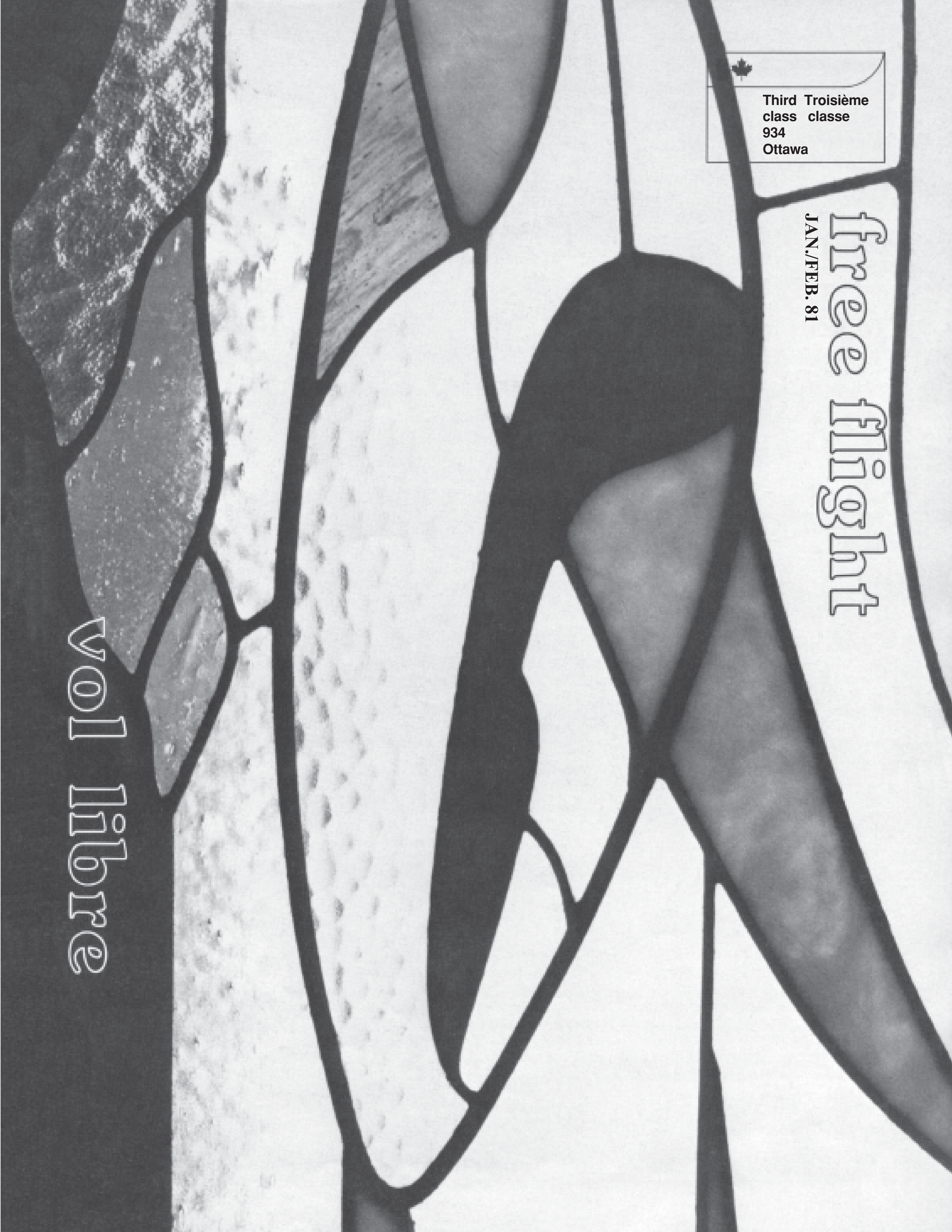

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class classe
934
Ottawa

free flight

JAN./FEB. 81

vol libre

LETTER FROM THE *New* EDITOR

Dear friends,

Well, here I am, discovered by your SAC directors and asked to take over the editing of this fine magazine to complement my favourite hobby of “soaring with the winds” and hunting badges.

My role is the collection of your technical articles, photographs, soaring stories, incidents and accidents for educational purposes, nasty letters-to-the-editor, tid-bits, and all new ideas and discussions.

My first goal is to get FREE FLIGHT out to you in the month of issue printed on the cover so that information is not out-dated before receipt.The biggest variable now is getting the new printers in Ottawa “up to speed” so that producing and mailing the magazine can be shortened by at least three weeks.

My second goal is to keep the text accurate and get rid of those maddening typos. Once I have sent the copy to Ottawa, Jim Leach is going to do his best to help me here, making sure the SAC general information is correct, and checking the FREE FLIGHT proofs. He is also responsible for the paid advertising, classified ads, and “Stop the Press” last minute input (which is not proof-read).

Important repetitive items have received their assigned space now: SAC Supplies, Member Clubs and Directors and Chairmen’s mail addresses will be in the back pages of each magazine, and “Editorials” on the first pages. I also added the last minute Notice as constant reminder, and Coming Events. I hope you find this arrangement convenient if needed for quick reference.

FREE FLIGHT lives and dies with the role you all MUST play as CONTRIBUTORS. I know it’s an old story, but I would like to remind you; that’s why you received thin issues lately, the poor editor dried out. Believe me, many thoughts are well worth being written down and rushed to me. Do not suppose that someone else will do it or that your story my not have general interest. Have a look at the FREE FLIGHT content statistics on page 4. Where are you budding authors?

I want to make FREE FLIGHT a stronger vehicle of communication between the two Canadian beaches. I rely on you and everyone in the soaring family, so that you may receive the magazine you have been looking forward to.

Thank you for your cooperation.

Ursula

Cher ami,

Et bien voilà, découverte et nommée par les directeurs de L’ACVV au poste de rédactrice de ce magazine au titre si évocateur, cette responsibilité s’ajoutera naturellement à mes “hobbies” favoris: idées nouvelles et sujets à discussion.

Ma fonction consiste à rassembler, trier, sélectionner tous les articles techniques, histoires de vélivoles, rapport d’incidents et accidents pour fins éducatives, lettres “feroces” addressées à la rédaction, idées nouvelles et sujets à discussion.

Votre contribution (même dans la langue française) est essentielle pour faire de “FREE FLIGHT” un magazine vivant, intéressant, informatif. La rédactrice ne peut bien sur le faire toute seule. Ne pensez jamais comme beaucoup de vélivoles que vos idées ne valent pas la peine d’être publiées.

Auteurs aux idées fécondes, à vos plumes!

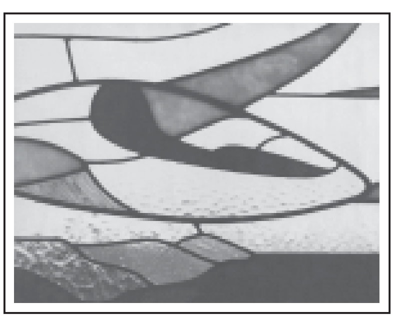
J’ai besoin de vous pour insuffler une vie nouvelle à “FREE FLIGHT” afin d’en faire un moyen de communication éfficace entre les adeptes du vol à voile d’un océan à l’autre qui répondre j’en suis sûr à votre attente.
Merci de votre coopération.

(Traduction par Jean-Jacques Martel)

free flight

Jan/Feb 81

The Journal of the SOARING ASSOCIATION OF CANADA
Le Journal de L'ASSOCIATION CANADIENNE DE VOL À VOILE



Cover:
The winter doldrums were put to creative use, as Tony Burton illustrates free flight over the Gatineau Hills and the Ottawa River Valley in a stained glass glider.

Total circulation of the Jan/Feb issue was 1600

President's Notes:

by Karl Doetsch

Free Flight

Welcome Ursula Burton! Your task as the new editor of Free Flight is one of the most significant of the Association as it is through the coordination and stimulation of the editor that the membership-at-large communicates. The January Directors' Meeting, which was so well hosted by the Alberta Soaring Council, gave those Directors who had not already done so the opportunity to meet Ursula and to listen to her concept of how to make Free Flight timely and interesting. With Ursula's enthusiasm and your support, this is certainly achievable.

