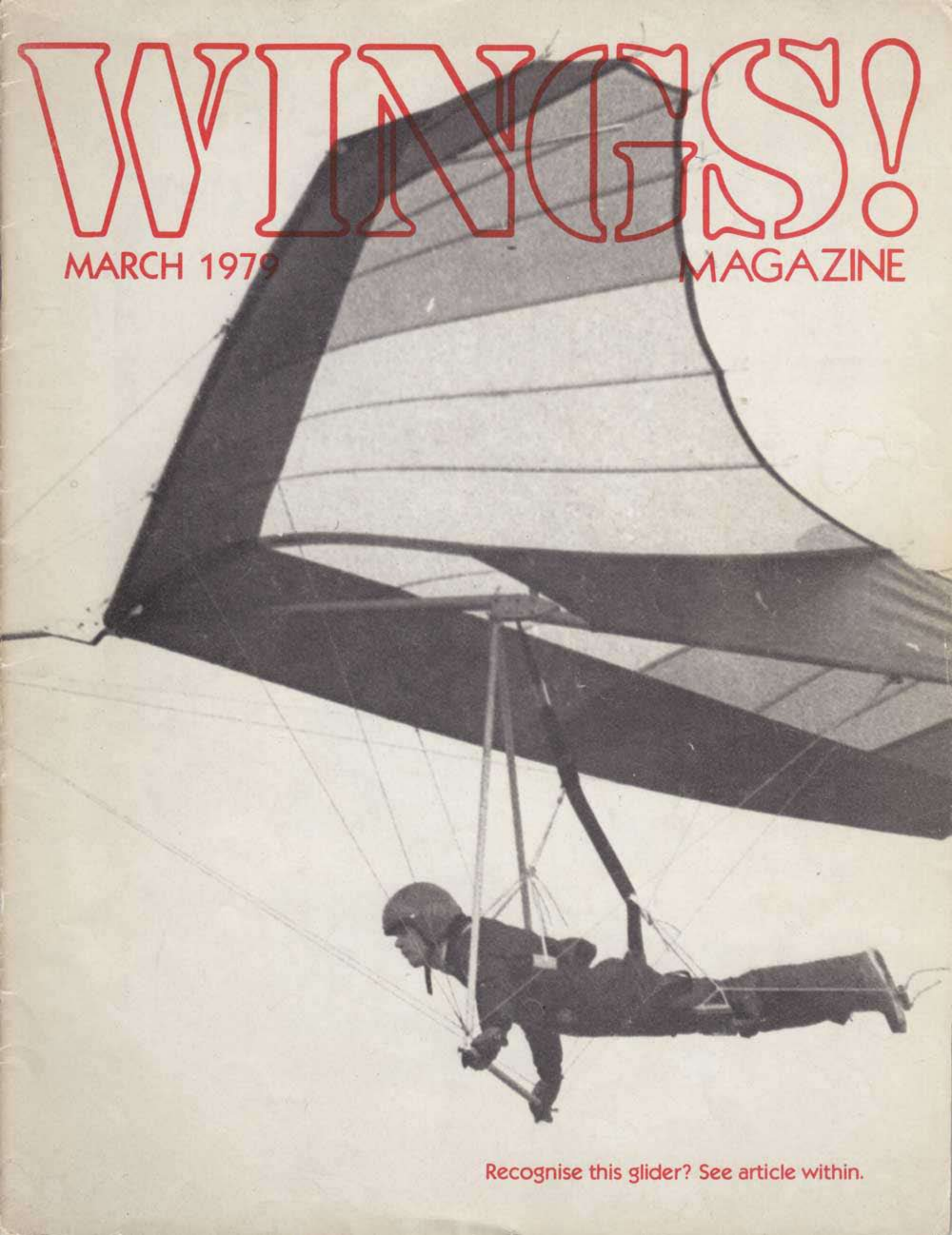


WINGS!

MARCH 1979

MAGAZINE



Recognise this glider? See article within.

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The choice of both **Champions** and **Newcomers** to the sport.

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do your shopping at the agm

Mainair Sports are mounting a huge display of hundreds of items from their stock at this year's AGM. If you are considering purchasing any hang gliding accessory in the next year, this is an opportunity not to be missed. There will be special reductions for this display only.

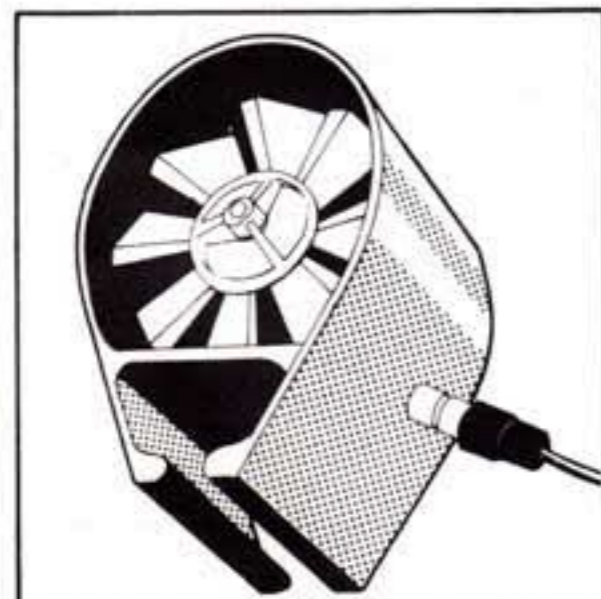
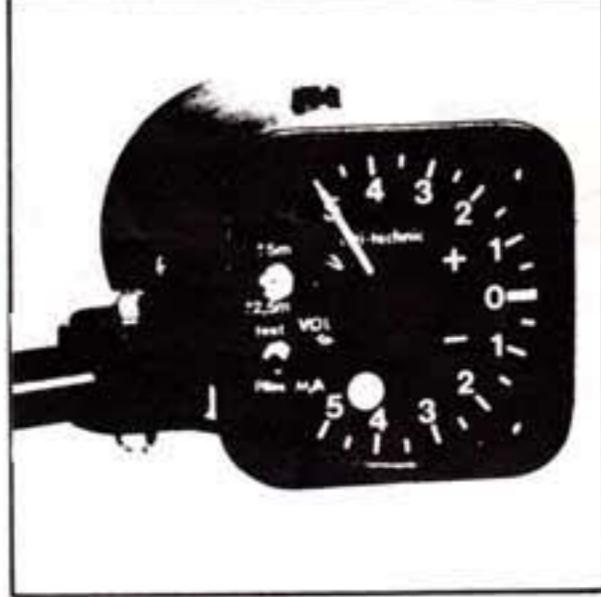
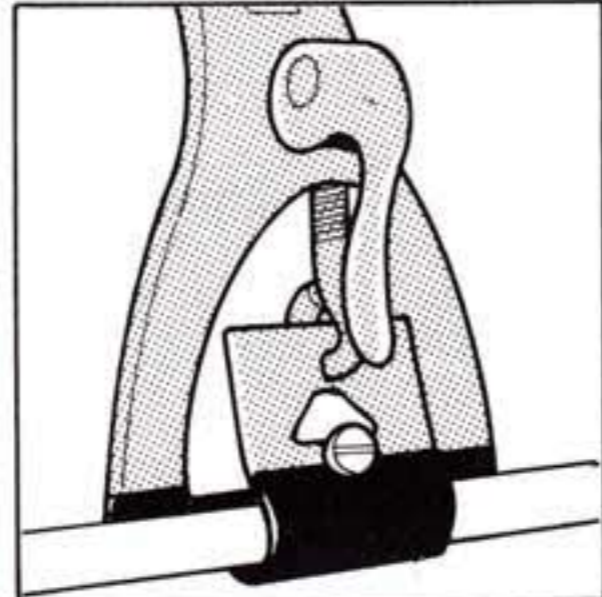
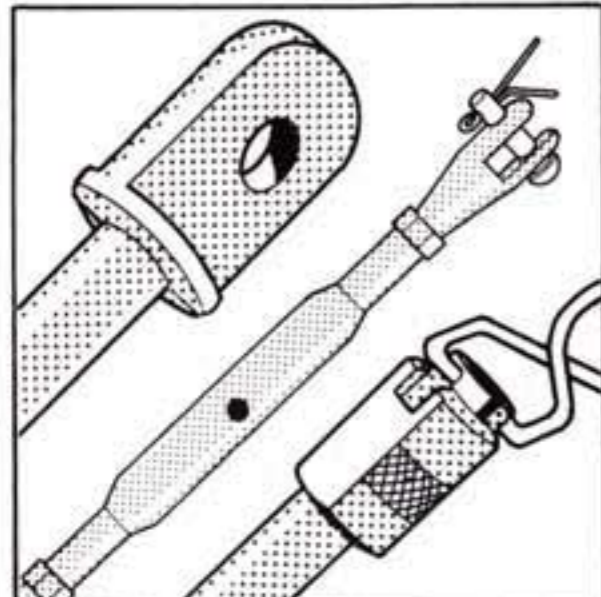
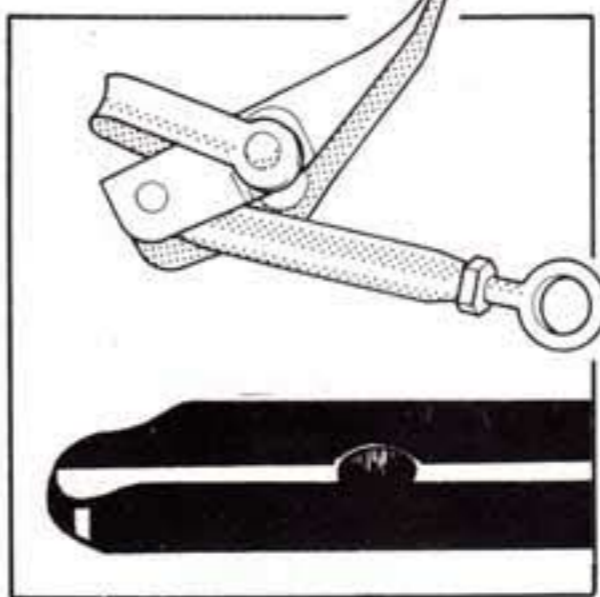
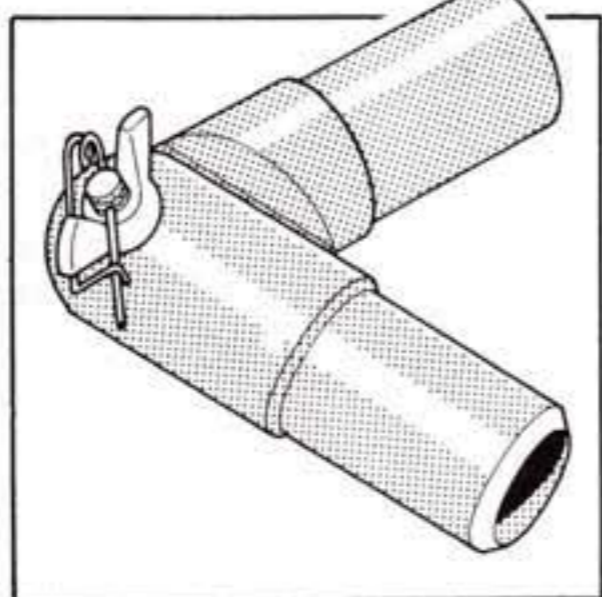
You will have the chance to try out 6 types of harness on a special rig provided by Mainair. There will be nine

different types of variometer to inspect, airspeed indicators and many altimeters. Among the new stock are coral hang gliding jewellery from Hawaii, Moon Boots, Aerofoil fairings, silk inner gloves, and balaclavas as well as lots more. Come to the AGM and don't forget your wallet, you might regret it.

If you can't come then send for the fully illustrated catalogue by filling out the coupon below.

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We are pleased to announce that we will be able to screen a short feature film of the fabulous Mitchell Wing under power. Potential Mitchell Wing owners might find this of special interest.

stop press.....

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SUPER SCORPION

A worthy successor to the existing Scorpion, this is the machine for the serious cross-country and competition flyer. The 120° nose angle and low twist values of the wing make the Super scorpion a highly efficient glider.

Incredible min sink performance coupled with an ability to flat 360 in very tight spaces, make the Super scorpion the ultimate thermal eater.

Pitch is light but positive. A new aerofoil section allows extended glides at high speed – ideal for getting out of sink or hopping from thermal to thermal.

Super scorpion is equipped with two small tip struts. These struts allow the sail to ride as high as it likes when flying at low speeds, but ensure that at high speeds or radical attitudes the keel always has a higher angle of attack than the tips, thus providing quick dive recovery.



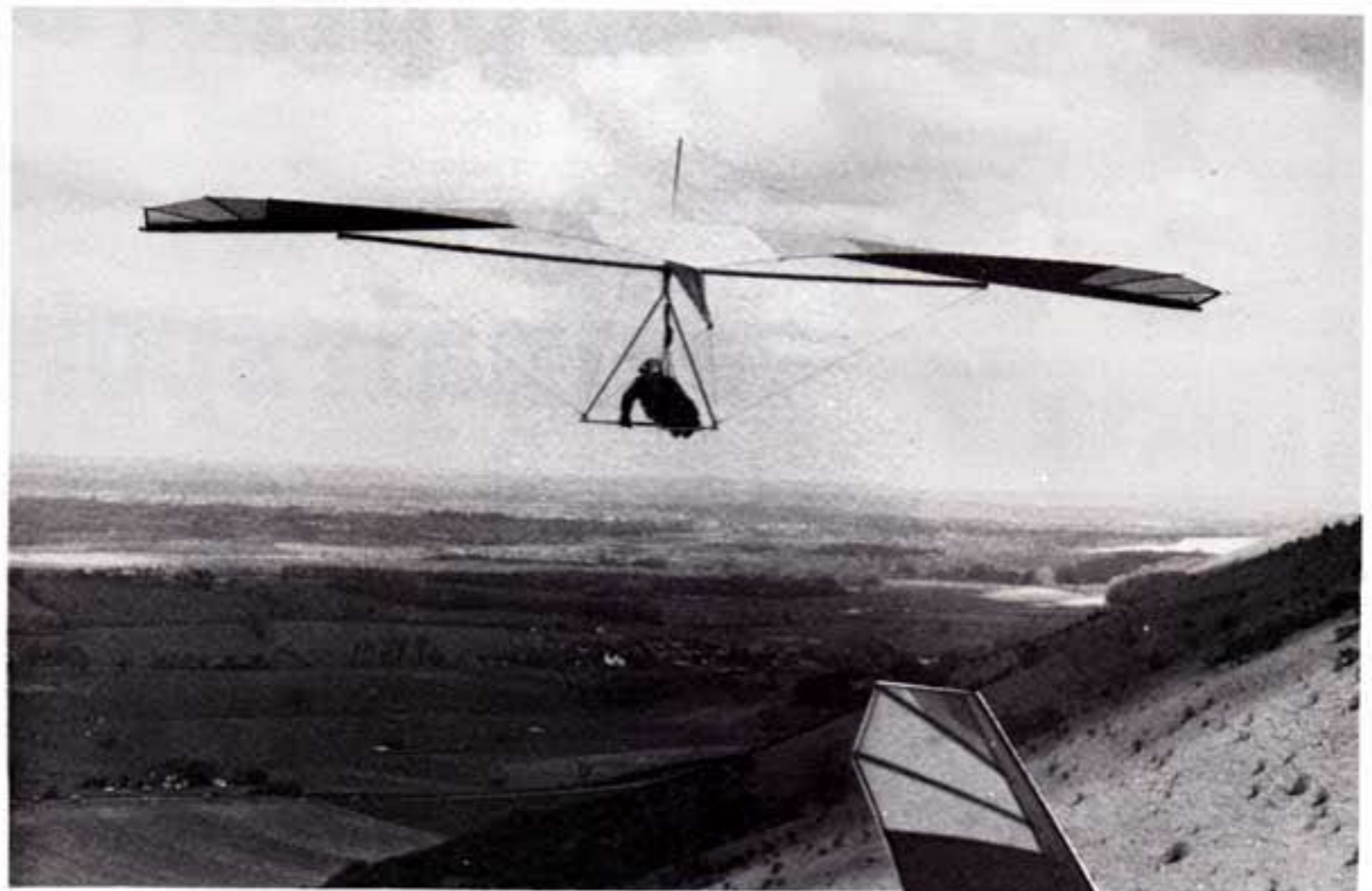
Super scorpion (and Spectrum) have all exposed tubes bright anodised. Unlike the Spectrum, this glider is only available rigged for prone, so a 'B' bar is necessary if you want to fly seated.

Advantages

The simplified structure allows you to rig in about the same time as a Hiway standard!

Because the tips of the wing are not connected by wire to the front of the machine (no wing wires) the frame can release excess loads by flexing. This also makes for a smoother ride in turbulent conditions.

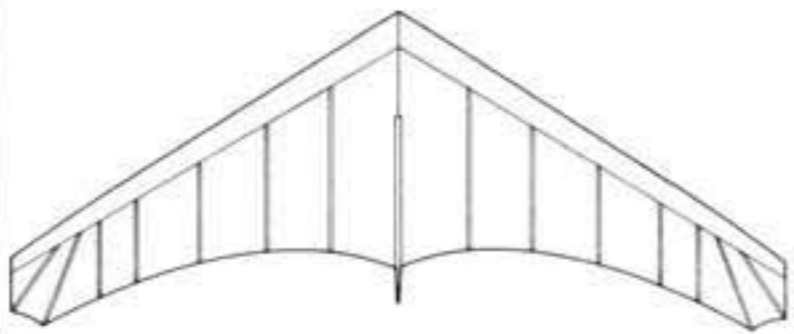
The whole frame structure is lighter



because the removal of deflexors, bottle screws and cables also means removal of the sleeving at the attachment points. Also, Super scorpion is lighter than its older brother because the short keel pocket is less cumbersome than the fin, full pocket and related hardware.

No wing wires and bottle screws means you don't have to be continually tweaking the cables to keep in tune. It's all in the sail, fully tuned and permanently tuned. No wing wires means there's less to go wrong, and the removal of all that clutter from the leading edges pays huge dividends in drag reduction.

The variety reduction of components is also reflected in the price of the machine. A supership at a reasonable price is now a reality.



Super scorpion	Leading Edge	Keel	Length packed	Knockdown length	Area	
A	16'5" (5m)	11'2" (3.4m)	16'9" (5.1m)	12'3" (3.75m)	150ft ² (13.6m ²)	
B	18' (5.5m)	12'1" (3.7m)	18'4" (5.6m)	13'3" (4.05m)	173ft ² (16m ²)	
C	19'8" (6m)	13'3" (4m)	20' (6.1m)	14'3" (4.35m)	198ft ² (18.4m ²)	
	Aspect ratio	Nose angle	Weight	Pilot weight range	Strength rating	Span
A	5.5	120°	40lbs (18kg)	8-11st (50-70kg)	1200lbs (545kg)	27'10" (8.5m)
B	5.6	120°	46lbs (21kg)	9-13st (57-82kg)	1260lbs (571kg)	30'7" (9.35m)
C	5.7	120°	52lbs (23.5kg)	11-14st (70-90kg)	1290lbs (585kg)	33'6" (10.2m)



WINGS!

