FREEFLIGHT

Mar-Apr 76

Contents

Freeflight Issue 2/76 March/April 1976

Official Publication of the Soaring Association of Canada

Cover Photo by Wally Norris; 2-32 CF-RRP on final at York Soaring, Arthur, Ontario.

Graphic Design by Roger E. Murray, Graphic Design Centre, Toronto.
Printed in Canada by Dondi Printing Services Ltd., Toronto.

Tentative deadlines for future issues

Issue 3/76 May/June April 16, '76
Issue 4/76 July/August June 14, '76
Issue 5/76 Sept/Oct August 13, '76

Material for future issues of FREEFLIGHT should be mailed to:
Bob Nancarrow
43 Sealcove Drive
Etobicoke, Ontario
M9C 2C7

MOVING ?
Send your change of address to:
Mrs. Terry Tucker
786 Chapman Blvd.,
Ottawa, Ontario
K1G 1T9

Letters to the Editor

Dear Bob,

Firstly, I would like to pass on my compliments on the tremendous job you have done in updating and publishing a most enjoyable magazine. I now look forward to receiving it. Keep up the good work. It is appreciated.

Now, to get to the prime topic – the prang of our HP14T CF-HPI on August 29, 1974. In skimming through the last issue of Free Flight, I noticed the accident report immediately (Pg 7, Nov./Dec. 75 issue) and decided to write you with the 'meat of the matter'! Later when I read the whole mag, I came on your editorial, so you see there are others who feel as you do on passing on our expensive lessons.

As mentioned, our HP14 is a T tail version and it has a long wing – just short of 60'. For aileron protection, we installed a tip plate which protruded some 3" below the wing, the material being an aluminum alloy approximately 3/16" thick. Tow hook position was as per design – under the instrument panel with the release lever located at the bottom of the instrument console to the right of the stick.

Now back to Aug. 29th, 1974. Our gliderport has basically one runway – a north/south. I had taken off earlier in the day and flown locally with another pilot in a BG12. After about an hour and a half, he lost his lift and returned for a landing – I decided to follow to practice a short-field landing into wind. This meant that I would be landing to the west, across the runway – the approach and landing were uneventful except I used up more field than I had expected – seems the wind was gusting slightly and had dropped as I turned final. We pulled the sailplane back to the north end of the runway for a south takeoff. I went through my crosswind checks – nose of the HP was slightly downwind of the tug and right wing was down, flaps were in negative and wind was westerly 10 to 15. Takeoff signal was given and the HP began to roll. As soon as the wingrunner let go, the HP began to swing into wind against full opposite rudder and tail on the ground. Acceleration was rapid – RELEASE – screamed in my head, but by the time I had changed hands – from the flap lever to the stick and from the stick to the release lever, I was in the air going almost sideways. I released–the HP stalled and dropped on the nose then the tail – fortunately, the wings were level. Damage consisted of a flattened nose cone, a torn and distorted tail cone a broken right stabilizer and elevator and wrinkles in the fin. Rather than patch and repair, we built new assemblies over last winter so our bird is as good as new.

What happened? Why was the swing into wind so vicious and uncontrollable? An inspection of the takeoff area supplied an immediate answer. The wing tip skid had contacted the ground probably as soon as the wingrunner let go and remained there cutting a nasty furrow until the HP became airborne. I can't recall any sensation that would have alerted me to the tip being on the ground. Perhaps a combination of the thin tip plate – a long wing and soft ground is the answer.

A repair plan was formalized which included a modification program in areas which had been identified as potential accident makers, such as cutting down the wing tip plates to about one and a half inches, backing with a foam block and covering with fiberglas – moving the tow hook closer to the nose so that the towrope would have a tendency to straighten out any swerve on the ground. We decided to install the hook in the nose with the release handle coming out of the instrument console at the upper-left. Incidentally, Dick Schreder has moved the towhook into the nosecone on all his latest designs. Wonder why? Also, we

LIST OF MEMBER CLUBS

Quebec & Maritime Zone

Air Cadet League (Que), 5726 Sherbrooke St. W., Box 340, Montreal, P.Q. H4A 3P6
Appalachien Soaring Club, Box 271, Sherbrooke, P.Q.
Ariadne Soaring Inc., 735 Riviere aux Pins, Boucherville, P.Q. J4B 3A8
Buckingham Gliding Club, c/o J. Bisson, 302-D-150 Gerber Blvd., Gatineau Point, P.Q.
Champlain Soaring Association, 111 Mgr. Tache, Boucherville, P.Q. J4B 2K2
Montreal Soaring Council, Box 1082, Montreal, P.Q. H4L 4W6
Missisquoi Soaring Association, Box 189, Mansonville, P.Q. J0E 1X05
New Brunswick Soaring Association, c/o Dr. A. Dobson, 521 Blythwood Ave., Riverview, N.B. E1B 2H3
Quebec Soaring Club, Box 9276, Quebec, P.Q. G1V 3B1

Ontario Zone

Air Cadet League (Ont), Mr. H. Bruhlman, 1107 Avenue Rd., Toronto, Ont. M5N 2E4
Air Sailing Club, Box 2, Etobicoke, Ont. M9C 4V2
Base Borden Soaring Group, c/o 71 Sangro Loop, CFB Borden, Ont. L0M 1C0
Bonnechere Soaring Inc., Box 1081, Deep River, Ont. K0J 1P0
Caledon Gliding Club, R.R. #1, Erin, Ont.
Central Ontario Soaring Association, Box 762, Peterborough, Ont.
Chatham Air Cadet Gliding Club, 561 Lacroix St., Chatham, Ont. N7M 2X1
Erin Soaring Society, Box 523, Erin, Ont. N0B 1T0
Gatineau Gliding Club, Box 883, Station B, Ottawa, Ont. K1P 5P6
Huronia Soaring Association, c/o M. Badior, 435 Hugel Ave., Midland, Ont. L4R 1V4
Kawartha Soaring Club Inc., c/o H. Ksander, 11 Parkview Drive, Peterborough, Ontario.
Lahr Gliding Club, c/o W. Montagne, CFPO 5000, K0K 3R0
Lakehead Gliding Club, Box 161, Station F, Thunder Bay, Ont.
London Soaring Society, Box 773, Station B, London, Ont. N6A 4Y8
Provincial Motorgliding & Soaring Association, R.R. #2, Blackstock, Ont. L0B 1B0
Rideau Gliding Club, c/o H. Janzen, 172 College St., Kingston, Ont. K7L 4L8
SOSA Gliding Club, Box 654, Station Q, Toronto, Ont. M4T 2N5
Toronto Soaring Club, Box 856, Station F, Toronto, Ont. M4Y 2N7
Windsor Gliding Club, c/o H. Preiss, 2050 St. Anne, Windsor, Ont. N8N 1V7
York Soaring Association, Box 660, Station Q, Toronto, Ont. M4T 2N5

Prairie Zone

Air Cadet League (Man), c/o Capt. G. Evans, 364 Duffield St., Winnipeg, Man. R3J 2K2
Air Cadet League (Sask), Mr. J.J. McDonell, Box 5099, Regina, Sask. S4P 3M3
Red River Soaring Association, Box 1074, Winnipeg, Man. R3C 2X4
Winnipeg Gliding Club, Box 1255, Winnipeg, Man. R3C 2Y4

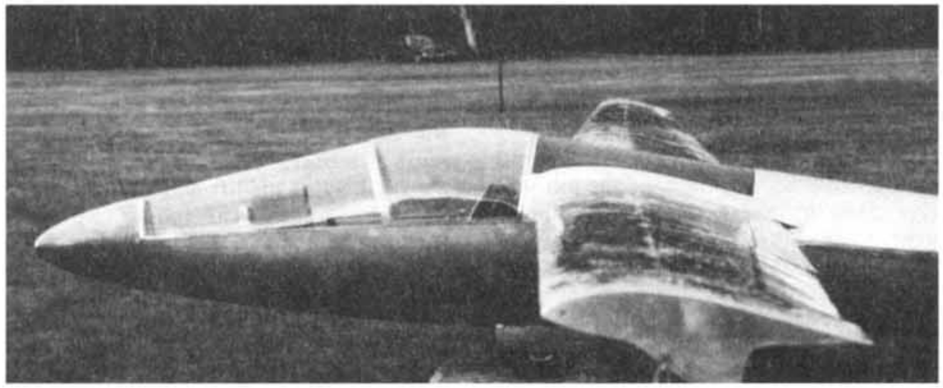
Alberta Zone

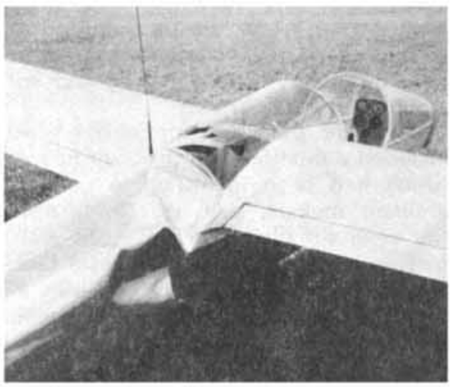
Air Cadet League (Alta), c/o H.M. Fowler, 23 Grafton Dr. S.W., Calgary, Alta. T3E 4W1
Cold Lake Soaring Club, Box 1714, Medley, Alta. T0A 2M0
Cu Nim Gliding Club, Box 2275, Calgary, Alta. T2P 2M6
Edmonton Soaring Club, Box 472, Edmonton, Alta. T5J 2K1
Regina Gliding & Soaring Club, c/o 2117 Grant Rd., Regina, Sask. S4S 5C9

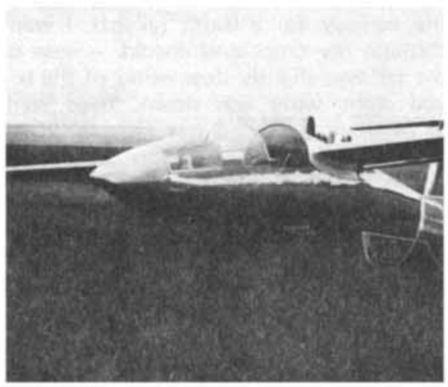
Pacific Zone

Air Cadet League (B.C.), c/o Capt. R. Lacerte, 8908 Glenwood St., Chilliwack, B.C.
Alberni Valley Soaring Association, Box 201, Port Alberni, B.C. V9Y 7M7
Comox Gliding Club, Box 238, Lazo, B.C. V0R 2K0
Kamloops Gliding Club, c/o D. Lurkins, 627 Alberni Street, Kamloops, B.C., V2B 1T2
Okanagan Soaring Association, Box 1135, Kelowna, B.C. V1Y 7P8
Vancouver Soaring Association, Box 3651, Vancouver, B.C. V6B 1Z1
Van Isle Soaring Association, c/o R.J. Hansen, R.R. #2, Courtenay, B.C
Wide Sky Flying Club, Box 6931, Fort St. John, B.C. V1J 4J1

Letters to the Editor







designed a new sprung tailwheel to try to keep the tail on the ground as much as possible even on rough ground.

How did our mods turn out? Well, let me put it this way – there is no way that I would have considered a wingtip on the ground unassisted takeoff in 1974. Our test flight schedule was two car tows then to airtow. The second car tow was a downwind takeoff with the tip on the ground – absolutely no problems. With a troublefree 1975 flying season behind us and more relaxed pilots in the cockpit I think I am safe in saying that we've tamed our bird down and taken a lot of tension out of the takeoff/landing procedures.