Funding

To continue in the vein of buoyancy, the Board was delighted to learn that through provincial funding of soaring by the Nova Scotia Government, the Association again meets the Federal Government's criteria for obtaining funding. Naturally, the first action resulting from this good news was the setting up of a meeting (which will have taken place at publication time) with Federal Government officials to attempt to reinstate full Federal Government support for soaring. Hopefully, I can report a successful outcome at the Annual General Meeting.

Inflation has hit us all, and the effects as far as the SAC is concerned are two-fold. First, the Board has found it necessary to propose to the membership at the AGM an increase in the prime fee from $40 to $45 per annum. It may be possible to reduce this increase if Federal Government funds are forthcoming but if not, the only way in which such fee increases can be kept to a minimum is through growth in the Association. The other area of inflation is in our insurance claims. The claims for 1980 have exceeded the premiums paid and this will almost certainly result in an increase in insurance premiums for 1981. The fundamental law remains the same: fewer accidents lead to lower premiums.

New Programs

Much of the discussion of the Directors' Meeting centred on the Association's plans for the coming season and beyond with the implementation of some of the programs planned this year, and the continuation of existing and long-standing programs. New starts will be given in the area of a coaching program to be established by John Firth with the aim of developing advanced soaring and competition techniques and an officials' development program which we hope will provide the personnel resources on a nationwide basis to allow competitions from the local through to the national level to be held by many more clubs. These programs will be developed in close co-operation with our Sporting and Instructing committees so that in both of these areas the Association will be better able to serve the membership throughout the spectrum ranging from recreational through to the highest level of competitive soaring.

The general question of membership growth in our sport was certainly uppermost in the minds of directors during their deliberations, and a new thrust by our Membership Committee chairman, Chuck Keith, will be to identify on a national basis what attracts and keeps people in our sport more successfully in some areas than in others, and how we, as an association, can help member clubs to grow in a controlled fashion. Both the retention of existing members and the attraction of new members will be considered, and some emphasis will be placed on youth programs.

The Board has agreed to establish a Numismatics Committee under the chairmanship of Bill Lintell of the Gatineau Gliding Club with the purpose of producing Trade Dollars depicting Soaring in Canada. This will be a first for sports, and we hope will result in the annual minting of a new trade dollar which will become a collector's item, provide publicity and raise funds for soaring. Also on the committee front, we welcome Dennis Miller of the Regina Club as the new chairman of the Trophies and Statistics Committee.

Annual General Meeting

The Annual General Meeting will be held in Toronto this year (12, 13, 14 March 1981), and the Board has established an interesting program along the lines of last year's where the formal business meeting is kept to a minimum, while structured seminars and workshops will be held dealing with the SAC status report, the SAC new programs, provincial organization, club operations, technical developments in glider design and the coaching program. Well known personalities are being invited to support not only these workshops, but also to attend the banquet. I hope to see you there.

THE SOARING ASSOCIATION OF CANADA
L'ASSOCIATION CANADIENNE DE VOL À VOILE

is a non-profit organization of enthusiasts who seek to foster and promote all phases of gliding and soaring on a national and international basis. The Association is a member of the Royal Canadian Flying Clubs Association (RCFCA), the Canadian national aero club, which represents Canada in the Fédération Aéronautique Internationale (FAI, the world sport aviation governing body composed of national aero clubs). The RCFCA has delegated to SAC the supervision of FAI-related soaring activities such as record attempts, competition sanctions, issuance of FAI Badges, and the selection of a Canadian team for the biennial World soaring championships. FREE FLIGHT is the Association's Official journal.

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Vice President
DR. R.W. FLINT

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MRS.TERRY TUCKER

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Contributor's Deadlines:

10th day of every 2nd month

Directors Meeting Report

Edmonton, Alberta January 10-11, 1981

Lloyd Bungey

Material published in FREE FLIGHT is contributed by individuals or clubs for the reading enjoyment of Canadian soaring enthusiasts. The accuracy of the material is the responsibility of the contributor. No payment is offered for submitted material. All individuals and clubs are invited to contribute articles, opinion, reports, club activities, and photos of soaring interest. Prints (B & W) are preferred, colour prints and slides are acceptable. No negatives will be used. Any material that a contributor wishes to have returned must be accompanied by a stamped, self-addressed envelope.

FREE FLIGHT also serves as a forum for opinion on soaring matters and will publish letters-to-the-editor as space permits. Publication of ideas and opinion in FREE FLIGHT does not imply endorsement by SAC. Correspondents who wish formal action on their concerns should contact their SAC Zone Director. Directors' names and addresses are given elsewhere in the magazine.

All contributions to the magazine will be acknowledged on receipt. We will endeavour to say when it will be used. All material is subject to editing to the space requirements and the quality standards of the magazine.

The contents of FREE FLIGHT may be reprinted; however, SAC requests that both FREE FLIGHT and the author be given attribution on any such reprint.

FREE FLIGHT is printed by
M.O.M. PRINTING

Your Directors January meeting is the one at which the activities of the previous calendar year are reviewed and the course for the coming season laid out, in preparation for the AGM where YOU the members will have the opportunity to pass your comments on our actions and plans.

The venue for this January's meeting was the city of Edmonton where opportunity was taken to meet with members of the Alberta Soaring Council, these members coming in from as far away as Claresholm (300 miles) to attend the Saturday evening get-together organized for this purpose.

Following the established procedure, the Directors met informally on the Friday evening to exchange their latest news from their zones and also received last minute additions to the information packages previously circulated.

The Saturday business session started at 9 a.m. sharp and continued until 5.30 p.m. Even the lunch break, traditionally a relaxation period, was taken up with the business at hand, albeit inadvertently as one topic was raised and dominated the remaining conversation.

Our new FREE FLIGHT Editor had travelled to Edmonton to present her plans to the Board and receive Board comments and a very fruitful hour was spent Saturday morning discussing FREE FLIGHT, its future format, publication dates and input needed. Your Directors are in full agreement that FREE FLIGHT is the most important item of communication with the members and its regularity, timeliness and information content are of prime importance. We and the editor aim to see that improvements in all these areas are obtained.

The remainder of Saturday morning was spent on reviewing progress on the 48 items on the current projects list.

Saturday afternoon was spent reviewing the financial status of your association, reviewing the general plan for 1981 and examining the budget prepared to meet these requirements. This budget will be forwarded to each club President prior to the AGM and interested members should contact their club President for full details.

The traditional Saturday evening get-together took the form of supper at the Garrison Club at which your Directors were joined by 15 of the Edmonton, Cu Nim and Namao Club members followed by a gathering at a private home where a total of over 40 members of these three Alberta Zone clubs met your Directors in a social atmosphere.

The Sunday business session started at 8 a.m. For part of this session, the Sporting Committee chairman Dave Marsden attended to provide input. World Contest matters, the contest scene in general and the future development of cross-country flying were discussed at this time.

Other matters handled were the locations of the Eastern and Western Regionals and Instructors schools. In regard to the latter, the Directors wish to receive bids for the 1982 schools as soon as possible so that the decisions for the 1982 season can be made earlier than in previous years. Many other items filled the meeting which adjourned at 3:30 p.m. to enable the Directors to head for home and 2 months of hard work before the AGM.

Executive Director Notes

by Jim Leach

— news from the Director's desk —

WHAT HAPPENED TO FREE FLIGHT IN 1980 — AND BEFORE

We are receiving many letters here at National Office asking the question "Why am I receiving the Jul/Aug issue of Free Flight in December?" Obviously the question demands an explanation and is the topic of my notes for this issue.

By mid-September, when it was obvious Free Flight for Jul/Aug had not surfaced, we phoned the editor and asked for a status report. The report indicated that there was not sufficient material available to publish a Jul/Aug edition. This was immediately reported to the President. It was determined that Free Flight had not missed a printing since the major format change in 1975, and 1980 was not the year to set that precedent. Apparently Free Flight has become quite a collector's item. Accordingly, the editor was directed to proceed with the production of all outstanding editions for 1980, regardless of the obvious late mailing dates.