The official magazine of the BHGA

Editor: Garth Thomas, Bole Hall Cottage, 15 Amington Road, Bolehall, Tamworth, Staffordshire. (Tamworth 65854)

Commercial Editor: Lesley Bridges, Yard House, Wentnor, Nr. Bishops Castle, Shropshire. (Linley 322).

Editorial Board: Jeannie Knight, Tony Fuell, David Worth. **Area Reporters:** Scotland: Ian Trotter, North: John Hudson, Eire: Roy Hammond

South West: Steve Moss, Wales: Rob Symberlist. Printed in Great Britain by Blackburn Print Ltd. Hove, East Sussex.

BHGA Council: President of Association: Ann Welch, OBE., Chairman: Reggie Spooner (Cowes 292305), Treasurer: Derek Evans (Sevenoaks 59995)

Brian Milton (St. Albans 55231), Jeannie Knight (Ashington 892770), Jeff Marvin (041 334-6892)

John Hunter (Hatfield 71027), Ashley Doubtfire (Marlborough 3021), Garth Thomas, Co-opted Members: Malcolm Honeychurch,

Roy Hill. Northern Ireland: Chris Simmons. **Council Officers:** Technical Officer: Alan Barnard (Crewkerne 72478),

Training Officer: Keith Cockroft (Halifax 882883), Registration Officer: Terry Dibden

(Wimbourne 886464), Medical Advisor: Dr. Dunstan Hadley, BHGA Solicitor: Anthony McLaren (Halnaker 457)

Radio Communications Officer: John Westcott

Secretary: Chris Corston (Taunton 88140)

British Hang Gliding Association, 167a Cheddon Road, Taunton, Somerset, TA2 7AH

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EDITORIAL

Dear Sir,

I am writing to let you know how disgusted I am in the present format of WINGS! Back in July 1977 our subscription went up by £1.50 p.a. making our membership fee £7.50 p.a.! The increase was supposed to meet the extra cost of producing the A4 magazine. A better mag. one would think – bigger format, bigger pictures, more informative reading on all aspects of flying. While advertisements are O.K. in their place and are necessary for manufacturers' products (to better hang gliding as a whole, etc.), I think it is a bit much when one finds half of WINGS! used up with adverts!

In the December issue I counted only 9 pages which were readable (i.e. non-advert) out of a total 24. If WINGS! is stuck for material why not reprint from our many member club magazines, or from foreign publication? Let us not forget what WINGS! is all about – hang gliding!

J. Crane, Liverpool

Mr. Crane particularly asked that I should print this letter to encourage other members to air their views about WINGS! I look forward to having your comments, either in writing or face-to-face at the AGM. In the meantime here are answers to some of Mr. Crane's criticisms:

BHGA has a paid-up membership of around 3700. WINGS! has a notional budget of £3.50 per head from the annual subscriptions, or roughly 30p. per issue from each member. Each page costs just over £60 to produce and distribute. (Revenue from advertising can be discounted since the net receipt from one page of advertising barely covers the cost of printing the page. In effect, we can produce a 20 page issue with no adverts for the same cost to members of producing a 28 page issue with 8 pages of paid advertising. I want to get this changed, but that is another story and doesn't affect Mr. Crane's complaints.

We have approx. £1100 per issue to work with (i.e. 3700 members @ 30p) which means we can print around 18 pages of non-advertising pages per average issue. So, if we produce an "American Cup" issue with 26 pages of non-adverts we have "overspent" on that issue by 8 pages and have to compensate by having smaller-than-average issues later. (Actually, this is all a little "pie-in-the-sky" since WINGS! doesn't have an allocated budget, doesn't receive the receipts from selling advertising space, nor from the sale of back issues, neither does it pay the typesetter or the printer. This is another thing which I would like to see changed.)

I have received other complaints about my three issues of WINGS! Excluding the "too much advertising" complaint the others have been: a) too little attention to design,

b) too many typographical errors, c) too much unrelieved copy, d) too few photos. I accept unreservedly that I don't have the flair for layout that Dave Worth had. It's several years since I worked on magazine production and I don't have the "fluency" I once had. Regarding the typographicals I always used to spot them when someone else was editing so I suppose it's a case now of "not seeing the wood for the trees"! The balance between copy and illustrations is an area where I have views which differ from past Editors, I think. I see WINGS! as a members' magazine, by members for members. The majority of contributions I receive are written ones so copy gets more space than photos. Okay, I do receive lots of colour prints (which reproduce badly in black and white), some frightful colour transparencies (from which only poor black and white prints can be made), and assorted black and white prints where the subject is rendered undistinguishable by the lack of contrast and the surfeit of scratch marks! I exaggerate, but the number of reproducible photos I receive from members (of course, I exclude the professionals like James McMenemy, Richard Kenward, etc.) is very small.

Finally, I've been criticised for being late in producing my first issues. I purposely held back the December issue so that I could include the American Cup report and didn't foresee Brian Milton having the crash that delayed the completion of his essential contribution. It's an error that I regret. I sincerely apologise for the complications it has caused.

Garth Thomas

Council Matters

Meeting held in London
on 21st January 1979.

Roy Hill had accepted co-option to Council.

Ann Welch reported that the Observer handbooks had been printed and that the Pilot handbooks were due to be printed in the next two weeks. Ann felt that a Student hand book was necessary and she was discussing this with the Training Officer.

It was confirmed that Bob Bailey had qualified for the award of the President's Trophy for 1978.

Ten people had been killed in accidents in the UK during 1978. In the Chairman's view 50% of these could have been avoided if major efforts had been made to prevent them.

The Secretary reported: Membership had steadily increased to

3669 plus over 100 "family members". Trends showed that the number of new members was decreasing while the number of members renewing was increasing: Barrie Annette had decided to retain editorial freedom – he would publish his Sites Guide independently.

Roy Hill was elected to take over from Garth Thomas as the new Training Committee Chairman.

Dennis Munn, Dunstable Club Secretary, reported that at a meeting with the Bedfordshire County Council and the London Gliding Club the Dunstable Club had signed the Authorisation Agreement which had been unaltered since its presentation to the Club in October. They had

been told that it was up to them to either sign the agreement that severely limited the Club's use of airspace or stop flying altogether. Chris Corston reported that the CAA had not felt able to attend as they had not been invited by all parties. He had attempted to get various individuals to attend the meeting in support of the club but due to either work or the petrol strike they had not been able to. The existing situation was highly complicated legally and could only be fully resolved by legal action which could be very costly and prolonged. The situation had not been helped by the Dunstable Club's lack of close contact with Bedfordshire should discuss the situation with

the BHGA Solicitor before advising the club on further action.

Gerry Breen and Jim Bowyer attended the meeting to ask for the Welsh Hang Gliding School to be re-registered as soon as possible. Gerry explained that he had been absent frequently during 1978, there had been a great deal of unsuitable weather, morale had been low and de-registration had been deserved. He went on to explain that the School had been re-organised with Jim Bowyer in charge. Gerry was told that the Council would accept a formal application for reinstatement of the school on the BHGA Schools Register, and subject to the Training Officer's formal inspection and satisfactory report, the

Training Committee were authorised to re-register the school on 5th February 1979.

The appointment of a Development Officer. The Selection Panel (Reggie Spooner, Brian

Milton, Derek Evans, Chris Corston and Terry Wilkinson of the Sports Council) had short-listed 7 people for interview. 2 had subsequently withdrawn. 4 members of BHGA and 1 non-member had been interviewed.

The panel had unanimously agreed that the job should be offered to Simon Marriott, an outstanding candidate, and recommended this. Council agreed by a majority vote to appoint Simon Marriott if he

would accept, at a salary of £7000 p.a. Garth Thomas voted against the appointment, believing the matter should be put to the AGM. Council understood that 75% of the Development Officer's salary, expenses, and secretarial support costs were likely to be grant aided by Sports Council. (*Simon Marriott has not accepted the position. ED.*)

Steyning Bowl. Mr. Langmead had been persuaded by Dave Anscombe to consider re-opening the Bowl to hang gliding. The main terms for continued use would be: the site should be open to all fliers and not be run as a club site; an annual rent of £2000 should be paid in advance. A Steyning Bowl Management Committee, supported by the Southern Club, had been formed. Plans for raising income to meet the rent were discussed. It was considered very important that the site should remain open especially for training in an area with few sites and a huge population creating considerable pressure on them. Jeannie Knight proposed that a loan of up to £1300 be made to the Steyning Bowl Management Committee to pay a year's rent in advance which would enable the site to re-open immediately for use by all BHGA members, the loan to be repaid with appropriate interest within 12 months. It should be personally guaranteed by all members of the Steyning Bowl Management Committee, jointly and severally. This was agreed.

Preparations for Competitions in 1979 are going well.

A preliminary report on Christopher Reed's fatal accident at Mill Hill had been sent to all Council Members. This was the tenth fatality in 1978 and, in John Hunter's opinion, was a more realistic figure previous year's. John stated that of all the recommendations he had made resulting from fatal accident investigations during 1978 only one had been acted on. For example, he cited the recommendation, "That clubs and schools should be encouraged to introduce a system of Intermediate Training" that had resulted from his investigation into the death of John Humphreys. The Chairman agreed that Council had a duty to act on the recommendations but had failed to do so.

Chris Corston

Details of current Council Members and their involvement since last AGM

Name	When elected to Council	Attendances	Special Council responsibilities	Commercial interests
Ashley Doubtfire	'78 AGM	7 out of 9	Powered h.g. from 7 May '78.	Proprietor of 2 h.g. schools
Derek Evans	Re-elected each year since '76	8 out of 9	BHGA Treasurer	Banker to BHGA & several members
Malcolm Honeychurch	Co-opted to replace Will Jones 20.8.78	3 out of 4	None	None
Roy Hill	Co-opted to replace Malcolm Hawksworth on 10.12.78	2 out of 2	Accepted chair of Training Committee on 21.1.79. Alternate delegate to '78 CIVL meeting.	None
John Hunter	'78 AGM	9 out of 9	Accident Investigation Officer. Represents us on CAA Private Aviation C'ttee. Working on parachute development in association with GQ. Has been involved in Airworthiness and is on Approval Panel.	None
Jeannie Knight	'77 AGM	9 out of 9	Chairs Editorial Committee	Partner in h.g. school
Jeff Marvin	'78 AGM	4 out of 9	None	None
Brian Milton	'76 AGM	9 out of 9	Chaired powered h.g. C'ttee until 7.5.78. Competitions C'ttee chairman. Press Officer Chairman of Press & Publicity C'ttee.	Intends to become a partner in "Flight Promotions" (sponsorship brokers). Currently this is run by his wife, Fiona Campbell in partnership with Arthur Puffett.
Reggie Spooner	Elected to Council in '76 Elected BHGA Chairman '78 AGM.	9 out of 9	BHGA Chairman. Delegate to '78 CIVL Meeting. BHGA Representative to Royal Aero Club Council.	Insurance broker to BHGA & several members.
Garth Thomas	'78 AGM	9 out of 9	Responsible for organising Mere '78. Responsible for Training from 7.5.78-21.1.79.	Editor WINGS! Receives fee for artwork, layout, typing, etc.

Ann Welch, our President, deserves a special mention. She has attended most meetings and has given much valuable advice and guidance. She has also spent nearly two months solid editing the Pilot & Observer handbooks and preparing a basic training manual.

THE A.G.M.

and who you'll be voting for

The A.G.M.

From 2.00 – 10.00 p.m. on Saturday March 31st and from 10.00 a.m. – 6.00 p.m. on Sunday 1st April 1979. Warwick University, Nr.Coventry.

Full details and voting slips for existing members were sent out in the Jan/Feb edition of the magazine at the end of February. New Members who have joined since the 1st March were each sent details and Voting Slips with their membership cards. A more detailed programme will be available to those attending.

Candidates for Election to Council

Mike Caston of the Penine Club. Recruited by Malcolm Hawksworth to assist with the newly formed Flying Committee. He is particularly interested in accepting responsibility for Airspace usage and has recently become our representative on the National Air Traffic Management Advisory Committee. He has no commercial involvement.

Theo Willford Chairman of the Malvern Club and the Midlands Federation. Interested in Training and Airworthiness. He has no commercial interests.

Brian Milton is seeking re-election to Council and details of his involvement will be found in the table below. He is particularly interested in continuing to be responsible for Competitions.

Roy Hill is seeking election to Council and details of his involvement since co-option can be found in the table below. He is particularly interested in continuing responsibility for training which he has just taken over.

Derek Evans is standing for re-election as Treasurer and details of his involvement will be found below.

Brian Pattenden from Suffolk and friend of Dave Cook. He is particularly interested in accepting responsibility for Technical and Airworthiness matters. Brian is a Silversmith/Designer and has no commercial involvement in hang gliding.

Rob Stokes from Portsmouth and Chairman of the Skysurfers.

The Secretary only received his nomination just before WINGS! deadline and was unable to contact him by 'phone. He runs an engineering firm and is known to supply small components used in hang glider manufacture to Hiway and possibly other manufacturers.

Rob is particularly interested in accepting responsibility for technical and airworthiness matters.

Mike Caston, seeking election.



I am 31 years old, married with two children. I have been hang gliding for two and a half years and hold the pilot badge. I fly a Flexiform Spirit with the Pennine Hang Gliding Club.

I am employed by British Airways as a Co-pilot on BAC 1-11 Jets. I have been flying conventional fixed wing aircraft for twelve years and most of my experience is on jet transport aircraft flying in airways and controlled air-space in Europe.

I came into hang gliding to experience silent flight and to be free from restrictions.

If elected to Council, I would be responsible to the BHGA for airspace usage. I would attempt to keep us free from restrictions that may be imposed on us by other organisations and help us to share airspace sensibly, fairly and freely with the other users. I am also interested in preserving the good name of the BHGA as a professional organisation.

I am prepared to spend as much time as is necessary to achieve the aims mentioned.

VOTE FOR ME AND I'LL SET YOU FREE.

Derek Evans – Treasurer and Council Member.



Barclays Bank Manager, married, two children.

Took up flying after seeing Mere 1975. Fancied the Treasurer's job in March 1976 and unfortunately, was accepted as there was no opposition.

I am responsible for seeing that we do not run out of money; I deal with the Sports Council Grants Unit and help with BHGA administrative planning. My wife, Audrey, did the Membership Secretary's job for almost 2 years prior to the Taunton Office being set up.

The Treasurer's lot is pretty onerous now with over £70,000 passing through our hands last year and I shall have to hand over soon to someone with more time at their disposal – any takers?

My other main interest in BHGA is in promoting competitions and in seeing British Hang Gliding is regarded as the tops.

I help organise the League meetings, was Team Manager for the American Cup Team last year and this year I shall be helping organise the World Championship Team in France and the American Cup Team again.

My own flying somehow suffers as a result of all this admin. work but I scraped in with my Pilots Wings last Autumn.

I do need a successor soon for the Treasurer's job and so I propose that the League Winner each year becomes Treasurer for the following year – that should produce a little more wind-up at each League Final!

Brian Pattenden – standing for Election.

I am a self-employed Designer/Silversmith married with 2 children. I first became interested in hang gliding 2½ years ago and have been flying for 18 months. I have always been interested in flight, especially birflight, manpower and kites where the design and technical aspects have been the main attraction. I have been building the MPA "Musfly" with David Cook and was a mainstay in his groundcrew, being involved in the epic channel flight as signwriter and assembly/launch/retrieve crew. I am currently working on tow systems for weightshift gliders, both winch and aerotow, and the design of a high performance flexwing/rigid hybrid encompassing new materials and technologies. I fly an Avon Swift at present. My profession of Design and Metals qualifies me to research materials, their applica-



tions, economy of use and manufacturing limitations. I can assimilate quantities of information, isolate relevant factors, and formulate cohesive hypotheses. I am skilled sufficiently to create working prototypes from these ideas. I have rebuilt a secondhand hang glider once used as a trainer, repaired and restored it to airworthiness, researching the materials and the stresses evident in the faulty components. Through this I am deeply concerned at the "state of airworthiness" of gliders used in training and sold by reputable dealers. I am concerned to see that gliders must be airworthy in design and production and that help and advice is available to

all undertaking repairs, home builders and those who modify standard production machines or construct design prototype powered gliders. Airworthiness must encompass all aspects of structural integrity and determined flight-handling characteristics. I am prepared to devote all the time and effort necessary to ensure matters related to airworthiness are attended to quickly and effectively. Where I have no knowledge of any technicalities I accept the responsibility to learn and understand them so I can speak with authority on behalf of everyone with a vested interest in the airworthiness of hang gliders.

Roy Hill, seeking election.

40, married, 2 sons, understanding wife. Former glider pilot talked into hang gliding by son. Built his first glider and taught him to fly. Involved in hang gliding since 1973. Taught number to fly in early



days. Holder of pilot's wings and observer badge. Notable flights 4 and 6 mile cross country. Currently flying Super Scorpion every flyable weekend. Founder of Thames Valley Hang Gliding Club. Chairman 2 years, currently President. Member of Competitions Committee. Chief Marshall National League. Chief of Delegation British Team to European Championships Austria. Attended civil meeting Kossen as observer, currently writing class specifications for FAI

world and international competitions. Co-opted to Council Dec. '78. Chairman Training Committee. Between hang gliding is Assistant Chief Trading Standards Officer for Oxfordshire.

Ambitions: 1. To fly XC from Marlborough to home (Oxford). 2. To see a training structure that will produce competent and safety-conscious pilots who can still beat the Yanks on their home ground. 3. To see tow-launching as a safe alternative means of getting airborne.

Come and use your vote

Did Icarus have a girlfriend?

by Gill Todd

"Did Icarus have a girlfriend?" I ask quite simply and plainly. If he did, was she aware that with a few well chosen words, she could have stopped all this business right from the start. I could have settled down to watching the 1939 film on Sunday afternoons, instead of trekking half way across the country (which means getting up at the crack of dawn, and I happen to be the type who values sleep), in all weathers and with an ever hoping heart, that the wind might change from N.W. to W (or vice-versa, I could never tell the difference).

When I first met my male Icarus many wind changes ago, he calmly told me about his hang gliding exploits. "Oh, how interesting", I exclaimed, "What a fascinating hobby", and continued to dream of beautiful days in summer, maybe a stroll by a river with all nature's flora blooming, whilst he jumped off a few little hills and soared like a seagull.

But!! my dreams were soon to be shattered. "Let's go out for the day, I'll go hang gliding", said he. "Oh, how nice", said I, glibly. After a two hour drive, we came to the spot. "Where's the take off place?" I asked quietly. "Oh only a short walk away", said he. (I have since learnt better - his short walks are twice the length of my long

ones). We set off, my enthusiasm waning with every footstep, up and up, up and up, and me only used to walking to the bus stop.

"This is fun", I said, gritting my teeth and trying to look like an experienced hill walker! We eventually came to the spot and I collapsed unceremoniously in a heap. After I had regained my breath I started to take notice of what was happening around me. All colours of the rainbow were being put together, people were getting into harnesses, etc., (what a pity, I thought, that men hadn't heard of colour co-ordination - still it's a hope for the future).