DAVE TUSTIN

Dear Editor:

Your editorial regarding accidents and reporting of same was quite interesting.

I've been a tow pilot for the Sosa club for fourteen years and have done between 2 thousand to 3 thousand tows, yet when I wanted to discuss a procedure the present club officials were pushing, and which I felt would result in an accident on our runway, they refused to discuss it at a tow pilots meeting. When I brought the matter up in a semi-annual meeting we hold in August, the president of the club stated, "I don't understand towing procedure, and this should be discussed at a tow pilots meeting". There were no further tow pilot meetings held after that time, (although a meeting was scheduled it was cancelled.)

Fact: If an accident occurs on an airport, and someone is injured, the MOT assesses blame. If two aircraft were involved and one pilot is held responsible due to faulty manoeuvers

Fact The MOT can cancel that pilots licence and assess a fine of up to $5000.

Fact The civil courts can then become involved and claims for damages can easily exceed One million dollars.

Fact Public liability insurance - may or or may not be paid – if criminal negligence charges are laid – AND the club assets are up for grabs to satisfy such legal claims and of course the Directors of the Club can also be held liable if it can be shown that they were aware of the situation leading to the accident (and did nothing).

I've flown gliders for 25 years and have seen many accidents – but who's listening?

WM. ADAMS

Dear Editor,

May I offer a comment on the article "Turns on Tows" in the 7/75 Free Flight?

I believe the nasty flat turn idea is intended to keep the rope tight. However, prevention is better than cure so it is best not to let the rope go slack. This is very easy to do, and to teach, if one realizes that you must not start to turn the glider as soon as you see the towplane roll into a turn. I ask students what would happen if they were being towed on the road by another car with a 200 foot towrope and they started to turn as soon as they saw the towcar turn. The way to keep in position is to keep the rope coming straight out of the towplane's tail and you should always be able to see both sides of his fuselage. When the towplane starts to turn there will be some two seconds while the rope is not coming straight back, when you can see that it is about to come straight again then start your turn, not as soon as the towplane starts. If you do follow the advice to keep the wings parallel you will be starting to try to make a turn behind the towplane (your car will go up the curb).

Mr. Editor, may I make a minor nitpick? Even in the States a hanger is something you hang your coat on; hangar (with an A) flying please!

TERRY BEASLEY

WANTED: Proofreader with good knowledge of English, particularly terminology related to flying; easy work with good prospects of becoming editor.

Hangar Flying

World Gliding Championships

We goofed! On page 18 of the November/December issue we quoted some travel rates for those interested in flying to Finland this year for the World Gliding Championships. On the 22 - 45 day normal excursion ticket no stop over is permitted; however the rates are much lower than quoted previously. The June rate is $585. not $811. as stated and the May rate is $481. instead of $725. Have a good trip!

We Goofed Again!

In the FIRMAL ELECTRONICS ad on page 18 of the Nov./Dec. issue we printed the wrong post office box number. What with the postal strikes and our errors the good people at FIRMAL aren't getting much mail. If you have written to FIRMAL about instruments for your machine and haven't had an answer, please give them another try because they probably missed your first letter. *(See page 22)*

Safety Committee

The Chairman of the Safety Committee says he has only FIVE replies from clubs naming Club Safety Officers. Let's here from the rest of the clubs across the country.

Federal Grants

Federal Government Grants-in-aid. Congratulations to Ken Del-Piero of the Erin Soaring Society in being awarded a grant towards his studies at U. of T.

Some $310,000.00 was allocated by the Department of Health & Welfare to support promising athletes participating in non-Olympic sports. The values of awards are based on the level of the academic program being undertaken by the student-athlete. University students are eligible to receive $1,800.00; those in community college or CEGEP $1,200.00, and those attending summer school, terms or semester courses up to $900.00 while those still in high school may receive $600.00. In announcing the awards National Health & Welfare Minister Marc Lalonde noted that one of the primary purposes of the grants-in-aid program, initiated five years ago, was to encourage Canadian athletes to attend Canadian universities and also to assist them in combining both their educational and competitive sports careers.

For SAC members who are interested in applying for a grant you should be able to get an application form from your school; if not then write: — Fitness & Amateur Sport Branch, Education Grants-in-Aid, Department of Health & Welfare, Ottawa, Ontario, K1A 0X6. Please do not write to SAC for forms as we do not have them. Fill out two copies and send one to SAC as we have to make recommendations regarding priority; also please send a note giving any additional information you believe may help us in making recommendations.

T.R. Beasley, Past President.

European Tour

In cooperation with Lufthansa German Airlines a European "Special" for glider guiders (and their families) is contemplated for sometime in August 1976.

The tour would consist of about one week's flying at the Wasserkuppe, the cradle of glider flying with a tour of the Schleicher plant (ASW 17-15-19-20 etc). Then on to a week at the famous alpine soaring site of Zell am See in Austria. On the way a visit to the Schempp-Hirth and Glasfluegel plants to see their latest products (Nimbus II, Mosquito etc.) Zell am See is locaed amidst some of the most spectacular scenery in Austria, at the foot of the Grossglockner mountain range. You'll never forget flying there. Third week would be free to plan and enjoy individually. While the men are flying there will be lots of opportunity for the women to shop, sightsee, swim, relax etc.

In a group you could enjoy reduced airfares, reduced accommodation rates, reduced flying fees and the company of other flying enthusiasts. If you are even remotely interested write to A.O. Schreiter, 3298 Lone Feather Cr. Mississauga, Ont. for details. No commitment necessary at this point.

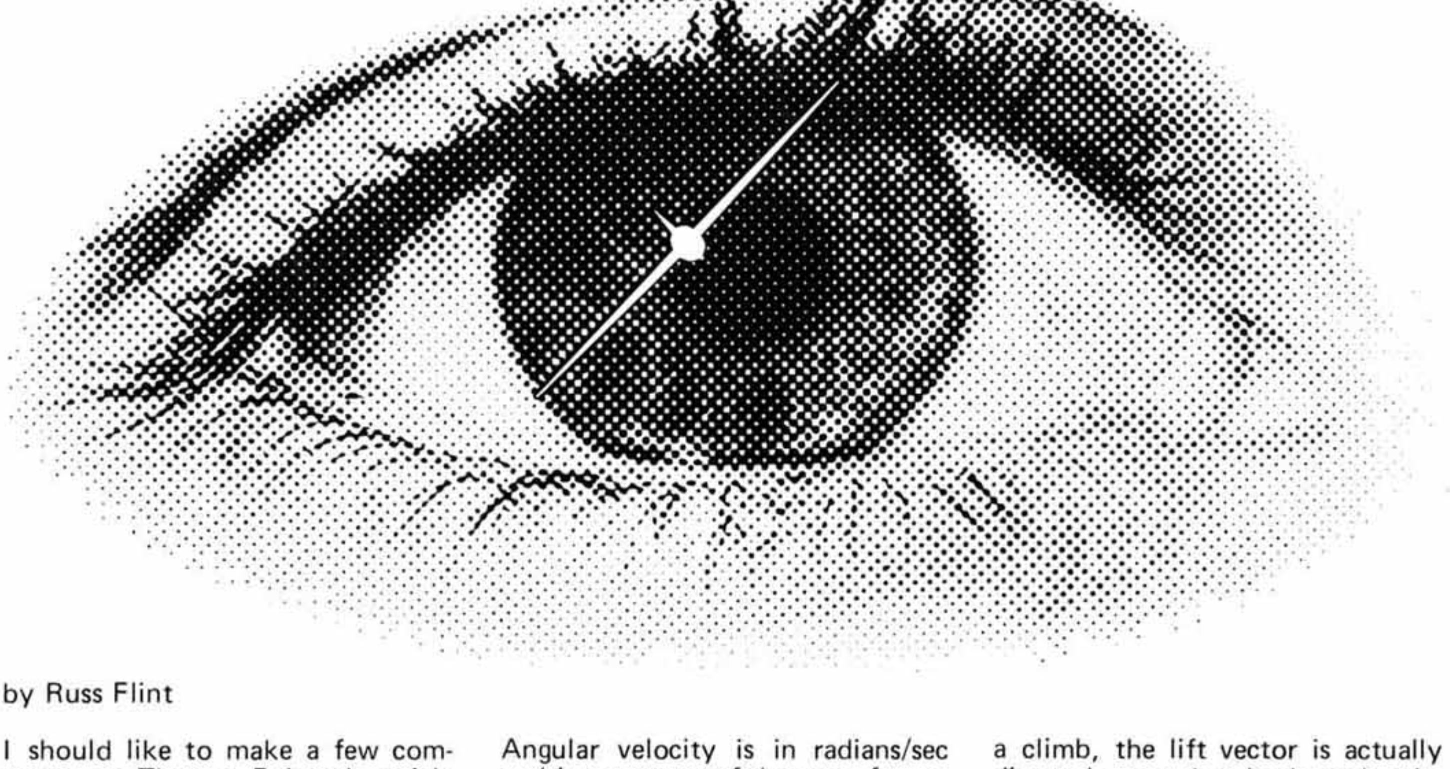
Hang Gliding

Hang gliding is one step closer to being regulated in Canada. Meeting in Ottawa in September, the 46th annual conference of the Royal Canadian Flying Clubs Association (RCFCA) passed a resolution urging the MoT to certify the operation of hang gliders in Canada and to designate air space for their operation. Don Fisher, president of RCFCA, said the sudden interest in the sport makes it necessary to move as quickly as possible to ensure the sport develops safely.

"We have invited the various regional hang gliding associations throughout Canada to use the RCFCA facilities to form a national association for the regulation of the sport," he said. Mr. Fisher, a DC-8 captain with Air Canada, was re-elected as president of the RCFCA for a second year.

At the SAC annual meeting in March of 1975, a motion was passed recognizing hang gliding as a new development in sporting aviation quite separate from soaring due to site requirements and operational methods.

Another look at TURNS ON TOWS



by Russ Flint

I should like to make a few comments on Thomas Reisner's article "Turns on Tows" printed in the Nov.-Dec. 1975 issue of Free Flight. Though I agree with his condemnation of the "flat-turn" method of following a turning tow-plane while on aerotow, I feel he has oversimplified the situation and has allowed one or two errors (or perhaps misconceptions) to creep into his article.

The first of these relates simply to the theory of any turning aircraft. Reisner states that "the angular velocity of the aircraft alone determines how much bank will be needed....". In fact the angle of bank is determined by both angular velocity and the radius of the turn.

For an angle of bank θ, $\tan\theta$ = (angular velocity)^2 x (radius of turn) – g where g is the acceleration due to gravity (= 9.8 m/sec^2 or 32 ft/sec^2).

Angular velocity is in radians/sec and is a measure of the rate of turning.

A much more fundamental misconception is contained in Reisner's statement that for a glider on a fast tow "by lowering the nose the excess lift is actually converted into forward thrust relative to the flight path". In fact, by reducing the angle of attack of the wing, one is simply reducing the total amount of lift generated (and of course, the induced drag too). Considering the case of a straight and level tow, the faster the tow speed the more one would have to lower the nose of the glider to keep the lift generated by the wings constant. The direction of the lift vector would not change, since (by convention) it is always perpendicular to the direction of motion, i.e. to the relative wind. (Thus, in a climb, the lift vector is actually directed somewhat backwards relative to the earth's surface.) In the situation depicted in Reisner's diagram, if the flight paths of the two aircraft were parallel (as he stated) then the lift vectors would also be parallel.

