



UNI GLIDING

newsletter

June 1980 Vol.5 No.3

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This month -

A Research Project

Theory of Flight

Comments on the Club

The Flight Scholarship Scheme

(an entry form for your friends)

MAY 80

RESEARCH PROJECT

Introduction

As part of the S.A.G.A. competition format, handicap factors have been introduced. These factors reflect the differences in aircraft performance competing in Sparta Class. This approach is consistent with competition formats in use in NSW, Victoria as well as overseas.

The problem

Two sailplanes regularly competing in various Australian states do not have equivalent performance information available to most designs. These are the EP1 and 2, designed and constructed by Ted Pascoe. Both aircraft consistently place well, making the use of reliable base data desirable. This is particularly true in the T.S.A./Lattimore handicap system to be used at National level.

A request has been received from the organisers for detailed polar curve information.

The project

To develop performance curves for both the 'Spruce & Super Goose' sailplanes.

Basic programme

To flight test the sailplanes, each paced by designs on which comparable and detailed information is available.

Details

It is intended to use high level aerotows, two simultaneously with one sailplane under test and its pace sailplane.

To carry out runs at designated speeds timed by stopwatch and altimeter; with the pace plane setting the speed, the sailplane under test maintaining station alongside; and data noted on kneepads by both pilots.

Sailplanes	EP1	86	Merv Gill	pace	Cherokee	GPR	Peter Wright
	EP2	GXX	Chris Dearden	pace	ES 60	GTI	Emilie

launching two tugs, details yet to be organised  
ground crew Adelaide University Gliding Club Inc.

Cost

It is proposed that all manpower be provided free of charge; that sailplanes be provided free of charge; that data time (including any computer work) be arranged to costed separately; that aerotows be paid at current rates.

To cover this one cost element, the Adelaide University Gliding Club is approaching the S.A.G.A. for financial assistance up to \$200; to be used at half of the total cost expended. The other funds to be raised by the pilots participating in the tests.

Timing

Although the intention is to run the test dawn +2 hours in a period up to September; numerous details are yet to be finalised and no detailed timing is attempted.

Benefits

In addition to the direct benefit of the project, it is hoped

### Notes from Instructors Panel.

1. A series of newsletter articles on Theory of Flight is being produced by the instructors. It is hoped that pilots will also read the recommended book "Theory of Flight for Glider Pilots" by Stafford-Allen, available from the GFA shop, 29 Market St., Adelaide (about \$5), or other similar publication.
2. Instructors panel discussed the subject of aerobatics. It was agreed that these be allowed occasionally subject to the requirements stated in the AUGC Flying Manual re parachutes, currency and notification to the duty instructor. Any pilot wishing to perform aerobatics must have had the required training and entry in log book.
3. Instructors panel restated the policy that any cross country flight must have the approval of the duty instructor.
4. The need to re-train some winch drivers was discussed, as some drivers had been demonstrating poor technique. All winch drivers will need to be checked out on the new rig.
5. It was re-stated that the duty instructor has overall responsibility for all aspects of the daily operation, including ground organisation, winch drivers, etc.
6. A cross-country rating for the Bocian was agreed: 75 hours total gliding, plus cross-country Arrow rating, plus current on Bocian. It was agreed that training flights take priority over Bocian cross-country flights unless circumstances would allow the Bocian to go cross-country without detriment to the on field training operation. In the event that the Bocian go cross-country, preference should be given to a training cross-country rather than a mutual or solo cross-country flight. Bocian attendance at regattas or other sites would therefore need to be requested well in advance so that schedules can be organised.
7. All student pilots undergoing training, as well as solo pilots, must have current GFA membership cards. This would apply to student pilots who get beyond the orientation or familiarisation flight stage, and who are definitely going to continue with the club. Issue of GFA cards is made quarterly.
8. A Daily Inspectors course is to be held soon at Gawler. We have one or two pilots who could attend. Please put your name on noticeboard or contact T.Kiek if you wish to attend.
9. Instructors panel addressed the subject of pilots attitude, in relation to recent on-field incidents involving clashes of personalities. Instructors are aware of situations where pilots can be "too upset to fly safely", and appropriate action may need to be enforced in the interests of safety to all others.
10. It is a pilots responsibility to keep his/her log book up to date. Accordingly you may be asked to show your log book from time to time.
11. The instructors log book is for instructors reading only, and matters therein are confidential to the instructors panel. Panel seeks cooperation from members to adhere to this principle.