Faced with this direction and a limited amount of material, the editor evolved a schedule for 1980 as follows;

Jul/Aug	Available mid/end November
Sep/Oct	Available mid-January
Nov/Dec	Available end-January

The above is intended to provide the reasons and rationale that has resulted in the late receipt for the last half of 1980.

As you are aware or have read elsewhere, this edition is the first under the direction of your new editor, Ursula Burton of Claresholm, Alberta.

The manner in which Free Flight is being produced is undergoing some major changes. It has been decided that we here in the National Office would accept the responsibility of negotiating with local printers the best deal available and to be on site to provide a more continued management process. In addition, the National Office would further accept the responsibility for commercial and classified advertising. This seemed to be a natural and routine business transaction.

The results of all this of course is that the editor should have more time to attend to the creative aspect of producing Free Flight and be permitted to enhance the role of "Editor". Time will tell how successful we will be.

At the October meeting, your Directors handed down a firm direction that Free Flight be available by the end of the first week of the first month of each edition. For example the Jul/Aug issue should be in the mail by the first week in July. With this firm direction, Ursula and I have evolved the following schedule which after the first two 1981 editions should realize the Directors objectives.

cont'd on page 5

FREE FLIGHT ANALYSIS SEP 75 – JUN 80

ANNEX A
to: SAC 400
dated: 11 Dec 80

	75 SEP-OCT	75 NOV-DEC	76 JAN-FEB	76 MAR-APR	76 MAY-JUN	76 JUL-AUG	76 SEP-OCT	76 NOV-DEC	77 JAN-FEB	77 MAR-APR	77 MAY-JUN	77 JUL-AUG	77 SEP-OCT	77 NOV-DEC	78 JAN-FEB	78 MAR-APR	78 MAY-JUN	78 JUL-AUG	78 SEP-OCT	78 NOV-DEC	79 JAN-FEB	79 MAR-APR	79 JUL-AUG	79 SEP-OCT	79 NOV-DEC	80 JAN-FEB	80 MAR-APR	80 MAY-JUN	80 JUL-AUG
PRES NOTES	—	—	—	—	—	—	—	—	—	—	X	X	X	X	X	—	—	—	—	X	X	—	X	—	X	X	X	X	
AGM REPORT	—	—	—	X	X	—	—	—	—	—	X	X	—	—	—	—	—	X	—	—	—	—	—	—	—	—	—	X	
DIR MTG REPORT	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	X	—	—	—	—	X	X	—	
HANGAR FLYING	3	3	5	6	9	5	3	5	6	7	7	6	3	5	4	3	—	10	4	7	—	3	2	9	3	1	2	4	
LETTERS	1	1	1	3	4	4	2	2	4	2	3	3	—	5	1	—	1	1	—	1	2	1	1	1	—	1	3	4	
CLUB NEWS	5	4	1	3	3	4	1	1	6	7	6	3	1	5	1	—	1	1	—	3	—	2	2	2	4	3	2	1	
ADS-CLASS	1	5	7	13	8	8	9	10	7	15	11	10	10	9	10	10	7	8	4	4	6	10	3	3	6	10	4	3	
ADS-PAID	4	5	4	6	8	8	4	4	4	6	7	8	7	7	6	7	9	6	7	7	12	8	7	7	8	6	8	6	
ARTICLES	5	5	6	10	6	8	7	5	5	6	4	5	5	6	7	6	7	6	11	5	7	7	8	8	5	5	12	2	
PAGES	23	23	23	23	27	23	23	23	23	23	23	23	23	23	23	23	31	23	23	23	23	23	23	23	23	23	23	19	

CANADIAN TEAM NEWS

by Al Schreiter

With only 5 months to go, the Canadian Team for the 17th World Gliding Championship is in dire financial straits. Only about $7500 has been pledged so far, which consists of $500 from each pilot and crew member on the team, and a $1000 pledge from the Alberta Soaring Council.

The federal government has abandoned us in spite of our excellent standing in the last world championship. If a Canadian Team is to represent us in Germany, we must finance it ourselves. All contributions of $10 and up will receive a tax receipt and will be deductible from your income. Please make a contribution NOW, we can't wait much longer for your support. If the "average" member would contribute only $25 tax deductible dollars we would achieve our goal. Are you going to be above or below "average"? Whatever you do, do it RIGHT NOW. Send your cheque to "SAC Canadian Team Fund", Box 1173 Station B, Ottawa, Ontario, K1P 5AO

The Canadian Team will consist of the following pilots:

Standard Class
Paul Sears (SOSA)
Jim Carpenter (York)

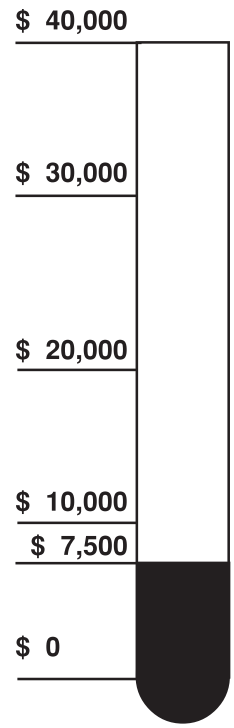
15m Class
Hal Werneburg (SOSA)
Uli Werneburg (Gatineau)

SUBJECT TO REVIEW

There are still crew spaces available. If you are interested in crewing at Paderborn and can be available at least from May 21 to June 9, 1981, write or phone me as soon as possible (416) 625-0400 H, 366-8779 B.

Please help your Team!

Al Schreiter
Chairman W/C Committee



EXECUTIVE DIRECTOR

cont'd from page 4

Jan/Feb 81	Mailing Date	14 Feb 81
Mar/Apr	Mailing Date	19 Mar
May/Jun	Mailing Date	13 May
Jul/Aug	Mailing Date	10 Jul
Sep/Oct	Mailing Date	8 Sep
Nov/Dec	Mailing Date	9 Nov

Having published these commitments to you, please be assured we will do our best to meet them.

Since considerable time has been and will be spent on Free Flight, it was considered essential to review the history of the magazine. As most back issues are available here in the National Office, a complete review was undertaken. Did you know that out of every $40 membership fee received here at the National Office $6.00 is spent on the production of Free Flight? Another $1.38 of your membership is spent on mailing the magazine? Aside from the cost statistics, it was deemed prudent to record some editorial statistics from the point where a major change in format occurred which was the Sep/Oct issue of 1975. The chart below is a summary of the review. The only edition that could not be reviewed because it was not available is the May/Jun 79 edition. Perhaps some of you collectors can provide the data.

In analyzing the statistics shown, I believe it is important to emphasize the purpose and concept of the magazine. I believe this can best be summarized as: "Free Flight — the major vehicle available to SAC for general communication amongst members. This magazine allows dissemination of information and news principally on Canadian Soaring matters and provides a forum for communications between members and the membership at large." FREE FLIGHT MAY/JUN 77, PP8.

A summary of the analysis is as follows:

NOTE: Percentages are based on a membership of 1600 for the year 1980.

a. Hangar News	1/3 of 1% participation
b. Letters	1/3 of 1% participation
c. Club News	1/5 of 1% participation
d. Class Ads	1/2 of 1% participation
e. Paid Ads	6.4 per issue
f. Articles	6.3 per issue
g. Pages	Average 23

Are you interested in a better performance?? I have appealed to club presidents to include a Free Flight correspondent as a permanent committee member and have requested a firm commitment for a minimum of two feature articles of their choice per year. This provides a potential of 90–100 articles per year for the editor to use. See Classified on back page. To ensure a quality magazine, members are urged to support the editor by submitting articles on a regular basis.

1981 ANNUAL GENERAL MEETING

DATE: 13-15 March 1981

PLACE: Constellation Hotel, Toronto, Ont.