The forces acting on the glider may be represented as in diagram 1 (taking as an example the high tow position chosen by Reisner). Consideration of such a diagram suggests that the most "efficient" position for the glider relative to the tug is probably such that the tow rope lies somewhere in the angle between the horizontal and the direction of flight, depending on the speed and rate of climb; otherwise tow plane power is being expended unnecessarily in fighting against either the weight of the glider, or in the other extreme, the lift generated by the glider.

Turning now to the case of a circling glider-tug combination, most glider pilots, I am sure, develop their own technique which may or may not bear much relation to what they were told to do by their instructors when they were learning to glide. Since I believe that those of us who do instruct students should be well aware of why we do things in certain ways, I have given considerable thought to the way in which we teach turning on tow. That the procedure is not just a case of simple aerodynamics is illustrated amply by considering advice given on the subject by two accepted authorities: Piggott on p. 114 of "Gliding" states that the glider should be banked "so that it follows the tug round with the rope meeting the nose of the glider in line with its fuselage". On page 27 of the SAC Instructor's Guide we read "the glider should be banked in an angle slightly less than that of the towplane". Neither of these two schemes will give what would be regarded as a co-ordinated turn, nor will they necessarily result in similar tow positions in a turn. Let us consider what actually happens on tow to determine the rationale behind these suggestions.

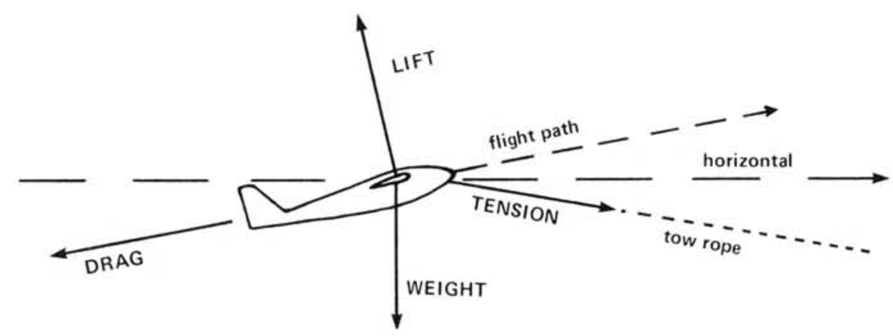
In a turning aircraft, the centripetal force causing it to turn is generally provided just by the horizontal component of the lift from the banked wings (= Lift x sin θ in diagram 2). However, for the glider on tow there is an additional sideways pull, P, provided by the tow-rope which forms a chord of the circle on which the tug and glider are flying (exaggerated in Diagram 3). If the glider is to remain on the same path as the towplane, this extra force P must be compensated for. Reducing the angle of bank slightly, as suggested by the SAC Manual will certainly achieve this, but the turn now becomes unco-ordinated (ball off to the outside slightly). However, P should generally be sufficiently small that the right combination of top rudder and down elevator should be able to compensate for it entirely.

Piggott's idea sounds good since it would eliminate the sideways pull P. However, the only way one can achieve this neatly is to fly the glider in a smaller radius turn than the towplane (see diagram 3). This would allow for a co-ordinated turn, but has the grave disadvantage that, should the towplane decide to tighten its turn, one is in a position to find a lot of slack rope hanging from one's tow-hook! The other way is to put on lots of bottom rudder, level the wings somewhat and skid around like a cat being pulled across a slippery floor by its tail (the "overuse of the rudder and underuse of the ailerons" technique criticised by Reisner).

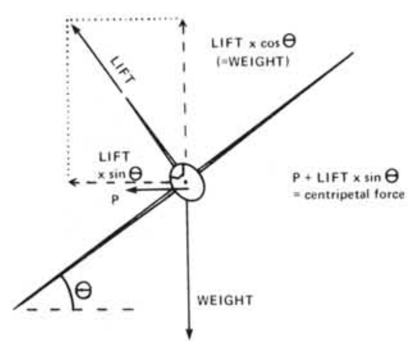
One final point is that of where to point the glider. A commonly used reference is the tip of the outside wing of the tug (this is suggested by the SAC Manual). Consider an example of a tug-glider combination flying at 65 mph on a 200 foot tow-rope with an angle of bank of 20°. This corresponds to a turn radius of 780 feet, one circle taking a little less than a minute to complete. The tug is about 15° ahead of the glider on the circle, and the glider pilot flying co-ordinated on the same path would be pointing 25 feet outside the fuselage of the tug. With a little bit of an induced skid, this particular pilot would soon be finding himself pointing right at the tug's wingtip! This sounds quite consistent with the rest of the SAC technique.

But WHY are we taught this skidding turn on tow? Is it because it is a little "safer" to be outside the tug's circle than inside? Is it to put a bit more tension on the rope (as it will)? Or does it just feel better to some people? Perhaps someone with a definitive explanation would tell us in the next issue of Free Flight.

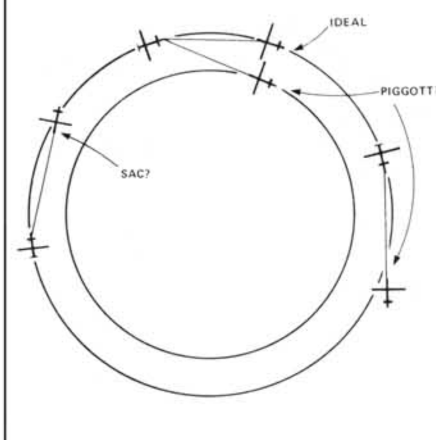
DIAG. 1



DIAG. 2

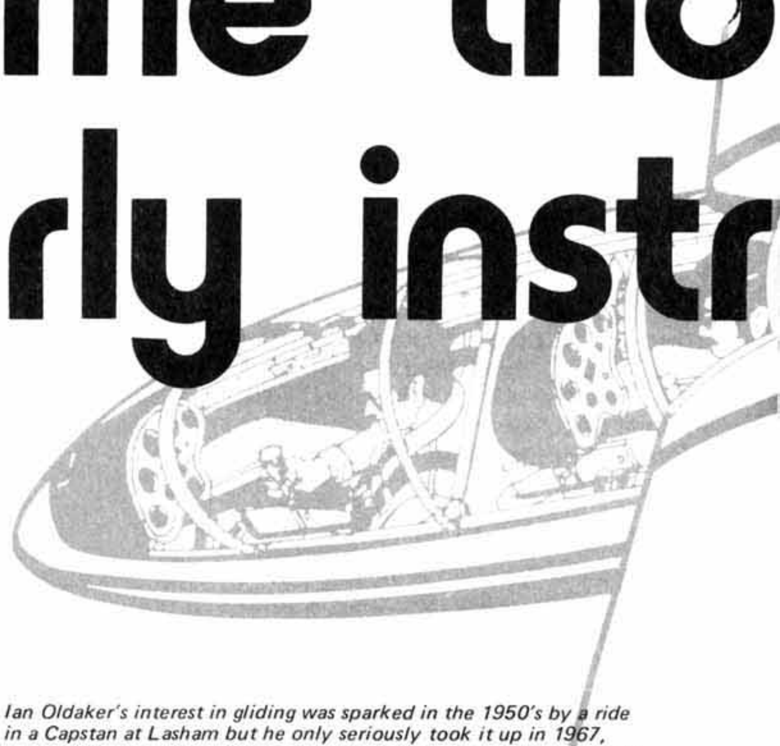


DIAG. 3



Some tho
early instr

by Ian Oldaker



Ian Oldaker's interest in gliding was sparked in the 1950's by a ride in a Capstan at Lasham but he only seriously took it up in 1967, when he and his new wife Yvonne were looking for something to do together when they moved to Manitoba. He owns a Tern which he built and in which he placed 12th in the 1973 Nationals. The next year he won the Western Regionals Sports Class at Claresholm. He is currently C.F.I. of the Winnipeg Gliding Club, which boasts eighteen instructors. Ian is also course director for the S.A.C. Western Instructor Courses. He is very keen on sharing his experiences through instructing, and the accompanying article is written with this in mind.

This article discusses some aspects of early instruction, particularly for those of us who are new to the game and are not yet too familiar with the S.A.C. Instructor's Manual. (This comes in three parts and I am going to assume that the reader is familiar with it. All parts, of course, are available from the S.A.C.) Besides an attempt to elaborate on the exercises in the manual I discuss some of the things that I feel we ought to be considering in early training.

In Stage I, the familiarization flight, if the student has not flown in a light aircraft before, I prefer not to have him follow through, especially during the takeoff or launch. I try to get him to concentrate first on things external to the glider without the need to try and understand its control. After release (get him to do it) I will let him follow through a bit, but only if he is really relaxed and we have time. Remember that the impressions formed now largely determine our student's future attitude toward gliding and his confidence in us and the glider.

Stage II, effects of controls, is perhaps one of the most important lessons to teach and it must be done thoroughly and by a competent instructor. It provides the grounding that all future flying depends on, so a thorough understanding is essential. A bit of extra time spent in this and one or two of the following stages will pay dividends in learning the later stages.

I must mention inertia which is the tendency of a body to maintain its state of rest or motion! Roll rates in gliders are low – not due to inertia – ever notice when you centralise controls from a brisk roll rate that the glider stops rolling almost immediately? Roll rates are low because the rolling control moment applied by the ailerons is opposed by the vertical drag of the wing as we try to force it up or down through the air – have you ever noticed the air resistance as you try to lift a sheet of styrofoam quickly from one end? So inertia has very little or no effect in rolling.

The student doesn't need to understand this at this stage but what he must understand is that full aileron control will not flip him onto his back. And to achieve a good soaring capability a pilot must enter turns briskly rather than gingerly – so in early training we must remember this and not let our students continue to handle the controls too gently to enter turns, as they develop their abilities.

Inertia is of little concern in pitching and yawing, it is very important in speed control. Typically one degree change in pitch attitude will produce only one third of one mph speed change per second, initially. We need to emphasise speed recovery in early training – it is then that instinctive behaviour patterns are acquired. Remember that next time your winch cable breaks – if left until later our student will be used to the normal cruising attitude – we point out attitudes in Stage II remember. Consider also a slow failure of a towplane's engine say 100 feet up; at wave-off or release we may be very close to stall speed and we need to recover speed fast. Due to our inertia we can't get speed unless we really stuff that nose down.

The Manual Part I "Instructor's Guide" under "Controls of a Glider" (Stage II) discusses primary functions, and mentions secondary functions which are taught in Stage V – not covered in this article. I sometimes wonder why they are not covered earlier as of course we use the rudder's further effect in Stage IV, gentle stalling, to raise a wing if it tries to drop on us. However, bearing that in the back of our minds for now, lets carry on with Stage II. We can demonstrate the three motions, pitching, rolling and yawing without the need to do turns.

The pitch demonstration is easy - remember inertia and speed control, and the use of the trim. It is important to discuss attitudes in relation to the horizon and we should be careful how we describe this. "More ground in the canopy" can be confusing but in the absence of an horizon may be the only way; the lower surface of the wing and the horizon is a good reference angle, but this must never be confused with angle of attack. Each attitude then, has a definite speed

ughts on uction

associated with it. Remember too that when talking of getting the nose "up" or "down" often refers not to the sky or ground but to the pilot! I can for example "pitch the nose up" more when in a medium turn, but in a spin or stall I can't move the stick further back to "raise" the nose, it stays down even more. So although we can and should demonstrate pitching in a simplified way we have to introduce sooner or later these other complications, so perhaps we should destroy in our minds now the idea that pulling the stick back will always make the nose go up. It may do so initially but its one lasting effect is to increase the angle of attack! And each angle of attack (in straight flight) has a certain speed associated with it. Think of it -- our "elevator" controls angle of attack. I feel this is very important, and I will return again to this idea.

