AVIATION

S·F·WALKER, R·N, M·I·E·E, E·R·S·A

Basic Instruction In the Art of Motorless Flight

Taking to the Air
When to Make Simple Turns
When to Fly Straight
Volplane and Volpique
Surviving Landings

THE·PEOPLE'S·BOOKS

Treasurer's Note.

The phrase "People's Books" on the cover of this newsletter should not be taken to mean that Lake Keepit Soaring Club, its committee or members support outmoded and discredited philosophies such as socialism and collectivism.

The phrase "People's Books" should be taken to mean that the newsletter is available to anyone who can afford the purchase price and who understands that by purchasing the newsletter they accept and agree that the publishers shall make a profit from the newsletter and from any personal information not excluding credit card details, credit history, web browsing history of family members and associates.

Editor's Note.

So little time, so much to know. In this highly instructional issue of Keep Soaring, you'll find some useful notes on how to be a better glider pilot. And nowhere near such a lot of waffle as in some previous issues.

The season so far has been very good. The club has been very busy and with Val at the helm, aided by Ian Downes etc. It's been a great atmosphere up there… if you could find a bed.

It has been a while since I have been at Keepit and a while since I have woken up every morning and opened the curtains to what looks like another classic Keepit day. Last Sunday was such a day… brilliant conditions, 12,000' cloud base and brilliant flights by all. I had a great flight and posted it on the OLC early so I could bathe in the warm glow of being in first place… knowing that John Hoye and Attilla had yet to post. See the article later on winning the daily OLC. It certainly worked that day… for at least 2 hours.

I wanted to do a repeat of the Edgerio-Coonabarrabran-Quirindi flight that Jim S had set last year, but some said that the conditions did not look good to the south and in typical Keepit fashion that task was kyboshed and then flown just the same.

John Hoye left early and plugged on around the task and flew 550 km in another one of those dogged flights which are so impressive to those of us with another 20 points of L/D.

Who knows what Attilla did. He appeared overhead at some stage when the sun was sinking in the west and was well into the beer. We all assumed that he'd landed so it was a suprise when reappeared ages later when the sun was well down. Another excellent flight. Who needs 18 metres and an engine? (Answer, the rest of us!)

The WIGS or women in Gliding were all over the place when I arrived, apparently having a great time of it. They cleared out over the weekend and then Keepit Fast started on Monday.

G Dale was in good form as usual. I have not managed to do an entire Keepit Fast week so far because of other commitments but I managed to wangle three days this time.

I sat in ZAB with G on the first day and one of us managed 120 kph for a 300 km task, probably won by Dave Shorted who fills the JS1 with spent uranium just for days like that.

There was a thunderstorm and a lot of lightning that night and the place got a good soaking. That's possibly the excuse for the terribly difficult conditions on Tuesday. The task was Manilla, Narrabri, Tambar Springs.

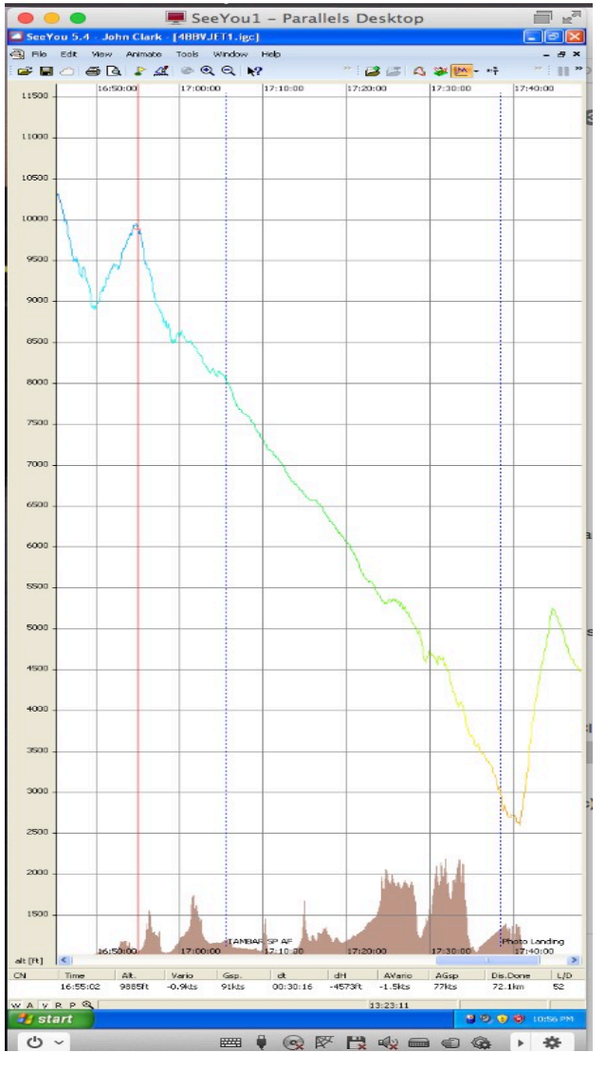
The first and second legs were dreadful with broken, weak climbs, delusional clouds, big sink. The result was G Push-the-Stick-Forwards Dale outlanded with Casey I'm-not-just-a-Dish-Pig Lewis on board. Bob Dircks followed them in to the same paddock near Borah while the rest of us struggled on to Narrabri. Conditions finally improved with a cloud base of 11,000 or so down the Pillager.

Dave Shorter was leading at this stage and persuaded all the other contenders that the conditions ahead were miserable and they should cut short their tasks and allow him to win. I don't know if he learned this of G, but it is a cracker of a strategy,… provided people are listening on the radio.

Unfortunately, I had mis-tuned the radio turning off Narrabri CTAF and heard not a word of this. Like Dave, I turned Tambar Springs at a reasonable 7500' which might normally have got me home… but for the sea breeze.

Have you any idea how stressful it is flying for 40 minutes without a single murmur of lift? Winding the MacCready setting lower and lower and flying slower and slower until there was no chance of getting home without some lift.

The trace is alongside… well, the good bit of the trace. Have you ever seen such a straight line from 10,000 all the way down to 2500'?



I totally lost all chances of final glide searching around the pimples west of Gunnedah and reluctantly pressed the button of shame and climbed high enough to cross the Carrolls where I could clearly see huge Føhn wind clouds streaming over the Liverpool ranges.

Meanwhile, Justin Smith was cruising over Keepit at 5300' blathering on about there being lift all over the place and did we want to go around again.

I think Wednesday was pretty good. G Dale made it up to Casey in much better conditions with Dave Shorter leading the way. Jenny's silent partner in the Mozzie, Paul Gibbs, flew in very well indeed on all three days achieving some very creditable speeds.

Being a balloonist, he used the Geoff Sim/ Lord Nelson tactic of "bugger the tactics, just go straight at them" which seemed to work better than chasing delusional cloud streets.

A major handicap over this period was the munga competition going on. Carol Shorter cooked on Sunday and nice too. On Monday we went to the Dircks and had a typically great Jan Dircks dinner.

But on Tuesday, Eric, visiting chef from somewhere like the Peninsular hotel in HK, aided slightly by Casey who successfully avoided kitchen duties by landing out, turned out a staggering 4 course dinner, beautifully laid out and served like a Michelin restaurant.

After Lord Mayor's Show, comes the dung cart as they say and I pity the cook or chef as they're now called at LKSC, who had to follow Eric.

What did we learn from Keepit Fast? Hmmmm… Deduct 2 from G Dale's MacCready settings after a thunderstorm… don't look for lift in a 20 knot sea breeze day…

SUPPORT YOUR LOCAL MILLER!

The community of LKSC bakers (and there are a few of them!) are fortunate to have one of Australia's best flour mills right on their doorstep. Demeter Farm Mill flour comes from the Wholegrain Milling Company at 17-21 Borthistle Road Gunnedah NSW 2380.

A good range of organic bakers flour as well as grains and muesli can be bought from the mill in 1, 5 and 10 kg bags.

Heading south, looking for poontang.

That was one line I remember from the movie, Zachariah, the first electric western. For a translation, ask Harry Potts. It could describe the 2014 Lake Keepit Barossa Safari but maybe not… we're heading south looking for woobla and good flying.

Based on these aims, the Safari is leaving almost two months later than normal and with the recent great soaring conditions, we're expecting some great flying. I'm not even going to add "for a change," just in case.

The plan is to get there via Forbes, Echuca and base ourselves around Clare for a few days. Weather permitting, we will try and get some good distance flights in on these 'rest' days.

We then head north to Wirrealpa station of which we have some fond memories. We spent 3 days at Wirrealpa on the Lake Eyre Safari eating salt bush mutton.

Admittedly we had the legendary sheep strangler Paul Thompson with us who was able to pass himself off as a local when it came to round up or rustling or whatever they do out there.

On the way up to Marree on the Lake Eyre safari we had some of the most spectacular flying we've ever had… 12,000' cloud base, 10 knot thermals as reliable as a German train and final glides of 140 km.