Everything looked great (so I thought) - unfortunately nobodd agreed with me. A huddle of Icaruses stood together, muttered, tuttered and nodded their heads. My goodness, what's happened? Eventually I was informed that there wasn't enough wind and it was in the wrong direction. Well! If they had only bothered to ask me!!! I could have told them, it was bloody windy! My hair had lost any style that it had once possessed, I was freezing cold and I defy anyone to contradict me!!

They and he eventually took off and, I must admit, after the initial shock of watching them jump what a glorious sight they

looked. All gigantic Jonathan Seagulls, soaring and not a flapped wing amongst them. A thought suddenly occurred to me, what do I do now? As I watched my now pin-sized Icarus about 1,000 ft below me, it dawned on me the reason why there were not many spectators on the top of the hill, and why the women folk were at the bottom keeping warm in their cars. I would have to of course wait for him to walk all the way back up. What fun!!

I am now older and wiser. I still go with him but I can't see the point of trailing up hills after him, just to sit there in case the wind picks up. I go for walks, pick fruit in the hedge-

rows, read the paper and wait for my hero to return. I then pat him on the back, tell him how good he looked flying and give him some sandwiches.

By now, no doubt, gentle (but courageous) reader, you'll probably be thinking why doesn't she find someone who does nothing more exciting than play scrabble or cheer the local football team? The answer is quite simple. I need him because my anxiety levels need a boost now and then, and he needs me to make his sandwiches. So you can see I'm stuck with it. As long as he doesn't fly too near the sun I'm really quite content.

Oh - if only Icarus had had a girlfriend!





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So you have seen the cover photo and you have an affection for hang gliders, then save this article until you have enough time to read it at your leisure. It will inform you of a dramatic breakthrough for British Hang Gliding.

The Southern Hang Gliding Club has always been a highly competitive club to fly in, with some of the world's best pilots snapping hungrily at the heels of two of Europe's biggest manufacturers. Design has never stood still. We all agree that design will continue to press on, although it is still very much a compromise. The choice is simple, we can design gliders with high sink rates and flat high speed glides which demand respect in handling, and we also have excellent low-sink-rate kites with sweet handling that become handicapped in windy conditions. The problem is the same the world over.



The new Vulturelite EMU by B. J. HARRISON

As well as the two main manufacturers operating on the Sussex downs, independent designers not in business within the sport have played a monumental part in design advances. Let us not forget that Miles Handley designed the Gryphon and THEN went to look for a manufacturer.

Ian Grayland, although closely connected by mutual interest to Hiway, has been designing his personal concepts for well over five years, incorporating ideas well ahead of their time. As far back as Nov. 1975 he was flying a glider with 22 foot leading edges and 11 foot keel; it had a sink rate respectable by today's standards with good glide at speed and the sort of handling that makes you think you could fly it through a wind tunnel and not touch the sides. He is a designer so hungry for improvement that he is rarely satisfied.

Last summer whilst working for Hiway he designed the Sigma, a high aspect ratio glider with impressive performance and sweet, carefree handling. It was crosstubeless, a principle he conquered to perfection with previous prototypes.

The Sigma aroused considerable interest: a 140 degree nose angle glider with a fully cambered sail, and with almost parallel chord. A prototype built

from Hiway materials to their high standard of finish it was as impressive visually as it was to fly. Ian's frustration with what was available to the glider-buying public was at bursting point. He knew he could design a kite with a slightly lower aspect ratio for practicability, sugar-sweet handling, low sink rate and flat glide at both high and low speeds. A glider built for soaring in the most marginal conditions and making penetrating a gale a flight enjoyed with confidence, inspired by its effortless handling.

The parameters of design were simple ... a glider to these high performance specifications, which is quick to rig and pack up, easy to transport, light in weight, which will not detune itself and is well statically balanced. All at a competitive price.

The sail was duly designed using airfoil principles proven on the Sigma. The Sigma's droop tips were discarded, roach tips were fitted and the directional stability was provided by a central fin. This was designed with the keel cranking down at the heart bolt to provide a fin. Crafty! The control frame was designed to slide forward along the keel for de-rigging ease and a natty, built-in steering system was designed which will surely be incorporated on every glider

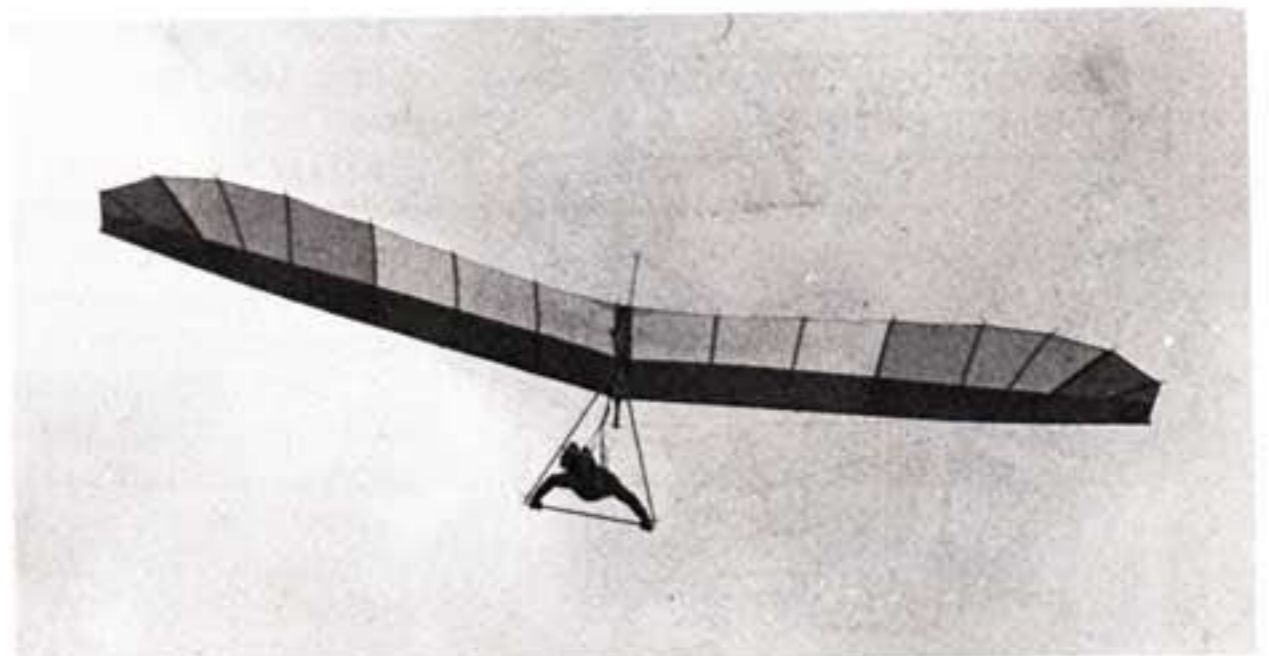
in the world within the next few years. Flexible battens and pre-stretched wires were used to eliminate a glider "running-in" and de-tuning itself.

The prototype EMU was built and flew first time, exceeding all expectations, and even brought a grin of satisfaction to Ian's perfectionistic ideals. The glider was then tested for structural strength in accordance with BHGA requirements. The results were as expected: it was indestructible. Ian teamed up with Roger King, himself keenly involved with hang gliders, and a business partnership was formed. With Hiway having set their heart on leaving the South downs, and a nucleus of their highly-skilled employees wishing to stay, the stage was set for Vulturelite to put their money where their mouth is.

Large premises were secured in Brighton and Roger and Ian went about setting up a factory geared not to produce one or two gliders, but the sort of quantity expected for a glider that will sell world-wide.

The factory was fitted out to exact requirements, no cost was spared, large lathes and milling machines were obtained, geared to producing quality components in quantity. Precision tube drilling rigs were made, and the latest sail making methods were incorporated, manned by highly-experienced hang glider sail makers.

The impact that the EMU will have world-wide will, it is felt by many people, make a British pilot flush with pride.



British League 1979

Improbable though it seems, spring is on the way. The days are steadily getting longer. As the planet swings on its way, this will eventually mean that warm air will be transferred to the northern hemisphere, relieving the British Isles from the frigid gloom which seems to have existed since about last November.

Soon, little lambs will be frisking in the fields, the playful vole will be meandering along the river banks, and, oh yes, the 1979 League will start going.

Just as the first swallow doesn't make a summer, the first League event doesn't make it spring. But the first League competition last year at Llandinam saw some surprisingly warm weather and some early thermals peeping out of their holes — perhaps this will happen again.

The wintering League pilots have been in a frenzy of designing and refining their gliders and their flying techniques ready for the 1979 season. As usual, some people take their pre-season preparations further than others **Bob Calvert**, for example, has been following a heavy training schedule including squash, swimming and running to improve his chances. His arch-rival, **Bob Bailey**, has been taking things a little easier and prefers to get his flying training in the air. Despite the snow and ice these hardy Northern pilots seem to have been out and about quite a lot.

Who's Flying What?

Since success in the league depends to a large extent on the right choice of aircraft it's not surprising that the winter has seen quite a bit of chopping and changing. The top pilots — the ones who are likely to bring home the trophies — tend to find things a bit easier since they can usually make some kind of a deal with a manufacturer. Lower down the League staying on a competitive glider

can involve a considerable financial hardship. Last years winner, **Keith Reynolds**, together with his flying buddies, **Mick Evans** and **Mick Maher** are sticking with the all-conquering **WASP** team for 1979. American cup winner **Graham Slater** started off by saying he'd stick with **HIWAY** on the Super Scorpion, but he's been showing a lot of form on the new **CHARGUS** Cyclone and I wouldn't be surprised if he reached the starting-line on a new mount . . .

Bob Calvert's with **HIWAY** still, for the time being, but admits that his competitive ambition might drive him to other makes if he shows signs of being outclassed on the Super Scorp. **Bob Bailey's** been "playing the field" over the winter but will probably start the season on his tried and trusted **WILLS WING XC**. **Mick Atkinson**, **Trevor Birkbeck** and **Jan Ketelaar** are definites for **BIRDMAN** with the dreaded **Lester Cruse** still trying to make up his mind . . . **Lester's** been trying to get the **MANTA** agency together for some time and might turn to the **Fledge II** later on. **Johnny Carr** seems to have spent the winter buying kites like golf clubs — as well as a **Gryphon** and a **MOYES Maxi** he's been showing a lot of interest in the new **CHARGUS**, as has **Brian Wood**.

Pilots And Their Problems.

Simply getting to all the 1979 competitions is going to place a major strain on all League pilots. For those at the top the pressure of flying commitments is even worse. With at least four major international events scheduled anyone who is good enough to represent Britain is going to need an understanding employer, or a considerable private income, or sponsorship. **BHGA**, and **Flight Promotions**, have spent the winter looking for sponsorship but the prospects look fairly bleak at the moment. The last few weeks of the transport strike have caused **ATLAS EXPRESS** to reconsider all their sponsorship arrangements for 1979, and it looks at the moment as if the League is going to have to remain self-financing for the first few competitions.

Several individual pilots have negotiated sponsorship deals with outside companies. Probably the most successful of these is **Chris Johnson**, who has had a continuing relationship with **WINDMASTER SAILCLOTH** for the last two seasons. Naturally, being **HIWAY'S** sailmaker helps, but **Chris** has put a lot of effort into keeping his sponsor happy with the sport, and it's paying off once again.

The top pilots can usually expect to get something from the manufacturer of their glider. The most generous company at the moment seems to be **WASPAIR** who are sponsoring three pilots **Reynolds**, **Evans** and **Maher**). These lucky lads will be getting travelling expenses and subsistence at all the

League competitions, as well as being taken to some of the major European events in the giant **WASPAIR** truck. Naturally, the gliders are looked after by the factory. Explains **Barry Bourne**, "we really want to be successful in 1979, and to do that we feel we've got to get behind our pilots. The money we're putting into the sport will help them to produce better flying and that's obviously good for us." This philosophy is obviously paying off — several major US fliers have expressed interest in the **Gryphon**. Look for some interesting developments in the US competition scene.

BIRDMAN is another company that believes in supporting its people. **Ken Messenger** says of the League, "It regularly gives us a chance to fly against our manufacturing competitors in a wide variety of conditions. We all learn from this experience and it accelerates developments in general . . . I will be offering bonus payments for any (**BIRDMAN**) pilots who finish in the top three of any League."

HIWAY take a more laid-back view, possibly reflecting their management style. Both **Steve Hunt** and **John Ievers** have strong views about taking part in competitions and, while supporting a loosely-knit factory team spearheaded by **Bob Calvert**, they have tended to provide gliders for their employees who are then left to decide on their own account whether to fly them competitively or not. The move from Brighton to Wales in late January can't have helped either, and several of last year's **HIWAY** League fliers are now ex-employees without a works kite. **Steve Hunt** is reported to have something new on the stocks for early '79 and **John's** view is that, while the League is a useful opportunity to review developments and a big impetus for the sport as a whole, gliders don't sell primarily on competition results — although he admits that **Graham Slater's** success in America has been helpful in their exporting drive.

The Events Themselves

There will be six League events in all starting with one based on Abergavenny on February 24-26, and organised by the peripatetic **Roy Hill**. The League Entry for the 1980 League will be held on October 27-29 and prospective participants will need to provide (documentary) proof of three separate 10km flights out of ridge lift before October 1st — so get up there! All the top pilots reckon that 1979 is going to be the big make-or-break year for the League. Most of them said that they expected to win (they're a pack of jokers!) — **Bob Bailey** went one better, "Not only am I going to win the League this year," said he, "I'm going to fly 50 miles as well."

Think **BIG** if you're going to be successful.



1st League Winners

1. Graham Slater, Superscorpion
2. Keith Reynolds, Gryphon
3. Mick Maher, Gryphon
4. Dale Clothier, Superscorpion
5. Bob England, Gannet
6. Lester Cruse, Cherokee
7. Bob Calvert, Superscorpion
8. Mick Evans, Gryphon
9. Bob Bailey, Cyclone
10. Jeremy Fack, Superscorpion.



Graham Slater.

EVENTS 1979 — PROVISIONAL PROGRAMME

March	16-17	IHGA Dublin Fly-In.
	24-26	2nd League.
April	13-16	Britain v Sweden & Norway — UK Round
	13-16	IHGA Cork Fly-In.
	17-22	Bleriot Cup.
May	5-7	3rd League.
	9-11	Ladbroke's Perranporth Event
	21-22	Britain v Sweden & Norway — Norwegian Round
	24-28	" " " — Swedish Round
June	2-3	Tow Meet
	2-3	IHGA Sligo Fly-In
	9-11	4th League
	14-15	Scottish Open
	14-17	IHGA Slieve Donard Fly-In
	16-24	UK International XC Meet
	23-30	Midnight Sun Cup '79, Norway
July	9-15	USA XC (Bishop)
August	18-20	5th League
	31	10th World Open (Grenoble)
September	1-2	"Mere '79" — UK Open
	15-17	6th League (Atlas)
	27-30	US Masters
October	1-5	US Moab
	13-21	American Cup
	27-29	League Entry

Would event organisers (club, area, national or international) please let WINGS! know the dates of other events planned for 1979 or 1980.

Sky a Safari

Fly next year's machine this year

Safari Winner of the 5th league, Graham Hobson — 17 miles. Over 18 months of intensive flying of the prototype "Safari" proved to us that we had a winner to follow "Sunspot" and it is now in production. For light winds the medium "Safari" has the min. sink performance to equal the large "Sunspot" and that is saying something. It also has the penetration for strong winds and positive, predictable handling

with immediate response which is so necessary for all kinds of flying.

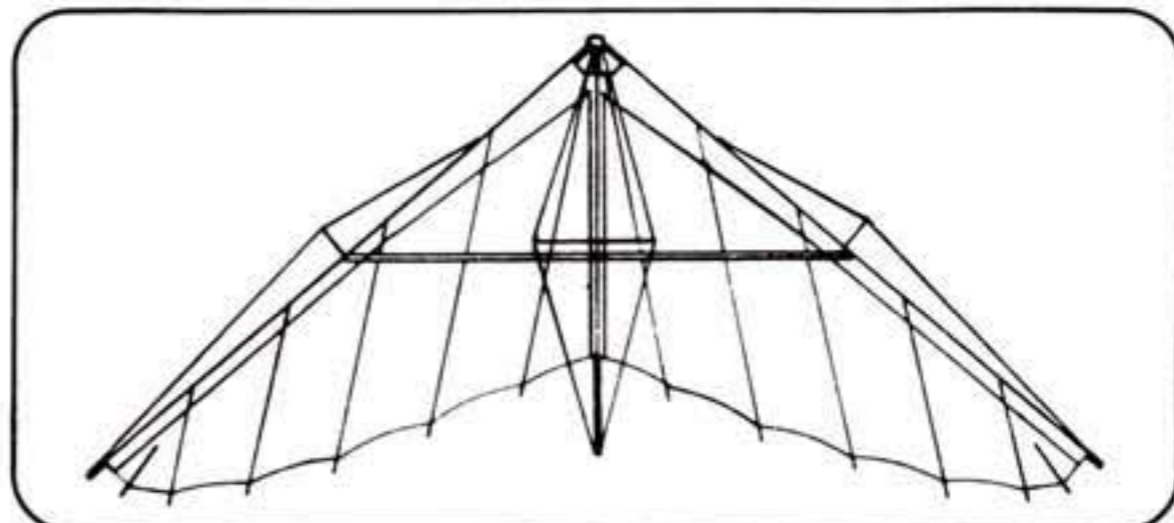
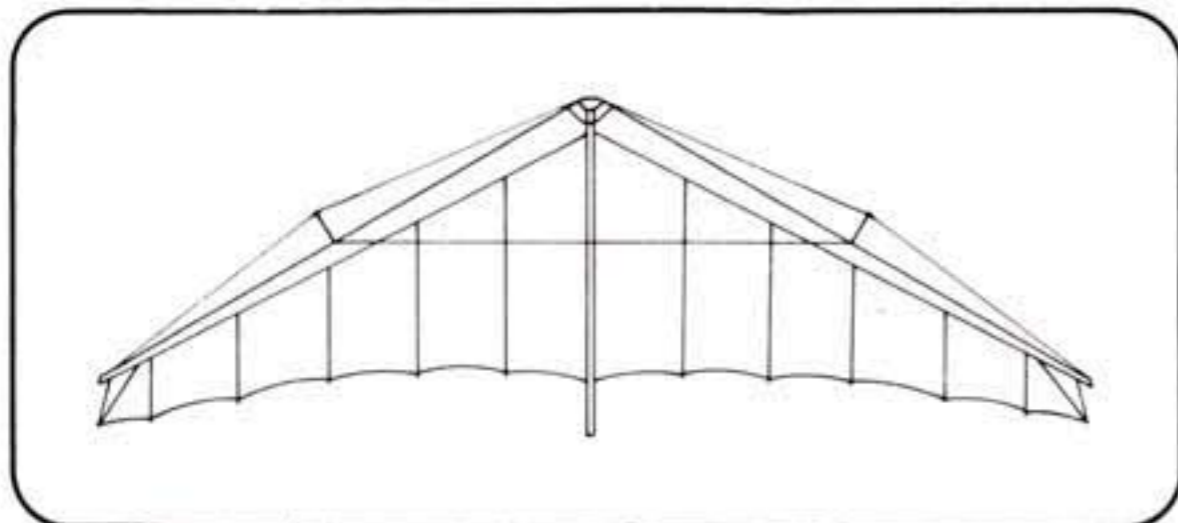
Glide angle at speed is good. The reflexed preformed battens in every seam make the whole wing pitch positive without the need for locked up tips etc. Vertical dive recovery is positive.