Rolling is demonstrated initially with gentle use of the controls so that the adverse yaw is not too obvious; neither will we need to use elevator coordination in any resultant turn because of the small amount of bank. Actually any yaw, etc., should be corrected by the instructor. We roll, then to say 20^{o} and then immediately roll back again -- remember we are demonstrating functions or effects of controls, we are not yet trying to control rolling. Have the student look well ahead so that he can notice the angle of bank with relation to the horizon. (Picture a protractor on the horizon and us in the glider banked with our wings parallel to the 20^{o} radial).

When we give a bad yaw demonstration which develops into some form of a banked turn we may give our student the impression that he can make legitimate turns with rudder only (remembering boats). To avoid future rudder turns onto final (I will return to this under Stage XII), therefore we must keep the wings level during this demonstration. The further effect of yaw is demonstrated in Stage V, we must avoid it now.

This is the first instructional flight, and the student will be concentrating so much on each effect, one at a time, that our use of another control will usually go unnoticed. If he does mention it we must explain ourselves, and a fair explanation will be accepted. Important points are that the student must be very clear which control he is using and its effect, and that the effect is always the same in relation to the pilot regardless of the glider's attitude to the horizon. Instruction should be deliberate and unhurried, and our student should have and we must give him plenty of opportunity to fly it himself, and to experiment with the controls.

The "Air Instruction Notes" Part II of the Manual talk about lateral, normal and other axes of the aircraft. By all means talk about rolling about longitudinal axes etc., when on the ground, but we should avoid giving unnecessary information and using unfamiliar jargon in the air. Our air instruction therefore must be clear, very concise, and only deal with the immediate task.

In this early flight we will need to refer to the stick, but as soon as possible in subsequent flights we should be aiming to ask the student to move the aircraft in relation to its current attitude or the horizon, i.e. ask him to lower the nose, or better still to watch his speed, or to turn to the left, etc., after all this is what we do all the time without thinking of how we move the controls. Teaching the jargon of flying can't be done in one flight so we must watch our language especially if the student flies with many instructors; we can't assume he knows it, but know it he must -- eventually.

So much for the primary functions. It is important I think to concentrate perhaps a little more on this exercise than on the later stages, so that the student gets a good foundation for his future flying. Sometimes we are perhaps too hasty to proceed to the next stage without giving the student time to fix in his mind the basic facts on how the machine flies and how he controls it. Consolidate on this and the next exercise or two and the remainder will come more easily than we think.

Club News

YORK SOARING WAVE CAMP '76

"Every year for the past half-dozen or more years Walter and some of his friends have been gathering at Black Forest to do a little wave soaring . . . ." Thus we might paraphrase a certain TV commercial, but the statement does describe the activities of a group of pilots and friends, mainly from York Soaring, who have been going to Colorado Springs to try wave soaring in the lee of Pike's Peak. This year was no exception, and the wave camp, from January 4th to the 11th saw Walter Chmela, Don Clarke, Phil Eastmann, Dave Harpur, Lena Holm, Gar Ingram, Wilf Kruger, Dennis Mooney, Fred Mueller, Bob Patterson, Neil Poole, Peter Rawes, Dave Timms, Brent Turnbull, Bonnie Walker and Sig Welscher in attendance.

This year, for once, none of the members of the camp had to "volunteer" for job of cook. Bonnie Walker, bless her soul, offered to do the job. And what a job! Breakfast, as you ordered, all set for you. Apple Strudel THAT big! Chicken tetrazzini! Cakes and cookies and pies! Bonnie did a marvelous job of organization and cooking, and with the help of Lena Holm, who always seems to be available when there are chores to do, we ate very, very well.

During the week we were there, we had three reasonably good days of wave flying. There weren't the days of booming, fantastic rates-of-climb, but the wave was present, and could be worked. Silver and gold altitude gains were claimed by Gar Ingram, Dave Timms and Phil Eastmann. Lennie pins, for flights above 24,000 feet were claimed by Wilf Kruger and Bonnie Walker as well as the three pilots mentioned. Fewer badge claims were made this year, since most of the participants had already obtained gold or diamond altitudes previously. Nevertheless a few flights exceeded 30,000 feet, and there were 23 flights in which gold altitude gains could have been claimed, and two similar diamond altitude gains. The technique this year seemed to require patience. Most of the lift turned out to be in the order of 200-300 feet per minute, sometimes more, frequently less, so the idea was just to "hang in there" and eventually the required altitude was reached. Rotor was mild, temperatures were moderate, so flying was not uncomfortable. On the non-wave flying days, some of the energetic ones went skiing, others checked out familiar aircraft. All in all, it was a good wave camp – good food, good fellowship, good flying.

BLUENOSE SOARING CLUB

Bluenose Soaring Club will begin operations with one training glider, CF-OZA a Ka-7 purchased from York Soaring. The aircraft is in good condition and seems to be an ideal aircraft for introducing people to the enjoyable mix of gliding and X-C flight.

We expect to fly out of two sites; Stanley, about 10 miles NE of Windsor, N.S., and Debert, about 10 miles NW of Truro. This decision is governed partly by the geography of the membership and partly by the desire to present different flying conditions to the club pilots. An incidental point is that these airports are 50.50 km apart.

B.S.C. does not own a tow plane and we are approaching the problem of towing from two angles. Ms Debra Burleson, our chief tow pilot is negotiating with Sundancer Air Shows for aero tows. Mr. Peter Myers, Club President and Equipment Committee Chairman, has a lot of experience with winches in England and is hot on the trail of a similar one here. On May 1st we hope to have both launch facilities available at the Stanley site. At present we have 12 members, although we have not as yet had any kind of membership drive.

Our Technical Committee, headed by Chris Purcell is busy stripping down the trailer for repainting and converting it to enclosed status. OZA needs some smoothing and repainting along the leading edges; actually Walter Chmela and the friendly flyers at York Soaring kept CF-OZA in such good condition that we are frustrated fussbudgets; a bit of a budget and a little to fuss over. Tech Committee is also building a number of Braunschweig tubes, gust filters, etc. to give the Crossfell electric good T.E. compensation. Norval MacDonald, our V-P, is working on locations for good CB radios to use at both ends of our tow lines.

The Instructors' Committee, chaired by George Graham, is assembling a program of ground school classes to start in early May. Cross country clinics utilizing mini-tasks of 15 - 50 km are being designed by the same committee with the help of the fine people at the New Brunswick Soaring Assn. These events will be staged over consecutive week-ends in May and early June and will include a ground school focusing on theories and procedures for efficient cross country flight. The tasks will be made up to give experience with start gate procedures, turn point photography and general fun contest flying. The purpose of this activity is to give people a chance to get beyond the stagnating "float-around-the-airport" routine.

So come fly with us if you're down our way, we will be flying whenever the weekend weather allows.

George Graham.

MONTREAL SOARING COUNCIL

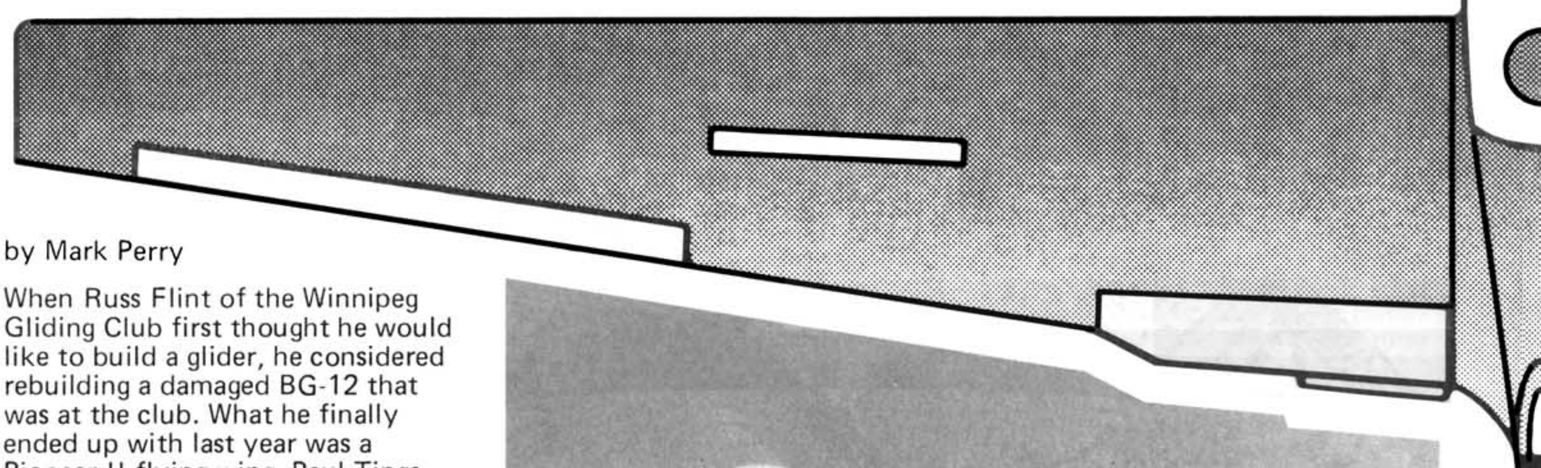
Ann Welsh visits Montreal Soaring Council

On a dismal September day I was very pleased to bring an old friend, Ann Welsh to meet the few members who were at Hawkesbury. Ann was in Canada to attend the FAI Annual Conference. She has been vice-president of the CIVV committee for many years and will probably assume the presidency next year.

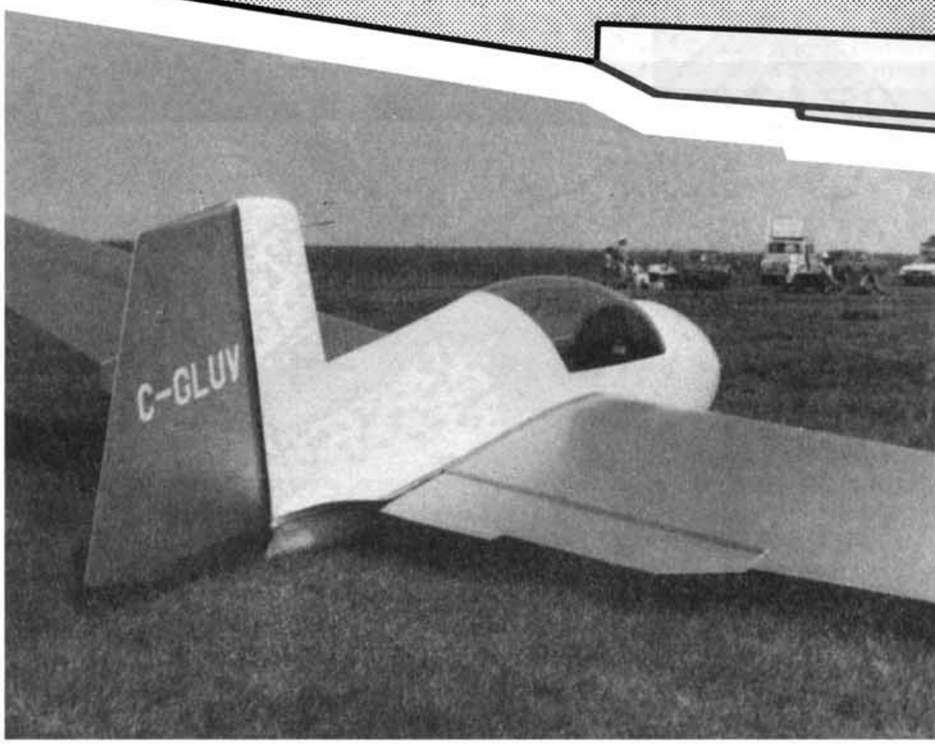
Ann is well known as one of the co-authors of "New Soaring Pilot" and has also written several other aviation and meteorology books, the latest being "Pilot's Weather". Ann has been involved in British gliding since the middle thirties and is herself an experienced pilot. During the war she flew in the Air Transport Auxiliary ferrying miscellaneous aircraft from light trainers to Spitfires and heavy bombers around the U,K., usually with no radio, no nav aids and no navigator! I believe Ann was quite impressed with our set-up at Hawkesbury. On the way to Ottawa we detoured to Pendleton so that she could see another club.