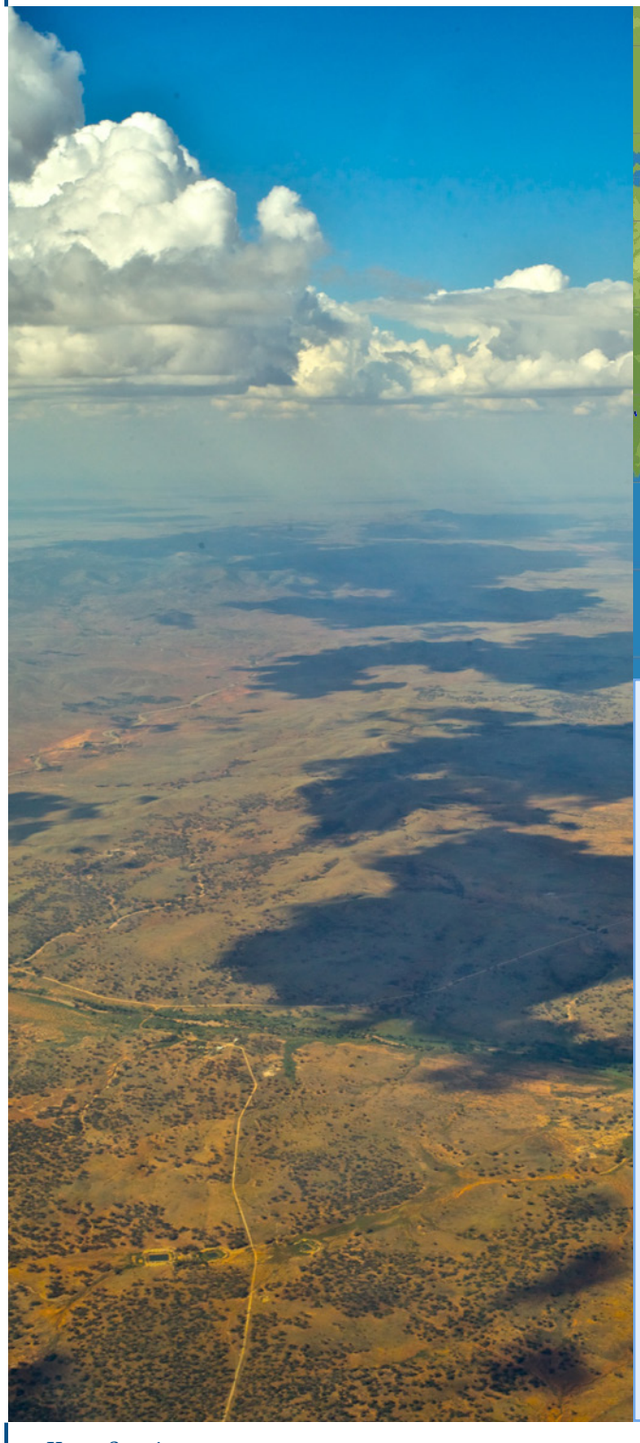
From there we cross the dread Strzelecki desert to Eldee Station which is to the north of Silverton and Broknill as the local GA pilots call it. Then home via Cobar. An estimated point to point distance of just under 3,000 km.

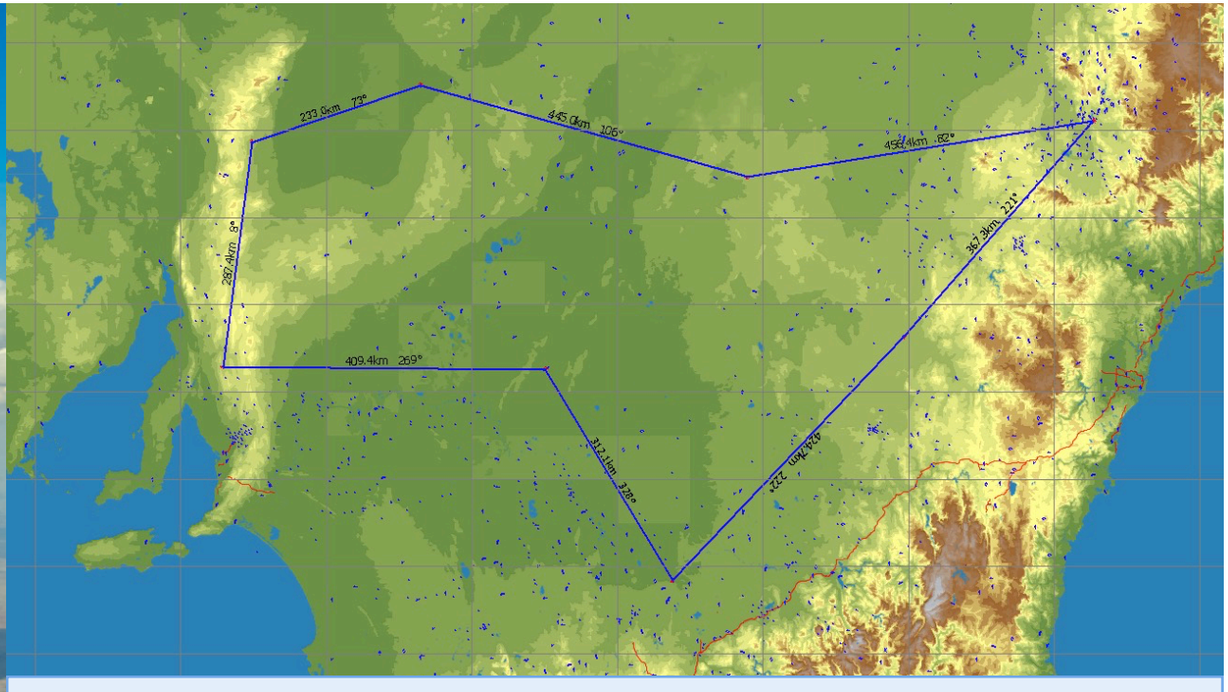
There are a number of 500 km legs which should mean that we get airborne earlier than Geoff Sim would prefer but then we're not dealing either with lazy Qld thermals or stale Qld air, which ever is worse. For some reason, both mean starting later in the day when Geoff is sure the sun is up to stay for a while.

Based on the advertised presence of unlimited alcohols, Geraldine or Girobina as she now calls herself to somehow avoid spam emails, should be joining us in Echuca in time for a lunchtime pissup on a river boat.

For those who like that sort of thing, we should have live tracking and messaging from the InReach tracker which can be seen at:

https://share.delorme.com/JohnClark2





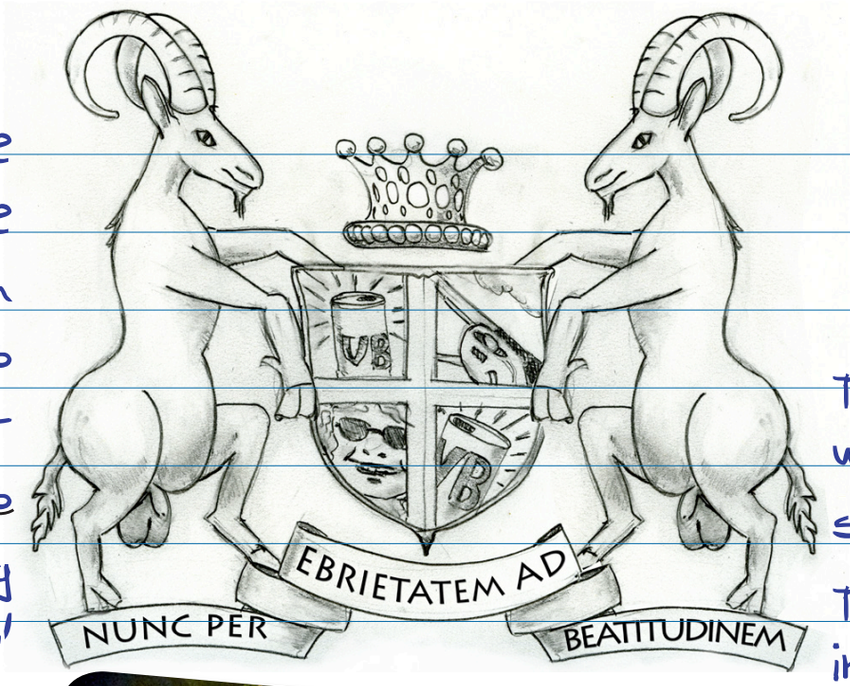
THE ROUTE:

Fri 28 Nov	Keepit to Forbes (air 429km/road 444km)
Sat 29	Forbes to Echuca (air 423km/road 519km)
Sun 30	Rest day Echuca … lunch on the paddle steamer
Mon 1 Dec	Echuca to Mungo Lodge or nearby Turlee Station … tba (air 313km/road 406km)
Tues 2	Mungo Lodge to Clare/Bungaree Station (for 3 nights) (air 450km/road 568km)
Wed 3	Minibus tour of Barossa Valley - lunch at Maggie Beer's
Thu 4	Mini bus tour of Clare Valley - possible lunch at Skillagoe
Fri 5	Clare to Wirrealpa Station - Dinner at Blinman Pub (fabulous pizza night!) (air 383km/road 500km)
Sat 6	Rest day at Wirrealpa - suggest visit to Brachina Gorge - BBQ dinner at Wirrealpa
Sun 7	Wirrealpa to Eldee Station (air 252km/road 465km)
Mon 8	Eldee to Cobar (air 429km/road 444km)
Tues 9	Cobar to Keepit (air 508km/road 521km)

You might have guessed that the editor "helped" with my ~~manager's~~ presies report in the last edition. It made ~~anus clenchign~~ grippping reading for me anyway!

You imagine how miffed I was, not being able to give the ~~bastard~~ chap ~~his comeuppance~~ his AFR?

Val Phillips has settled into the chair as Manager and is making her mark on the ~~seat~~ position.



FROM THE OFFICE OF THE PRESIDENT

After her break in the UK in August, it was grouse to hear her say how nice it was to be "back home" in LKSC... so it must have been pissing down in the UK!