Safari is a real cross-country machine which easily makes use of thermals and handles the strong turbulence which often goes with them.

For the experienced pilot who demands the best performance but still wants outstandingly good handling.

Sunspot. Still one of the best all rounders next to "Safari" for fliers of E.P.C. standard.

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Airmail

'KILI' CONFLICT

Dear Garth,

As members of the Kilimanjaro Expedition we are sad that Ashley Doubtfire's natural desire for self-promotion should have resulted in so many incorrect statements in the press, radio & TV. When even WINGS! is misled it's time to set the record straight. David Kirke & John Fack will send detailed reports in the next issue, but until then:

(1) Kilimanjaro has been flown before, notably by Rudi Kischazi in a Phoenix 6b. However, the last man to try was found some months later dangling from a tree in the jungle.

(2) The trip was organised by the Dangerous Sports Club as a winter holiday after David Kirke & Alan Weston flew Mt. Olympus last summer. They discussed it then with Bill & Steve Moyes who were thinking of flying "Kili" in February as part of a documentary for ABC.

(3) Ashley, a last-minute guest of the club, only had one responsibility, the oxygen, which he declined to instruct others in the use of. At the summit he ignored the repeated requests of David Kirke, an experienced mountaineer, to wait for and, with Alan Weston, assist the inexperienced fliers with their take-off, overflying them for observation in case of a jungle landing. He flew at the first opportunity, before the cloud built up, leaving all the oxygen equipment at the top with no operating instructions. At the summit all movement was difficult; shortly afterwards Jonathan Hardy collapsed and had to be carried down. It was left to David Kirke, with 12 flights experience, to tackle the cloud followed by Simon Keeling who nearly crashed on take-off. Alan Weston, exhausted after helping everybody else, stalled after take-off. Had standard mountain discipline been observed it is likely he and Jonathan would have got the flight they came for.

Mountain flying has a great future but the disciplines of mountaineering (teamwork, respect for the mountain and the claims one makes of it)

are essential. The "Everest Expedition" has been on the books of the Dangerous Sports Club for some time: without Himalayan experience, several seasons climbing in the Alps are essential.

This letter is written with reluctance, but as a matter of integrity and in the hope that others will learn from our mistakes.

David Kirke, John Fack,
Simon Keeling, Alan Weston,
Chris Baker, Jonathan Hardy

UNSAFE

Dear Garth,

I do not wish to be accused of nit-picking but I am finally prompted to write to you on a subject dear to all our hearts.

The straw that broke my 'camel's back' was the seemingly innocuous cover photo in December WINGS! showing Keith Reynolds modelling a nice design in old-fashioned clip Krab, and we all know what they are: D.A.N.G.E.R.O.U.S.

Keith is not alone in this laxity — numerous flying friends of mine use these clips, usually accompanied by comments like, "Oh, I'll change it when I get around to it." And all this in spite of Tony Fuell's and John Hudson's frequent warnings. All I can say is "Consider Paul Renouf's subtle hint to us all."

However, this just seems to be symptomatic of present attitudes, i.e. it will happen to someone else. I myself am an offender, I fly a Scorpion which has a strap hang point and when this became worn I decided to replace it, but even I put it off, "Oh, I'll do it in a day or two." However, one day I flew in severe turbulence and promptly changed the hang point.

I could imagine the accident report in WINGS!

"At 300 feet the pilot was seen to become detached from his glider and fell to his death. On inspection it was shown that his hang strap was worn and had given way. A spare strap was discovered in his car".

Mark Asquith,
Pro. UCSHGC

Dear Garth,

I hope the photo of Keith Reynolds on the cover of the December '78 issue was an old one as Keith is attached to his Gryphon by a *dangerous* parachute clip.

While old photos should not be excluded from use in WINGS! I do think that in cases like this an advisory note should accompany the caption so as to discourage dangerous practices.

Robin Billington, Secretary,
Midlands Federation.

The photo is recent, taken at the Welsh Distance K.O. in December '78. I gather Keith has been told about this clip many, many times, but . . .

ED.

SUN-POWER

Dear Garth,

I was interested to read in December WINGS! that NASA are intending to cover the wings of a hang glider with solar cells so as to make a sun-powered aeroplane. I did a quick calculation to check out the feasibility and you may be interested in the results:

Assumed wing area . . . 15m²
(about 160 sq.ft.)

Energy falling on a horizontal surface . . . 900 watts/m²

approx. (clear skies).

Total energy falling on wing . . . 13,500 watts.

Recently reported solar cell efficiency ("New Scientist", 30.11.78) of 5.5% (= say 5.0% after losses) gives useful power . . . 675 watts.

Man-powered flight of "Gossamer" aircraft designed on 1/3 HP or . . . 250 watts.

So it seems as if the solar powered hang glider is thoroughly feasible. It's also interesting that quite high levels of radiation can be received from overcast skies so that the plane would not necessarily have to come down just because the sun went in.

Peter Hanson, Doncaster

TOW PLANE

Dear Garth,

I read with interest the comments in George Worthington's letter in December WINGS! regarding the development of a tow plane. Similar comments were voiced in Mike Adams' letter, "Motorised Monsters", in May '78 issue. George says that the British have been in the forefront of several aeronautical advances. True . . . but I doubt that this applies to powered ultralight aircraft now. I say this after reading an article ("Flight International, December '78, page 2305) on John Chotia's "Weedhopper". This machine is now a hang glider but uses many hang glider constructional

features, e.g. a single surface wing that derigs and rolls up for portage. Stall speed is 20 mph, cruise 30 mph, 200ft take-off run, with a 292cc engine.

A second machine mentioned in the article is the "Hill Hummer". This has a double surface wing with butterfly tail. Again much h.g. construction is evident. A 250 cc engine provides the power.

The fact that neither of these machines uses weight shift is significant. It would appear that weight shift control of any hang glider designed specifically for soaring is not sufficient to maintain adequate control of the same machine when fitted with a power unit, especially in gusty conditions (Brian Milton proved this). The gyroscopic forces generated by the rotating engine masses also require that rate of change in direction or attitude be kept relatively low.

George Worthington suggests that only one in a hundred pilots is interested in a power attachment, and he's probably not far out. I wonder how many of the remaining 99 are interested in an aero-tow or winch launch. If this is only seventy-five it would seem that the development of either or both of these launch methods is inevitable. May I suggest that the BPHGC undertake the design and development of suitable powered ultralight aero-tow plane(s) and BHGA take on the portable powered winch development. Either of these alternative launch methods, if successful, will result in a further development and growth in hang gliding.

Arthur Trapp, Kidderminster

CRASH

Dear Sir,

I should like to put the record straight by correcting a statement which appeared in the December edition of WINGS! under the heading "Power Incident and Accident Reports". I refer to the account of the fatal accident in May 1978. The report states that the accident is the subject of an AIB investigation, which is true. But it then goes on to say that "It appears that the kite had been home modified to accommodate the power unit." This could be construed by the reader that the accident was the result of a home modification. Whereas, of course, the results of the investigation have yet to be published.

The pilot was a highly respected, and many would say, brilliant flier. His approach to power hang gliding was made with meticulous care and attention for detail. This report, to my mind, gives the opposite impression.

Mike Hibbit,
Reading, Berks.

INDIA

Dear Editor,

Hang gliding has not yet become popular in India. There is a fantastic potential for it here. I bet a lot of people say that about their own areas. But after a look at the Himalayan Ranges they will agree, as mountaineers agree, where the ultimate challenge lies. Perhaps hang gliding is not yet ready for flights in those awesome mountains.

Last year Mt. Everest was climbed without the use of oxygen packs. One member of the expedition had a hang glider that he wanted to fly from the world's highest mountain. Nobody could carry it that high.



Much lower down, at Poona, we have formed a club in total isolation. It must be the only one in Asia, excluding Japan. Starting with a Rogallo built from plans in '76, I have gathered a few enthusiasts. We are learning as you must have done in the very early days. We think it will be wiser to import some know-how and equipment instead of struggling alone. I plan to make a trip to Britain this summer for the purpose.

Please inform your readers that we would be glad to be of help to anyone who plans to fly in India. In April '78 I heard only too late, that British fliers had come for some film work

nearby. We could have learnt a lot just by watching them.

There are over a hundred mountaineering clubs and several Government-run schools here. No reason why that should not happen to hang gliding too.

Fly high.

Sincerely,
Vivek Mundkur
College of Military Engineering,
India.

NOTAMS

Dear Garth,

Probably all club secretaries now receive each month ever increasing issues of NOTAMs. Sifted through before the "meat" is presented at the club level they serve a useful purpose — or do they? As a means of informing *us* of other flying hazards they do indeed have some worth. However, I am not at all convinced that when it comes to informing *others* of our intended flying activity, they serve any purpose at all.

To meet the requirement of a NOTAM the club must advise the latitude and longitude coordinates, radius of action, height above sea level and the date and time, a MONTH before the event. To assume that any club knows it will be flying a particular site on a previously specified day some 5 weeks into the future induces severe brain fade. Clearly intended for the use of powered machines that can take off regardless of wind speed and direction this procedure will, I am sure, be rarely used for hang gliders. But what about CANP you may well ask. Just Freephone 2230 is the magic message. Not anymore! (see elsewhere in this issue. ED.) For the second and presumably last time this system of warning other low flying aircraft of our activities is cancelled. The mid-week flyer now "Flies at his own risk". What we now need is a tailor-made system of notification that takes into account the fundamental factor that governs our capability to fly, namely wind speed and direction. We need urgent steps taken before some midweek flier becomes our first air strike fatality.

Brian Smith,
Devon & Somerset

If you feel that BHGA should set up and finance such a system which will benefit all hang glider fliers why not propose this at the forthcoming AGM. ED.

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ARE WE THE CHAMPIONS

Dear Sir,

Following the euphoria of our Americas Cup trouncing, it occurs to me that the 'real enemy' have escaped with their reputation completely intact — that lot down under.

Ever since we discovered that they actually flew hang gliders in Aussie-land they have led us in every field. I remember the sniggers when the first Australian glider appeared on the South Downs. It was full of battens and still hadn't got wing wires and it also had a weird looking fin with a deep keel pocket. Had they *no* idea? As for the flying, I wince at the thought of our Mere thrashings and note, with interest, how the likes of Stevie Moyes, John Ogden and Phil Mathewson seem to wander the world, winning competitions willy nilly.

I certainly won't think we are the champions until we have an 'Australias' cup and give them the hiding we gave the Americans. There must be an Aussie Tracy Knauss/Brian Milton somewhere under there.

David Worth, Penge

When we received a letter on notepaper headed, ADVANCED CEILING SPECIALISTS, one expects, at the very least, a report on skying-out, but . . .

Dear Sir,

I would like to know if any other group of intermediate pilots are more enthusiastic than ourselves. On the 17th December we had our first soaring flight at Devils Dyke. Since then we have had ten days Christmas holidays and four weekends, in which time wind conditions have not permitted us to fly. We have driven more than a thousand miles and visited all of the Southern hang gliding sites. On our one and only perfect day we visited Firlie and after rigging our gliders in anticipation of a flight at last, discovered that as we could not guarantee a top landing we would not be able to fly. Perhaps winds and all else permitting the pleasures of flying will again be ours. Three frustrated pilots.

Jose Hayler
Chris Teece
Ralph Neale
Tonbridge, Kent

General Principles

Recent accidents have once again reopened discussion about stability in hang gliders. More often than not the discussions concern pitch stability. One hears pilots comparing the differences between 'tucks', 'tumbles' and 'divergence' as if these things are some sort of necessary evil that the competitive pilot has to contend with.

By the grace of God not all the pilots that have had in-flight catastrophies have died, but it should be made perfectly clear that if you tuck or tumble a hang glider you have a very good chance of killing yourself, unless you are high enough to pull a chute.

I have made very accurate Rogallo models of many configurations for the last five years or so. Whilst the models do not give a total picture of full size glider performance, they do seem to predict the stability of the wing and the centre of gravity position fairly consistently. Many of these models have been divergent, some accidentally and some on purpose. To an extent I have been able to come to an understanding of pitch stability in flex wings by practical application and experimentation.

Aerodynamic pitch stability

The higher the angle of attack of an aerofoil the slower it will fly and the more lift it will produce until the stall angle is reached. If the angle of attack is lowered, the aerofoil speeds up and the lift diminishes. When there is no angle of attack at all, the aerofoil is streamlining. It is at maximum speed and is generating no lift, this is the aerofoil in ballistic trajectory.

Now, there is a theoretical point on any wing that is called the aerodynamic centre. *Fig. 1*. This is on the point around which these lifting forces could be said to work. All aerofoils have a pitching moment. That is to say they have a tendency to rotate one way or the other around the aerodynamic centre. See *Fig. 2*.

The only problem is that they have different pitching moments at different angles of attack. It's a gross over simplification, but an aerofoil pitches weakly negative at high angles of attack, and strongly negative at low angles of attack.

This basic instability has to be controlled if the wing is going to be of any use. This is always done by the addition of a stabilising surface. To make a glider go forward the centre of gravity always has to be slightly in front of the aerodynamic centre. If it wasn't the aeroplane would stop and stall.

In *Fig. 3* the centre of gravity forward of the aerodynamic centre pitches the aerofoil down and accelerates it forward. Unless this rotation can be stopped the aerofoil will continue to dive until it reaches the ground. This is divergent flight.

Fig. 4 shows how the addition of a conventional stabiliser overrides the negative pitching moment. Note that the stabiliser always has an angle of attack which is lower

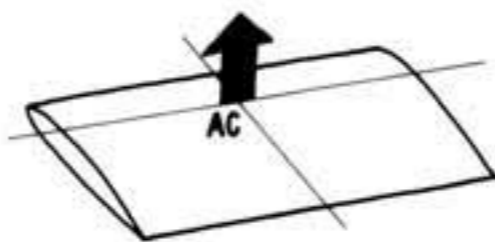


FIG 1



FIG 2

α = ANGLE OF ATTACK

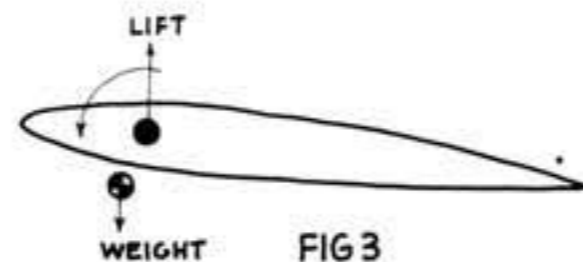


FIG 3

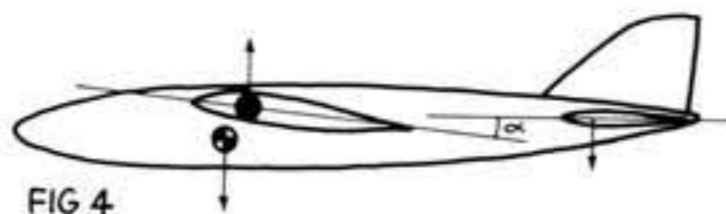


FIG 4

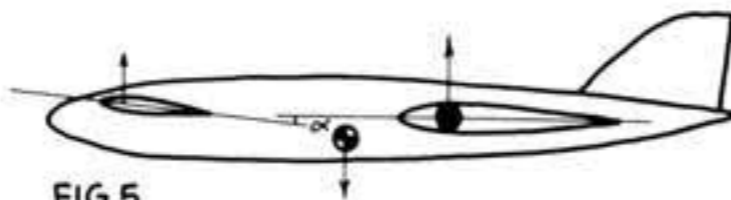


FIG 5

than the main wing. The faster the aeroplane goes the greater the downward force on the stabiliser, which necessarily returns the craft to straight and level flight. This is convergent flight.

Fig. 5 shows a canard configuration where the stabiliser is in front of the main wing. Exactly the same forces are at work. The only difference is that the stabiliser here has to have a higher angle of attack than the main wing. Since both wing and stabiliser are lifting, the canard configuration is theoretically more efficient than the conventional layout.

Sometimes the additional stabilising surface is not quite so easy to see. *Fig. 6* shows a reflex wing of the 'flying plank' type. In



FIG 6

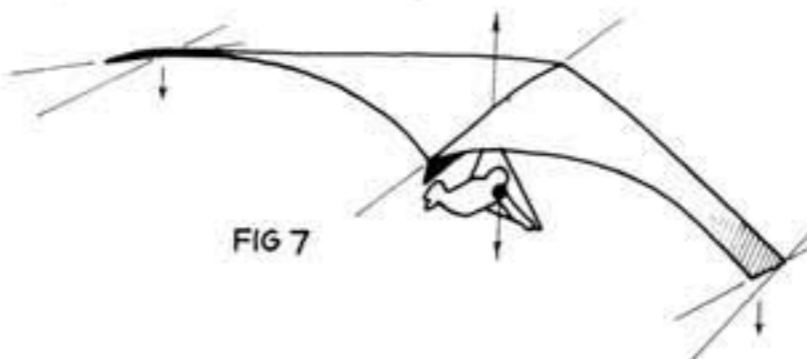


FIG 7

this case it is the kicked up rear section of the aerofoil that damps out any negative pitching. Keel reflex on a standard Rogallo is there for precisely this reason. The kicked up rear section of the keel stops any tendency to automatic diving.

Fig. 7 shows how the twisted up wing tips of a typical second generation hang glider act as the stabilising surfaces. Because of the twist in the wing, they are always at lower angles of attack than the inboard sections of the glider. The tips are also well behind the centre of gravity, thus they impart a positive pitching moment around the aerodynamic centre of the glider.

It is the hang glider designer's job to balance the stabilising force against the various pitching moments of the lifting aerofoil. Too much stabiliser and the glider will only want to fly at one speed. Too little and the glider may speed up uncontrollably at low angles of attack.

The potential for disaster is great because it is possible to design a glider that at all normal angles of attack behaves in a pitch positive fashion, but can stray into the area of pitch instability if the nose should accidentally get too low. It is also possible for pendulum stability to mask the aerodynamic instability of a wing. The defect in the wing will only become apparent when the pilot becomes weightless - and believe me that's an unfortunate time to discover a defect.

Pendular stability

Up to now we have been considering pitch stability of gliders without paying too much attention to the exact position of the centre of gravity. Hang gliders are very peculiar aeroplanes in that the pilot is by far the heaviest bit of the apparatus. This puts the centre of gravity very much lower than on a conventional aeroplane. See *Fig. 8*.