I have since received a letter from Ann where she expresses her thanks for the hospitality and her appreciation of the time spent in discussion of mutual interest with our pros, Gerry Nye, John Bissch and yours truly, Terry Beasley.

FLYING



by Mark Perry



When Russ Flint of the Winnipeg Gliding Club first thought he would like to build a glider, he considered rebuilding a damaged BG-12 that was at the club. What he finally ended up with last year was a Pioneer II flying wing. Paul Tingskou, another experienced pilot and builder advised that if he wanted to build some wings, why not a "wing"; Russ went ahead with the Pioneer at the beginning of 1973.

The Pioneer II is the design, sold as plans and partial kit, by Jim Marske of Michigan City, Indiana. In 1953, Marske heard of the Fauvel AV-36, the French tailless design, that had an upswept, highly tapered wing. Flying wings were previously thought to be feasible only through sweepback and twist, as in the pre-WW II Dunne machines and the 1940 experiments of Northrop and Armstrong-Whitworth. The success of the Fauvel depended on the reflex airfoil.

The reflex airfoil is the most positively stable of airfoils. The Pioneer's airfoil (33112-75/33110-75) has the mean chord intersecting the mean camber at 75 per cent of the chord, giving it high stability. As well, the unswept wing locates the centre of pressure so that large control forces are not needed as they were in the Northrup and A-W experiments where they subsequently negated the laminar flow advantages of the wings.

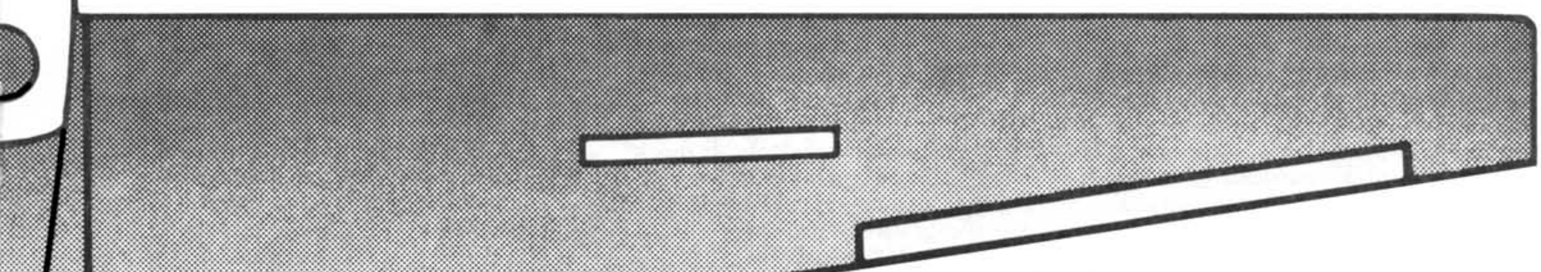
Marske next encountered the Backstrom Flying Plank. He was intrigued by the possibilities of flying wing sailplanes, and after model experiments with the Fauvel and Backstrom designs, began his own, the XM-1, in 1955. The XM-1 resembled the plank in appearance at first, but was succeeded by the 1A through D modifications, and then by the Pioneer 1A through D, to the Pioneer II. It evolved the forward tapered wing, and went from tip fins, to inboard fins, to the single central fin/rudder on the pod.

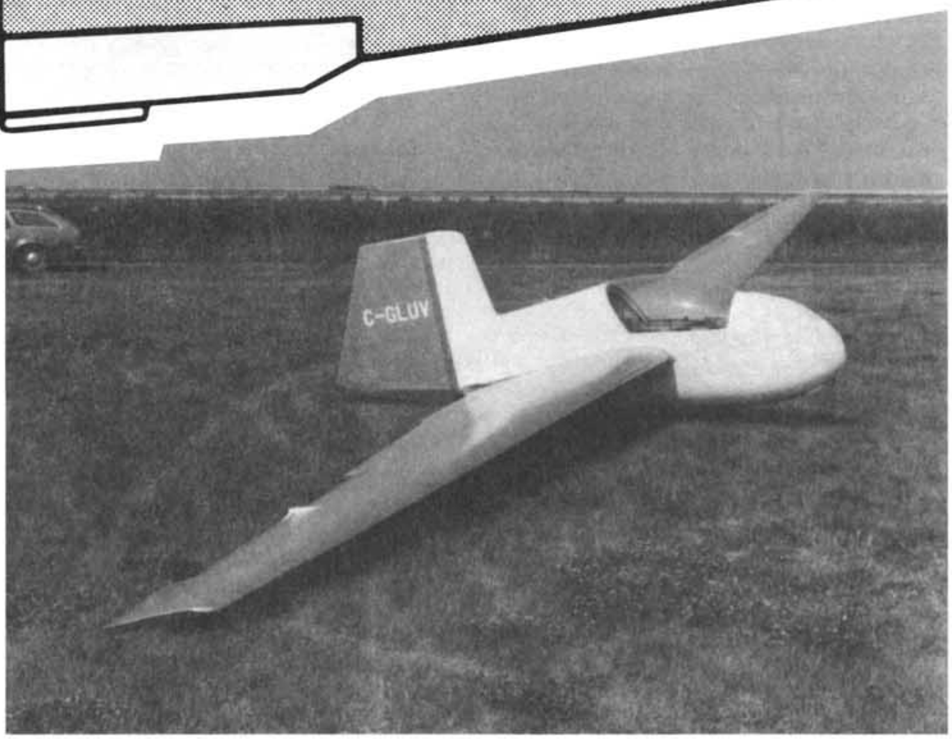
The Pioneer I used spoilers for roll control, but the Pioneer II for home-builders and "fun" flyers, uses conventional ailerons and upper/lower spoilers.

Marske's wings have all been "stall and spin proof", and up to the Pioneer I have exceeded all his expectations and goals. Russ Flint's choice of the Pioneer II was in part determined by the expected performance of the aircraft relative to most homebuilts at the time, as well as by the lower cost and extent of construction. Russ's total cost for his Pioneer has been about $2300. including instruments.

Flying wings have always been controversial. Scepticism stems from its unconventional appearance and, in the Pioneer II's case, the performance claimed. The 1974 Soaring Sailplane Directory said; "It is pretty well accepted that most designers and builders of gliders are optimistic in their performance claims by as much as 5 to 15 per cent. The last reference listed (Soaring 7-74, pp. 22-25, Flight test results by Paul Bikle) deals with the initial results of a limited flight test program that indicates the strong likelihood that the performance claims for the

PIONEERS





Pioneer II (and probably other flying wings as well) go considerably beyond the normal fudge factor".

That there is this scepticism about flying wings and specifically the Pioneer II was also pointed out in a letter to the September '75 Soaring in rebuttal to an article in a previous issue attacking the Pioneer II. The letter from Dave Miller and Doug Girard of London, Ontario referred to the following account (from Pioneer Newsletter, June '75) where their Pioneer II, C-GOON, outflew a Slingsby Skylark III. 'The two ships flew straight for five miles, stepping up the speed in 10 mph increments, from 50 mph to 90 mph, possibly redline in the Skylark. Mike Frijters, the Pioneer test pilot, enjoyed the startled look of the Skylark pilot, who after calibrating the new speed would look for the Pioneer around and below him only to find it constantly above! This Skylark model was the first one to have a laminar airfoil and while the factory claimed a glide ratio of 36:1; 31 or 32:1 is considered more operational. This suggests that Jim Marske's projected performance (35:1) is right on the money with Pioneers built to specifications. I cannot resist saying that this was accomplished with 41 ft of wingspan as against 59 ft of the Skylark's (44 per cent longer span)".

Paul Tingskou was able to "comparison fly" Russ's Pioneer II, C-GLUV (as in Luv), with a BG-12 and a Miller Tern. Performance was comparable if not better at higher speeds (50 mph and above). However at speeds lower than 50, he finds the L/D drops off rapidly, but the Pioneer with a smaller turning radius can really core thermals and stay up in scrappier lift.

C-GLUV flew for the first time on June 21, 1975; Paul Tingskou was the test pilot and the first flights revealed one aspect of the Pioneer that is of concern to Pioneer owners, and flying wing sceptics, sensitivity in pitch.

The reflex airfoil serves to give the inherent positive stability but quickness from the short moment arm was to be expected. Russ found C-GLUV (Pioneer II #9) to be more responsive than he liked. He partially improved this by extending the elevator control horn as far as he could, about three inches. Miller and Girard also reported sensitivity in pitch. Marske commented on these reports in Pioneer Newsletter, November '75, saying that such sensitivity was inherent in the design. The ship reacts more quickly with the local air currents, he said, possibly providing for more efficient flying. Unlike the conventional sailplane, he says, the flying wing will react more immediately to gusts. This matter, and others, have been dealt with in modifications provided by Marske as the IIB. He has reduced the control ratio by 2.5X. Russ's own modification reduced control response by about 60 per cent.

A further plan to make the elevator control more to his liking

Continued on page 20

The SAC reporting and analysis system for glider accidents

Over the past several years the SAC Safety Committee has developed an accident coding and analysis which has, as its primary aim to be a useful means to indicate areas requiring emphasis or attention by all pilots, but particularly during training. Its other aims were to maintain anonymity of the occurrence and its unfortunate participants and to be as simple as possible. It should also minimize the chore of reporting.

What was developed started from the comprehensive ICAO aircraft accident reporting system and while by no means fully satisfactory is felt to achieve its purpose. It would do the job much more effectively if the reporting were improved. Over the past eight years the success can only be considered 50% at best. This due solely to lack of reports.

Originally the report form asked for and gave information enabling the reviewer to make the assessment and allot coding. An advance notice card was next introduced, (SAC Safety Form 1) in order to alert the Committee of Occurrences and make possible quick distribution of any information which could be of help in preventing a repeat. So far that has not happened but should it be needed the capability is there. A new report form, (SAC Safety Form 2) has now been introduced which could result in providing more details and reduce the reviewer's workload. A set of 5 x 3 cards, one for each club has been replaced by 8 x 5 ones because the space available is running out. The annual report is a summary of the information on these cards and should provide interesting reading and be an indicator of where attention is required.

The new post of SAC Club Safety Officer should help improve both the quantity and quality of safety information. Accident reporting is one of their functions and forms an important ingredient in flight safety and accident prevention matters.

The Definition of a Glider Accident is:

(a) a fatality, or injury to any person requiring hospitalization for three or more days.

(b) damage to the glider costing in excess of $200 to repair.

SAC insurance plan

Past experience shows that claims have been handled by different people with different results. Some have been paid promptly, some not so promptly. Since there is only one right way please follow the procedure outlined below, and no other.