Val old girl, I trust your time in the job will give you as much pleasure and satisfaction as I enjoyed.

Chris Bowman and I did a fact finding tour of Takikawa in Japan during June. Takikawa is the location of SATA, the home club of one one our members, Koichi Onada.

It was ripper to catch up with Koichi on his home turf though we missed the roos and it pissed down there too.

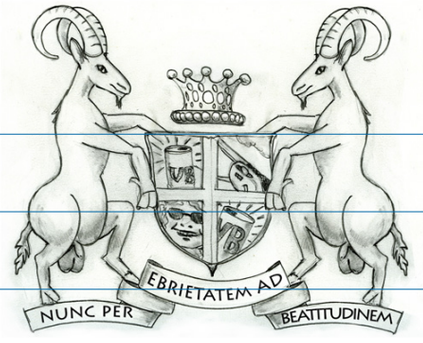
The club is similar to ours in many ways (apart from the roos) (and snakes) and obviously very different in others (like no poisonous spiders etc). (And no VB)

They have a real staff members who do visible work, some part time and some employed by the local council.

The tuggie was an Aussie from Waikerie who they made sleep in a cara like ours with all that deluxe stuff.

I mustn't forget to say oo-rooh to our "o/s" members for their help on this tour.

It was heaps good in Hong Kong where we had a good promo and pissup was helped by Anthony White and Casey Lewis. They don't have VB there either.



~~Glider-wreckers~~

Maintenance week was once again well-coordinated by Team Bull. You wouldn't believe it but the bastard wants to come back next year! The website bloke is going to make him pay heaps to get back on the mailing list!

This week saves the club a stack by not having real Annual Inspections but you have to keep an eye on them to keep them off the piss. Again many thanks to Anne and Dave for the munga and all that.

The committee has approved renos to the front of club house which will improve ~~its usability~~ things. Jason Kath and Christian Linnet will be doing the hard work, me supervising hehehe, replacing the fly wire

screens along the front with aluminium windows, trashing the front wall and levelling off etc. etc to make a bigger space I think.

This should result in new building for a song and not upset the treasurer... if he ever gets around to doing the accounts.

Because rest of youse won't ~~poor bloody~~ Vic Hatfield has taken over our lovely green John Deere and slasher. Remember ~~you ungrateful buggers~~ members, that these assets belong to all of us and we should look after them!

The season is "full on" at the club with heaps happening.

We had the women in gliding lot for a week. Our Jenny won almost everything except the novice stuff. The piccies earlier are their ~~rissup~~ speech night.

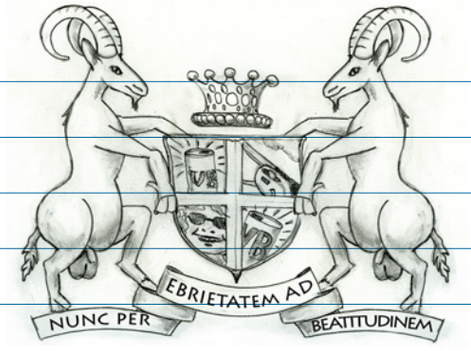
This was like ripper night and I got to stand in with the band. I have to say a case of Coopers does not have the true tone of a case (empty) of VB. Blame that on Pete'

There's a subtle difference between piccies of events and evidence. I was a bit lit up I think but that's it. I would explain to any other budding snappers that I have a LONG MEMORY!!

I've got to share this snap with youse. Our bob must have overslept or something. He turned up to the first day of Keepit Fast half dressed and finished during briefing.
This is him half-dressed looking to see if there is any vintage cheese inside his heritage socks. The tuggie almost passed out while Pete didn't seem to notice... he's from the UK of course and the one to blame for some poncy furriners beer turning up in the club fridge.

The 2014 Qualifying GP was held in secret at the club in November. I guess everyone is too hung over busy after a hard days flying to post much of anything to the chat group, especially if some foreigner member of another club won the day.

For those of youse who bet the farm on Chis Bowman to come out of nowhere and win by a nose, I apologise. He's been up to his neck in accounts (says he). Bob Dircks socks probably got the better of him an all though he flew a brilliant 2.2 km on the first day.



Our Allan Barnes, Jacques Graells and Matthew Atkinson did us proud, with the first two winning a day each. But in the end it was the furriners visitors who won the day.

So far as I can tell from the secret nature of the scores, they go like this.....

Craig Collings
Tom Claffey
Matt Gage
Allan Barnes
Lisa Trotter
Andrew Georgeso
Bernd Hubka
Peter Trotter
Jacques Graells
Greg Schmidt
Matthew Atkinson
Bill Hatfield
Ailsa McMillan
Peter Krygger
Bob Dircks

Well done youse all!!

There will no doubt be clashes between members needs and these activities, like blokes can't share rooms with the WIGS when it's sheilas week. But it's all for a good cause so keep your chin up and KBO.

The successfully running of these events will enhance fix our reputation and who knows, we might even get a look in the door at the world comp one day'

I must comment on 2 recent events concerning old long term members. The first was Gary Speight's 80th Birthday, well celebrated at Chateau Dircks. It was like when the dogs all held a meeting and "they came from near and far" and acknowledged the contribution to our sport that Gary as made.

More importantly we were able to acknowledge the friendships that we have made with Gary; again Happy Birthday Gary - may there be many more.

On a sad note I must finish by noting the passing of Geoff Neely. Geoff was a long term member and served the club in many roles, the last being one of the few local tuggies.

During my time as manager, Geoff was always ready and happy to step into the breach when required.

Geoff had an interesting flying life and was a very fastidious pilot.

Geoff was able to bring his life to a close at a time and place of his choosing and with that, he was able to depart in peace.

We are planning a lasting memorial at the club for Geoff and I will keep you informed.

This season is a cracker already. Remember your friends and fly safely i.e. stay in control and don't hit anything ~~I wouldn't~~.

G Dale at "Keepit Fast"

Last week was "Keepit Fast" – a week of coaching with British gliding coach extraordinaire, G Dale.

G is known to some of the early members of Keepit as he and his lovely partner Annie Laylee, spent a year at Keepit as manager and instructor following the disastrous fire in 1994. G returned to the UK following this stint at Keepit, to a job as National coach for the British Gliding Association.

These days G spends his life in the UK in the northern summer, and the southern summer working for Gavin Wills at Omarama in the South Island of NZ, and in-between times in Australia, South Africa and other odd spots lecturing and coaching performance pilots.

He is currently writing a series of books on cross country flying due for release shortly. Having seen the proofs, I'm keen to get my hands on a copy as soon as it's released. G has the knack of presenting ideas in a unique way which makes complex issues clear and obvious.

G is a member of the British gliding team at world comps and has won a few days in club class. He competes in a Std Libelle.

Apart from these formidable skills as a glider pilot and coach, G is an accomplished concert pianist, having trained at a conservatorium of music in Londonand has performed to an audience of 600 . Pilots at dinner last Friday evening were delighted to be entertained by dinner music supplied by G, a wonderful assortment of modern songs and jazz standards.

Something new for "Keepit Fast."

Directed Flying and Performance Comparisons

G Dale's approach to coaching is to build a course of lectures and instruction based on the needs of the participants. Having established the objectives of the course participants at "Keepit Fast", the week settled in to a series of short tasks each day of around 300 odd km, with analysis of performance results and lectures based on those results and the issues that arose from the various pilot performances.

Each of us flew the same task, (with occasional extra length for the higher performance gliders,) with the same limited start height, so that comparisons of the essential factors for cross country performance could be analysed. This is something as a weekend club we should be doing more often – Kingaroy's regular club racing every weekend shows how flying skills are developed by this activity.

So, what did we learn?

I guess the key thing that registered in my mind from this week's lectures was:

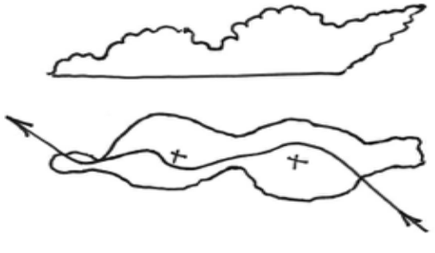
"That gliding is a game of chance."

It's something I've heard before from G, but seeing it demonstrated again brought home the message to me. In the gamble of the game of chance, you need to improve the odds in your favour, and reduce the risks. G clearly demonstrated the truism of the bird in the hand being worth more than the one in the bush.

While it is very profitable to leave a 1 knot thermal for a doubling of climb rate, the same benefit does not accrue from a doubling from 5 to 10 knots, and the process of chasing an improvement from your established 5 knot thermal to find say, 7 or 8 knots is very risky. (See later article on time to climb.)

I must say that many times I get overcome by my own impatience, and go chasing better thermals, rather than sticking with what I've got, and risking a blow up as a consequence. I think I'm also guilty of making too many corrections in thermals, trying to maximize lift, while in fact I may be worsening climb performance by not flying consistent circles.