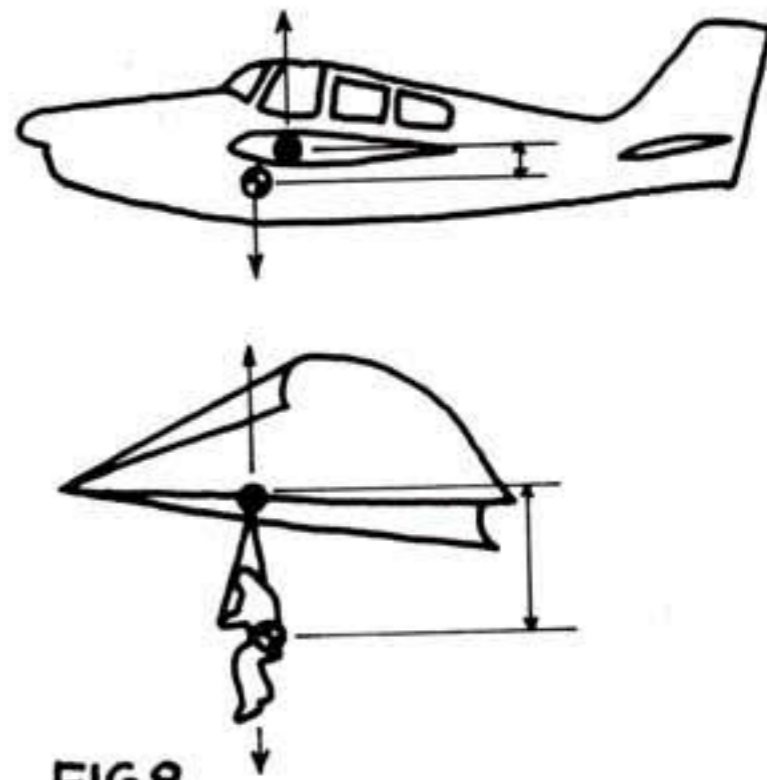


FIG 8

As long as the pilot is somewhere underneath the glider and holding on to the triangle this position will tend to be maintained due to the simple force of gravity. Indeed the whole control principle of a hang glider

of Pitch Stability

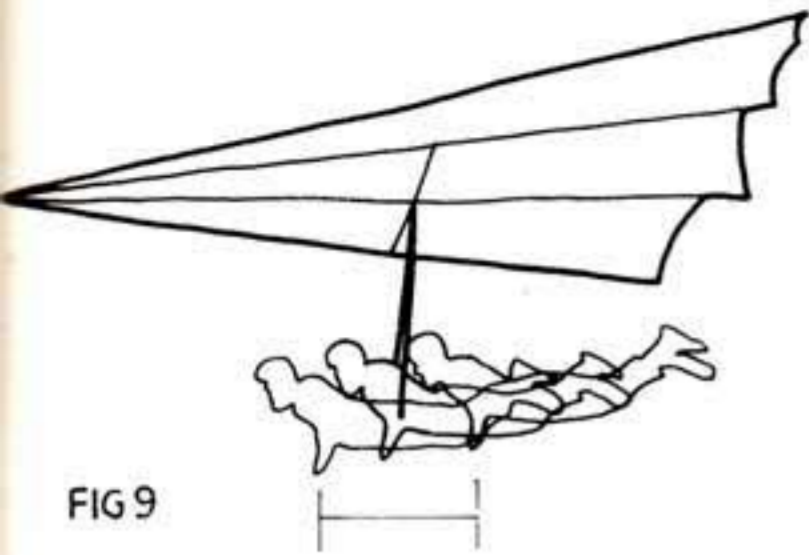


FIG 9

stems from moving this very low centre of gravity around relative to the wing manually. As a means of control this is highly efficient, but it does have one or two drawbacks.

The first drawback is that it only operates when your weight can do work against the control bar. In a weightless situation there is very little you can do to influence your glider's flight.

The second drawback is that a hang glider's harness is soft, that is to say it will only provide stability below the horizon. For instance, unless your mass is experiencing a rotational or centrifugal force in say a past vertical wingover, your body will fall down onto an inverted glider, and that could spoil a good day's flying.

Figs. 9, 10 & 11 show that the closer you get to a vertical dive the less effect moving your weight will have. So if you are in a dive-prone glider, when you get to vertical you won't be able to fly it out. The position is somewhat aggravated by the fact that the faster the glider accelerates the lighter you become relative to it, until at free-fall you are relatively weightless.

What all this must mean is that any glider that relies on pendular stability alone to get it out of radical attitudes is dangerous. It therefore follows that all hang gliders should be equipped with effective stabilising devices that will return them, loaded or unloaded, back to level flight the right way up from unusual attitudes.

This would seem to be a statement of the obvious. Nowadays nobody would dream of flying a standard without a king post and guaranteed locked in reflex – or would they? Remember when you put deflexors on your standard to make it go faster? Remember the Chandelle Comp? And what about the European glider that's just been withdrawn because of tucking problems? A riffle through the pages of recent Glider Riders would seem to suggest that several American models are a little prone to extended dives. Yes, people are still flying divergent gliders.

High thrust line in powered gliders

The advent of power has brought a few surprises with it in terms of pitch stability. Let's examine what happens to a powered hang glider in a power-on stall.

Fig. 12 shows a mythical second generation hang glider with Soarmaster clip on power unit. The glider has fixed truncations and pre-formed battens. The pilot is trying to make way in a headwind and the throttle is locked wide open. His airspeed is considerable. Notice that the centre of gravity is far below the thrust line of the power unit.

Fig. 13. Bang – he runs through the vertical shear surrounding a small but strong thermal. The nose is pitched up violently and the wing stalls.

Fig. 14. The pilot can't get to the hand operated throttle which is still at full bore, because his hands are busy coping with the turbulence. The nose of the wing above him now begins to drop following the stall rotating around the centre of gravity, and as it drops so it is pushed from behind . . .

Fig. 15. The wing is powered right round the centre of gravity into a dangerously low angle of attack. The reflex of the pre-formed battens and the fixed truncations simply aren't powerful enough to damp out the negative pitching caused by the high thrust line. At this stage enormous speed is built up and the hang glider power dives over and in front of the hapless pilot.

Fig. 16. The negative angle of attack is now so great that the wing stalls and flares inverted, but at very high speed. The glider rapidly decelerates and the spars start to sag. A split second after this the pilot's body still travelling at high speed slams into the structure, and the wing collapses. If the pilot is very, very lucky he rides the stricken machine down to the ground and holds an impromptu press conference. This doesn't normally happen!

From things I have read and heard about it seems that it is also possible to get some unpowered hang gliders to behave like this

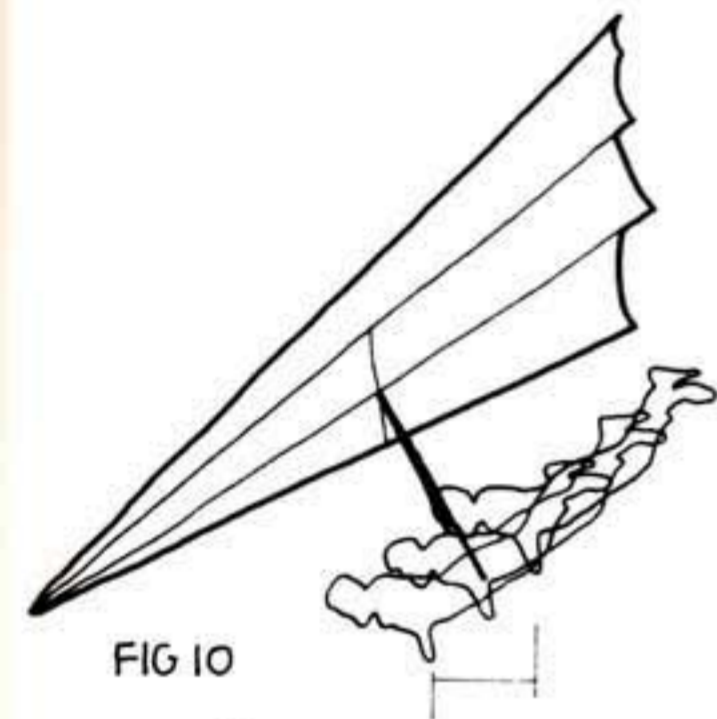


FIG 10

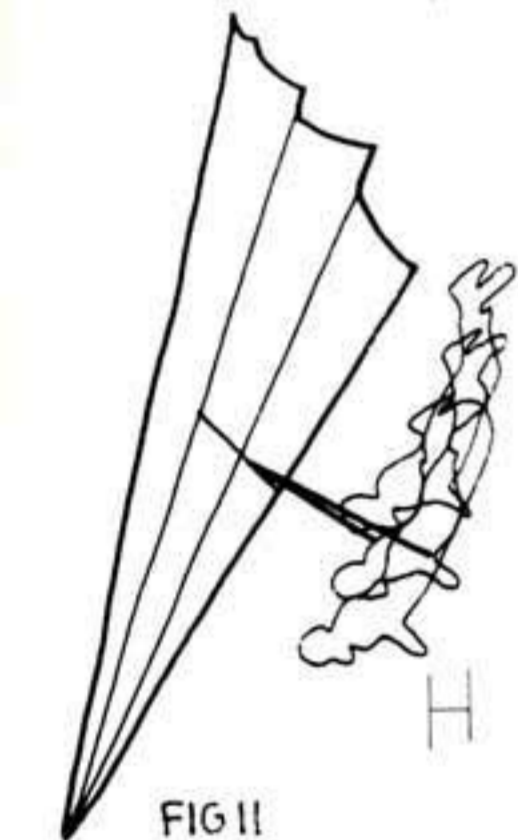


FIG 11

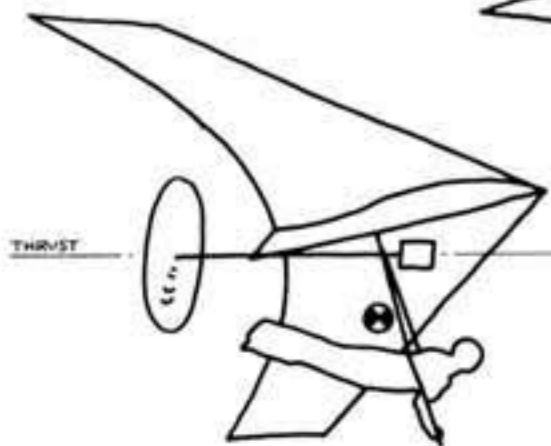


FIG 12

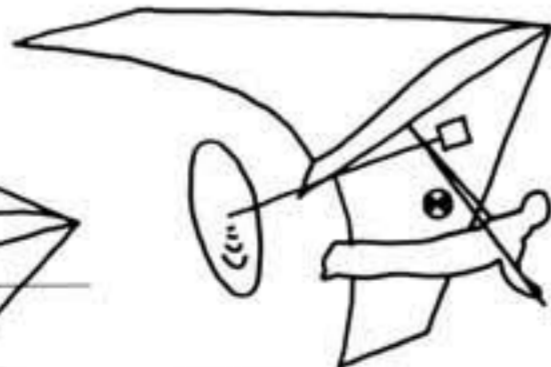


FIG 13

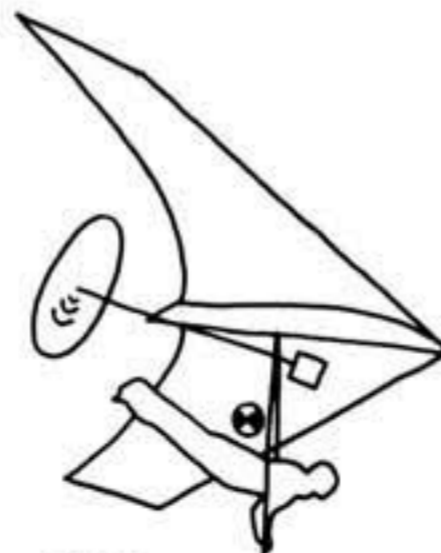


FIG 14



FIG 15

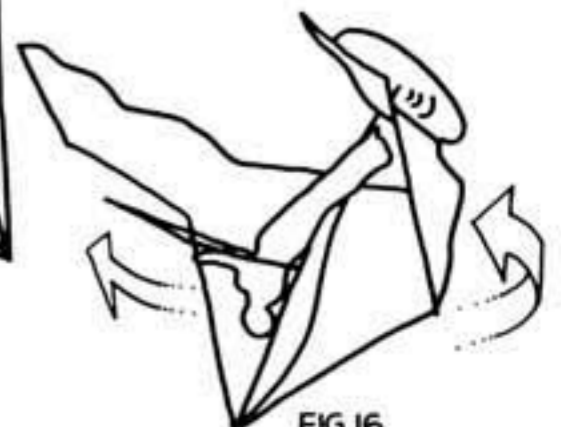


FIG 16

from doing repeated radical whip-stalls.

Anyway the whole point is that the addition of power to a hang glider that has been designed for soaring does alter its pitch characteristics if the thrust line is above its centre of gravity. Extreme caution is obviously called for.

There is as yet no formal bank of aerodynamic knowledge about the exact per-

formance of flex wings. Hang glider design is still very much at the 'suck it and see' stage. All fledgling technologies to through this period. It's normally where the great intuitive advances are made, where the major innovations are conceived. However we do know from the unfortunate experience of others, that flying a flex wing upside down is very dangerous; we also know that it is

very safe when it is flown the right way up.

Any behaviour which deliberately takes a glider into a situation where it might go upside down must, I believe, be considered foolhardy.

MARK WOODHAMS

The George Worthington Column

THE REAL WORLD



In America, during the past few months, we've experienced a rash of unjustified and false World Record claims for hang gliding. These have appeared in our two main, nationally published, periodicals (*Hang Gliding and Glider Rider*).

Many of these American publications are sent to Great Britain. It is easy to imagine that some of the British pilots and manufacturers might decide to copy the deceptive practices that they read about and get *their* records published in one or more of the British periodicals. If this is done, it will cause embarrassment to the "instigator" and to the periodical at some later period, when it is "exposed". Perhaps by explaining here what has been happening in America, we can prevent the embarrassment from occurring in Great Britain.

Three really super flights have been flown in America recently. They are (1) a 22 mile out and return tandem flight (2) a tandem flight to 13,800 feet and (3) a hang glider which was dropped from a balloon at 32,700 feet. I enjoyed the detailed articles written about 2 of these flights, and also the notice in an advertisement regarding the third flight. Unfortunately the author in each case wasn't content to just describe the notable accomplishment of each flight. Instead, each flight was called a World Record, which was false and misleading, and designed to make the reader assume that each flight achieved a special honor (World Record) which it did not.

Some people might feel that it's just a question of semantics, because it *is possible* that one or even all three were the best that has ever been done, and therefore are World Records but alas which are unprovable and unofficial.

But it's not, I believe, a question of semantics but one of integrity, honesty, and professionalism.

The term World Record has a very definite and positive meaning. It means that a system has been set up thru-out the world, to collect, study, verify, and publish those records which are submitted as being World Records. In all cases, a certificate (proving the record) is issued to the pilot. By doing it that way, every person in the world can determine what the present record is, and by what margin a new record must exceed

the old. Also everyone in the world, with sufficient interest, can obtain factual information on any particular World Record. It further allows the term World Record to have a positive legitimacy and a special distinction. The alternative to the above method is anarchy whereby every person, or every nation, claims a particular accomplishment to be a world record, without consultation with the other persons or nations. It becomes claims and counter-claims, and no one knows what or who to believe.

How do we know that Russia or some other country hasn't had a higher hang glider drop from a balloon? We don't. How do we know that longer and higher tandem flights haven't been flown elsewhere in the world? We don't! the reason we don't is because the representatives of the hang glider pilots of the world, decided *purposefully*, not to include tandem flights nor balloon drops as part of the FAI code. They were intentionally omitted after careful study and debate. Other categories were similarly left "out", including duration, and speed records.

I am not willing to pass judgment, at this point, as to whether these aspects of hang gliding flight deserved to be omitted. Maybe they did and maybe not, I don't know. However, if some individuals or groups believe that one or more of the omitted categories should now be included, this can be done. The by-laws of the FAI provide for definite procedures which can be followed to make

changes in the Code. *Anyone* can begin the process of initiating these changes.

The embarrassment was, I think, most acute in the balloon drop article. (America's *Hang Gliding Magazine*, December 1978). The sizeable group of people involved with that article seemed to go out of their way to falsely give the impression that the flight was an official hang gliding world record. They not only called it *that* in the title, they also used the term "Mr. (so and so), Soaring Society of America representative" to infer that the prestigious organization had sent an official to verify the proof of record. The facts were quite different. The gentleman in question was not an official or a representative of the Society. He was instead merely one of 15000 members of the society. When I phoned to ask the Society some questions, I was informed by the official of the Society, having to do with world records, that the Society had no knowledge of the case. Similarly, other portions of the article were obviously carefully phrased and worded to give the presumption of "official" sanction.

Naturally, this attempt to mislead was spotted, and a letter to the editor (I am told) will appear in a forthcoming issue exposing the parts of the claim which are unwarranted and deceptive. This will cause some anger and embarrassment, I would imagine. And that's the pity, because the flight was impressive, noteworthy, and courageous. It didn't need the deception which was used.

Information

THE DANGER OF COLLISION AND NEAR MISSES WITH LOW FLYING MILITARY AIRCRAFT

From 1st January 1979 the Airspace used for Military Low Flying was extended to cover most of the British Isles.

Military pilots are briefed that all hang gliding sites that have been notified to MATO by the BHGA are active at weekends. This means that if flying in the vicinity of sites military fliers are expected to see and avoid hang gliders.

In some areas, including Wales, hang gliding clubs have arrangements to notify local RAF Stations if soaring is going to take place during the week. Using these arrangements does not however guarantee that low flying military aircraft will avoid you. This is because RAF Stations will only know of some (approximately 50%) of the low flights in their local airspace.

The extension of the area available for low flying has increased the number of low flying notifications handled by the Military Low Flying desk (Freephone 2230) under the CANP procedure. The procedure was set up to safe-guard commercial low flying operators, e.g. crop sprayers, gas/electricity pipe line aerial surveys, etc. and because of the sheer volume of their work it is no longer possible for any notifications to be handled that relate to sporting aviation activity.

It is now up to the BHGA, possibly in conjunction with other sporting aviation bodies, to make representation to NATS (National Air Traffic Services, the joint MOD/CAA Service responsible for UK airspace usage) to see what steps can be taken to make hang gliding on weekdays safer.

UNTIL WE NOTIFY YOU THAT NEW SAFETY MEASURES HAVE BEEN AGREED ANYONE SOARING ON WEEKDAYS IN ANY AREA SUBJECT TO MILITARY LOW FLYING DOES SO AT HIS/HER OWN RISK.

The Secretaries of all Clubs known to the BHGA Secretary were sent a circular during February explaining this with a new map which shows all areas of the UK that are used for Military Low Flying and areas of intense aerial activity. Another circular sent at the same time gave updated details of the pro-

cedure for originating NOTAMS. Copies of the Low Flying Map and circulars are available to any member who wishes to write to Taunton for them.

MEMBERSHIP RENEWAL

Memberships numbered 10,135 to 10,405 are due for renewal on 1st April 1979.

TRAINING

From the number of enquiries I have received since taking over the training role within the BHGA, it seems there is a large number of members who are concerned to know what the future training policy is likely to be. There is no simple answer. Of course we have the new pilot rating scheme and observers' handbook. If you haven't received details already, you will in the very near future. There is also a students' handbook and an instructors' handbook in the pipeline. Courses will soon be organised for instructors and club coaches.