1) Best solution for everyone is not to have a claim. However, it's not always workable.
2) If step one fails, and you have a claim, notify WYATT & TAYLOR 5927 YONGE ST., WILLOWDALE, ONT. M2M 3V7 giving rough details and the name and address of the person in your club who will be in charge of your end of the claim. If it's urgent, don't hesitate to phone Ron Wyatt at 416-223-1118 during business hours or 416-473-2376 at his home.
3) Be sure your club representative is completely familiar with the events leading to the claim, and that all club members involved deal with him. This avoids too many cooks spoiling the broth.
4) Deal promptly and fairly with the adjuster of your claim.
5) Sit back and relax, a claims cheque will be in the mail.
6) If the simple procedure outlined above fails to produce the desired results within 4 weeks from the time your adjuster has completed his work and recommended payment, contact yours truly, A.O. SCHREITER SAC Insurance Committee, 3298 LONE FEATHER CR. MISSISSAUGA, ONT.

If you have any questions regarding the plan itself, premiums, policy conditions, etc. please get in touch with me. Although claims are still running quite high the plan seems to be maturing and there is certainly hope for the future. Please remember that the ultimate success or failure, and the real cost, is determined by all of us. Fly accordingly.

A naive Look at insurance by T.R. Beasley

The whole point of insurance is a sharing of risk. All owners of a specific category of property pay a premium such that the total premiums can be used to cover the losses.

The main risks that a glider owner recognizes are: –

(a) Public liability and property damage (caused by operation of the glider).
(b) Accidental ground loss (fire, theft, etc.)
(c) Airframe damage caused by operations (in-flight hull risk).

With a conventional type of insurance policy the premium is apportioned as a fixed sum for (a), while (b) and (c) are usually expressed as a percentage of the declared aircraft value. This means that if a club doubles its fleet the insurance premiums will double even if the membership remains constant or even reduces. Any change in the number of members will not effect the insurance premium. It is also obvious that risks (a) and (c) above will be zero if the aircraft are not flown.

Any change in the amount of flying carried out will not affect the insurance premium but it is obvious that the exposure to risks (a) and (c) above increases as flying is increased.

Now look at the SAC insurance scheme which has the premium based primarily on a solo pilot head count. If a club doubles its fleet there is only a slight increase in insurance premium, if the membership remains constant. If the membership doubles then the insurance premium will also nearly double – in both cases regardless of the amount of flying done.

I believe that we should take a close look at this situation and also attempt to relate it to normal club operating practices. Many clubs are operating at a saturation point; by this I mean that they cannot increase the amount of flying carried out because they are fully utilizing their towing capacity. Therefore an increase in the number of members will not increase the amount of flying and therefore will not increase the risk of an insurance claim.

It appears that some attempt should be made to base the premiums on the exposure to risk; if this is agreed then neither the conventional system nor the SAC scheme makes much sense. It is, therefore, suggested that a simple way to introduce exposure to risk as an input to the premium assessment is to use the number of flights per year as an input parameter. A simple way to do this is by the use of a formula such as: –

$P_3 = \frac{S}{200} + X + 50G$ where P is the total premium, S is the value of the gliders, X is the number of flights, and G is the number of gliders.

For comparative purposes the conventional insurance costs would be:

$P_2 = \frac{4S}{100} + 100G$ assuming the rate is 4% of hull and $100. per ship for PL and PD.

The existing SAC scheme gives us:

$P_1 = \frac{S}{200} + 45N$ where N is the number of solo pilots in the scheme.

Table 1 is presented to show the differences resulting from these three schemes. Clubs A, B, C, and D in the Tables are randomly selected real SAC clubs whose statistics were available to me from SAC records. Club 'E' is a large club of 150 solo pilots and the figure 'G' excludes this club's private owners. Club 'F' is the same club but 'G' includes the private owners.

Obviously in order to make meaningful comparisons the total premiums must be made equal; as direct use of the formulæ does not achieve this the cost per flight figures C_2 and C_3 have been factored such that $C_2 = K_2 \times P_2/X$ and $C_3 = K_3 \times P_3/X$; $C_1 = P_1/X$ where $K_2 = \Sigma P_1/\Sigma P_2$ and $K_3 = \Sigma P_1/\Sigma P_3$ where ΣP_1, P_2, and P_3 indicate the sum of these items; however, see the note against Table 1.

Note that using the suggested formula ΣP_3 is within 10% of ΣP_1 so the total premium received by the insurers is not too different, and this is all that interests him. It may be argued that the weightings

TABLE 1

Club	N No. of members	G No. of gliders	 No. of towplanes	S Fleet Value $ x 1000	X Total flights	Members per glider	Flights per member per glider	P_1 SAC Premium $	P_2 Conventional Premium $	P_3 New Proposal Premium $	C_1 Insurance cost/flight P_1/X	C_2 Insurance cost/flight K_2P_2/X	C_3 Insurance cost/flight K_3P_3/X
A	34	9	1	53.8	1336	3.78	4.36	1799	3152	2105	1.35	1.99	1.92
B	23	6	1	48.3	818	3.83	5.92	1276	2632	1409	1.56	2.72	2.09
C	39	7	1	42.1	897	5.57	3.28	1965	2484	1507	2.19	2.34	2.04
D	68	10	3	91.3	2778	6.80	4.08	3516	4952	3884	1.27	1.50	1.70
E	150	9	3	109	2974	16.7	2.2	7295	5560	4119	2.45	1.58	1.69
F	150	27	3	300	3615	5.6	.9	8250	15000	6615	2.28	2.47*	1.98*

* IN THE C_2 AND C_3 COLUMNS FIGURES FOR CLUBS A THRU E ARE DERIVED USING K_2 AND K_3 NOT INCLUDING CLUB F, THE FIGURES FOR CLUB F ARE DERIVED USING K_2 AND K_3 NOT INCLUDING CLUB E.

of the three terms S, X, and G are not correct . I do not intend to defend them as this is not intended to be a fully developed proposal, simply some ideas for consideration. However, I would point out that the heavy weighting of X is useful as this is generally a major contributor to club revenue; if a club does a lot of flying and charges on a per flight basis they will automatically produce the revenue to pay the premium.

If SAC should decide to negotiate and implement such a scheme there may be a problem in the first year. I suggest that this be based on the previous year's data for the club; the number of flights taken being the higher of (i) the actual flights achieved in the previous year or (ii) on SAC statistical average over all clubs. For example, taking the four clubs used in Table 1, and introducing a new club, G, that has just been formed we have the data shown in Table 2.

Another potential problem may be the group or private owner who only makes a small number of flights per year. It is possible that the best way of handling this would be to insist that all such aircraft are included with the statistics of a participating SAC approved club. In order to avoid 'paper' clubs being formed SAC could easily provide a definition of a club, e.g. must satisfy at least all of the following: –

(a) Provide dual training facilities.
(b) Provide launching facilities.
(c) Must be open to the public.
(d) Must include SAC dues with membership fees.
(e) Must have named a SAC Safety Officer and participate in the SAC safety scheme.

Retro rating should be avoided by making the premiums high enough to be able to insure against that risk; however, if it should be found necessary then this too should be on a per flight basis. On the other hand should rebates become due they, too, should be made on a per flight basis. I would go further and suggest that if rebates were paid they should be held by SAC and not paid back to clubs until they had shown an exemplory safety record for, say, three years and no club not cooperating fully with any SAC safety scheme should be eligible to receive a rebate.

An alternative approach to establishing premiums would be for the average number of flights per glider insured the previous year to be used for all gliders seeking insurance for the coming year. This would certainly be easy to administer. Looking at Table 2. it is seen that this would only affect one of the clubs considered, D, whose predicted number of flights would drop to 1806.

I sincerely hope that these ideas will provoke some thinking and cause some correspondence on the subject. I must mention that these ideas have not been discussed with the SAC Insurance Committee, nor with the other SAC Directors, nor formally discussed with my own club. I am sure that there are some snags, loopholes, and problems that I have overlooked, however, if everyone who is interested in this problem (and it is a problem – particularly for SAC Administration) examines the suggestion from his own Club's point of view we will soon be able to identify them.

Perhaps we should examine this suggestion further?

TABLE 2

Club	1974 Flights (x)	Fleet	1975 Prediction (x)	
A	1336	10	1389	based on '74 average
B	818	7	972	based on '74 average
C	897	8	1111	based on '74 average
D	2778	13	2778	based on '74 actual
E	2974*	12*	–	–
F	3615	30	4167	based on '74 average
G	0	2*	278	based on '74 average
	9444*	68*		

Average = 138.9 flights/ship
*2974 excluded from total
12 and 2 excluded from total

CALL FOR PAPERS

CANADIAN AERONAUTICS AND SPACE INSTITUTE

SECOND CANADIAN SYMPOSIUM ON RECREATIONAL AND NEW-GENERATION LIGHT AIRCRAFT

Toronto: 13th-15th September, 1976

Co-sponsors: The Experimental Aircraft Association of Canada; and
The Soaring Association of Canada; and
The Canadian Owners and Pilots Association; and
The Ministry of Transport

Theme: The Impact of Recreational Aircraft Technology on the Design and Development of New-Generation Light Aircraft

Locale: Holiday Inn, Toronto

The Symposium will consider the theme in four sessions:

(1) The market demand for new-generation, recreational, training and utility light aircraft and the development of aircraft specifications to meet this demand;
(2) Optimum aerodynamic configurations and design techniques;
(3) The development and production of cost-effective power plants, aircraft structures and systems;
(4) Panel discussion on the challenge to industry to produce new-generation aircraft.

Papers are invited for presentation at the first three sessions. Authors are invited to consider what types of new-generation recreational, training and utility one-to-four place aircraft should be produced as alternatives to existing aircraft that have reached a plateau of development. The overall input of papers should provide specific guidance to industry, governmental research and regulatory agencies and universities on what policies and techniques should be used to develop and produce cost-effective families of new-concept, aerodynamically efficient aircraft with exceptionally good economy (range/endurance), take-off, climb, gliding, landing and low noise characteristics but which are conveniently road transportable and can be inexpensively stored and maintained.

Submission of papers, including abstracts, should be sent before the 14th June, 1976, with names and addresses of the authors, to:

The Secretary,
Canadian Aeronautics and Space Institute,
77 Metcalfe Street,
Ottawa, Ontario K1P 5L6.

SAFETY IS A STATE OF MIND

by Bob Gairns

Bob Gairns is a mechanical engineer and technical writer who arrived in Canada from the UK in 1956 and has been a member of Montreal Soaring Council ever since. Bob started gliding in Scotland in 1948 and power flying in 1950; he has towing and gliding instruction experience and has owned several sailplanes, currently a Libelle 301. He has a Gold badge with goal diamond. Bob was one of the two founding editors of the MSC newsletter "Downwind" and served as editor of FREE FLIGHT from 1967 to 1970.

Flight safety is a subject which can be discussed at any time, but is of particular interest at the start of the flying season.

In 1975 there were a number of accidents involving Canadian glider pilots and it is worthwhile to describe some of them to see the reason for their occurrence and to see if something can be learned from the mistakes of others. The ones that come to mind are listed below.

Location. Buckingham Gliding Club – a grass field surrounded by woods. The first accident was to a Blanik, flown solo, towed by a 150 HP Piper Supercub. At approximately 250 ft the tow pilot found he did not have full power, so in order to clear the trees, released the towrope. The glider pilot attempted to return to the airfield but a wing struck a tree, the glider cartwheeled and was damaged beyond repair; pilot unhurt.