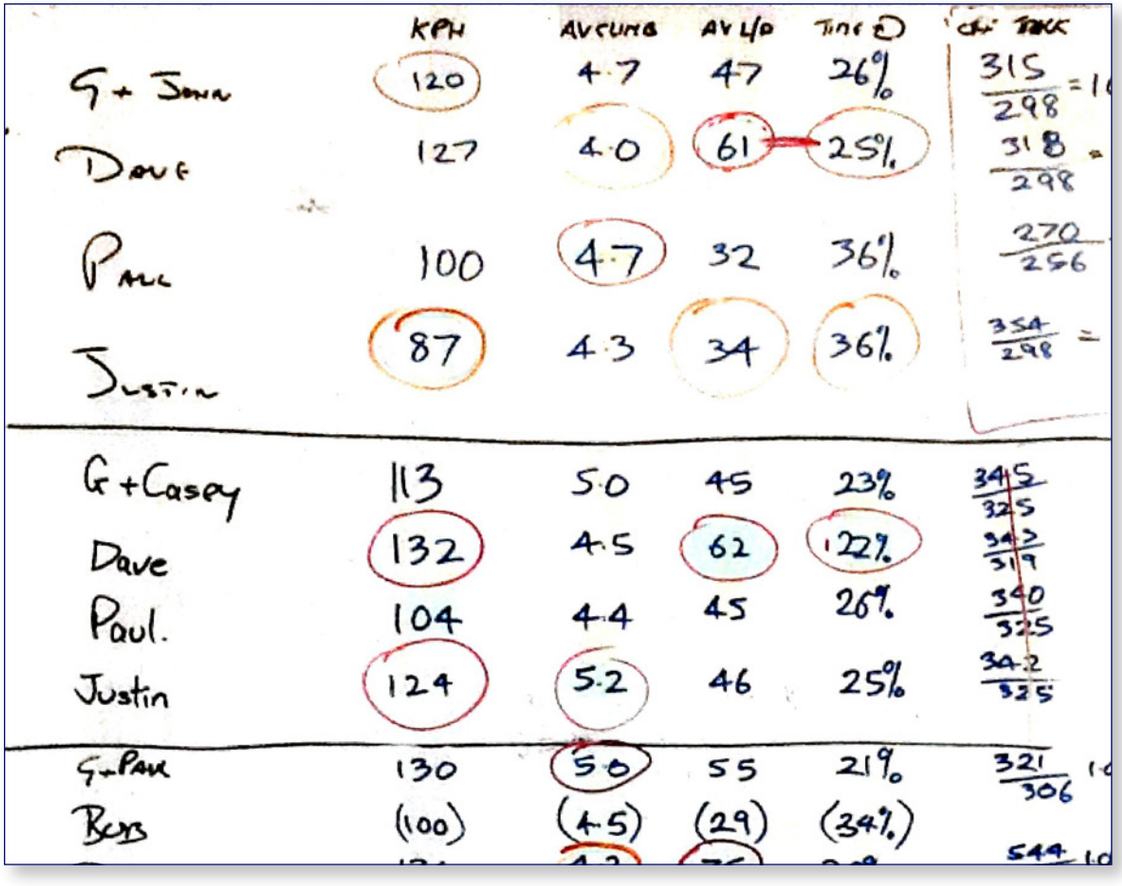
The same principle applies to planning a track through the air, taking a route that maximizes the chances of finding a thermal core. Selecting a Route under a cloud, should maximize the "chance" of finding a thermal – "X" marks the possible locations of thermals. Fly past as many as possible.



Analysis of daily performance was also interesting. A bit galling for me personally having written articles for club consumption on how to thermal. (See later article on Circling Performance)

Probably the single biggest factor in cross country speed is the average climb rate achieved. Consistently, my average climb rate was the worst amongst all the participants.

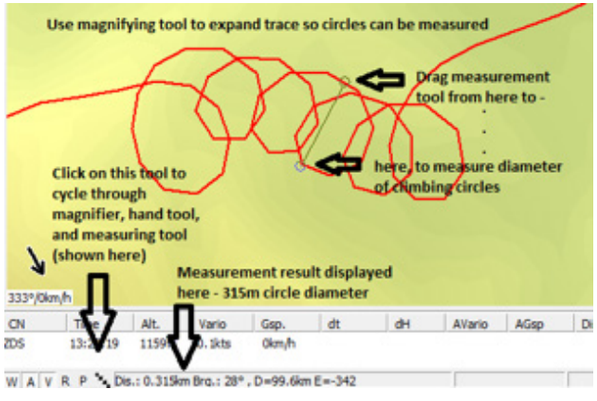
This lead to analysis of our SeeYou traces to determine how tight pilots were turning. G made an issue of this, pointing out that he consistently



Keepit Fast. Analysis of XC performance on days 1 & 2. The headings read: Pilot, Speed (kph), Average Climb Rate, % Time Spent Thermalling, and Extra Distance through flying off track.

turns tighter than competitors he races against, and by employing this technique he manages to climb faster and beat his peers. He certainly was able to demonstrate this from his SeeYou flight traces. Consistently, his circling diameters were less than everyone else.

You should try this analysis on you own flights. Here's how:



I confess – that's my trace and I must have been getting tired or lazy to be circling in such wide turns. No excuse of heavy ballasted glider could explain away this result.

CIRCLING IN THERMALS (TAKE 2)

Some time ago I wrote an article about circling in thermals. (The original calculation sheet was dated 2006). Having sat through an analysis of our climbing techniques with G, it seems that I need to take a dose of my own advice.

I'll republish this article here, for two reasons: It goes back so far that anyone who read it then will have forgotten it, and the advice is still relevant, and… There is a very fundamental flaw in this article. Can you spot that flaw?

CIRCLING IN THERMALS

Dave Shorter

Probably the biggest difference between flying gliders and conventional planes is that we spend a large proportion of our time flying in circles.

A top cross-country pilot may spend 25% of his time circling, while others of us may take well over 50%. The less time climbing, the more time we spend on our task, and the faster (and further) we travel.

So it will come as no surprise that choice of thermals and circling efficiently are probably the most critical contributors to successful flying.

Thermals, trigger points, cloud shapes, selection of thermal, and finding the best lift when you're in the thermal are covered by a lot of texts, and underlie the success of a lot of the most successful and experienced pilots.

But circling efficiently …?? We all learnt that before we went solo!! Or so we think. But most club pilots (including many instructors too) fly too flat.

Maximising the rate of climb is very much affected by how well we fly the glider in the thermal and choice of bank angle and speed makes a big difference.

From the table below, you can see the difference angle of bank can make – flying 50 knots at 30° instead of 45° means an extra 100 metres in your circle diameter. That could be the difference between being in or out of a thermal; back down on the ground instead of up under the clouds.

I've flown in thermals with a lot of pilots circling at 30°. Probably the biggest mistake made by most pilots is to fly the glider too flat. In a tight or narrow thermal it's absolutely essential to bank over to a good 45° to stay in the thermal.

CIRCLING DIAMETER (mtrs) / TURNING TIME (secs)

Circling Speed	Angle of Bank (degrees)					
	15°	30°	40°	45°	50°	55°
40 Knts	322 / 49	149 / 23	103 / 16	86 / 13	72 / 11	60 / 9
45 Knts	407 / 55	189 / 26	**130 / 18**	109 / 15	92 / 12	76 / 10
48 Knts	464 / 59	215 / 27	**148 / 19**	**124 / 16**	104 / 13	87 / 11
50 Knts	503 / 61	233 / 29	161 / 20	**135 / 16**	113 / 14	94 / 12
52 Knts	544 / 64	253 / 30	174 / 20	**146 / 17**	122 / 14	102 / 12
55 Knts	609 / 68	283 / 31	194 / 22	**163 / 18**	**137 / 15**	114 / 13
60 Knts	724 / 74	336 / 34	231 / 24	194 / 20	**163 / 17**	136 / 14
65 Knts	850 / 80	395 / 37	271 / 26	228 / 21	**191 / 18**	160 / 15

Even in strong, powerful, wide thermals the central core is often much stronger and it again pays to be banked well over to maximise rate of climb.

Why do people fly so flat? Many reasons:

- It's much more difficult to maintain a steady glider.
- Speed control becomes more difficult as you get closer to stall.
- G forces get higher (at 45° you're pulling 1.4 G while at 30° it's just over 1.1 G).
- It's difficult to get an honest assessment of your angle of bank – it normally looks steeper than it actually is.
- It's generally more uncomfortable. It needs more concentration and you have to work harder.
- I find when I get tired, lose concentration or I'm just feeling lazy I fly much flatter – it's easier and less work.

Speed to fly is also very critical. A slow speed reduces your circle diameter and gets you closer to the core, but too slow and you start mushing. As the glider is close to stall any turbulence and wind gusts make the glider very unstable. Generally with very smooth thermals you can fly slower – if it's gusty you may need an extra 5 knots or so.

You need to test out your rate of climb against other gliders to find out what speed is optimum for your glider, but as a general rule of thumb most un-flapped fibreglass gliders seem to go best at 50-55 knots well banked. Flapped gliders may find they can fly a bit slower. With maximum water ballast, optimum speed may be 10 knots more."

So what can we do to improve our circling performance?

- Set up two reference lines at 90° on the top of your instrument panel – a set square or two drinking straws mounted in blue tack – each at 45° to the horizon. Check the alignment of these against the horizon when circling. You may be surprised.
- Time your circles – line up a mountain, or road and see how long it takes for it to come around under the nose again. Keep counting for a few turns.
- Can you maintain an average turn rate of 18 seconds or less? (45° at 50-55 knots requires 16-18 sec). 3 turns in a minute you're too flat – 4 per minute you're going great!
- Circle with other gliders. Can you out-climb them? That should be your objective every time you fly alongside someone else.
- If the other glider is catching up to you from behind you're probably flying too flat (or too fast – it's a paradox that the faster you fly, the wider you go and the slower your turn rate). Conversely, if he's gaining height faster than you, are you flying too slow and mushing?
- And remember that the thermal is never a perfect vertical column – keep adjusting your circle. Bank over and really tighten up whenever you find that really "zingy" core.