## IN MEMORIAM

On Sunday last one of our long-time club members passed away, died, ceased to exist, pussed up daisies, and went to meet its maker.

Our friend took up gliding seriously on Easter Sunday, 1977 after many years driving past gliding fields and stopping to admire the joy of soaring when time permitted. Several vacation jobs in the Riverlands allowed him to watch the gliding activities at Waikerie.

Gliding with the Uni Club at Lochiel (after some initial problems that included some fairly major skin **injury**) became very enjoyable with the nice drive into the country each week or fortnight. The free air and the chance to run around in the open added to the joy.

A year after joining the Club our late friend gained Silver C distance and height by going to Saddleworth but it took almost another 18 months to gain the duration leg although it took several attempts including towing the Arrow down to Bordertown.

In fact he towed the Arrow and other gliders to many places for Club purposes, for regattas and on retrieves. There were two trips to Bordertown, two to Waikerie, numerous to Balaklava (including one on his last day), many to Gawler and a few to Stoncfield and Murray Bridge. Going to regattas were found to be a good way to see the state and outlandings were an opportunity to see out-of-the way places.

Taking part in Club projects was an important part of his life. Unfortunately he had little ability in any field but he did great and often important work by transporting materials around the place. Some of the projects he took part in include the building of the winch, the recent rebuilding of the winch, the making of the hangar doors, erecting the hangar and repainting of the Arrow. Some of his most interesting tales come from these projects. One interesting story was about climbing to the top of the ridge and carrying down stone to put in the hangar floor (how many people knew that part of the ridge is under the hangar floor). Another story was about the time that the Arrow was last painted. The Arrow actually went in his bedroom while our friend spent the nights outside. Unfortunately the weather was unseasonably bad which did not help either the work on the Arrow or his health. Worst of all our friend became a little too involved in the project for his own good and bore the ingrained paint until the end. His parents joked that there were more of the paint meant for the Arrow than the Arrow did. Still some people camping outside nextdoor came off worse.

You can't live forever and at the ripe old age of 187420 miles on Kingswood **suffered** a **fatal heart** attack. A trooper to the end, it did at the end of a day of gliding having during that day carried six people to and from Lochiel and three cables to the field and retrieve

HEAVY COMMENT:

'THE LAST CLUB MEETING'

The club meeting held at the beginning of May represents a safety valve. In this sense, it was a different club meeting.

It ran a lot longer than usual, the scope of topics covered many policy areas, and discussion was prolonged and emotive.

Let's hope that it achieved the results desired.

Now back to normal club meetings.

Traditionally, we aim to hold the meeting to 1½ hours, followed by the 'real' business in the Uni tavern.

It does mean two things. One, the members of the Executive have to have their areas of responsibility properly taped. That is, facts and figures to hand, topics arranged and discussion leaders primed. The chairman chairs; tightly.

And the less of the 'motion be put' and 'amendments to the motion' the better. Think your motions through before hand so that they make sense; break up your complex motions into several single point ones, which can be dealt with in turn. The 'foreshadowed motion' is quite acceptable, because that way the ultimate intention is seen, without having to take it all in one hit.

Perhaps that way we'll have less walk out halfway through.

After all, the club meeting is supposed to be for information as well as decision making.

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QUOTE:

From a very wise commentator on our way of life:

"Discussion is an exchange of ~~know~~ledge. Argum~~en~~t is often an exchange of ignorance."

-S.T.A. Ticket.

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OUR NEXT 'DISCUSSION & ARGUMENT' SESSION WILL BE HELD

ON: JUNE 4th

AT: 7.30 p.m.

IN: THE SPORTS ASSOCIATION MEETING ROOM

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## WHAT'S COMING UP

The new competition season begins in September. It consists of a series of regional venues and several important major contests.

Traditionally, the single seaters have been taken by the more senior pilots to these contests. This has tended to mean that on-field activity at home has responded to fewer aircraft and pilots being around. Also, it has tended to mean that learning to fly cross country or competitively has to be done alone in a single seat sailplane.