The aim is not to set up a bureaucratic machine which members find unacceptable. The intention is to establish a comprehensive training structure which will enable a hang gliding pilot to progress safely from the ab initio stage to the most advanced flying with maximum safety and to provide him with the knowledge to meet the challenge of XC flights and comply with the law as it applies to hang gliding.

The aims are simple but the implementation is another matter. Let's have a look at the existing structure. Most initial training is done in the commercial schools. This raises many questions: (1) do you want newcomers' first experience of hang gliding to be through commercial schools? (How were you introduced to the sport?). (2) What do you do with schools who do not meet minimum standards? (3) What happens to pilots after their initial training? Do the schools actually keep a check on progress of ex pupils? Can they? (4) Are there enough/too many schools to meet the demand? (5) What about clubs? Do they wish to train and more important, have they the experience, equipment and money to train properly? Should they confine their activities to continuation training through club coaches and the pilot rating scheme? One thing is certain, clubs will have to take a more active

interest in training and to this end courses will be organised for club coaches and observers.

That's enough questions for a start. If you think you know the answers I shall be very pleased to hear from you. We are at present in the process of formulating training policy for the next few years and this is your chance to have an influence on the way training should be developed. Write to: Roy Hill, Chairman Training Committee, 68 Besselsleigh Road, Abingdon, Oxford, OX13 6DX, or see me at the AGM.

ABERDEEN HGC

This new club has been formed, with Charlie Ingram as Chairman, Ivor John as Secretary, Eric Brooks as Treasurer, Mick Elstone as Sites Officer and Doug Neyedli as Training Officer. A sites list is being worked on but in the meantime the club, which has 20 members, wishes to thank neighbouring clubs who have welcomed them on their sites.

WASP AWARDS

The Wasp awards for 1978 were presented by Barry Bourne of Waspair recently at a small informal celebration evening. Congratulations are in order to the following fliers who have done so well during the '78 season:

Keith Reynolds, British Champion (G160) receives the large silver cup 'Wasp Flyer of

BHGA members wishing to fly in the Aberdeen area are asked to contact the committee on the following phone numbers: Aberdeen 876153, 630077, 861067 and 780816.

CONGLETON CLOUD

Under condition (xvi) of the Licence granted by the National Trust, there is to be **no flying** from 1st April to 30th June on the above site.

John Clarke, Sites Officer,
Peak HGA

AN AMERICAN "FIRST"!

"Don Marshall and Debbie Weisenhunt have just become the first couple to get married while hang gliding. The Rev. Barry Finkenbury conducted the service on the public address system at an airfield in Albuquerque, New Mexico as the groom and bride exchanged rings high overhead."

Reprinted from the (Irish) Sunday Press, Feb. 18, 1979.

the Year 1978' to keep for all time plus a sponsored glider for the 1979 season.

Runners-up were Mick Evans (G160) and Mick Maher (G160) who both receive a silver cup and a sponsored glider. Finally, the award given to the 'Most promising new Wasp flyer' goes to Alan Weeks who has been flying for just 2 years. His consistent flying during 1978 gained him this award.



MIDNIGHT SUN CUP '79 NORWAY

The Bodo Hang Glider Club have extended an invitation to BHGA fliers to the Third Midnight Sun Cup. Venue is Keiserwarden, 1000ft ASL, with landing area on the beach about 5 miles from Bodo. The competition follows the FAI Class II and Class III rules. Competitors must have a Hang III or equivalent Certificate, a Sporting Licence and valid insurance. Requests for further information, and application forms, available from Bodo Hang Glider Club, PO Box 93, 8012 Skeid, Norway. Applications must be received before May 31st.

POWER SAFETY

Pilots flying powered hang gliders should use glass fibre helmets rather than polycarbonate ones, as petrol or oil dripping off the motor may land on the helmet and damage it. It might be as well also to have a fire extinguisher handy in case the fuel tank is damaged in a crash..

Dunstan Hadley,
BHGA Medical Adviser

IRISH HANG GLIDING ASSOCIATION EVENTS IN 1979

17/18 March	Dublin Fly-in	Contact Mark Leslie, Stableyard Flat, Knockmaroon House, Castleknock, Dublin.
13/16 April	Cork Fly-in	Contact Roy Hammond, 11 Sheare's St., Cork.
2/4 June	Sligo Fly-in	Contact Mark Leslie (address above)
14/15 July	Slieve Donard Fly-in	Contact Bertie Kennedy, 10 Richmond Park East, Glengormley, Newtonabbey, Co. Antrim.

SWINYARD HILL, MALVERNS

No flying from this site during March and April, because of lambing.

REREGISTERED

The Welsh Hang Gliding Centre (S.Wales), New Road, Crickhowell has been re-registered and is again listed on the BHGA Schools Register.

RHOSSILI

Flying at Rhossili is now open to *all* BHGA members – membership of the S.W.Wales HGC is no longer required. Site information and rules, etc. are displayed in the Coastguard Building. Rob Symberlist, secretary of the SWWHGC, (Tel:

0792 26729), has provided this list of useful telephone numbers for the Rhossili area:

BRAWDY (RAF) ATCC Low Level Controller. (0437) 3404 & 3408. Warn ATCC of "0-2000ft., hang gliding".

SWANSEA AIRPORT (0792) 27550. For weather conditions.

RHOSSILI COASTGUARD – Gower 502. Contact at the beginning of every flyable day at Rhossili.

MUMBLES COASTGUARD – (0792) 66253 & 67761.

STEYNING BOWL

This site should be open again from the beginning of February. It was very nearly lost completely because of the failure of pilots to pay the flying and parking fees. The price of subsequent

re-negotiation has been high – an advance payment of £2,000 has had to be paid to the landowner in order for the site to be re-opened.

The money has been got together with the help of a £1,300 loan from BHGA, £300 from the Southern Hang Gliding Club and £200 each from Knight Hang Gliding and Ultra Sports. The BHGA money has to be repaid and a Steyning Bowl Management Committee has taken over the running of Steyning to ensure that this is done.

Arrangements for Steyning will be as follows: Season tickets including flying and car parking for a year will be available at £10; Flying and car parking on a daily rate will cost £1 per day; car parking only will be

when only the very best is good enough...



VECTOR

Medium*: A.R. 7.3. Span 35 ft. Area 170 sq. ft.
Large: A.R. 7.4. Span 36.5 ft. Area 180 sq. ft.

*27 miles G. Snape (NSHG) Sept. '78. 1st L/D Knockout, A. Williams, Mere, Aug. '78.

FLEXI-FORM SKYSAILS

U.K.

FLEXI-FORM SKYSAILS. Unit 24, Nassau Mill, Cawdor St., Patricroft, Manchester. 061-707 1389. Mainair Sports, Rochdale 47728. Midlands, Malcolm Hawksworth, Blackshaw 231. Scotland, John McConnochie, 066-76 2414. S. W., Tony Williams, Bristol 35449. Cumbrian, Northern and Yorkshire Hang Gliding Centres.

FRANCE ÉOLE 2000. 55 rue de Charenton – 75012 – Paris. Tél. 307.50.50. Importateur exclusif.

SPECIALIST SAILMAKERS AND HANG GLIDER MANUFACTURERS.

50p per day. Season tickets will be available from Jeannie Knight, 10 Spring Gardens, Washington, West Sussex, and Graham Slater, 11c Denmark Terrace, Brighton. Anyone applying for season tickets should make cheques payable to BHGA (Steyping).

On one occasion last year, 35 gliders were on site and only the four school gliders in use had been paid for. If Steyping had been lost completely it would have forced pilots at an elementary stage on to other sites, there would have been accidents and sites would no doubt have been lost. Renegotiation has been a lengthy procedure and now that the site is back as an official open BHGA site, please help to keep it by paying for your flying and parking there.

WINGS!

Would Club Secretaries please keep WINGS! Editor informed of club activities or find a willing member to act as WINGS! correspondent.

Would Editors of club magazines please add WINGS! Editor to their mailing lists.

PRODUCT NEWS

MAINAIR SPORTS DEVELOPS NEW SKYDECK

Mainair Sports have brought together two of the world's best hang gliding instruments into a single module, to produce, what they hope will become regarded as the 'Rolls-Royce' of flight decks.

They have selected the Thommen altimeter from Revue Thommen of Switzerland and the Ball Variometer from Ball

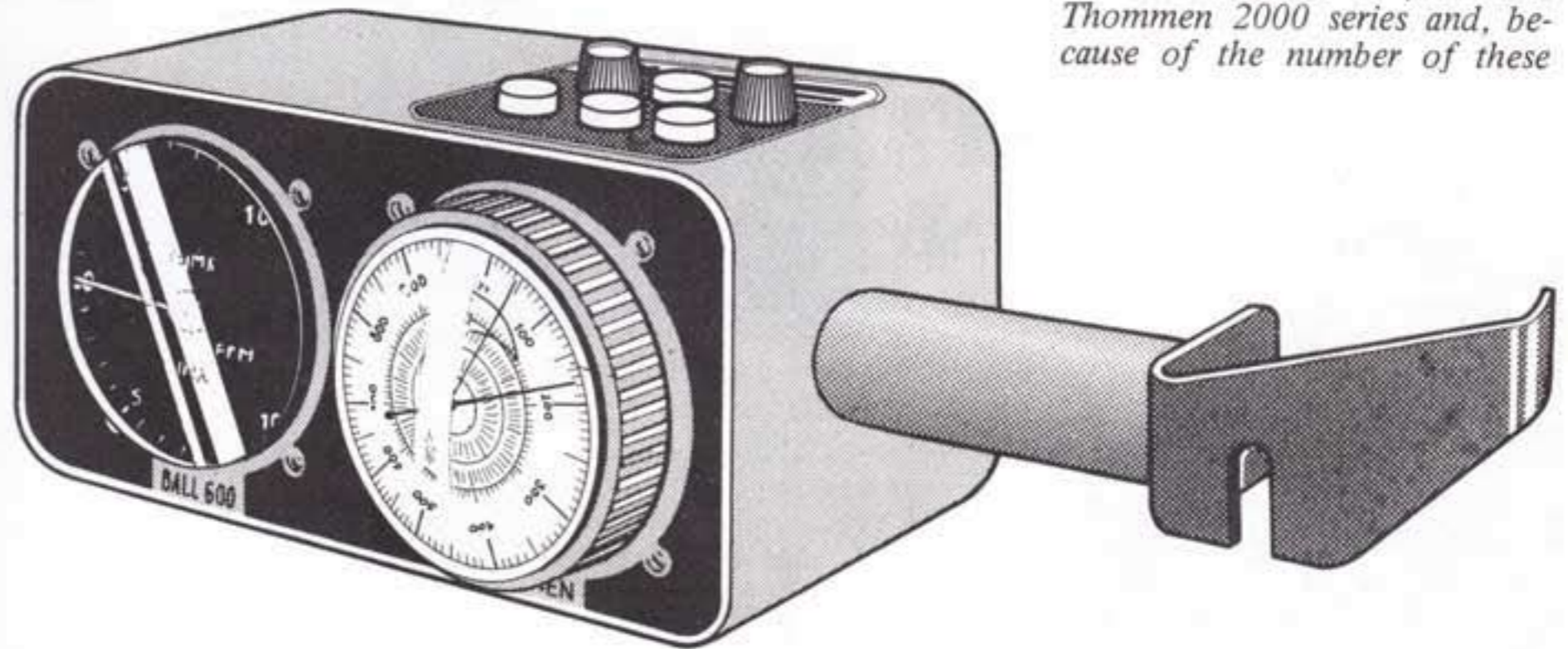
Engineering of Colorado, USA. Both instruments and manufacturers have been regarded as leaders in their field and indeed few hang glider pilots would argue with such a claim.

The instruments will be mounted in a moulded case whose outside dimensions are a neat and tidy 5.7/8" x 3.1/2" x 3". The case will be fitted with an 'Instrumount' fixing and construction will be modular.

The Ball 600 unit used is equipped with the Ball 405 audio system. Control functions

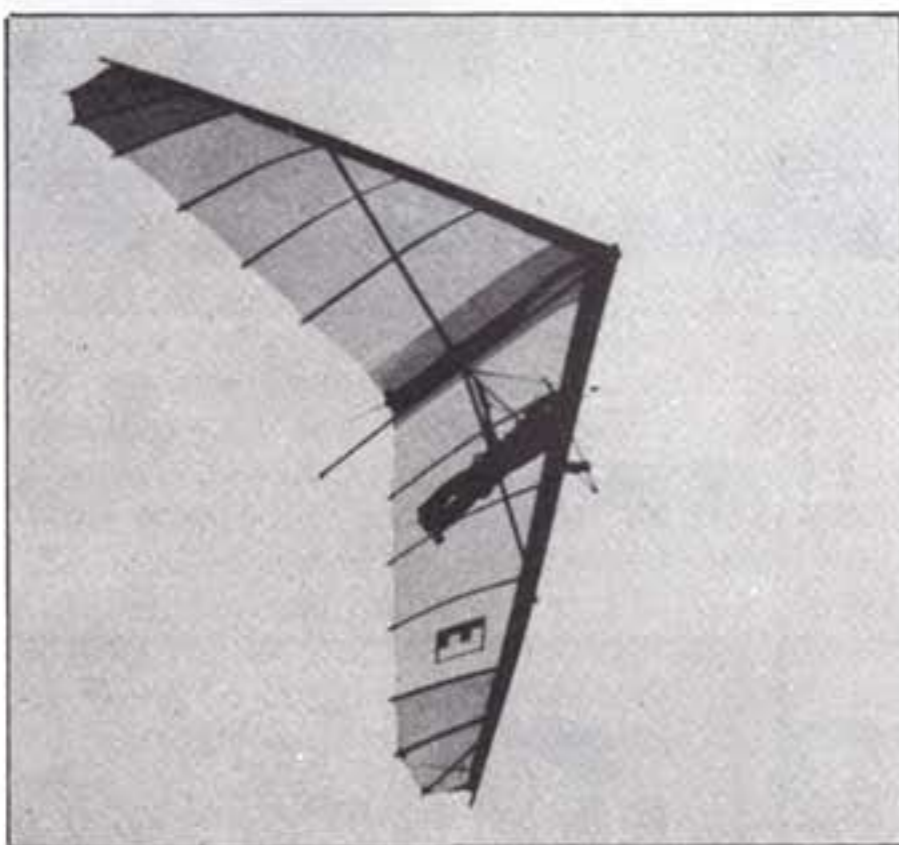
are - on/off, battery 1/ battery 2, high scale/low scale, audio up/down/zero and volume control. This variometer has been used in sailplanes for some years, so is a well proven design. All components and circuit boards are wired for plug type replacement. Mainair will also keep a full set of components in stock so that future repairs will be carried out on a replacement basis to ensure that repair time is kept to a minimum. The Ball variometer also carries a full 12 month guarantee.

The altimeter is from the Thommen 2000 series and, because of the number of these



SKYLINE

- simply better -



Skyline	small	medium
Aspect Ratio	6.4	6.4
Area	170 sq. ft.	175 sq. ft.
Span	33'	33' 8"
Keel	8'	8'
Weight	46 lb	49 lb
Pilot Weight	8 - 10 st.	10 - 12 st.

Skyline	large	super large
Aspect Ratio	6.0	5.9
Area	195 sq. ft.	215 sq. ft.
Span	34'	35' 6"
Keel	8' 6"	9' 6"
Weight	53 lb	54 lb
Pilot Weight	12 - 14 st.	14 - 16 st.

UK: FLEXI-FORM SKYSAILS
MANCHESTER 061-707 1389
EUROPE: ÉCOLE 2000
PARIS 307.50.50/307.59.14

The Skyline has no wing wires, just a simple rugged airframe and a carefully cambered sail. Low weight and advanced sail technology give a superbly light 'inertia free' feel to the handling - so important when flying close to the hill or thermalling. Roached tips, short keel and high aspect ratio contribute to the performance whilst mellow slow speed characteristics add to the pleasure.



altimeters in use, the Skydeck will be offered with the altimeter as an option.

The modular construction means that the unit can be bought as a vario and case with a bracket for seated flying. Then, a stalk extension can be added for prone flying.

Also an airspeed indicator is currently being developed which will attach neatly to the same case.

The whole unit was designed by a hang glider pilot. All switches, except volume and

zero, are push button (handy when you have gloves on) and they are located on the top of the case for maximum protection.

The unit will be available in April/May and is expected to cost around £230 complete with altimeter.

CONDORS

Secretary of the Devon & Somerset Condors is now: Will Mills, "White Horse Inn", Washford, Somerset

POWER ANNOUNCEMENT

The Committee of the BPHGC feel that, at the present state of the art, two major problems requiring special care and techniques exist with a flexwing powered hang glider:

- (1) Pitch instability under power. This is caused by the need for a thrust line well above the centre of gravity.
- (2) Due to (1) above, and the extra weight of a powered hang glider, take off can be difficult. The Committee would like to discourage flat land take-offs especially in light winds (under 10 mph).

BRITISH POWERED HANG GLIDING CLUB



SCOTTISH SPORTS PHOTOGRAPHER OF THE YEAR AWARD

Ron Docherty, who flies his SST with the Lomond HGC, and whose photos adorn WINGS!, Flying Scot and many pilots' homes, has won a special award for a portfolio of ten colour prints of hang gliding.

This year's competition, unlike previous years, required photographs of a range of sports and since Ron's were exclusively of hang gliding, he was placed third. However the judges were so impressed, stating that he would have won on the old rules, that the special award was created.

Pilots who'd like pretty pictures of themselves should turn up at Bishop on a Sunday if it's westerly. Saturdays are out for Ron as he's busy covering weddings. Beware though: if you believe the front of his harness, he's Britain's No. 1 Sex Maniac. There's a rumour (I've just started it) that he's known affectionately by the ladies of Leven as "Oor Wullie".

Ian Trotter



Another hang gliding "First". The weather-vane was a Christmas present to Dr. Michael Glanvill from his wife. It was made by Tony Gane, Top o' Hill, Percombe, Stoke-sub-Hamdon, Somerset. (The doctor now flies prone!)



Peachy by HARDMAN.





no wind, below freezing, & 38 miles

by Jim Potts

If anyone had told me 18 months ago that one morning I would wake up, drive to a field not far from my house, take off and fly 38 miles to my regular flying site, I would have told them they were absolutely mad. However, such is the pace of hang gliding development that on Sunday 26th November I did achieve this flight which is undoubtedly the most memorable in my three years flying experience.

After more than two weeks of almost continuous rain and gale force winds the conditions changed dramatically for this weekend and the Sunday dawned clear and bright, in fact one of those beautiful winter mornings with crisp air, heavy frost and a cloudless blue sky. Together with my friends Richard Armstrong and Ian Wilson and Richard's wife and sister, we travelled with our gliders to a field west of Kilmarnock where I set up my Cirrus 5, complete with the new Kingpost mounted fuel tank which I had tested the day before. Needless to say I had armed myself with an Altimeter and compass, and checked my intended route with the various villages dotted over the countryside on the Ordnance map. Two cups of very hop soup from Richard's wife, ski-gloves, sunglasses and plenty of clothing, would I hope ensure my body comfort on the long flight. I had agreed with my ground crew that initially I would follow the road to Tinto and they would follow in their cars. This way I would be familiar with the landmarks and they could keep me in sight until at least I could see Tinto in the distance. Although I was a little worried at the extra weight of fuel I was carrying, after a careful engine warm up the Cirrus 5 took off cleanly with the angle power available from the Soarmaster Unit, and I climbed to around 700 feet in several lazy 360's as my crew made off to the cars and started down the road. During these 360's I had time to admire the view which was quite

beautiful in the bright morning sunlight. To the West across the Firth of Clyde the snow-capped mountains of Arran stood up boldly against the blue sky and over Glasgow to the North the Campsie Fells and Ben Lomond were also snow covered. Beneath me the ground covered in a heavy frost, was sparkling brilliantly.