AGENDA:

13 MAR
1900 — Pre-registration
— Reception

14 MAR
0830 — Registration
0900 to 1200 — **SAC STATUS**
National Office
— Membership
Budget
SAC PROGRAMS
Membership Growth
Competition

14 MAR — AGM BUSINESS
1330 to 1700
Reports
Motions
Other Business
1900 **BANQUET**

15 MAR
0830 to 1400 **DIRECTORS MEETING**

0900 to 1200 **WORKSHOPS**
Provincial Organizations
Club Operations
Glider Development (Technical)
Coaching Development

MY INSTRUCTOR

by Tom Schollie

Edmonton Soaring Club

My instructor is a really great guy
He's teaching me how to fly
In a glider called a 2-33
There's a seat for him and one for me.

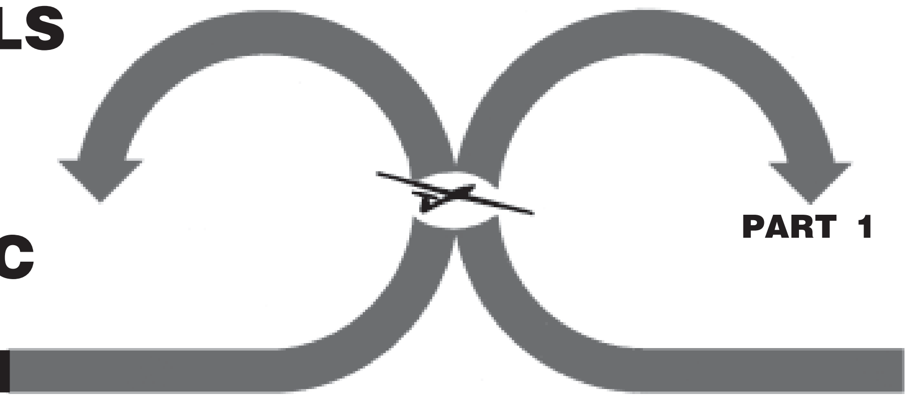
He teaches me on the take-off run
To lift the skid and when that's done
To lift off gently and stay down low
To make it easier for the planes that tow.

Then hold position just slightly high
Out of the wake of that up-ahead guy,
And don't let us slingshot in the turn
And listen and watch and try and learn.

And after awhile, some sinks in
We're safe enough to solo and grin
And accept the bouquet of local flowers
And the ice-cold water of solo showers.

Yes, my instructor is quite a guy,
He holds the key to that beautiful sky.
His patience and skills I've really admired
And it's all volunteered, I'm proud and inspired.

FUNDAMENTALS of ATMOSPHERIC CONVECTION



PART 1

by Robert Dorning

— reprinted from Australian Gliding, Jul 1980 —

This series of articles will describe, in a general sense, the fair weather convection process which occurs in the layer of the atmosphere directly above the earth's surface. The first two articles in the series will deal with the diurnal, or daily, variation of both convection and of the vertical distribution of air temperature. They will be restricted to the simpler case where convection takes place in the form of thermals and not in thermal streets. Subsequent articles will deal with the practical questions which flow from the theory contained in the initial articles, but which could not adequately be answered without it. Topics to be treated include: typical temperature traces and their interpretation; the timing of the onset ('trigger temperature') and finish of useable convection; early morning stratus; thermal sources ('trigger points'); enhanced convection over mountains; 'latent heat' thermals; wind shear at inversions and the moderation of surface winds towards evening.

FUNDAMENTALS OF ATMOSPHERIC CONVECTION

Many glider pilots think of a thermal as being a distinct and isolated entity. While this is true to a certain extent, it is both more correct and more enlightening to appreciate each thermal as but one in 'a field of thermals in a region of descending air' (Telford, 1970). In the early stages of ones gliding career it may be useful to think of a thermal as having a separate existence, but the more experienced pilot should view a thermal as just one small element in a convection process stretching over vast areas.

Moreover, by restricting attention to the thermals that a pilot flies in, earlier and later thermals are usually given little thought. The day-long procession of thermals is not appreciated and the place within it of the sampled thermals is not understood.

This description of the overall daily convection process sets out to show the existence of these relationships and their significance for the serious soaring pilot.

It is possible, but awkward, to describe the physical motions involved in the convection process as it grows and decays throughout the day. It is easier and more rewarding to study them in terms of the changes of the vertical temperature structure of the lower atmosphere – it is differences in air temperature that are the driving force of vertical air motions. In doing so, a picture of the physical air motions can become apparent.

ADIABATIC PROCESSES

The actual convection mechanism is generally well understood — it follows the principle that hot air rises. Convection occurs when air is heated unequally causing the temperature of the region receiving the greater amount of heat to rise above that of other regions. This hotter air will expand, lowering its density. In becoming less dense the air becomes buoyant and, if nothing prevents it, will rise. How high and how fast will depend on the temperature of the environment it enters.

To explain further we must first describe the distribution of air pressure up through the atmosphere. Air pressure is simply the total weight, spread over a surface, of the air in a vertical column stretching upwards from the surface to the top of the atmosphere. On average, the weight of the air in a column with the height of the atmosphere and having a cross-sectional area of one square inch is 14.7 pounds. One third of the way, say, up through the atmosphere, the height of such a column is that of the remaining two-thirds of the atmosphere and the weight of this will obviously be less than in the full column. The pressure, one-third of the way up through the atmosphere, will therefore be less than at ground level. Two-thirds up through the atmosphere the height of the column will be that of the remaining one-third of the atmosphere and the pressure produced by the air in it will be less than in the previous case. At the top of the atmosphere there is no air, thus no weight of air above and so the pressure is zero. Thus from this simple reasoning it can be seen that **air pressure decreases with increasing altitude.**

Any air parcel which rises due to convection will therefore rise into air at lower pressure. In doing so it will expand to equalize the pressure between itself and its new surroundings. The pressure of the rising air parcel will fall to that of the air at that altitude.

The temperature of an air parcel can be made to change by adding heat to, or extracting it from, the air parcel. On the other hand, if an air parcel undergoes a volume change (ie. it expands or is compressed) **without gaining or losing heat,** its temperature can still alter. When a parcel of air rises and expands, without losing or gaining heat, its temperature will fall. The reverse will happen – its temperature will rise – when it is compressed on sinking back down to a lower level. The reason for this is difficult to explain without referring to the mathematical equations which express the Ideal Gas Law, but it has to do with the fact that the three variables which describe the state of a gas – volume, pressure and temperature – are interrelated physically and that if one changes then one, or both, of the others will change. It can be demonstrated, however, with some simple examples. When decanting oxygen from a high pressure cylinder into a glider oxygen bottle, if it is done too quickly the glider bottle will get very cold as the oxygen expands rapidly into it. The same can be seen where propane gas cylinders are filled. The LP gas flows from the high pressure storage cylinder and expands into the empty camping cylinder causing the temperature of the latter to fall, often to such an extend that frost forms on its outside. The reverse case is experienced when using a bicycle pump. As a tire is pumped up, the barrel of the pump is warmed by hot air undergoing compression inside. This process where air is cooled, or warmed, without losing or gaining heat is known as an adiabatic process. 'Adiabatic' meaning simply without a loss or gain of heat.

THERMALS AS AN ADIABATIC PROCESS

At this stage no more than a general explanation of thermals is necessary. Virtually from the first days of training, most glider pilots have an idea of how a thermal works. Later in this series of articles we will go into more detail about the formation of thermals close to the ground.

The sun's rays pass largely unabsorbed through the atmosphere and are absorbed, or reflected, by the earth's surface. That which is absorbed heats the surface. The ground is not heated evenly however, as different surfaces absorb more or less of the incident solar radiation and are warmed to varying degrees depending upon soil composition, moistness, ground cover, etc. The air in immediate contact with the ground is in turn warmed by it, but over hotter patches it is warmed to a greater degree making it buoyant relative to the cooler air around. If conditions are suitable this air will break away from the surface layer and will commence to rise as a thermal. As the thermal ascends it enters air of lower pressure and the air within it will expand to lower its pressure to that of its new environment. The air in the thermal will undergo an adiabatic expansion and its temperature will fall. Now, if its temperature is still higher than that of its new surroundings it will continue to rise, expanding and cooling further as it goes. It will stop rising only after it encounters air having the same temperature as itself.