For those interested in the maths the turning radius and rotational time are independent of glider mass or design. The formulae are:

Diameter (metres) = $0.0539\ V^2/\tan \phi$

(ø bank angle, V knots)

Time (sec) = $0.3295\ V/\tan \phi$

CFI's Note: the inclusion of the picture alongside should not be taken to mean that this is an example of good circling technique. The perpetrator failed Keepit Fast except when he was made to take a remedial flight with G Dale in the Duo.
Though the angle of bank is adequate, either the pilot has been reading Klaus Holighaus or he is doing a Garry Speight with the yaw string. The lake looks nice though.

A good coverage of the mechanics of flight can be found in the book by Welch and Irving, New Soaring Pilot.

(Footnote. An interesting side issue is that loss of height in a single turn is minimum when banked at 45°. So if you have to turn back in a hurry, and you're scratching for height turn at 45° bank.)

So, where's the flaw?

After publishing this table of circling values, Garry Speight said "I know the theory is correct, but I must say that achieving the turn rates calculated in that tabulation is extremely difficult." I had to agree.

Achieving a consistent turn rate of much better than 3 per minute is more than I can manage, let alone a 16 second turn rate, which is what you should achieve for a 45° banked turn flown at 50 knots.

I didn't worry about this any more, just thought that it was a very interesting demonstration of how difficult turning tight can be.

Then, after all these intervening years, the light finally came on….

Our Airspeed Indicators (ASI) are calibrated based on the international standard atmosphere, which is 1013.5 pressure at sea level and 15 °C temperature.

We NEVER fly at sea level, and normally fly at significantly HIGHER TEMPERATURES than 15 °C. Our True Airspeed (TAS) when flying at elevation from a hot airfield is considerably higher than the Indicated Air Speed.

CIRCLING DIAMETER (mtrs) / TURNING TIME (secs)															
for: Field Temp°C =	35	Field Elev (ft) =	1150			Flying Elev. (ft) =	8000								
Thermal cooling° C/1000ft =	3			Density Altitude at Flying Elevation =		9854									
Indicated Airspeed	True Airspeed	3													
		15\		30\		35\		40\		45\		50\		55\	
40 Kts	48 Kts	461	59	214	27	177	23	147	19	124	16	104	13	87	11
45 Kts	54 Kts	584	66	271	31	223	25	186	21	156	18	131	15	110	12
48 Kts	57 Kts	664	71	308	33	254	27	212	23	178	19	149	16	125	13
50 Kts	60 Kts	721	74	335	34	276	28	230	24	193	20	162	17	135	14
52 Kts	62 Kts	780	77	362	36	298	29	249	24	209	21	175	17	146	14
55 Kts	66 Kts	872	81	405	38	334	31	279	26	234	22	196	18	164	15
60 Kts	72 Kts	1038	88	482	41	397	34	332	28	278	24	233	20	195	17
65 Kts	78 Kts	1218	96	565	44	466	37	389	31	326	26	274	22	229	18

Calculation Assumptions -

1) Pressure altitude = Altimeter reading. Ignore atmospheric variation which should be limited to less than +/- 500ft (QNH variation from 990 to 1030 mbar)

2) Thermal cooling °C / 1000ft in assumptions above (should be 3°adiabatic lapse rate) but with mixing may be slightly lower than this. (The effect of using 2.5 is negligible)

3) So temp (OAT) at flying elev = Field Temp - (Flying Elev - Field Elev)/1000*3

4) ISA Temp (std temp at altitude) is 15°C (sea level) less 2°C per 1000ft.

5) Density Altitude at Flying Elev = Pressure Altitude + 120 x (OAT - ISA Temp)

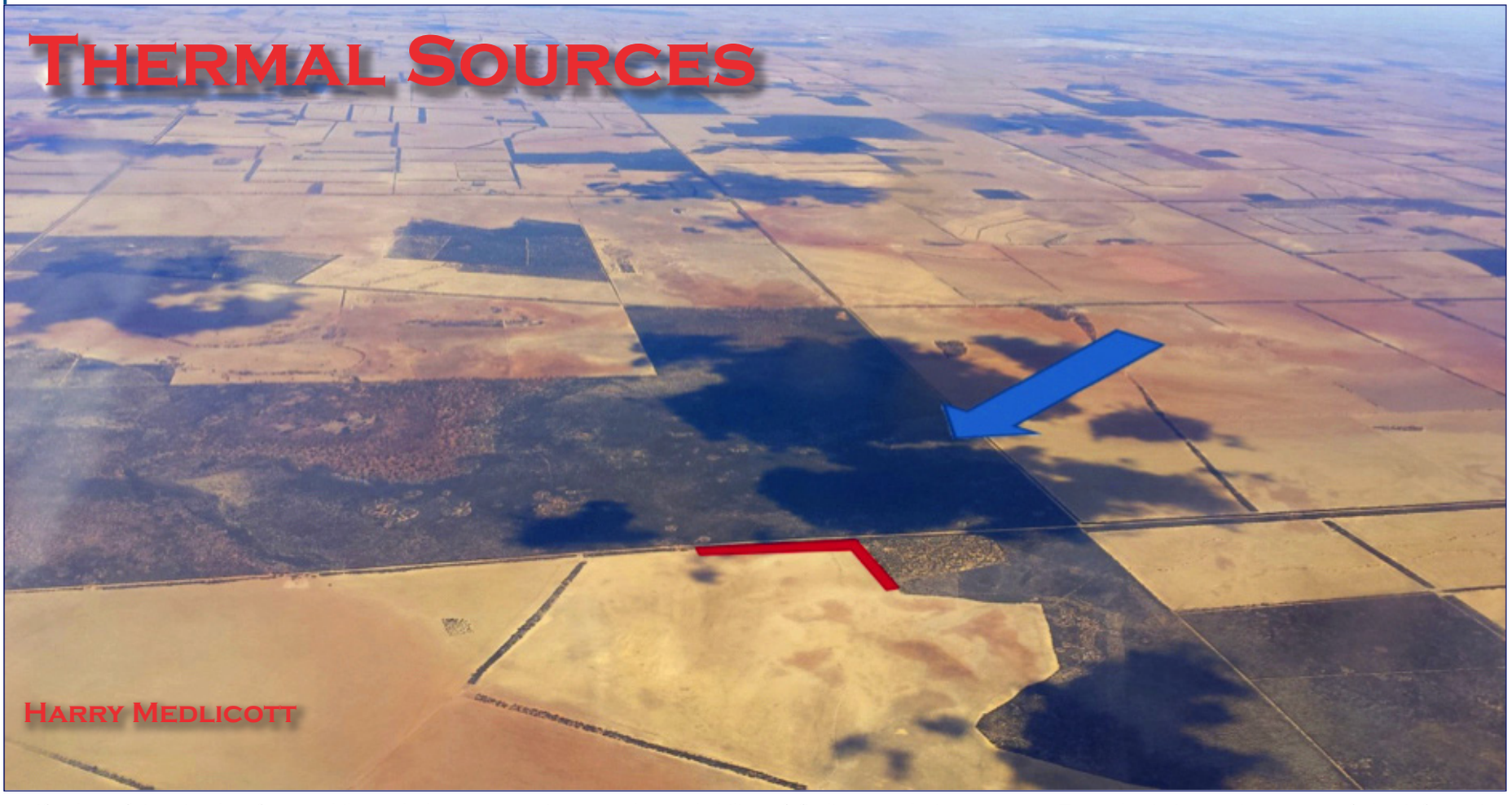
6) True Airspeed increases at 2% of Indicated Airspeed per 1000ft of effective altitude.

So a table of turning circles and times, corrected for say, 8,000 ft, after launching from Lake Keepit on a 35 °C day would look more like the values in the table above.

We've loaded this spreadsheet onto the club website at http://www.keepitsoaring.com/LKSC/Downloads/Circling_Speeds_Bank_Radius_Time_Corrected.xls

You can enter different values in the top blue fields to see the effect temperature and elevation have on the circling performance.

Thermal Sources



Harry Medlicott

If when flying I relax for a while and do not concentrate on finding the best air, the inevitable result is getting lower than desirable and having to regroup my thinking. This situation probably equates to a pilot with little cross country experience who, not knowing how to interpret the sky, struggles to find lift.

The above photo, reprinted by courtesy of James Cooper from Soaring Australia, could well be the view available to a cross country pilot. To a pilot of low experience it may provide few clues as to where to increase the probability of finding good air or a strong thermal. To an experienced pilot, whether subconsciously or not, it tells a useful story. The blue arrow represents the wind direction and a speed of 5/10 knots. The red lines represent the area the author (not me) would expect to find a thermal.

The challenge is for you to study the photo and write down everything it tells you about the sky ahead, especially where you would fly hoping to find a good thermal.

To make it interesting some of the information which the photo reveals may be found on the next page. Don't cheat and peek a look if you want a good idea of just how prescient your observational skills are.

The scene is typical Australian dry farming country. There is no sign of crops in the extensive bare areas which suggest a summer environment. The scattered cloud shadows indicate cumulus clouds and, as the higher the cloud base the further apart the cumulus clouds, their density suggests a high base.

There is streeting evident in the pattern of the clouds, running from the bottom left hand corner to the central top.

The pilot who took the photo would have been nicely under the street if he was flying in the direction of the photo. Always remember that parallel to cloud or lift streets are sink streets and best avoided.

Let's assume that the pilot has lost height and is now looking for ground features to gain altitude. A general rule is that when cumulus clouds are present we study them when in the top half of the total height available and when we drop into the lower half then we should be looking at ground features and the lower we get the more our interest is focussed on ground features.