The arrival of a trailer for the Bocian promises to permit us to change this.

Several solo pilots have indicated an interest in being P1 in the Bocian at one of the upcoming contests. This will permit one or several of the newer club members to get a feel of flying at a contest site.

The benefits are several-fold. The larger size of the Bocian and crew needs are compensated by its two seats. The novice competitor can fly under guidance.

It permits the whole club fleet to go to the contest, overcoming the manpower segregation between home and the venue.

It might be too ambitious to aim at fielding the Bocian at regional events. However, there are some long established and well known venues where attendance could make sense.

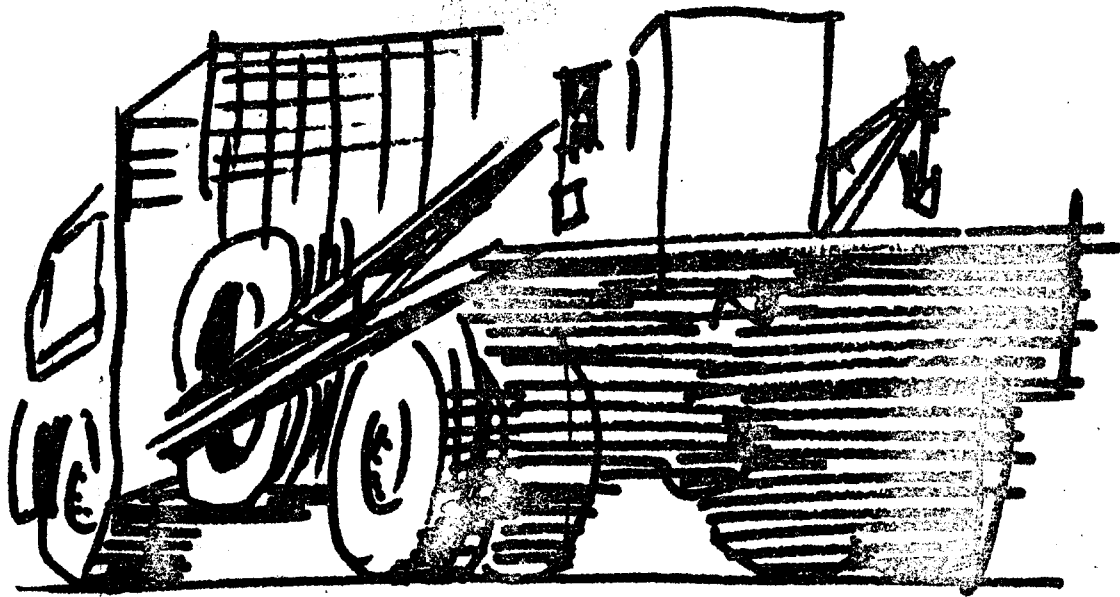
The contest is either close to home ( Balaklava in November) or runs for a full week ( Mildura in December) or is held at a suitable time of the academic year (Lechiel ; and Waikerie in October).

One other contest should have a strong representation by the Uni club. Horsham, in February 1981, is the Sports class Nationals. The club's activities in this class over the years should be suitably climaxed by attendance at the re-introduction of a National meet.

With the NSW state trophy currently in S.A.; attendance at the NSW state venue in January is reasonably assured. In turn, competitors from there at Horsham has already been promised.

The reason for introducing this subject so early, is that plenty of advance notice is given, and the club members can voice their preference.