The reason why a thermal is an adiabatic process can be seen by considering the individual air parcels that make up the thermal. Except near the edges of a thermal, where there is mixing with outside air, any given air parcel will be at the same temperature as neighbouring air parcels. As a cluster of air parcels ascends the pressure within each will fall and thus so will the temperature. However, as all air parcels in the cluster will be at the same temperature at any given moment, heat will not flow between them as they rise and cool, ie. each will not gain, or lose, heat. Therefore, by definition, they undergo an adiabatic expansion.

LAPSE RATES

The rate at which air temperature decreases with increase of altitude is given the title of 'lapse rate', ie. the rate at which air temperature **lapses** with increasing height.

As the air which makes up a thermal rises it cools adiabatically. The **rate of temperature decrease** in air which is rising and cooling adiabatically is therefore known as an **adiabatic lapse rate.**

SATURATED AND DRY ADIABATIC LAPSE RATES

As the air in a thermal ascends it carries aloft water vapour which was present in the surface layer of the atmosphere. As the rising air cools adiabatically the temperature of the water vapour falls along with it. If the thermal goes high enough the temperature of the air and water vapour will fall to a point where the water vapour will no longer be able to remain as a vapour and it will condense to a liquid in the form of minute water droplets. As more and more vapour is fed up from below the number and size of the condensed droplets will increase and the early stage of a cumulus cloud will become visible. If conditions are favourable the cloud will continue to grow until a developed cumulus cloud is formed.

When water is boiled a considerable amount of heat must be applied to increase the energy level of the water molecules so that they can break out of the relatively close arrangement of a liquid and exist as free, rapidly moving and widely spread gaseous particles. This required energy is known as **latent** (stored or potentially available) **heat.** When water vapour condenses to liquid water, this latent heat must be released so that the molecules can become constrained in the liquid phase. When water vapour condenses in the atmosphere this liberated latent heat will warm the surrounding air. If condensation occurs in rising air the release of latent heat will reduce the rate at which the temperature falls as the air rises. Thus it is found that there are two different rates at which the temperature of air which is rising will decrease with elevation. There is the rate when water vapour is condensing in the rising air (ie. when cloud is forming) and the rate when ascent is not accompanied by condensation.

The rate of temperature decrease of rising air in which water vapour is condensing is known as the Saturated Adiabatic Lapse Rate (ie. the volume of air is **saturated** with water vapour in that it contains as much water vapour as it can at its particular temperature). It is an adiabatic process in the sense that the rising and expanding air is not having heat supplied to it from outside, but it is not a true adiabatic process as heat is being supplied from within.

The other situation of rising air cooling without condensation is a true adiabatic process. Its rate of temperature decrease is known as the Dry Adiabatic Lapse Rate (DALR). The reason it can be labelled 'dry', even though air will normally contain some water vapour, is that the water vapour is present in such small proportions (less than 4% by volume under normal atmospheric conditions) that its effect on the physical properties of air is negligible. There **would** be a temperature difference between two air samples, one absolutely dry and the other with normal humidity, which had undergone the same adiabatic expansion or compression, but such a small difference that it can be ignored for all practical purposes.

The precise rate of temperature decrease in rising air which is considered dry is determined by the physical make-up of air and can be found mathematically from the Ideal Gas Law. This works out to be very close to 3°C per 1000 feet (1°C per 100 metres). Therefore, for each 1000 feet that a dry air parcel ascends, without mixing, its temperature will fall 3°C. Conversely, the temperature of the air parcel will increase by 3°C per 1000 feet as it is compressed adiabatically descending to lower levels.

On the other hand, the effect of the water vapour **when it is condensing** is significant. The release of latent heat to the surrounding air warms it and so reduced the rate at which it cools as it ascends. Unlike the DALR, which is a constant value, the Saturated Adiabatic Lapse Rate varies with temperature and altitude. This is due to the ability of air to contain greater amounts of water vapour at higher temperatures and pressures than at lower ones. However, in the temperature and height range of interest to glider pilots, an average value can be used. This gives a Saturated Adiabatic Lapse Rate of 1.5 °C per 1000 feet (1°C per 200 metres).

The subject of air-water vapour mixtures is a study in itself and is outside the scope of this article. It has been covered here only to the extent that the meaning of the adiabatic lapse rates is made clear. In order to keep this description of atmospheric convection as simple as possible we will assume for the rest of this article, and the next, that the thermals do not go high enough for the temperature to fall to where the water vapour carried aloft will condense out forming cloud, ie. the days are blue thermal days rather than ones with the sky dotted with fair weather cumulus. This restriction does not alter matters significantly, but it does allow largely unnecessary complexities to be avoided.

THE ENVIRONMENTAL LAPSE RATE

Those who have been to gliding competitions will be familiar with the temperature trace which is displayed each day on a blackboard (see Fig. 1). This is used to forecast the height to which thermals will go on that day and the likely time they will become useable. Two lines are drawn on these height-temperature diagrams. One is a straight line representing the DALR from the estimated maximum temperature of the day. The other is a crooked line plotted from air temperature measurements taken at various altitudes on an early morning flight in a tug aircraft. This line is known as the Environmental Lapse Rate (ELR).

On these diagrams, the ELR is a plot of the **actual** air temperature above the gliding site at the time of the temp-flight. If other flights were done at the same time from other points over the surrounding countryside, they should produce basically similar traces, except where affected by modifying factors such as a large expanse of water or the passing of a frontal system. The temp-trace, or ELR, is therefore a representation of the vertical temperature structure of the lowest levels of the atmosphere at that time of the day in that general vicinity.

FORECASTING THERMAL HEIGHTS

Armed with these concepts, which are possibly the most powerful ones in gliding meteorology, it is possible to study the diurnal growth and decay of the convective boundary layer. In gliding, the application of these concepts is usually limited to the forecasting of expected thermal heights on a particular day, but this leaves unanswered a number of questions which are central to the nature of the convection process – namely, how the Environmental Lapse Rate varies over a 24 hour period, why thermals exist **at all** after the time of maximum surface temperature[1] and why thermals often go higher later in the day. We will briefly review the means of forecasting thermal heights and then go on to consider the broader convection process.

For the forecasting of thermal heights, an early morning measurement of the ELR up to around 6500 feet is required. This can be obtained from a powered aircraft or occasionally from a radiosonde flight sent up by the national meteorological service. The thick line on Fig. 1 is a typical example of such a temp-trace. Its notable features will be explained in the next article in this series. The only other requirement is the estimated maximum temperature for the day which can be obtained from the Met. Bureau, radio broadcasts or through your own personal experience.

Thermals will commence soon after the sun rises although it will not be till some hours later that they will go high enough, or last long enough, to be of use for soaring. The rising air will cool dry adiabatically starting from the surface temperature at the time the air leaves the surface layer and will continue rising and cooling until it enters a relatively warmer environment. This will be the top of the thermal at that time because if it went higher it would be cooler, and therefore less buoyant, than its surroundings and would sink back to a lower level. Examples of rising thermal air are represented in Fig. 1 by the dashed lined which have a slope of the DALR (3°C per 1000 feet) and show different starting surface temperatures. These lines are known as ‘dry adiabats’.

The temp-trace is a representation of the vertical temperature structure of the lowest levels of the atmosphere over the area round

1 The term ‘surface temperature’ refers to the temperature **of the air** in the vicinity of the earth’s surface and **not** the temperature of the ground itself.

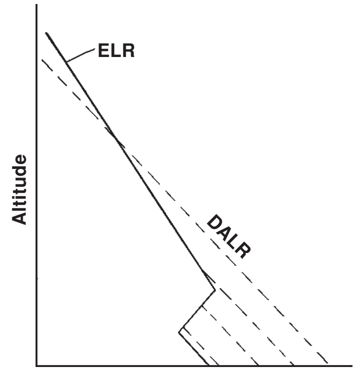


FIG 1. A typical diagramatic representation of graphs of air temperature at various heights used at gliding competitions for forecast daily maximum thermal heights. The thick full line is the measured early morning temperature profile above the gliding site up to about 6500 feet.

the gliding site **at the time of the temp-flight.** As very little of the incoming solar radiation is absorbed by the atmosphere it will not cause the temperature of the layer which interests us to alter greatly. The solar radiation is instead absorbed (if not reflected) by the earth’s surface and the major agency which warms the lower atmosphere throughout the day is the heat which is carried upwards from the surface by thermals. Therefore **above the layer** which thermals are penetrating (the convection layer) **air temperatures will remain** more or less **the same** as when measured that morning.