As a rule of thumb, good thermals are about seven times their height apart. All the air warmed by conduction from the earth sooner or later reaches a thermal and a large one contains thousands of tonnes of air.

This means that a large thermal reaching 10,000 ft may have collected the warm air from about 300 square kilometres. When thermals going this high are marked by clouds then navigating towards them is not difficult even though they are often 20 km apart.

Blue thermals going high pose a problem because if you miss one it can be a very long way to the next. Under these circumstances it can be wise to scan the track ahead and try and identify better areas for thermals such as groups of red paddocks and modify your track slightly to intercept them.

Thermals break away at what we call trigger spots but they are the result of the aggregation of air from a very large area. A trigger point may be a place such as downwind of a dark paddock or a rocky outcrop. Just as likely is a point, in conjunction with a breeze or wind, where ground features cause the warm air near the ground to be concentrated.

The head of a valley facing the wind and having a large flat catchment area is an obvious one but also lines of trees can divert the airflow and concentrate it resulting in a thermal being generated where there are two lines of trees forming a Vee and facing the prevailing air flow.

So let's look again at our photo. There are some obvious areas where the warm air from the expanse of bare ground would be concentrated.

In the lower right hand corner the forested area has a right angle which is facing the prevailing wind.

Just above this point is a road with substantial trees either side. The angle comprising the row of trees and the forested area faces the prevailing wind and would also tend to concentrate the warm air flowing into it.

There are two rows of trees in the low centre of the photo which could work but I would not go out of my way to fly there as the trigger points upwind would most likely have used the air from the extensive bare area.

The small cleared area between the large forested area and a small forested area, centre and slightly left, would have warm air funnelling into it.

Can't be sure, but there appears to be a higher raised area running along the lower edge of the main forested area. Might be a trigger point for a thermal.

When flying cross country most of us want to do it reasonably quickly and it is apparent that to carefully search all of the possibilities would take too much time unless we were desperate.

My own experience is that, in contradistinction to working clouds, it can be better to go to one isolated trigger point with a high probability of having a decent thermal than an area with many possible trigger points, so if flying in the direction of the photo would fly over the trigger points discussed but not spend too much time unless a thermal was evident.

To digress, a similar situation commonly exists when flying back to Lake Keepit late in the day from the north. Pilots fly down the western side of the Nandewar range and change direction a bit to intercept possible thermal sources such as the heads of valleys, large areas of exposed rocks etc. However they do not spend much time investigating each source but quickly press on to the next interesting area if nothing substantial is found.

The area from which the warm air for the thermal has come stretches perhaps 10 or 15 kms to the west and this area is accordingly usually devoid of strong thermals. Hence experienced pilots try and get onto the higher west and sun facing country later in the day.

Getting back to the photo you will note two or three smaller forested areas beyond the major one in the foreground. A perhaps better chance of easily finding a thermal when flying over these than the very large area in the foreground.

Experienced pilots look down when in a good thermal and try to identify the area from which the thermal originated.

It goes into their memory bank. Ingo Renner, by far the most successful international pilot to have represented Australia, used to mark his maps with the position of good thermals and lift areas he had encountered. My own limited experience is that you can come back to an area years later and find the same thermal sources still work and conversely with areas of poor lift.

Hope all this is of interest. How well did you score?

Harry Medlicott

FURTHER HOME WORK

If you did well on the last test and picked enough thermals to stay airborne, you might like to try your hand at these pictures too.

Top: The upper grey-green area of the picture is a dry river bed though whether this is any cooler than the surroundings is open to conjecture. There is a thermal as you can see from the two gliders climbing, but where is the source?

Bottom: Another difficult, cool and blue day. The country is flat except for the shallow depressions of salt pans. There's a moderate wind blowing as you can tell from the dust being kicked up by the truck. Would this trigger a thermal? Where else would you look?

WINNING THE DAILY OLC.
EVERY DAY.

You can enjoy a lot of sporting activities such as sailing, cycling, surfing and gliding without ever feeling the need to win but there are times when winning can be good. Some of us are very competitive and feel the need to win in all of our activities while other people compartmentalise and keep competition to peripheral activities such as parking, queuing and commuting. Winning is nice from time to time. Well it certainly beats being a full-time loser.

Cowardice and cheating are both things you find in sport and both emotionally charged words for many, but neither is all bad.

In a lot of sports, cheating is what you do to win. You interpret the rules, you bend the rules or even have them remade to your advantage. The America's cup is a prime example though there are many many others.

Shortly after WWII, British motorbike manufacturers were looking for exports. Triumph went to Daytona beach and thrashed the side-valve Harleys and Indians racing there. So the US motorcycle racing association banned overhead valves… until Harley had them. Then Norton went over with an overhead cam engines and again the Harleys were thrashed… so overhead cams were banned. You might even make a case that American football is the way it is so they do't have to compete on the world stage.

Of course, bending or remaking rules happens mostly in big money sports like football, sailing and motor sports where winning is everything because of pressure from fans and sponsors.

In races like the Sydney to Hobart, there have often been whispers about boats using their motors in calm conditions and where sail area is measured so fanatically, there's always room for using 'illegal' sails.

Gliding is fortunately freed from most of these pressures and there appears to be little room for creative cheating in gliding. There also appears to be little room for having a little fun and amusing your fellow competitors too, even if it ain't exactly cheating.

We were once sailing on a Sunday race. It was an absolute drifter and it looked very unlikely that anyone would get more than half way around the course. Crews strained, continually but gently trimming sails to catch every breath of wind. The concentration was intense.

Then, slowly, slowly, a boat behind us started catching up. They appeared to get some pressure from somewhere and our crew got even more frantic in their efforts. It was not until this yacht was a few boat lengths away that we saw the tell-tale water pulsing from their boat's exhaust. As they slowly motored alongside, engine throttled right back, they hailed and told us they were abandoning. It was hugely funny.

When using the engine in most sustainers and self launching motors, the glider is considerably slower and only a jet sustainer might give you an advantage but even then, it's very audible and visible. Nevertheless, used in the right way, an engine can add some zest to an otherwise bad day.

Returning from Coonamble on a Safari, we were having a hard time getting over 4500' and it looked as if we were being forced to take the long way around the Warrumbungles. We were scratching around the foothills, polishing some rocks to a high shine, trying to catch something to get over the top instead of around the edge.

We saw Geoff Neely wandering up a valley and then suddenly, towards the head of the valley, he seemed to get something strong off the rocks. In the distance, we could see him climbing and finally disappearing straight over the top. ZAB turned and followed up the same valley but could not find the source of this lift.

Later, back at the club, we asked Geoff about this magic climb and he explained that he'd been so maddened by the conditions that he'd given up, turned on his motor and gone home in the shortest possible way. He did not realise that we couldn't see he was motoring… still it certainly added some laughs to an otherwise difficult day.

Surely cowardice has to be good, if it helps you survive and pass on your genes? It's been shown that most young women like dangerous men but grow out of this preference when they have children, preferring softies. But few wives and children want a dad who is a total loser. So occasionally a certain amount of daring is required and a strategic if virtual win is very useful.

What follows are some fairly fail-safe strategies for winning the daily OLC which don't involve cheating or excessive bravery. They work well with those at home and work, provided you don't allow people uncontrolled access to the OLC site.

Before you start thinking about setting up a bogus, parallel OLC site, forget it. It's too much work and lots of work is counter to the spirit of this project.

There was a time shortly after I met my wife when I was required to cheat at games. She was a child of the Space Invaders era, me of the pinball and table football age. She is strangely competitive and even finds a way to cheat at the memory game… how I have never discovered. When computer games arrived on the scene, they were a natural for her but I just did not get it.

My base competitive instincts did not allow me to lose to her every day so I worked out how to alter the scores list. She'd go off to bed and 5 minutes hacking at the computer would have me top of the scores list. Simple and effective and it gave me a start in programming.

Now my wife has a particularly aggressive Alpha Female friend who is always texting and posting stuff on Facefriend about this win and that triumph. I would not say that this costs me much sleep but it does niggle.

Winning the OLC on several occasions has helped this situation enormously. All it takes is a quick post on the interweb and you can be a hero for a day. Almost.

These are the instructions for winning the daily score.

1. Seize the day. You need to choose your day to win the OLC. Most people, the vast majority of people, know absolutely nothing about gliding. You can collar someone at work and tell them you flew ten, a hundred or a thousand kilometres over the weekend and it won't mean a thing. "You flew 10 kilometres without an engine! What a legend!" So the first thing to grasp is that when winning the OLC daily competition, you don't need to fly very far. Choose a day to fly when nobody else is going to be flying and if possible, conditions are terrible in other places.

To be frank, this means little. For most of the year, conditions are terrible in states like Victoria, South Australia and WA and nobody glides in Tasmania do they? So you only have Queensland to worry about so make sure a tropical cyclone is on its way before getting driving to the airstrip. Don't worry too much about the Kiwis. The weather is largely awful over there for most of the year. And the Yarpies are not going to be out of bed until well after you have won.

2. Keep Situationally Aware! This is really important. If there's some hotshot (mainly Atilla) out there, flying a glider with a great handicap, you must land and post before they land. This is not difficult because Atilla always lands after dark.

2. Don't make the mistake of flying too far. It's not necessary to fly off the earth. Leave that to Jenny. If you must fly a long way, make sure it's a series of quick dashes between Manilla and Gunnedah… the OLC doesn't know the difference. That way you're close enough to land as soon as you hear some hotshot calling inbound.