My crew were now well on the road, so I glanced at my wrist compass and headed East. Although by now I had over thirty hours flying time on the Soarmaster, divided between an Olympus and a Cirrus 5, I was surprised to find the air was the smoothest I had ever experienced, and since visibility was superb I realised immediately that the flight was definitely 'on'. I was very quickly ahead of my ground crew and flying over fields towards Craigie Village. I then headed along the Darvel Road towards Hurlford, then round Galston and Newmilns. By this time I was at 1,000 feet and starting to feel cold although in fact I had only travelled about 8 miles. In view of this I dropped down to 600 feet and could see people near the villages running into the houses and bringing out their families to wave to me as I passed. Farmers in fields were also stopping tractors, to look up into the sunlight and wave. As this was more or less flat land with no hang gliding activity these people were seeing something which they had never seen in their lives before and the novelty value was certainly high judging by the enthusiastic reaction to my flight. Just after Newmilne, the ground appeared to be coming up towards me so I realised I would need to start climbing again. By this time I could see Tinto (2,400 feet), which must have been about 25 miles away and was standing out clear and sparkling against the blue sky. At this point I had to make the decision either to follow the road or go straight across the open moorland for 15 miles before crossing any other roads. I

mentally checked my physical condition, listened to the engine, glanced around the glider to see that no excessive vibration was causing cables to blur, that there were no apparent fuel leaks, and set off straight across the moors. During this part of the flight I flew at 1,000 feet and constantly checked for nearby tracks and farm houses just in case the flight had to be aborted for any reason, and I had to find somewhere from which to walk back! The glider and engine, however, were performing faultlessly and I checked that I was running at around third throttle with over 40 mph air speed. At last in the distance I could see some vehicles on the A74 which lay like a glistening black ribbon through the snow covered landscape. Just before the road, I crossed the edge of a village and suddenly the glider lurched and jumped so violently that I shouted out, lost the mouth throttle and regained control, in that order. On reflection I must have hit warm air coming from the early morning house fires. I was immediately grateful that the glider was so pitch positive and responsive in handling. Tinto by now was looming much larger and although my feet were now completely numb, my hands didn't seem to belong to me, and my nose had long since ceased to exist, I knew I was going to make it. By now, of course, I was much higher and the entire countryside was covered in snow. The valleys to the South were filled with pockets of early morning mist and the smoke from the isolated farmhouses to the East could be seen rising vertically then flattening out, probably under a layer of warmer air. The remaining 7 miles towards Tinto were filled with anticipation of the welcome I would receive from club members who had known for some time that I had a burning ambition to make the flight and would obviously be hearing me in the distance by now. I then flew over the road

which enters the valley to the South of Tinto, and realising that there would be a slight Northwest wind, I headed for Dungal Hill, where I expected club members would be gathered. To my surprise and total dismay there was not a single car or flier in sight at the regular parking point and I concluded that they must be flying on some other site, possibly on the North face of Tinto itself. By this time, of course, I had no idea how much fuel was left and since I was beginning to lose co-ordination with the extreme cold, I decided to make a landing near the telegraph pole where members leave a note of the place in which flying is taking place that day. Two cars arrived just as I was landing so I headed for our regular landing field, eased back the throttle and came in for a gentle stand up landing in about three inches of snow. Only then did I realise just how cold I was and I nearly fell over as both my feet and my hands were absolutely numb. Club members John McKinlay and David Whitelaw ran over to congratulate me knowing full well that I must have flown from home, and after gulping down a mug of David's hot coffee

I was able to speak and confirm that the flight must have been around 40 miles and had taken me something over 50 minutes. I was pleased to find out later that the members of the Lanarkshire Soaring Club had been on the top of Tinto to fly the North face and had heard me coming and consequently had watched the last mile or so of my flight.

On reflection I realise that the flight I made was really what powered hang gliding is all about. No conventional hang glider could have made such a flight since there was no thermal activity and no wind. I had taken off on flat ground and made an enjoyable trouble-free cross-country flight of 38 miles in a cloudless and turbulence free sky. Over the past few months I have made many powered flights but this flight was the culmination of my hang gliding experience to date. I firmly believe that provided powered hang gliders are flown in suitable conditions, they have a place in our sport and certainly I am very satisfied with, and have every confidence in, the Cirrus 5/Soarmaster combination. I had been warned of the need to keep warm and over 50

minutes at 45 mph in freezing conditions, it is a problem, believe me!

My thanks to Brian Harrison and Andy Fawcett at Scot-Kites who built my Red Baron Cirrus 5 and who have helped so much with a wealth of information on powered flying. Also to my ground crew Richard Armstrong and Ian Wilson and for those two cups of hot soup without which my flight would not have been completed.

Postscript. Before Christmas I had flown into some works children's parties with my Santa gear on when I was approached by the local Council to see if I could do some demos for them. Over the Christmas week I flew round most of the outlying villages and schools. The finale came on Saturday 23rd December when I flew round the town and landed in one of the parks to be greeted by many children and families (it was safe enough – the Council had put up barriers and ropes). The only problem I came across the whole week was if the throttle dropped out of my mouth I had the devil of a job finding the mouth of my beard.

POWER COMMENT

Dear Garth,

Well, it had to happen. Last year I got myself this engine that gives one the opportunity to go as high as one wishes. Let me tell you how it happened. Living only ten minutes driving away from a more or less private flying site (mentioned in a former WINGS! issue), and doing quite a lot of flying abroad, I have not had very much interest in powered hang-gliding. It was not until a pupil of my school, that I became interested in it. So I took the ferry and drove to Gerry Breen, keeping it all very secret, especially to the boys at the Birdman factory. Unfortunately, the '78 air frame did not fit to the Soarmaster, so we had to call Ken Messenger, who was quite surprised. Anyway, we got everything ready and Gerry took off. I would advise anyone who thinks hang gliding means easy floating through the air or jumping from a hill with some kind of parachute, take a look at Gerry's flying but do not attempt to imitate it.

However, the glider turned out to be perfect for powered flying so it had to be my turn. I daresay I have never been scared during my flying career before taking off, but this time . . . well, thanks to Gerry I got my harness on and off I went, right from the edge of

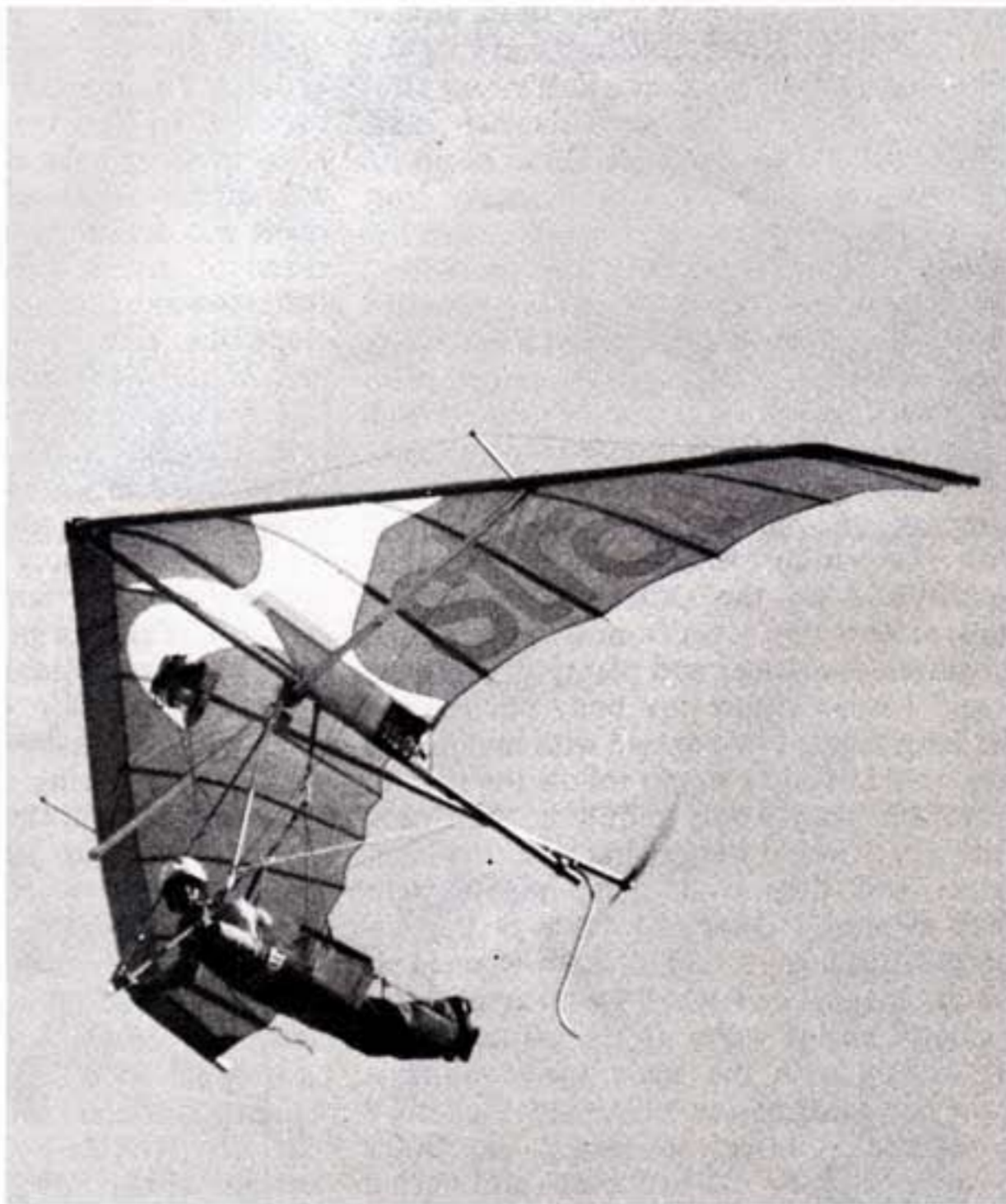
the ridge. All the new forces, that were created by the engine made me so nervous, that the mouth-throttle slipped out of my mouth a couple of times . . . That afternoon I learned how to take off from flat ground and on my last flight it became very foggy and I wondered where the fog came from, because it was rather sunny when I took off. I looked down and I saw very small triangular shaped, bright coloured flying objects deep down below me. I remembered that only sunshine lightens up the sail of a hang glider, but then I looked around me and saw nothing but clouds, which means, that you see almost nothing. It scared me and I remembered the stories from pilots flying in clouds so the decision was easy: engine on idle and down I went.

Back to the earth I learned what it means to be someone who has done something, that others have not done yet. Back at the factory, they were quite well informed about my activities (thank you Ewart) and everyone was very enthusiastic. Only Dave Raymond thinks he is the wise one, no powered flying for him, he could be right, I don't really know. Now that I fly the powered '78 for a couple of months, I think that especially

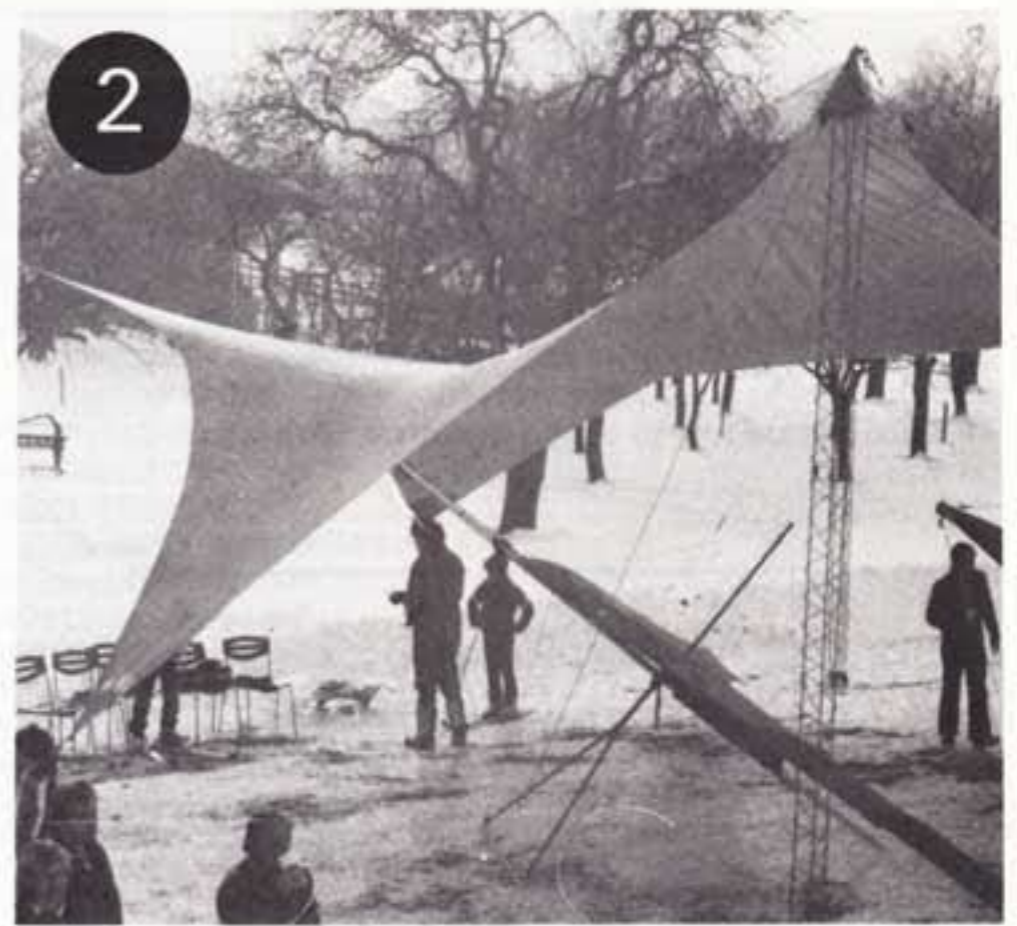
powered hang gliding is very much in its childhood, and it is a lot more complicated and dangerous as normal flying but

it gives you the thrill of your lifetime.

Paul Beukers
Birdman Sports, Holland



Gerry Breen flies Paul's combination.



WASP WEEKEND

The weekend of January 20/21 had been well publicised in Germany as the Wasp Demonstration Weekend and over 70 fliers turned up to take part in the contest. Competition rules were some of the most simple ever devised – Take-Off, Complete as many 360s as possible, land.

The Wasp factory took Robin Haynes, Barry Bourne, Alan Weeks and Terry Davies along and 2 of these placed in the first 8. Other than the factory team and the Germans, teams also arrived from Italy, Luxembourg, Holland and Austria – and there was even a lone American.



The "WASP WEEKEND", Hochplatte, Bavaria, 20/21 January, 1979.

1. The Landing Area.
2. Wasp "Space Tent" made from bag cloth by Barry Bourne.
3. Practise on Friday.
4. Competition well under way.
5. The "Laser L190" put up a good show.



PLACE	NAME	COUNTRY	GLIDER	No. of 360's
1st	Wolfgang Genghauwer	Germany DFCA	Gryphon G160	12
2nd	Barry Bourne	England - London	Laser L190	11
3rd	Silvio Borga	Italy	Gryphon G160	10
	Hans Kaulfub	Germany DFCA	Gryphon G160	10
	Dr. Rudi Muhlbauer	Germany DFCA	Gryphon G160	10
	Stefan Steffl	Germany Bavaria	Gryphon G160	10
	Detlev Ziege	Germany Ravensburg	Gryphon G160	10
8th	Alan Weeks	England - London	Gryphon G180	9
	Jorg Bauriedl	Germany	Gryphon G180	9
	Gerd Link	Germany - Trier	Falcon Floater	9
	Trior Scharpt	Germany	?	9
12th	Paul Loch	Germany - Trier	Gryphon G180	8
	? Bohn	?	?	8
	Milan Kupec	Germany DFCA	OLY Cirrus 160	8

small ads

All small ads should be sent to Mrs. Lesley Bridges, Commercial Editor, Yard House, Wentnor, Bishops Castle, Salop. Ads sent to any other address will be redirected and therefore delayed. Personal ads are free to BHGA members, limit 35 words. NO power ads please.

31 Springfield Crescent, Parkstone, Poole, Dorset. Dear Madam, I want to sell a standard KESTREL red and yellow, 90° nose angle suitable for person up to 14 stone. I want £100 for it. Ian, Parkstone 748770.

Sexy small MOONRAKER 78 for 10st. pilot. Hardly flown, never crashed or bent, as new. Beautiful Bainbridge sail with that superb Birdman Airframe. Absolute bargain £100 under list. Contact Julian at Bristol (0272) 828934.

KESTREL WINGDINGER. Six battens, twin deflexors. A good intermediate kite. Converts seated/prone. Lovely pukey colours. With seated harness, spare fittings and bag. £150 ono. Bob Dear, Chertsey 60478 evenings.

MIDAS E, good condition never pranged. Sunburst colour scheme, excellent cross country machine. This glider reaches the parts that other gliders cannot reach. £325. Tel. Mansfield 34002 or 644884.

SST 100C. Very good condition, clean with bag and a HIWAY prone harness. Still the best all round kite in the world. £300 ono. Tel. Lewes (Sussex) 4646.

FLEXIFORM SPIRIT. Large size in very good condition, complete with harness, £275. Tel.

Longridge 4155 (nr. Preston, Lancs.)

MIDAS SUPER E. White tips, blue, red, orange, white either side of keel. Clean ripple free sail, fully tuned. £390 suit pilot around 10-12st, reason for sale, new glider on order. 01-684 4772.

G.S.I. combined electronic air speed indicator/ vario single tone stall warning, battery check, extremely sensitive vario with audio bleep on up. £90. Contact Eddi Horsfield 01-684 4772 (Croydon, Surrey)

G.S.I. combined vario and A.S.I. Perfect working order (used 3 times) £70. Phone Dave Bluett - Brenchley 2890

Vario value-PTERON audio visual with variable audio threshold. Recently checked by Pat King. £45. Rechargeable batteries 2x9v with charger to suit above vario and others £15. Ian Trotter 031-552 7736.

HIWAY 240, red and white sail, bag and harness, good condition, only £100 ono. Contact Mark Teale, Sutton Coldfield 021-378 2960.

CHARGUS/VORTEX 120, absolutely as new, multicolour sail, hardly flown £400. Tel. Mere 440 after 5 pm. Company policy dictates divorce from my beautiful **MOONRAKER 78** (large). Superb machine,

tasteful decor, for heavier pilot. £425. **PRONEWEB** harness, ideal for prone conversion. (Has flown across the Channel). £20. Cliff Ingram, 64 Priorsfield, Marlborough, Wilts.

WASP FALCON IV.

The perfect floater, seated harness, good condition, only £250. Ring 01-778 2434 (evenings).