Thermals can be represented in Fig. 1 by drawing dry adiabats from the surface temperature at a particular time. If we consider a thermal which takes off soon after the temp-trace in Fig. 1 was flown, it is likely that the surface temperature will be drawn from just **to the right** of the temp-trace surface temperature and the thermal will ascend until the dry adiabat intersects the temp-trace. At all levels beneath this intersection height the dry adiabat is to the right of the temp-trace and the thermal air is thus warmer than its surroundings. At the intersection of the two lines the temperature of the air in the thermal is the same as that of its new environment and the thermal cannot grow further upwards as it would enter warmer air. The intersection of the dry adiabat with the Environmental Lapse Rate marks the top of the thermal at that time.

As the day progresses the surface temperature will usually increase until mid-afternoon. As the convection layer grows the thermals transport heat upwards, warming the layer and modifying the Environmental Lapse Rate up to the top of the layer. The early morning temp-trace therefore, remains true **above** the convection layer, but **not** so **within** it. The manner in which the ELR is modified within the convection layer will be explained in the following two sections.

As the day gets hotter, thermals leave the surface layer with higher temperatures and the dry adiabats which represent them must be drawn further and further to the right as in Fig. 1. The intersection of the dry adiabats and the ELR moves upwards representing an increase in thermal heights. At the time of the day’s maximum temperature the dry adiabat drawn from this temperature will cut the temp-trace higher than all previous ones giving the maximum thermal height for the day.

On understanding this behaviour, it is a simple matter to forecast thermal heights each morning before a task is set. Having plotted the temp-trace one simply draws a dry adiabat from the estimated maximum temperature, and where it intersects the temp-trace gives the expected maximum thermal height for that day. As maximum temperature usually occurs three or four hours after local noon thermals will approach their maximum height (and strength) at this time.

This technique for the forecasting of thermal heights is both simple and reliable. If at all it seems to underestimate maximum thermal heights by 500 to 1000 feet. It all depends, of course, on the accuracy of your estimate of the maximum temperature. With experience, and using the Met. Bureau’s forecast as a basis, it is possible to get reasonably close by taking into account local knowledge, the trend of maximum temperatures over the previous few days and the movement of large scale weather systems.

ELR OF THE CONVECTION LAYER

To this point we have only considered the early-morning ELR. As convection develops its action significantly modifies the temperature structure of the atmosphere up to the height to which thermals are penetrating. Fig. 2 shows four actual temperature soundings taken at three hour intervals throughout one day. This diagram has been included because it is typical of what occurs within, and just above, the convection layer. The ‘0900’ trace is simply the early morning ELR. By 1200 hours convective activity had modified this within a layer above the ground to an approximately dry adiabatic lapse rate. In the two later soundings, as thermals went higher, temperatures, within this convection layer increased, but the ELR **still** approximated a dry adiabat. Above the convection layer, the ELR remained basically unchanged.

Why the convection layer **must** have a dry adiabatic lapse rate can be understood by considering the circulation generated about a thermal. In Fig. 3 the top of a thermal is represented by the intersection of the ELR and a dry adiabat drawn from the surface temperature. In the real atmosphere this intersection point represents a quasi-flat surface which is the top of the convection layer. As air rises to the top of a thermal it is prevented from penetrating through this surface by the warmer air above. As

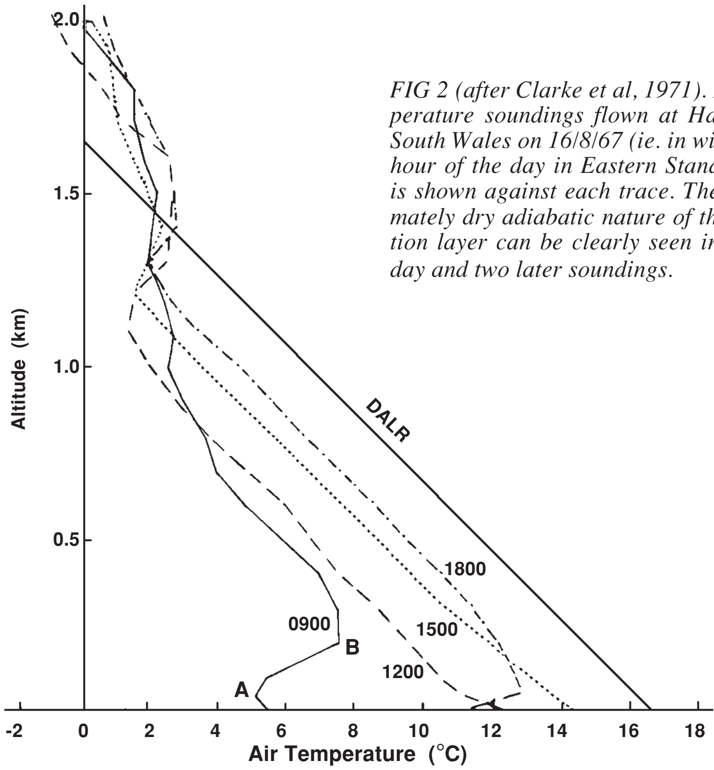


FIG 2 (after Clarke et al, 1971). Four temperature soundings flown at Hay in New South Wales on 16/8/67 (ie. in winter). The hour of the day in Eastern Standard Time is shown against each trace. The approximately dry adiabatic nature of the convection layer can be clearly seen in the midday and two later soundings.

more air is feeding up from below, the air at the top must go somewhere and the only place is outwards and downwards. It will spread radially outwards in all directions from the central thermal source. In doing so it will mix with and displace air already at that level. But this is **not** the only thermal in existence at that time. There will be others spaced around it and each will have air diverging radially from its top. The outflow from adjacent thermals will meet along lines halfway between them forcing the two flows to turn downwards. This sinking motion will be aided by the cooling resulting from the mixing with air outside the thermal.

Near the ground there must be an inflow to replace the air streaming upwards in the thermal. In the absence of strong winds this inflow will be from all directions, but this too must be supplied from somewhere. The radial inflow at ground level will be fed by air descending from the outflow at the top of the thermal. As the air in the inflow moves over the ground it is warmed once again by the surface.

This simple model of the circulation about a thermal is presented to show how the characteristic temperature profile of the convection layer comes about. It is useful, however, for glider pilots as a means of visualizing the distribution of lift and sink in the atmosphere in light wind conditions. It is strictly valid only for the case of no wind and is supported by laboratory experiment, numerical models and those tantalizing views from high flying aircraft which show fair weather cumulus dotted evenly over wide areas of countryside. It is not applicable in the case of significant wind as then the thermal cells become organized into streets of lift and sink. Another article will be written to develop ideas about thermal circulation models.

HEAT EXCHANGE IN THE CONVECTION LAYER

It can be seen from this simple convection model that for the surface temperature to rise it is not sufficient for just the surface layer to be warmed. In that case once the warmed surface layer had broken away in a thermal much cooler air would descend to replace it and the surface temperature would fall. What happens must be something like the following: as the air in a thermal rises through the convection layer there is a certain amount of mixing at the edges of the thermal and this warms the outside air to a certain extent. However, except in the decaying stages of its life, a thermal will retain its identity as a distinct structure due to the vigour of its ascent so that the effect of this initial mixing is limited. On the other hand, in the outflow at the top and the descending air between thermals, the motions would be generally slower allowing mixing and the release, into the convection layer, of the heat carried upwards by thermals. Inside thermals the air will cool dry adiabatically as it ascends. Outside the thermals it will mix with the air around, warming it and being cooled itself. On the descent the mixed air will warm adiabatically. If, however, the mixed air is not warm enough upon reaching the surface layer, it will cause the surface temperature to fall. Therefore for the surface temperature to remain constant, or be able to rise, the temperature of the mixed air between thermals must be such that, on being brought to the surface dry adiabatically, it is only slightly below the ambient surface temperature. This state will be achieved only when sufficient heat has been transported upwards by thermals. The temperature profile of a convection layer organized such that all levels can be lowered dry adiabatically to the surface and have a temperature the same, or only slightly lower, than the surface temperature must be approximately a dry adiabatic lapse rate.