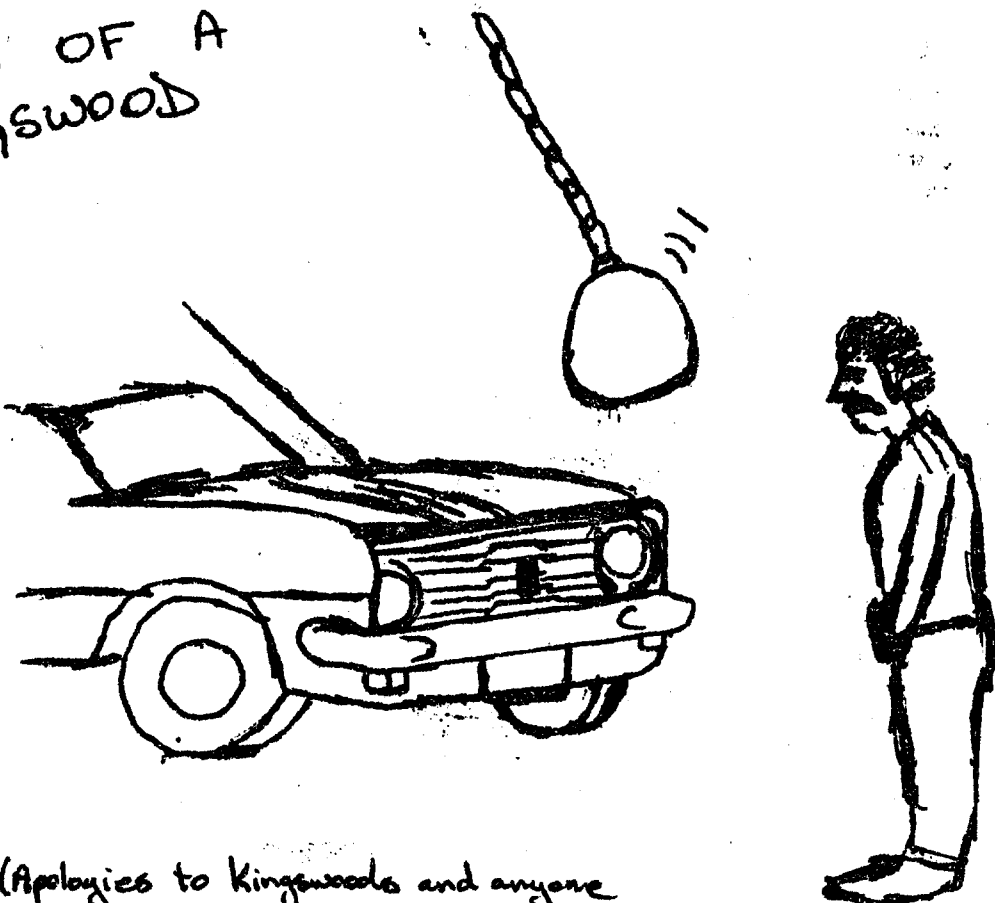
In this way, the decision to go or stay will not be an arbitrary , uninformed one.



'THE MARK MOBILE'  
LARGER THAN LIFE

- is it the Mark I, Mark II, ... Mark ~~III~~ B?

DEATH OF A  
KINGSWOOD

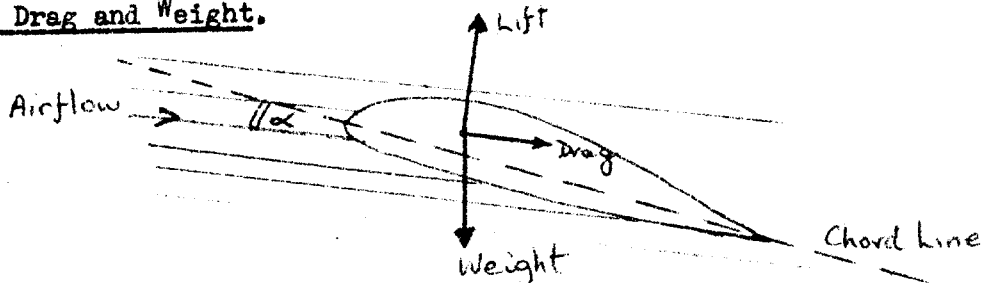


(Apologies to Kingswoods and anyone  
with artistic tastes or sensibilities)

## THEORY OF FLIGHT

This is the first in a series of articles by the Instructors Panel to assist trainee glider pilots. It is recommended that all trainees purchase the book "Theory of Flight for Glider Pilots" by Stafford-Allen, from the G.F.A. shop, 28 Market St., Adelaide, which is an excellent reference on this subject.

### Lift, Drag and Weight.



Very simply, the forces acting on a glider wing are represented here.