One report said the pilot claimed he did not release his end of the towrope and this caught an obstacle and dragged the glider down. Observers said it would have been possible to land safely. The glider pilot had been forbidden to fly the Blanik as his flying was considered to be erratic.

A second accident at this airfield on the same day occurred with an instructional flight in the club 2-33, when a student pilot hit a car which was on the runway towing another glider . The wing of the 2-33 was badly damaged. In this case the instructor was not paying attention and the accident could have been avoided.

A 2-33 at this same club on an instructional flight with a very experienced power pilot in the rear seat was approaching to land. The instructor looked behind for a few moments. During this time the student opened the dive brakes fully; the instructor looked ahead again but by this time the airfield was too far away. Glider undershot and received considerable damage.

Location: York Soaring Club, north of Toronto. Accident concerned a modified J3 Cub towplane (150 HP engine replaced original 65 HP). Pilot had commercial licence. For some reason this pilot got into a spin at 400 to 500 ft above ground, held the stick back "so he would not hit the ground too hard". Aircraft was wrecked; pilot broke his ankle.

This aircraft will fly slowly without spinning, therefore the pilot had put the aircraft in an extreme position. Comment: modern power training does not normally teach spin recovery.

Location: Glen, New Hampshire; aircraft: 1-34 owned by SOSA club. Pilot had limited experience, none at a wave site. On first flight the dive brakes came open and a landing was made in a local golf course. The brakes had not been properly locked.

On a second flight the subsequent day, the pilot got low over woods, had sufficient height to reach a paved strip (North Conway), but tried to regain take-off field. At a low altitude he saw he could not reach this field, tried to land in a clearing in the woods, wrecked the glider; pilot unhurt.

This pilot had been given permission (at his home field) to fly at Glen provided one of his club instructors with wave experience was present. No SOSA instructor was on the field at Glen, but the pilot flew regardless.

Location: Lake Placid, New York, airfield 1744 ft. ASL surrounded by hills 2000 to 2500 ft above local ground level, the nearest hills being 4 miles to the east. Conditions: considerable cloud cover with some gaps. Cloudbase approximately 2000 ft above ground. Pilots were in M.S.C. Blanik, privately owned Ka6E and Nimbus II and were towed through a gap in the clouds for some wave soaring. Pilots became lost due to lack of ground reference. All landed out without damage, one at Saranac Lake 14 miles to NE. Comment: Pilots were fortunate to find suitable landing areas when they descended below cloudbase, also were fortunate not to hit hills. Pilot experience in wave flying in mountainous areas varied from slight to moderate, but even the most experienced pilot cannot see through cloud! Safest plan when lost above cloud would have been to fly out of mountainous area, to the east, but this could not have been done safely under about 8000 ft above Lake Placid airfield. Otherwise do not fly in mountainous areas under 6/8 cloud conditions.

Location: Hope, B.C., large 5000 ft long airfield, on Labour Day weekend. Glider: H301 Libelle. Pilot: HP 14 owner, with cross country experience and outlandings second flight in type. Towing is by winch at this field and pilot was familiar with this launching method. At 300 ft on tow, glider was observed at low speed and steep climb angle. Pilot released rope, opened brakes as if to make a straight ahead landing, changed his mind, put the brakes in, and at low speed started a steep turn to the left. After a quarter turn, glider spun in and hit ground. Pilot died from injuries.

Comment: manoeuvres at low height should be made at adequate speed. In a strange aircraft the only safe action would have been to fly straight ahead.

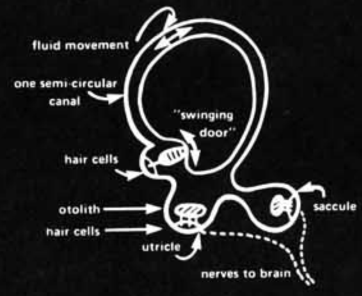
Location: Quebec City or thereabouts. Pilot: part owner of Kestrel 19 m. Two years ago one of the owners overshot landing area and attempted circuit from 200 ft, caught wingtip and broke off fuselage in front of tail. This year one of the owners has broken the fuselage again in front of the repaired portion. Comment: once shy, twice foolish.

Gliding is as safe as you wish to make it. Accidents can happen at any time, and are usually due to a combination of circumstances. Pilots must be constantly awake to take corrective action when the unexpected happens, but the main prevention of accidents is by the carrying out of proper procedures, by planning and by practising discipline in the air.

One is taught at M.S.C. to start one's circuit at approximately 900 ft above the centre of the field. However, all too often pilots who have reached 1-26 standard or higher become overconfident and nonchalantly come in at varying heights to start their circuit. It is important to start all circuits at 900 ft in order to get into the habit of making a good circuit. Then when one does go cross country, the practice of making such standard circuits comes naturally and gives an adequate margin of height for emergencies such as a fence or a ditch seen at the last moment.

Be a thinking pilot, practise discipline and stay alive.

FIGURE 1



ORIENTATION

by Don Clarke

Don Clarke is professor of physiology at University of Toronto. In summer he flies a bright red 1-26 out of York Soaring and he holds an altitude diamond as a result of winter flying at a Colorado wave camp.

Some sense of balance and some sense of orientation are obviously necessary for the type of animal which stands in an unstable position on top of two long legs, and which from primitive times onwards has been given to wandering from the home cave under the necessity of returning to it sooner or later for comfort and safety. For the glider pilot, the problem of balance and orientation is especially interesting, because he is likely to be exposed to conflicting signals, and hence confusion. The purpose of this article is to describe the mechanisms by which the body perceives its position, and changes in position in space, and what responses it makes to these perceptions. We will be dealing with the orientation of the body, with changes in position, both in a straight line and in a turn. In other words we are speaking of position, of linear and angular velocity and of linear and angular acceleration. I would like to make a further distinction, which is not always made in articles on this subject, between disorientation, which results when we are getting information about position and velocity and acceleration, and for a variety of reasons are not able to sort out the signals and thus get confused, and unorientation which may result from simply a lack of signals.

Of course much, probably most, of our information about orientation and movement comes from the eyes. We must not forget that touch and pressure sensors in the skin also give us lots of information. The "seat-of-the-pants" feeling comes from these senses. In addition to the above important senses the labyrinth system, associated with the inner ear, gives information, and in this article we will deal in large measure with this structure, for its action is rather less obvious than that of the eyes and the touch and pressure senses.

Inside the skull, adjacent to the inner ear structures and, oddly enough, connected with them is the complex labyrinth structure. It is about the size of a dime. Imagine two small hollow sacs, connected to each other and filled with fluid. From one of these sacs there extends a group of three hollow rings. The planes of these rings are at 90 degrees to each other. When the head is upright, one of the rings is nearly horizontal, another is upright and nearly in a fore-and-aft position, the other is upright and nearly in a side-to-side plane. The little sacs are called utricle and saccule, and the rings are the semi-circular canals. The canals arise from, and lead back into the utricle sac. Figure 1 shows something of the nature of the connections.

At the bottom of the utricle there is a bunch of cells with hair-like filaments projecting upwards from them, and resting on top of these hairs is a bit of hard substance which weighs down on the hairs, deforming them a bit. This structure acts as a gravity sensor. If the force of gravity is increased, the little stones, or otoliths press harder on the hairs, bending them more, and this causes appropriate patterns of nerve impulses to travel to the brain, to be there interpreted. If the head is tilted forward, backwards, or sideways, then there is a different pattern of deformation of the hair cells, and this pattern of deformation is picked up and interpreted by the nervous system to give information about the position of the head with respect to gravitational forces. Obviously, if the head is inverted this can also be perceived, as a result of the particular deformation of the hairs. Now note that forces of linear acceleration as well as forces in a turn act in the same manner as forces of gravity by causing a bending of the hairs as a result of movement of the otoliths relative to the hair cells. The utricle will sense both direction and magnitude of such forces. Normally we interpret them with no difficulty.

The three semi-circular canals each have hair cells somewhat like those in the utricle, except that the hair-like projections from the cells lining the bottom of enlargements in the canals do not support a stone-like structure. Rather, the hairs are covered with a gelatinous substance, which practically occludes the hollow core of the canal. The gelatinous cap seems to act as a swinging door in a passageway. As the fluid in the canals moves one way or the other, the gelatinous cap is caused to swing in accordance with the pressures exerted by the fluid, and the distortion of the hairs, as in the utricle sets up nerve impulses which are interpreted in the brain. A little thought about the cause of fluid movement in a closed ring-like structure will show that these structures will respond to angular motion i.e. to rotation of the head. If the angular motion is of uniform velocity, the fluid and the canal supporting the hair cells and cap will all move together. There will be no bending of the hair cells - hence no sensation. It follows then that these particular labyrinthine structures will give no information about uniform angular motion. However, let us consider angular acceleration. If the head begins to rotate, the inertia of the fluid in the semi-circular canal will tend to keep it from moving. There will be relative motion of the fluid on the one hand and the walls of the canal and the hair cells on the other hand. The fluid will tend to push the "door" one way or the other and hence there will be a bending of the hair cells. The consequent nerve stimulation will be interpreted in the brain. Similarly, when the angular motion ceases, the fluid will tend to continue to rotate although the canal has stopped. Again, nerve messages will be sent to the brain.

In summary the utricles will give us information about the orientation of the head with respect to gravity, about linear acceleration, and about angular motion. From the semi-circular canals we get information about angular acceleration. Note that we do not get information about uniform linear motion from these sources. This comes from the eyes, but if for any reason (eyes closed, night-time, flying in the middle of a cloud) we do not get information from the eyes, then we have no idea of our linear velocity — i.e. our speed.

Now it is all very well that we should get information about position, velocity and so on. Of more interest however are our responses to the information. I won't deal with the variety of well-coordinated responses which are necessary just to keep us in an upright standing position but will deal with just a few of the responses of more immediate interest to the pilot.

If we turn our head, there is a peculiar response of the eyes known as nystagmus. Possibly it has, or had some survival value in more primitive animals. The result of this reflex response is that if we turn our head, say clockwise, the eyes will automatically move in the opposite direction, as if to remain focussed on some object. As rotation continues, the eyes will suddenly flick in the direction of rotation and then slowly move again in the opposite direction. Now if we stop rotating, the strong decelerating forces cause eye motions in the opposite direction. The eyes will flick quickly in the opposite direction (counter clockwise) and then slowly move in a clockwise direction. This cycle may be repeated several times during the next few seconds. Of course the eye movements cause corresponding changes in the position of images of fixed objects in the retina. They appear to move. We get dizzy.

In addition to the eye movements, a number of muscle reflexes which are designed to keep us in an upright position also take place. Of course all these reflexes are designed on the reasonable proposition that the head and body are more or less upright to begin with. Fore-and-aft movements, and sidewise tilting movements are automatically checked so that we remain upright. We can't make the usual muscular righting reflexes when strapped into a cockpit, but we still can have a number of problems flying in a straight and level course as a result of misinterpretation. Suppose the head is tilted backwards. The formerly horizontal canal is now nearly vertical. A rolling motion will now stimulate it, and such a motion will be incorrectly interpreted as a turn. Imagine yourself, vigilant as always, looking sharply upwards at another sailplane flying above you. Suddenly turbulence rocks one wing up. How do you interpret this? Here is a problem in disorientation.

Or suppose smog or fog obscures the horizon, and gradually one wing tip falls low. If this action is not too rapid, it may not be perceived by the labyrinthine system. The positions may feel normal even if the ball bank indicator says "tilt". If we try to centre the ball, the wings may be levelled, but as a result of the acceleration about the roll axis as we level the wings, our senses say "tilt". Here is unorientation followed by disorientation.