As will become evident below, this description of the heat exchange within the convection layer is over-simplified, but it does demonstrate the essence of the matter.

Experiment and reasoning thus show that, as the convection layer grows throughout the day, the Environmental Lapse Rate throughout its depth (except for the bottom 200 feet or so – see later) is approximately dry adiabatic. This fact creates theoretical inconsistencies in the thermal height forecasting technique described above and challenge our understanding of the nature of thermals. We shall explore these difficulties in the second article of this series after completing the description of the general diurnal convection process with a discussion about the characteristic features of early morning temp-traces. In order to bring out the full significance of these features we will complete this article by introducing the concept of stability.

STABILITY

The concept of stability applies to layers of the atmosphere. It has to do with what the subsequent vertical motion will be of a region of air which ascends, or descends, within the layer under consideration. It has been shown that a temperature difference between an air parcel and its surroundings will cause the air parcel to rise or fall, and also that as an air parcel moves vertically

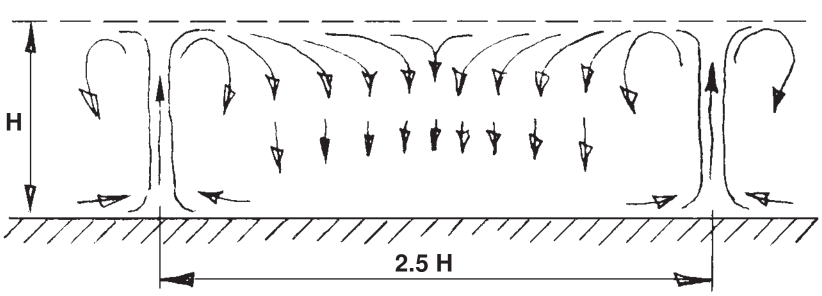


FIG 3. Simplified conception of flow circulations about thermals in nil wind conditions.

without mixing with other air, its temperature will change at the dry adiabatic lapse rate (provided that water vapour is not condensing out). Now consider an air parcel which is initially at the same temperature as its surroundings. If it is lifted by some means, say turbulence caused by a gust of wind, and does not mix with the air it passes through, it will cool dry adiabatically with the result that there **may** by a temperature difference between itself and its new environment. This will depend on the vertical temperature profile of the layer. If the air parcel is now warmer than its surroundings it will accelerate upwards. If it is cooler it will reverse its motion and descend. If there is no temperature difference it will tend to stay where it is.

The opposite situation can occur. An air parcel may be displaced downwards and upon warming dry adiabatically it may be warmer, or cooler, than its new environment. If it is cooler it will accelerate downwards, but if it is warmer it will bounce back up again. If it is at the same temperature it will tend to remain where it is. As an air parcel rises or falls, without mixing, its temperature varies at the dry adiabatic lapse rate, but the temperature of the air it enters will depend on the temperature structure of the layer. The behaviour of an air parcel which is rising or falling, therefore, has a lot to do with the Environmental Lapse Rate of the layer it is in.

A region of air which causes an air parcel to accelerate upwards following an upwards displacement will also cause an air parcel to accelerate downwards after a downwards displacement. This can be seen by considering the example in Fig. 4(a). The heavy full line is the ELR of a layer between 2000 and 4000 feet. Imagine an air parcel at 3000 feet (point A) which is initially at the same temperature (15°C) as its surroundings at that level. If it receives a displacement upwards and rises without mixing with other air, it will cool at the dry adiabatic lapse rate of 3°C per 1000 feet, which is represented in the diagram by the light dashed line. If the displacement lifts the air parcel, say 500 feet, its new temperature will be 15 – 1.5 = 13.5°C. The air already at that level (point B), however, has a temperature of 13°C and so the air parcel, being warmer and therefore more buoyant, will accelerate upwards.

On the other hand, if the displacement had carried the air parcel down to a lower level, say 2500 feet, its temperature would be 15 + 1.5 = 16.5°C, while that of its new environment would be 17°C (point C). The air parcel would be cooler than its surroundings and would sink further. This behaviour, where vertical motion is enhanced within a layer, is due to the slope of the vertical temperature profile of the layer being less steep than the dry adiabatic lapse rate. Such a layer is said to be ‘unstable’.

By contrast, a layer in which the slope of the Environmental Lapse Rate is steeper than that of the DALR is said to be ‘stable’. In a stable layer vertical motion is suppressed and if an air parcel is displaced upwards, or downwards, it will rebound to its original level. This can be seen by considering Fig. 4(b). Again the heavy full line is the ELR of a layer between 2000 and 4000 feet, but this time its slope is steeper than the DALR. Again consider an air parcel, initially at 3000 feet (point D) and at the same temperature as other air at that level, which is displaced upwards without mixing. As it rises the air parcel will cool at the dry adiabatic lapse rate and if it is lifted 500 feet its temperature will be 15 – 1.5 = 13.5°C, as before. This time, however, the air already at 3500 feet has a temperature of 14°C. The air parcel is cooler than its surroundings and will sink back down.

If the air parcel had been displaced downwards 500 feet, warming adiabatically its temperature would be 15 + 1.5 = 16.5°C. The air parcel would then be warmer than its surroundings at 2500 feet, which have a temperature of 16°C, and so it would rise back up again. Thus a layer with an Environmental Lapse Rate steeper than the DALR will resist vertical air motions and will cause air displaced either upwards, or downwards, to return to its original level. A lapse rate which is less than the DALR (ie. with a slope steeper than the DALR) is therefore known as a ‘stable’ lapse rate.

A layer which has an Environmental Lapse Rate equal to the DALR is said to be a ‘neutral’ layer, because air within such a layer which receives a displacement upwards, or downwards, will remain at the level where it comes to rest. It is neutral because the temperature structure of the layer does not have an effect on vertical motion. If an air parcel is displaced from a level where its temperature is equal to that of its surroundings, its temperature will change, as it ascends or descends, at the same rate as the layer.

The concept of stability is of relevance not only to vertical displacements **within** a layer, but also to vertical motions which attempt to enter a layer. For example, the degree of stability of a layer will affect the extent to which a thermal will be able to rise into it and so may control the maximum height of convection. These stability conditions of the atmosphere are important concepts for understanding vertical motion in the atmosphere, the effect that various factors may have on convection processes, and also why standing lee waves occur.

Some readers may suspect that, for the generation of strong thermals, it would be desirable if an unstable layer existed within the expected height band of the convection layer. It may seem that once a thermal penetrated this layer the temperature difference between the thermal and its environment would increase steadily upwards causing the rate of ascent to increase. Such a hope would be forlorn, however, because unstable layers generally cannot exist for very long. In the atmosphere, above the surface layer, there is almost always enough wind-induced turbulence to displace air parcels up and down causing runaway uplifting and sinking in an unstable layer. Such updrafts and downdrafts would gradually mix the layer, gradually eroding the unstable lapse rate. They would continue until a neutral lapse rate was produced.

Unstable lapse rates are thus not generally found in the atmosphere. If they do form they are soon converted into a neutral layer by their instability. Only neutral layers and stable layers will be observed in the early morning temp-trace. The exception is a shallow layer immediately above the surface during daytime which has become known in the gliding fraternity as the ‘super-adiabatic layer’.

The next article in this series will complete the description of the general diurnal convection process. It will then proceed to answer significant practical questions that arise from the theory, including inconsistencies evident in the accepted techniques of thermal height forecasting. This will include an examination of the nature of the super-adiabatic layer.