Lift acts at right angles to the airflow and is affected by various factors:

- (i) the airspeed of the glider; double the speed and the lift increases 4 times
- (ii) the camber (or curve) of the wing; more camber gives more lift.
- (iii) the total surface area of the wing; larger area means more lift.
- (iv) the smoothness of the wing surface; wet wings and bugs reduce lift.
- (v) the air density; denser air provides more lift.
- (vi) the angle of attack of the wing to the airflow; lift increases as the angle of attack is increased up to the stalling angle (about  $15^\circ$ )

Drag acts parallel to the airflow and is affected by the same factors.

Weight acts vertically down through the Centre of Gravity (C of G) of the glider and can be altered by the addition or removal of ballast, passengers, etc.

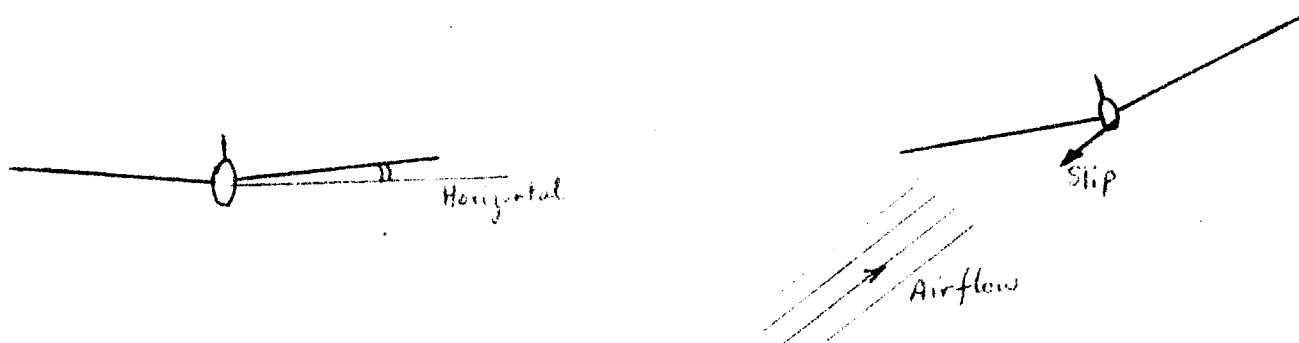
Equilibrium: Theoretically, in steady flight in a straight line, we would find that Lift, Drag and Weight forces are in equilibrium, the energy for forward motion being provided from the loss of potential energy (height) of the slowly sinking glider. In real life, the Lift acts up through the so called "Centre of Pressure", which will move forward slightly as airspeed is increased. It is preferable in gliders design that the Centre of Pressure is slightly behind the C of G so that the glider has a natural nose down tendency for safety reasons, slow speeds. Therefore, to maintain equilibrium, the glider needs a balancing force, which is achieved by the pilot by using elevators (trim). Hence, if a very heavy person occupies the front seat, more back stick (elevator up) is needed to maintain steady flight at a given speed. Conversely, heavy weight at the tail (perhaps caused by someone leaving the tail dolly on) may result in a pilot not being able to get enough forward stick to avoid a stall.

The Stability problem is relieved greatly by the provision of a stabiliser (tail plane) which is an airfoil designed so that its angle of attack is less than



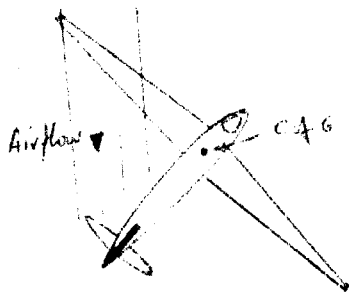
the angle of attack of the main wing. In steady flight, if the nose of the glider is forced up by a gust, the main wing angle of attack may increase from say,  $6^\circ$  to  $8^\circ$  (a 25% increase), whereas the tailplane angle of attack might increase from say,  $2^\circ$  to  $4^\circ$  (a 50% increase). The relative increase in lift of the tailplane will therefore be greater than that of the main wing, and this would result in a pitch up motion at the tailplane, forcing the nose of the glider back down to it's equilibrium position again. This is one of the features of gliders which is designed to produce Stability, here in the pitching plane.

Lateral (or Roll) Stability is achieved in gliders by designing a dihedral angle between the wings and the horizontal.



