performer which has kept me in

the middle ranking of the British Hang Gliding League. Reluctant sale of trusted kite, but must purchase latest model to keep in contention. Colour scheme in browns/oranges £560 excellent condition. Phone Roger Wates 01-300 1128 ext. 34 (work) 01-647 9701 (Home).

# FANCY A HANG GLIDER FOR 25p?

(or Two for 50p?)

Yes, we are trying to do you a favour again and, incidentally, get our British Team to Chattanooga for the *Americas Cup* in October. Lotsa Money Needed for this trip so we hope you all still have £2.00 left for your second chance to win a Hang Glider. Two more chances in fact —


First Prize — One Hang Glider of Your Choice  
Second Prize — One Hang Glider of Your Choice

(Kites From: BIRDMAN · CHARGUS · HIWAY · SKYHOOK or WASPAIR)

Your money this time will enable us to test our best against the top flyers of USA, Canada and Japan. Post your counterfoils to **Derek Evans** in the envelope provided, cheques and postal orders **Payable to BHGA, to reach him by September 29th. More tickets can be supplied on request.**

Very many thanks to those who contributed to the Kossen draw and to the manufacturers and donors for the prizes — your efforts have ensured that we can send a strong team to the European Championships next month. The Americas cup is our last International Competition this year and your support again will be gratefully received.

# Hiway territory.



The sky becomes your playground when you fly one of the new range of Hiway hang gliders.

No longer need you sacrifice handling to gain high performance. Super scorpion and Spectrum become your obedient servants as you fly from thermal to thermal.

And you get all this without the cumbersome and drag creating deflexor arms and wing wires. The simplicity of the new machines mean that you'll be first to rig and first to fly.

Whether you're a cross-country pilot, competition flyer or just gliding for fun, Hiway have the machine for you.



**Hiway Hang Gliders**, 27/35 Bernard Road, Brighton BN2 3ER.  
Telephone : Brighton (0273) 681278.