The threshold level of angular acceleration at which these structures just begin to respond is about ½^{o} / sec / sec A roll rate of 3 seconds from a 45^{o} left bank to a similar right bank will obviously stimulate them adequately. On the other hand, a little calculation will show that 10 seconds of flight with a gradually increasing bank (but not enough to stimulate these canals) could lead to an appreciable, though unperceived bank.

Our strongest cues come from our eyes, but in the turbulence especially, the various accelerating and decelerating forces acting upon the labyrinths may give signals which do not agree with visual signals. Whee! For the unaccustomed person, reach for the air-sick bag.

Note the word unaccustomed. It is possible, with training or experience as most of us know, to get reasonably correct signals without motion sickness most of the time. (Figure skaters learn to accustom themselves to the strong rotational forces they experience.) However, unusual motion patterns of simultaneous rotation and translation can usually provide sickness or disorientation to almost anyone. Think of the possibilities — you are looking downwards and to one side of the cockpit, reaching for a map or gloves and again there is a sudden upward gust. You snap your head around and upward as the aircraft lifts and rolls. Instant vertigo!

In summary it may be said that we get information about position, uniform movement and acceleration from numerous sources within the body — the labyrinths, the eyes, and the touch and pressure sensors in all parts of the body. When we experience forces of acceleration, (linear or angular) in different axes or direction simultaneously, disorientation, vertigo or motion sickness may result.

GLIDERS IN THE NEWS

Most SAC members are interested to hear what new gliders have been purchased or changed hands and what new prototypes are in the works. It is hoped to continue this column as a regular feature column in 'Free Flight' but its success will depend on material being submitted. 'Grape-vine' news will be included so no guarantee of accuracy is given! If you are sensitive about having your plans published to our great Canadian Soaring Public then please write and let me know your wishes as I might already have heard your secrets!

All contributions should be sent to Terry Beasley, 173 Leslie Ave., Dollard des Ormeaux, P.Q., H9A 1X2. Any gleanings from foreign magazines will be particularly welcome, as will news of home-builts.

CANADA

C-PIK & C-GAUL are the first two PIK 20s in Canada, imported by K. Kovacs, and G. Couser and partners. They have been flying at Hawkesbury since May and SAC evaluation is complete. Draft Type Approval G-91 is in process.

C-GUDE is a new HP-14, purchased partly built by J. Bisscheroux and G. Nye. Now completed and flying at Hawkesbury. Very nice it looks, too.

C-GUID is the first DG 100 in Canada. G. Geyer-Doersch visited Germany in May and did a round tour of all the main glider factories. He went back again in October and spent three weeks in the DG factory helping to build his ship; he knows it inside out! He then brought it back by air-freight, accompanying it as supernumary crew-member on the 747. First flown at Hawkesbury in November and SAC evaluation in process. Note that Guenther is the agent for DG.

The purchase of the DG led to frantic horse trading at Hawkesbury as Guenther had to dispose of his old faithful

CF-TUB LS-1. This was purchased by W. Roach and partners, who had to pass on

CF-VKA (the Ka-6 with the loud radio), this was snapped up by T. Tye and partner. All this activity perhaps prompted L. Cassiani and partner to purchase

C-FOLO another Ka-6, from M. Aubut of Gatineau club and bring it to Hawkesbury. Gatineau will not be down one glider for long as M. Aubut has ordered a DG.

CF-FGR is the Kestrel 19 purchased by J. Firth and flown in the 72 World's in Yugoslavia and sold afterwards to a Hawkesbury syndicate. It was damaged in a road accident on the way to the Nationals this last year and has now been repurchased by John who will repair it. He hopes to have it ready for the season and this will put his HP CF-RNN up for sale.

ASW-15b We understand that two are on order. These will be new types for Canada as it is considerably different to the existing ASW-15.

ASW-19 We hear that one is going west. Another new type.

Jantar Std. Two are on order. Another new type that was greatly admired by those of us who examined it in Australia.

GERMANY

FS-29 A fantastic variable geometry sailplane from the Stuttgart group has flown and testing is under way. Rather than get involved with the problems of sealing for chordwise extensions and maintaining contour they went the other way — variable span. For slow speed flight the span is 19m, and aspect ratio is 29. For high speed flight the outer wings are telescoped inwards over the inner section and the span is then 13.3m, with aspect ratio 21. The dive brakes are on the inner wing so with the short span the wing is very clean — better not try and land with short span though.

SWITZERLAND

18m Pilatus. An 18m version of the B-4 is expected to fly soon. With their successful entry into the glider field they plan to follow this up with a high performance two seater and then a powered version.

FLYING PIONEERS

Continued from page 13

has been considered by Russ with the advice of Paul Tingskou. It calls for building another pair of elevators with reduced area. The plan would continue the line of the trailing edge inboard to the trailing edge root, excluding the area that falls aft of this line. It is hoped that this "eyeball engineering" will have the desired results. Russ had hoped to do this over the winter but other commitments prevented it. Besides his work as a physics teacher, Russ is an active member and instructor at the Winnipeg Gliding Club, and is Prairie Zone Director of SAC.

Russ has been quite satisfied with the performance of C-GLUV. In the summer of 1975 it totalled about 25 hours of flying including three 3 hour flights.

The Pioneer II has a span of 42.6 ft and area of 149 sq ft with an aspect ratio of 12.2 and wing loading of 4.2 lb/sq ft. With this, performance is given as L/D max. 35 at 60 mph. This compares with 23:1 at 53 mph for a 1-26E having a span of 40 ft and aspect ratio of 10. A BG-12 claims 34 at 56 mph with a span of 50 ft and aspect ratio of 17.7. The Tern, with a span of 51 ft and aspect ratio of 20 claims 34 at 58 mph. The Pioneer because of less structural weight has a lighter wing loading than any of these.

The construction of the Pioneer II is composite. The wings and control surfaces are wood. The fuselage /pod is a steel tube frame enclosed in a glass fibre shell.

The theory of tailless sailplanes is founded on basic axioms of sailplane design; minimize drag and weight while maintaining high lift. In theory the flying wing should have excellent performance. The Pioneers are showing themselves to be as able performers as Jim Marske intended them to be. One hopes that his projections of standard class and glass fibre ships will come into being to further demonstrate the performance that the flying wing promises.

FOR THE TECHNICALLY MINDED

by T.R. Beasley

There appears to be an encouraging increase in interest in the technical side of our sport as evidenced by the "Soaring Symposia" in the U.S.A., the NASA Sponsored Meeting at MIT, and our own Canadian Aeronautics and Space Institute's Symposium on Recreational Aircraft held last May. Your Association is an active member of OSTIV (Organization Scientifique et Technique Internationale du Vol a Voile) and one of the objectives defined in our By-Laws is to engage in and encourage scientific research appertaining to soaring flight. OSTIV generally divides its papers into two groups, Technical and Scientific. Topics which are always welcomed include, but are not limited to, the following. –

Technical.

1. New structural concepts in sailplane designs,
2. Aerodynamic improvements;
3. Results of flight tests related to performance, flutter, stability, etc.
4. Airworthiness requirements criteria;
5. Fatigue in sailplane structures, especially fibre glass;
6. New developments in motor sailplanes;
7. Soaring in controlled airspace;
8. Advancements in pilot training;

Scientific:

1. Characteristics of thermal convection;
2. "Thermal Waves" and organized convection;
3. Atmospheric boundary layer studies
4. Airflow over mountains, including lee waves;
5. Cloudphysics studies using sailplanes or motorgliders,
6. Turbulance studies;
7. Measuring techniques and instrumentation;
8. Forecasting for soaring pilots;

Unfortunately it is already too late to solicit papers for the OSTIV Congress that will take place in Finland at the time of 1976 World Championships but anyone interested is invited to prepare papers at any time. If you require assistance, or review of papers, your Association will endeavour to help.

Anyone who is technically minded is encouraged to become an individual member of OSTIV. The tangible benefits are availability of OSTIV publications at reduced price and subscription to Swiss Aero Review which includes a monthly section of OSTIV news. The magazine carries most articles in German and French although some, particularly OSTIV news, are in English. If Clubs with several ex-European members took out memberships they would be providing support to OSTIV and also obtaining up-to-date gliding news.

Classified Ads

FOR SALE
Scheibe MU-13D, 16 m antique sailplane award winner, superb floater, outperforms 1-26. Structure in excellent condition, including enclosed trailer and instruments. $3950.
Contact: Peter Masak,
911 Brimorton Drive,
Scarborough, Ontario.
(416) 439-7919

FOR SALE
Libelle 201B, full contest equipment and metal streamlined trailer, oxygen.
Price $15,500.00 Firm.
From Toronto area only, share of this complete package may also be available.
Julius Nagy,
(416) 255-9433

FOR SALE
Winnipeg Gliding Club offers Schweizer 2-22, ceconite cover, painted and minor repairs done last winter. Has new tire, basic instruments and is in good condition with current c of a. Asking $2900.
Contact: Bryce Stout,
214 Strathmillan Road,
Winnipeg, Manitoba,
R3J 2V3
(204) 889-6041 (H)
(204) 946-6426 (O)

WANTED
Schleicher Basket type tow hook.
Contact: Jim Neely,
(519) 735-9625

BADGE FLYING CAMP
MAY 25th to JUNE 5th
Right After The INNISFAIL MEET in RED DEER Alberta.
This is The Place And The Time Of The Year, If You Want To Fly 50km or 500km.
COME AND FLY WITH FRIENDS
towplane, weather report, telephone will be available.

Let Me Know If You Are Planning To Come, so I Can Arrange For Sufficient Tow Facility.

(Mrs.) Toni Williams
2019 Dunrobin Cr.
North Vancouver, B.C.

FOR SALE
Schleicher Ka 6 Cr, Excellent condition, Basic instruments, Oxygen, Radio, Trailer etc. $8600 firm.
Contact: A. Heinemann,
R.R. 1,
Gormley, Ontario.
(416) 727-9566

WANTED
Instruments, Altimeter, ASI, Vario, Radio, Barograph in good working condition.
Contact: A. Heinemann,
R.R. 1,
Gormley, Ontario
(416) 727-9566

WANTED
Ka-6E or CR, 1-26D or E, Slingsby Dart,
Write: G.B. MacDonnell,
R.R. 3, Senger Road,
Kelowna, B.C.
V1Y 7R2

FOR SALE
CF-RNN, a special HP-11, past Nationals winner and record breaker, with many improvements (Soaring May 73), plus 15/17 metre option, water ballast, extra tail area, and large canopy. A rugged all metal ship with lightweight enclosed trailer, instruments, radio and oxygen for $9000.
John Firth,
542 Coronation Avenue,
Ottawa, Ontario.
(613) 731-6997

FOR SALE
Swiss Blown Canopy for Ka-7. New - still in the crate. $550.
Contact: Elemer Balint
R.R. 2,
Blackstock, Ontario
L0B 1B0
(416) 263-2133 (H)
(416) 248-3415 (O)

WANTED
Reliable Schweizer 2-22 Trainer.
Contact: Major A.D. Erickson,
Canadian Forces Station,
Alsask, Saskatchewan
S0L 0A0
(306) 968-2630

FOR SALE
Two Schweizer 2-22 Trainers in excellent shape, $4500.00 each.
Contact: P.J. Thompson, Secretary,
609 Upper James Street,
Hamilton, Ontario
(416) 385-6566 bus.
(416) 627-5990 res.