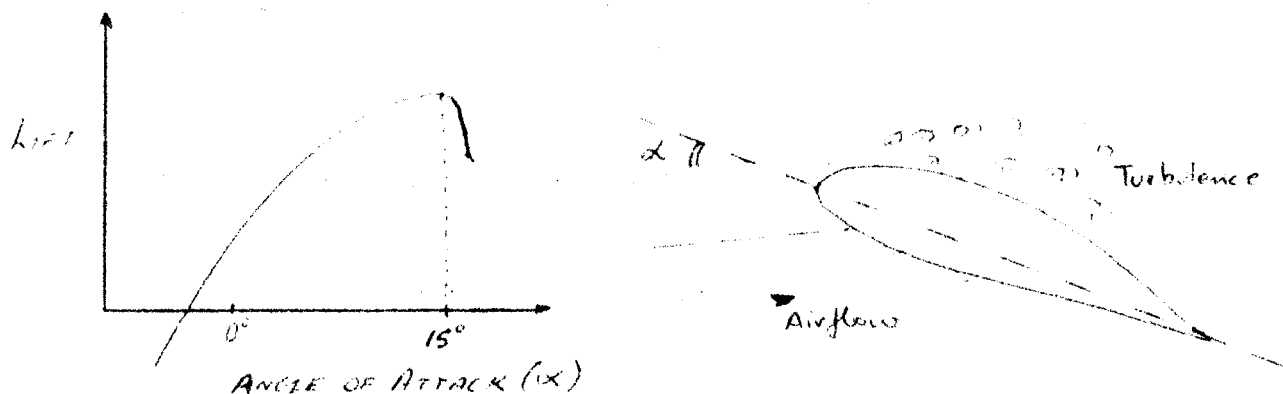
In the event of a gust lifting one wing, (or by the pilot momentarily using too much aileron in a turn without enough rudder), the glider will tend to slip sideways, and the lower wing will then have a greater angle of attack to the relative airflow than the higher wing - hence the lower wing will generate more lift, and raise itself back to the stable position.

Stability in the Yawing plane (about the vertical axis of the glider) is achieved mainly by the design of the tail fin. If the glider inadvertently yaws say, to the right, the relative airflow will be striking the left side of the fuselage and tail fin.



The size (area) of the tail fin, and it's distance aft of the C of G will determine how quickly the glider is weathercocked back to its normal flight path.

Stalling: As the angle of attack of the wing is increased, by easing back on the stick (elevator up), lift increases as shown in the following graph:



We see that at about a  $15^\circ$  angle of attack, the lift starts to decrease rapidly, as the airflow over the wing starts to break away and become turbulent. This turbulence can be felt through the stick as gentle shuddering, and indicates that a stall is imminent. Any further backward movement of the stick causes the angle of attack to go beyond the stalling angle - lift reduces dramatically and can no longer support the weight of the glider. In a stalled condition, the glider will lose height rapidly; in order to recover from the stall, the pilot must ease the stick forward to reduce the angle of attack, unstall the wings, and regain flying speed.

Because of this rapid loss of height at the stall, it is essential that pilots maintain "safe speed near the ground", in most gliders this is about 50 knots (calculated as 1.5 times the stall speed of the glider).

The stall speed of a glider is generally regarded as that speed at which the glider will stall in straight and level flight, and in most modern 2-seater training gliders this is about 35-37 knots. However, several factors affect this stall speed:

- (i) If the load carried (weight) of the glider is increased, e.g. by very heavy pilots, water ballast, etc., then the stall speed will increase, perhaps by as much as 5 knots.
- (ii) If the dive brakes are opened sufficiently to create turbulence over the wing then stall speed might increase by several knots.
- (iii) If the wing itself is creating less lift, e.g. wet wings, dirty wings, there may be a slight increase in stall speed.
- (iv) If the glider is negotiating a steep turn, then G forces will increase the load, which the wings may not be able to support, i.e. a stall may occur even at speeds of 50 or 60 knots in the steep turn.
- (v) Sudden updraught gusts created by funnel valleys when ridge soaring, may put the angle of attack past the stall angle, even at speeds of 45 knots or more.