5. Land early and post your flight early. It's essential to land early. There's nothing so disappointing as flying your arse off for an hour or two and then losing. If you find that you are getting pipped to the post, consider keeping a computer in your hangar or car and posting your flight from there.

6. Take a screen shot as soon as you have posted. Learn how to take a good screen shot of just part of the screen in case there are details you need to exclude.

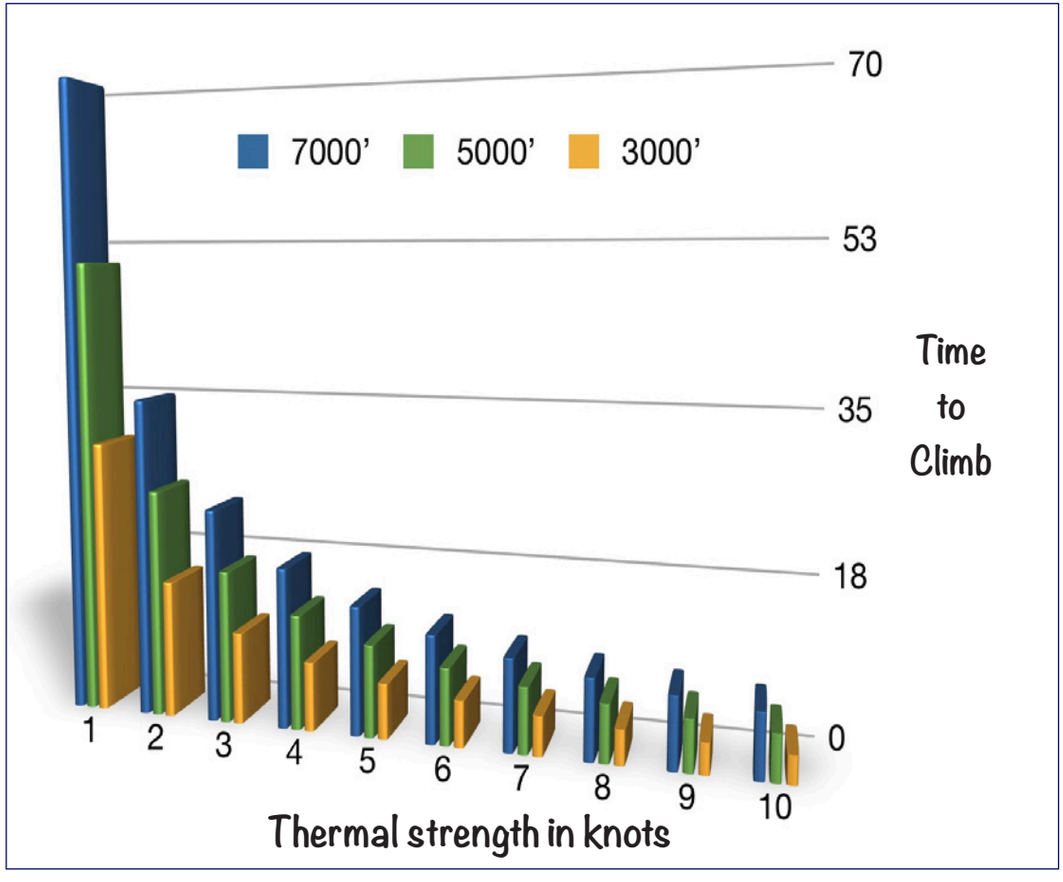
With these few simple steps, you can rely on winning the OLC daily score enough times to impress the most competitive of your friends.

There will be those, and Trevor West comes to mind, who must never find out about this. How would he feel? After all, he won the OLC worldwide daily score with a flight more than 14 times longer than my winning flight. What a terrible waste of time! And at his age!

An OCL winning flight! In fact, this 72 km odyssy may have really been the best flight of the day!

Time To Climb

MORE EXCITING FACTS FROM KEEPIT FAST.



Although it is probably true to say that most glider pilots show Aspergic tendencies, there is a wide spectrum of behaviours. At one end are the human computers, the organic calculators, who can reduce everything down to a series of numbers, even while outlanding.

At the other end are the artists, the poets of the sky (to paraphrase Matthew Minter!) who do everything by feel and intuition. Of course, many "artist pilots" have learned their chops as diligently as any musician but fly on the mental equivalent of muscle memory.

G Dale reckons that while flying under pressure, few of us are able to do all the calculations necessary to fly fast so it's important to get the basic numbers down pat, well enough to recall by reflex.

This is relatively easy where the numbers are self evident but not so easy where the numbers are counter to your intuition.

Here, we'll look at something which G Dale pointed out, is quite unintuitive.

We're always told not to waste our time in bad air but the question is at any point in time, what is bad air? What you might call bad air depends on a lot of factors; the conditions on the day, the time of day and what height you're flying are a few.

The graph alongside shows the time to climb 3,000, 5,000 and 7,000 feet, more or less the range of heights we see at Lake Keepit in a season. It is not a linear graph, that much is very clear.

At the left hand side of the graph, the thermal strength is very low and at the right hand side, the thermals are strong. As the strength increases, the time to climb gets less and less, but not in a linear fashion.

If you are climbing in a 1 knot thermal, it will take you a massive 30 minutes to gain 3000'. If you can move to a 2 knot thermal, you can climb the same distance in 15 minutes, a 50% time saving.

So it makes sense to leave the 1 knot thermal, as soon as you safely can, perhaps to join another glider that you have seen climbing faster in a thermal nearby.

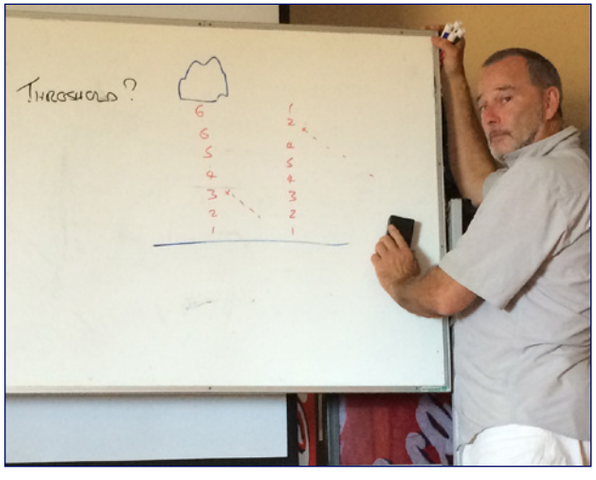
If you are climbing in a 4 knot thermal, it's going to take you 8 minutes to climb 3,000'. But you need to find an 8 knot thermal to climb 3,000' in half the time.

In fact, if you leave a 4 knot thermal and it takes you 3 minutes to fly to an centre a 6 knot thermal, you would have been better to stay in the 4 knot one.

A lot depends on your working height band on any day. If the top of usable lift is low, 4,500' for example, thermals are likely to be closer together but weak. You will be spending a larger proportion of time finding

and centring weaker thermals than you might on a 6,000′ day… so hanging on to a weaker than average climb may not be give as great a time penalty.

On more typical Keepit days, with a cloud base between 6,000 and 9,000′, the overall picture is more complex.



What G's whiteboard drawing shows is the way that thermal strength varies from ground to the top of usable lift on different days. (Does it look as if G Dale is worried about his IP being ripped off?)

On most days, thermals don't get organised too well until they're at least 1,000′ feet above terrain and often don't get good until they're over 3,000′. From then onwards, they normally increase in strength until cloud base.

On some days, where there's extensive condensation in the cloud and it tends to self-stoke, lift might be very strong immediately below the cloud. On other days, the lift drops off close to the cloud.

On blue days, where you might climb through what would otherwise be the condensation zone, the lift may taper off again with height.

Of course wind-shear will affect rate of climb with altitude, especially on blue days, where the lift can almost disappear at a wind shear boundary and then, if you persist with trying to climb, reform and increase above the shear. And sometimes, on blue days, you can find thermals which go thousands of feet above the majority.*

These break-through thermals can be a huge trap if you are silly enough (as I have done on several occasions) to believe that happy times are here again and decide that the top of usable lift has suddenly shifted up 3,000′.

You change up a gear, wind up your MacCready setting and push the stick forwards enthusiastically only to find that last high thermal was a one-off event and you're stupidly low and desperate for a climb.*

You remember Garry Speight's CROC (Critical Rate Of Climb) article, which states that at any time in your flight, there is a rate of climb which you will accept and anything less than that, you'll fly through.

If you are down really low, you'll accept almost anything to stay in the game. Up nearer cloud base, there's little point accepting anything other than a boomer… and even that is questionable because if it really is a boomer, you may spend more time centring it than actually climbing.

It's the middle height band where you have to make decisions. Of course, you need to have a pretty good understanding of the state of the day. You don't want to leave the last weak thermal of the day too low and find it really was the last.