SST 100B. Gold and white, as new condition. This sport blows my mind. Contact Pat Eaton, Nottingham 830431 9-5 pm.

Small SUNSPOT. Dark red, red, orange with white tips, complete with spare unused 'A' frame sides including seated harness. Flown less than 3 hours. £350. Phone Harry Turner, Morpeth 57754.

SUNSPOT 2 large size. As new, 1 hour in air, absolutely immaculate. Spare keel, control bar, deflexors. Seated harness and white helmet. Can deliver. £400. Martyn. Work 01-251 2730, home 01-552 5766.

20° CLOUDBASE. Good condition, flies well. Excellent kite for beginner-intermediate. £210 ono. Phone Matt Jayne 031-447 5707.

MIDAS SUPER E but with fixed wing tips. Deep red, s/gold, green, white. Inc. preformed battens. In good condition and is a lovely flier. Low airtime. Ill health forces sale. £375 ovo. Ring Barry, Romford 21005.

Your dynamic books need my dynamic cartoons. If you are, or will be, writing anything drop me a line. Bill Lehan, Neale House, Moat Road, East Grinstead, West Sussex.

WANTED. Pilots to train as instructors at the Cumbrian Hang Gliding Centre, June to

September. Tel: Lazonby (076 883) 610.

FOR SALE, WILLS WING XC220, multicoloured sail, genuine reason for sale. £450. Wills Wing SST 100B, rainbow colours £375. Tel: Lazonby (076 883) 610.

PHOENIX 6B Senior, suitable for the heavier pilot. Ideal intermediate glider. £300. Phone Nick Bishop, Middleton Sciven 216.

REAL MONEY given away for copies of Ground Skimmer Nos. 1-18 inc. and No. 26. Also Hang Gliding Nos. 57-59 inc. Dave Chambers, HMS Mercury, Petersfield, Hants. Ring Petersfield 2761 Ext. 346 during working hours.

STOLEN from boot of car in London. Was pair Prone Harness. Last seen with following cloth badges sown on front: Wasp, Hiway, BHGA, SHGA and Pilots Wings. Would anyone with any information please contact Andy Smith on 01-303 8255 (night) or 01-659 2221 (day).

SST 90 for sale £290. Contact Ivor John, 19 Mount Street, Rosemount, Aberdeen. Tel: 630077.

MOONRAKER '77. Multi-coloured. Flies like a bird and has been kept in good condition. £300. Ring Budleigh Salterton 5253.

'SUPER SCORPION C' as new, any trial. First offer wins this great glider at £470. Also for sale "Bob Kelly's Scorpion C", bargain at £270. Phone: Ted Battersea at Littlebourne 614.

"DRAGON HOTEL", Crickhowell, Central for all South Wales best soaring sites. Already popular with hang glider pilots. Tel: Crickhowell 810362.

GLIDER RIDER. The world's finest hang gliding publication. Up to 75 pages monthly of news, views, tec' tips, power and rigid info'. 1 year's subscription £14. All back issues available incl. Nov. American Cup and Jan. Milton Profile £1.20 each. Scot-Kites, 19 Camphill Ave., Glasgow, G41 3AU. **INTERESTED IN TOWING?** Now available, compact, lightweight, powered tow winches with limited line tension. Safari Tow Gliders using unique retractable three point towing system. Details from: Skyhook

Sailwings Ltd., Vale Mill, Chamber Road, Hollinwood, Oldham, Lancs. 061-624 8351. **NEW PARACHUTES.** Strong, compact, low sink rate, single handed "Throw Away" deployment. Competitively priced. Phone or write for details. Skyhook Sailwings Ltd., Vale Mill, Chamber Road, Hollinwood, Oldham, Lancs. OL8 4PG. Telex 667849. Tel: 061-624 8351, -681 5045, -681 5369.

INSTRUCTORS! Skyriders British Hang Gliding School needs more HIA registered instructors for next season. Part/Full-time or weekends only. Suit those with London base or commitments at school's training sites close Croydon, London. Phone Derek Bond 095-94 73996.

Hudson built ROGALLO. White battened dacron sail. Good strong kite for lighter flier. £100 with seated harness. Tel. 051-427 4068 anytime.

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HIWAY SPECTRUM small size and nearly new with seat and B-bar. £425. Large SCOT KITES prone harness £25. Knee hanger harness £10. Seated harness £12. Phone Judy Gilbert, Doncaster 855700.

HIWAY SPECTRUM small. 10/12 stone. Multicoloured, seated/prone, B-bar & seated harness. 6 months old, new kite forces quick sale £400. Fareham 281631.

HIWAY SPARES held in stock near Croydon, London. Evening collection possible. Convenient Essex/Kent/Surrey. Also new Hiway Gliders. Skyriders British Hang Gliding School 095-94 73996.

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going. Also the sportsman's wallet, made of heavy duty nylon with velcro strip, 30 colours to choose from. Who did you miss at Christmas? Why not make up for it, only £4.00 each. It even floats, for those of you who fly off cliffs. Contact Ultra Sports, 22 Albany Villas, Hove, E.Sussex, Brighton 25534/70261.

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U.P. DRAGONFLY. Highly manoeuvrable. Dacron yellow/green B.P. sail. Truncated tips, prone harness, rack for Cortina or similar. Suit experienced flier. All this for a cine camera and projector, or what. Pat Fry, Bournemouth 745840.

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MIDAS SUPER E. Top condition, flies beautifully. Finances force sale. A bargain £375.

WINDCRAFT prone harness, almost new £35.

WILLIS variometer £50, **DUPLEX** altimeter £35. Guy Burton, Cluny Hill College, The Park, Forres IV36 0TZ, Scotland.

Large SUNSPOT. Less than 15 minutes airtime. Small patches on sail therefore only £300. Also unused 'AIRE' vario/asi £80. Sale forced by loss of transport. Ring 092576 4798 during working hours.

AVON HUSTLER (large) flown 6 times only,

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SKYFLITE prone harness, blue, new and unused. £30. **PEDRO** electronic air speed indicator, very accurate, new and unused. £35. Phone Dave Orrock, Stevenage 66561 Ext. 278 days.

PARTNER WANTED to join E.P.C. holder with medium size beginner/intermediate glider, seated & prone harness, helmet, ventimeter, etc. £100 for Sale, 6 seat cartop dinghy, sails, outboard, oars, etc. £200 or p/ex glider. Leeds 622942.

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MOONRAKER 78 medium, blue and white. A really nice kite which was very popular in the 1978 League. £425. Trevor Birkbeck, Hambleton House, Clothierholme Road, Ripon, N.Yorks. Ripon 5540. **Surplus to requirements:** spare L/E boom for Bennett Phoenix 6 (original Bennett manufacture), also ex RAF altimeter. Offers to Tony Burgan, Shrewsbury 61791.

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18ft McBROOM ARGUS, still excellent and strong beginners kite in good condition and hardly used last three years, seat and bag. Phone 01-876 9721.

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MIDAS E. Long keel, one year old. Extremely good condition. Attractive spectrum colour scheme. Keel out: Dark red, red, orange, gold,

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CLOUDBASE 20ft Radial. Good condition, still an excellent intermediate. Must go. No reasonable offer refused. Phone Clare 01-505 1697.

VECTOR, medium, lovely coloured sail, flown only half a dozen times since last record breaking flight, as I already have a new one. Performance bargain at £385. Spares extra. Phone Geoff Snape on 0254 885909.

WASP FALCON III for sale, first £250 secures. Phone John on Hagley 2950 (evenings) or 021-705 6888 ext. 427 (daytime).

THERE HAVE NOW BEEN over 12 issues of A4 Wings! You will appreciate them even more if they are bound in a dark walnut simulated leather WINGS! binder with gold blocking on spine and motif of hang glider on front. £2.95 for A4 (Hang Glider also fits). £2.50 for A5 (original WINGS! and Club magazines). Livingstone Promotions: 2 Timberyard Cottage, Herstmonceaux, Sussex, **GALAXY FLIER**

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SPIRIT, VECTOR, SKYLINE. One of our gliders is right for you. Contact us first, for the best. Flex-form 061-707 1389.

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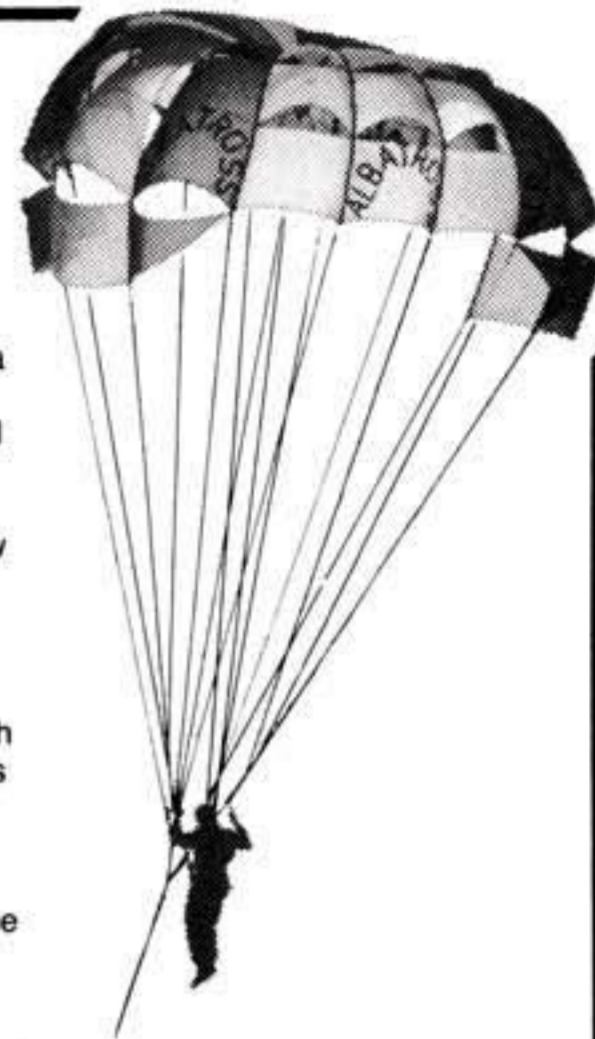
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Aspects of Hang Glider Aero-towing

by Tommy Thomson

I was most interested to read George Worthington's suggestions for a hang-glider tug, particularly since my own glider was primarily designed for tow-launch rather than hill-launch. I had therefore given this matter some considerable thought, and come up with just about the same parameters which he proposes, with the exception that the tow-speed range seems rather high for the current generation of hang gliders, apart from a few isolated cases.

Unless towing is restricted to the calmest of days, the first thing is to calculate a safe Towing Speed (V_t) to take account of all the components of turbulence, and one way of doing this is as follows. If we assume the average hang-glider to have a stalling speed (V_s) of about 13 kts, and having a proof-load-factor of about 4, this will result in a Manoeuvring Speed (V_a) of 13 multiplied by the square-root of 4, in other words 26 kts, the

highest speed at which the glider could accept the strongest possible vertical gust without structural damage. In conditions of turbulence however, it is also necessary to take account of horizontal gusts, which could momentarily take the speed up well beyond the V_a . We must therefore back off to find a truly safe V_t , and in the case of a hang glider it might seem appropriate to choose a V_t midway between V_s and V_a , since there is an equal chance of coming across a horizontal gust of positive or negative sign; in the case of the example above, the figure would then be about 20 kts, say 23 mph.

Of course it could very well be the case that the V_s of the tug might be considerably higher than that of the glider, so let us examine the characteristics of the proposed tow-plane of AUV 350 lbs, and a wing-area of 200 sq.ft. To achieve a V_s of 13 kts would require a Maximum Co-

efficient of Lift (Cl_{max}) of 3, which is completely beyond the bounds of possibility, even with a built-up wing with closely spaced ribs and a high camber-line. If we wish to equate with the V_s of the average hang glider, we would have to increase the wing-area to 300 sq.ft. But on the other hand we could stick with the 200 sq.ft., and accept a V_s of around 16 kts, assuming we could achieve a Cl_{max} of 2, which can easily be obtained through a variety of existing aerofoil sections. In which case it would be advisable to increase the V_t slightly, to a point midway between the V_s of the tug and the V_a of the glider.

Whatever the V_t however, it is obvious that it would be a comparatively low speed at which the tug would have to have complete controllability, certainly through the medium of 3-axis aerodynamic controls, and not merely of a marginal type, but powerful enough to overcome the vagaries and antics of the glider.

It is already clear that the end product would finish up as much more than merely an uprated Powered Hang Glider, and in all

likelihood would probably be categorised as a Powered Aircraft, with all the attendant regulations. The limited market would probably not appeal to professional manufacturers, and the complexity of complying with BCAR and the cost of obtaining an ensuing Certificate of Airworthiness might preclude an amateur design/construction. It might be possible to do something through the auspices of the PFA (British equivalent of the EAA), although such projects usually take some time to reach fruition.

In order to forestall the brickbats usually flung at me, that I should do something rather than just writing about it, let me hasten to add that I personally have enough on my plate at the moment, trying desperately to finish my own glider which has been on the stocks for 5 years now; were it not for that, I would certainly be interested in becoming involved in a tow-plane. What about a competition, with a small prize, for the best design entered. Perhaps the BHGA could underwrite the costs of prototype certification, if that were necessary.

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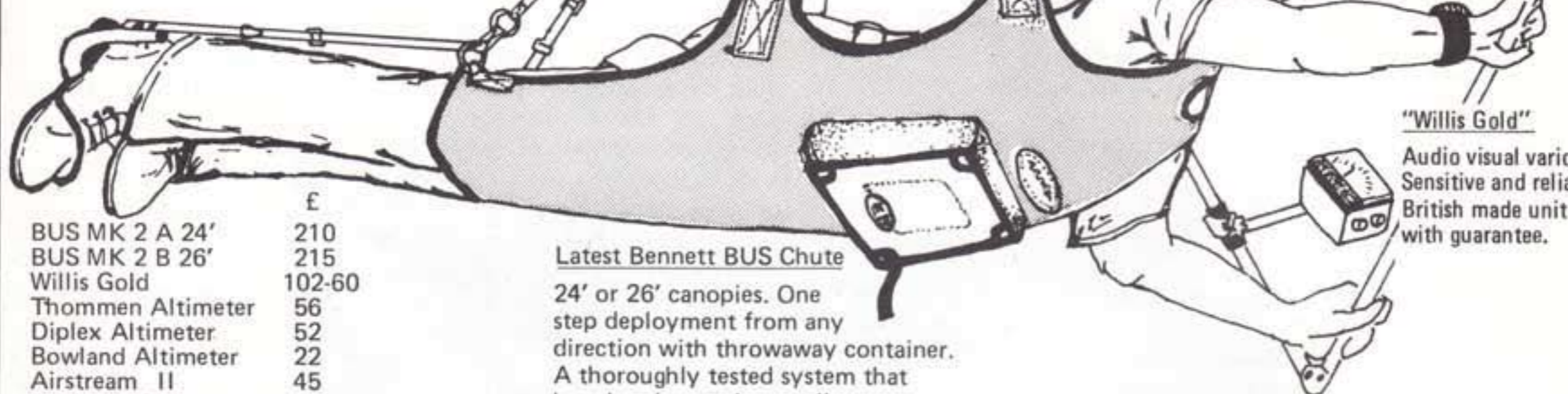
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Birdman Sports do not appoint agents lightly. Each one deals exclusively with ourselves ensuring a good standard of product knowledge. Each one is a dedicated hang gliding enthusiast. This means you, the customer, will get good service, good advice and follow up help and advice to your purchase.

In Scotland contact: David Squires 33 Whitehurst, Bearsden, Glasgow, G61 4PF
The North contact: Trevor Birbeck, Hambleton House, Clotholme Rd., Ripon, Yorks.
North Wales contact: Birdman Hang Gliding School, 186 Bryn Place, Llay, Wrexham, Clydd.
South Wales contact: Ewart Jones, The Quarry, Crickhowell, Powys.

CONGRATULATIONS

To: *Bob England and Johnny Carr (2nd and 4th respectively) for their tremendous performances on the Moonraker '78 in the highly competitive Class II at the European Open Championships Kossen against the best that Europe, Australia, America and Japan could muster.*

To: *Rolf Nossen and Brian Wood (1st and 2nd respectively on Moonraker '78) Class III at the Midnight Sun Cup, Norway.*

To: *Rolf Nossen (Moonraker '78 again) for his 1st place in the Norwegian nationals making him the 1978 Champion.*

To: *Mike Bundock and friends who scored a resounding 1st, 2nd, 3rd and 4th places on Moonrakers at the '78 South African Championships.*

To: *Johnny Harris for the first balloon release in Ireland last year and also for his more recent release using a Moonraker '78 for the first time.*

To: *Paul Beukers (Holland), who has the first powered '78 (courtesy of Gerry Breen and Soar-master). The glider is turning out to be very suitable for power having such a strong airframe.*

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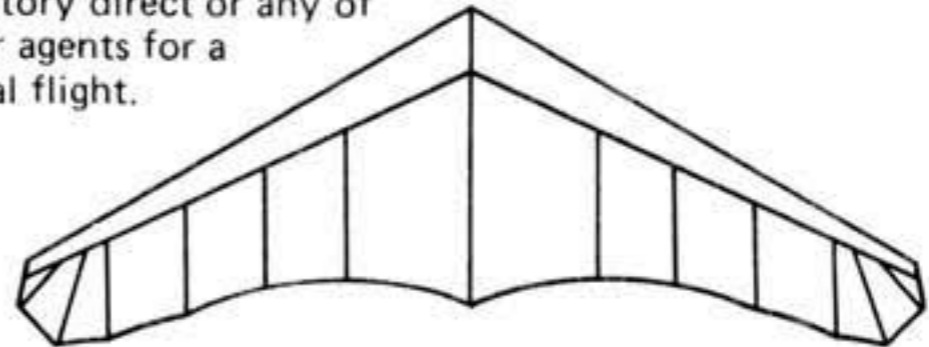
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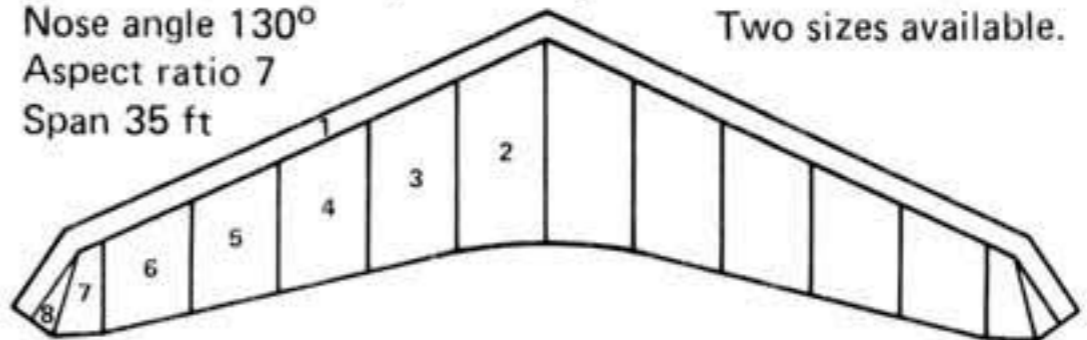
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