(vi) If a pilot suddenly heaves back on the stick, even at quite high speeds (say, 60 knots), this may be enough to put the angle of attack past the stalling angle - the so called nose high stall.

Pilots must be aware of the factors affecting the stall, must be able to recognise the onset of the stall, and must take prompt recovery action to avoid a dramatic loss of height.

Spinning: This is a condition of stalled flight where one wing of the glider drops, perhaps forced down by a gust. Already stalled, the angle of attack of the dropping wing goes further past the stalling angle. Drag on the downgoing wing increases dramatically, and the nose of the glider yaws rapidly towards the downgoing wing. This is the spin. The glider loses height rapidly, although the airspeed is not usually high. The pilot must take immediate recovery action, by applying full opposite rudder to inhibit the yawing, and then easing the stick forward (as rudders are centralised) to regain airspeed and unstall the wings, and return to level flight without allowing the dive speed to become excessive. The important point to remember is that considerable height is usually lost in the spin (sometimes in excess of 500'), so recognition of the spin and prompt recovery action is essential.

TK

In the next issue of the Newsletter, we hope to have an article on ground handling of gliders, and safety matters.

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## ADELAIDE HILLS SOARING GROUP

This is the name consistently given to a private flying operation at Sanderston by Emilis with his winch and Kookaburra. The name assures continuity, once the legal acrobatics are completed, with a training operation which will then begin there. At present the operation consists of flying two or three times a month, mainly passenger flying of 5 people who are making their time and effort available to get the organisation established.

The flying began in order to test the suitability of the site, to train up a basic core of experienced ground personnel, and of course to show the land owner that he hasn't been sold a pup.

Agreement to use the Sanderston airstrip was finalised in November 1979 after several years of negotiation. The land owner had had a bad time with a parachuting group on his land in the late 1960's, and had ended up throwing them out. Which is why Emilis is not prepared to have unannounced visitors at the site.

In July Emilis was affiliated with the Gliding Federation by the Adelaide University club. About the time the site was secured, the operation was discussed with the RTO/Ops, and an inaugural meeting held.

It was February 1980 before the flying operation began, in March in an open letter to clubs the RTO/Ops stated that supervision of the operation was directly under his control.

Traditionally, a new gliding club begins operations by being 'Sponsored' by an established club already affiliated with the state association.

In this case this is not appropriate for two reasons. First, the nature of the operation. Not only is the equipment private owned by qualified operating personnel, but Emilis also holds the site rent, public liability and passenger act cover insurance.

Second, apart from airworthiness and instructor qualifications, he has extensive experience and qualifications in the specific area of developing gliding sites; well beyond that of any established club.

The current flying will continue until the incorporation and affiliation processes are complete, and the full Adelaide Hills Soaring Group (inc.) then comes into existence.

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### QUOTE OF THE MONTH

Guy (having attached the ute to the cable during our breaking in exercises): Ute to winch, take up slack, take up slack, take up slack. (One wonders what Guy had in mind to do at the top of the launch.)

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### FOR MEMBERS OF INTEREST

Next month the first of the new improved newsletters will be printed - material for it should be in on the 16th. of June, that is the third Monday before the next meeting.

ADELAIDE UNIVERSITY GLIDING CLUB INC.

Scholarship Scheme

For \$8 you can be trained to solo flying standard (in a glider) by the Adelaide Uni Gliding Club. During second term we are running a scholarship scheme. Basically we are looking for someone who is going to be a safe and competent pilot and a good club member. It'll take time, dedication and patience. So if you think that you have what it takes - APPLY.

You'll be assessed (don't worry, it won't be a Spanish Inquisition) with a trial flight or two and a bit of a chat with an instructor or a senior club member. If you're the most promising we'll train you to solo standard - for free.

Application Fee: \$8.00

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APPLICATION FORM

A.U.G.C. SCHOLARSHIP SCHEME

NAME:

ADDRESS:

PHONE NO.:

CONTACT DEPT.:

I am an undergraduate of the University of Adelaide and enclose \$8.00 to enter the flying scholarship scheme.

Signed: \_\_\_\_\_

Send to Adelaide University Gliding Club c/- Sports Association.

For more information ring Graeme: 356 7868.

Mark: 251 2820.