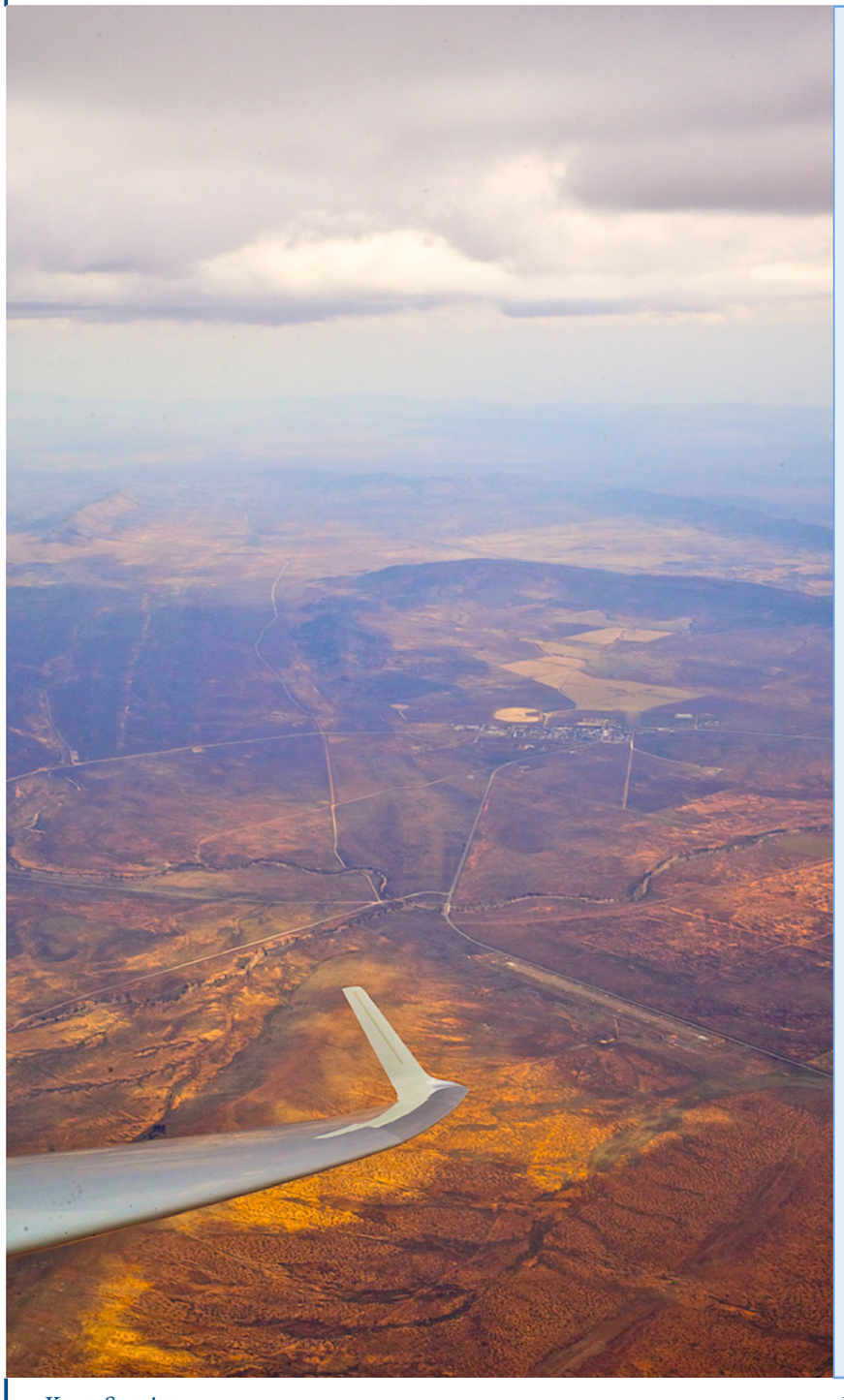
But if you're in the middle of a reasonable day, you can consider your options and roll the dice.

If you are low down and climbing in a weak thermal, always be thinking about your options. If the day is stronger than what you are climbing in, you might gamble that your weak thermal will strengthen as you get higher. But if thermals are reasonably close together, it may be a better bet to leave as soon as you can and look for something stronger.

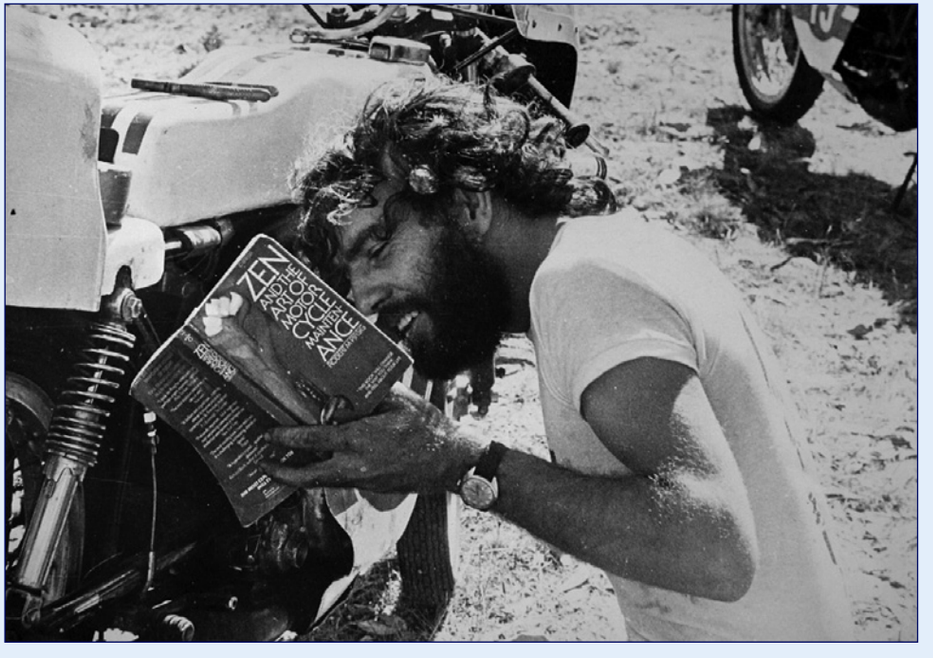
If you are in the middle height band in a moderately strong thermal, then your options are more interesting. You could leave and bet on finding something stronger but it would have to be quite significantly stronger to warrant the time penalty of searching and centring before you were established in what would be a relatively short climb.

*On the last Burketown Safari, we had mostly blue days and it was fairly common to find one or two thermals in a day which took you several thousand feet above the expected top of usable lift.

**Returning from Mungindi at the end of a recent Safari, I was grovelling below 4,000′ for 2 hours and then got a boomer to 8,000′. I pushed the stick forwards and found nothing… I was probably flying above the top of usable lift… Still imagining that the conditions had changed, I arrived at the high ground at the north end of the Kaputar range and failed to find a climb.



Further Reading



The 70's best seller Zen and the Art of Motorcycle maintenance is still a classic and the best selling book on philosophy of all time. However, it does have bugger all to do with motorcycle maintenance. It would be nice to know if this hairy young man managed to get his motorbike to go any faster as a result of reading it.

It would also be interesting to see whether the book had any affect on one's gliding.

It was certainly a powerful book and one which could have a profound affect on one's thinking… provided you could get through the whole book and the horror of discovering that the author rode a Honda Dream (though that was really the point of it). Thank goodness for Alibris and all the sites on the internet which let you buy old books and relive these grand moments! If anyone knows of a website where you can buy any of that old hair, please let me know.

Winning with Woitjec!

The legend is back!

Keep Soaring welcomes the mythical Polish soaring champion Woitjec Bziktk back to this newsletter. Countless are the numbers of members who have been imploring the editorial staff to get Woitjec back for his indispensable clues and insights to his enduring success in the air and on the ground.

Hot from his latest email, here are the Top Tips from Woitjec. Some readers have commented on the sometimes obscure nature of his thoughts, but we're assured by him that the translation is quite correct.

If there are any questions you want answered, please send them in, we'll translate them as well as we can using Babelfish, and forward them to The Man.

Birdman of Balmain asks: Woitjec, I used to like chasing my mates around the skies of an afternoon, but now I am good and I realise they are all really crappy fliers and I think they are holding me back.

Woitjec: It is not so good to fly with pigeons if you are a turkey. He who has something in his head will receive more, and he who has little will be deprived of even the little that he has.

Remember, we must all come down to the ground at the end of the day, but he who sees furthest and gets there soonest will have won. For one man to win there must be many losers. It is best not to be a looser.

Novice from Newcastle asks: M'sieur, you've dominated international competition like nobody else over the last 10 years. How do you achieve such consistency?

Woitjec: It is not so hard. I learn consistency from my mammy. Every day we eat the same thing… turnips in bacon broth from a pig we had to keep the house warm in winter. We never got another pig and endure the cold winters alone.

One day, I leave our village and go to the next valley where they make me eat other food. It made me sick. I was not happy.

In the west, all you have is change and look where you get! I always have the same and don't need change.

It's OK to keep winning and I know anything less would make me unhappy too. I like everything the way it is.

Is the same with drink. You see a pilot celebrate with a drink after a big day? That is a pilot who is not going to be a winner the next day. Living like a monk is not so hard during a competition. You sleep better on an empty stomach.

It is the same with women. My wife likes things soft… a warm room, warm clothes and a soft bed. This is a distraction and must lead to softness in the head. My wife does not come to competitions.

I now give you a good story which make it easy to understand how to make consistent results.

One day I walk into a restaurant from Hungary. Two things on the menu, Radnishi and Cheptaviji. I ask the man what is this food and he said to me: Cheptaviji is like the hamburger but is not like the hamburger. Radnishi is like the hamburger, but is like the sausage. I realised this is exactly like flying.

When you fly you will find there are thermals which are like a hamburger but like a sausage and other thermals which are like the hamburger but not like the hamburger. Always the same but always different. Look for the red meat inside.

Hot! Thank's Woitjec! Can't wait until next month's tips!

*** Winning with Woitjec is all in his own words though ome additional vowels may be added to aid understanding.*