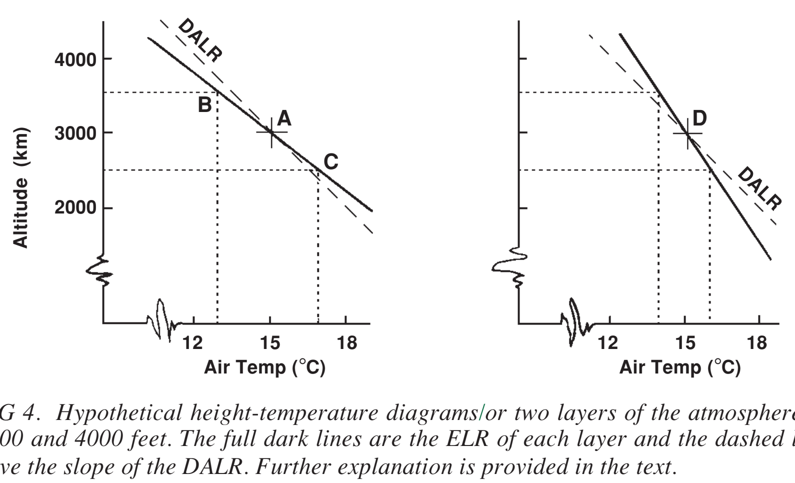


FIG 4. Hypothetical height-temperature diagrams for two layers of the atmosphere between 2000 and 4000 feet. The full dark lines are the ELR of each layer and the dashed light lines have the slope of the DALR. Further explanation is provided in the text.

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Where Did Your Money Go in 1980??

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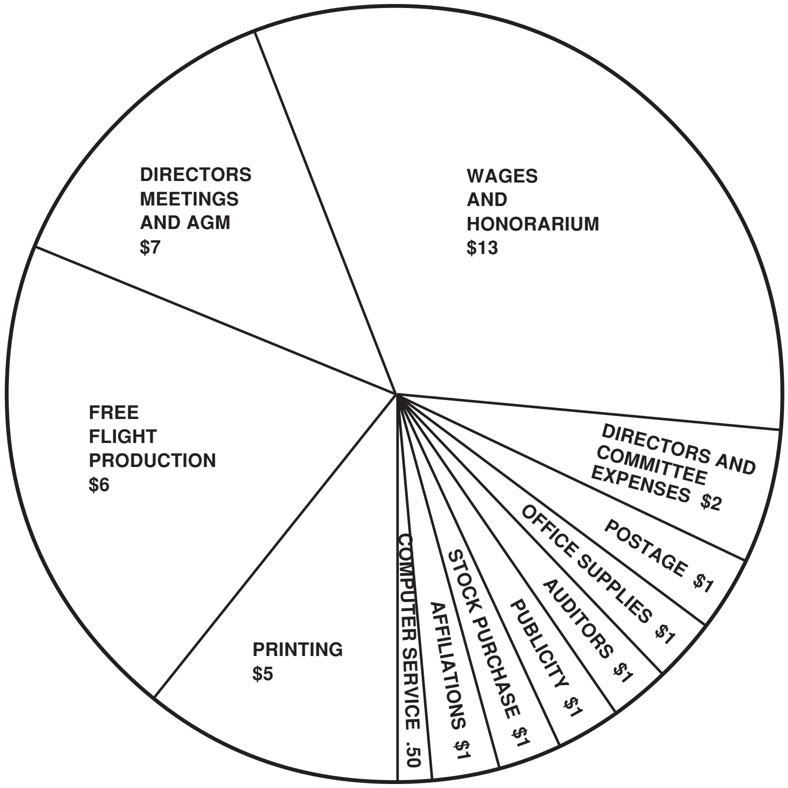

Dave Marsden Wins SSA Technical Writing Award

Dave Marsden has received the Paul E. Tuntland Memorial Award from the Soaring Society of America. This honour is awarded for the best published article or paper reporting the results of flight tests by the author during the year. Dave's article in FREE FLIGHT on SIGMA flight testing was judged by the SSA Technical Committee to be worthy of the SSA honour.

The Award will be presented to Dave at the SSA Annual Convention in Phoenix.

ed. note: Congratulations to Dave on his continuing work with SIGMA. We expect to see an article soon in FREE FLIGHT on the latest progress with "SPECTRE", his new 15 m variable geometry sailplane.

LIMERICKS

By "Phredde"

A pleasant young pilot named Bill.
Went flying when he was too ill,
His reactions were slow,
Too bad that was so,
He slope soared right into a hill.

We saw him soar into the cloud,
A thing that is not, here, allowed,
He's bound to come out,
Of that we've no doubt,
But the problem is where? we avowed.

by Percy Peabody

reprinted from Vancouver Soaring Scene 5/80

To flap or not to flap. No Mavis, this is not a report of a discussion between two uncertain hawks but just a rambling on about being able to flap or not.

Assuming, for arguments sake, that flaps are put on gliders for a purpose, what is the purpose on the Blanik? As the Fowler flaps move back and slightly down, the area of the wing is increased and there is a 'slot' effect over the top cambered surface of the flap itself. The result is a lowering of the stalling speed.

It seems that most pilots use flaps only when in lift, a sensible use as it is obviously useful to fly more slowly and stay in the rising air for the maximum time. However, this has limitations also. A glance at the glider polar shows that there is only one speed at which minimum sink is obtained, reducing speed past that point *increases* the rate of sink so you stay in the rising air longer and sink through it faster also — it could be a doubtful bargain, especially as the lower speed brings you nearer to the dangerous edge of stalling in gusty conditions. In a thermal the use of flaps is more a matter of personal preference than of demonstrated value — is it better to fly with flap which lowers stalling speed and turning radius but which also adds drag and hence sinking speed, or is it better to fly clean at a slightly higher speed? Only when the thermal is extremely narrow and the radius of turn must be at a minimum to stay in at all have the flaps a clear advantage. In decent thermals the difference in climb rate between a flapped and unflapped Blanik will depend more on the flying skill of the pilots than on the position of the flaps.

Most pilots at Hope invariably take off and land with the flaps retracted. On take-off this results in a longer run than is necessary. The standard landing procedure is to land firmly and fast on the main wheel and brake with the tail still in the air, the control column never coming back beyond the vertical. The longer take-off run causes more strain on the main wheel of the Blanik and greater stress on the towplane. The faster the landing the greater the shock on the gear, the longer the landing run and the greater the danger of nosing over when braking with the tail up. The lower the wind speed the greater will be the undesirable effects.

Does this mean that flaps should always be used on take-off and landing? Certainly not. It means that flying techniques should always be adjusted to the conditions. In light winds flaps should be used when taking-off to get the glider into the air as soon as possible — there is still a gain of better than twenty knots to be made before the flap limiting speed is reached. On landing, in light winds, flaps should be used, touchdown should be tail low, holding off while ever the glider wants to fly. This results in a minimum speed landing with less shock to the gear, an attitude giving maximum drag and so cutting down the length of the landing run, and a tail low position with the stick full back to give safer braking.

In gusty conditions there is no way flaps should be used. On take-off, especially with any cross-wind component, the glider should be held on the ground until it can be lifted off cleanly with no chance of sinking back to the ground again …

In any event, with a considerable airflow already passing over the wing while the glider is still stationary, flap limiting airspeed would be attained so quickly that retraction would be unduly hurried. In similar conditions the necessarily high approach speed rules out the use of flaps through the flap speed limitation. Landing should be fast (at a fast airspeed), and the main wheel should be put down firmly — in gusty conditions a tail-down landing with the glider dangling semi-stalled would be idiotic.

Observation suggests that most pilots, perhaps because there is often a high wind, land in the same way all the time — even when there is no wind. This is flying by rote rather than with understanding and thought and is very doubtful airmanship. Is the training system at fault?

Students are taught not to use flaps for take-off and landing. When, then, do they learn to do so? Perhaps they never learn! On early take-offs there is enough for them to cope with without messing about with flaps, but surely when approaching the solo stage they should be capable of moving a lever forward just after take-off. On landing they go through a pre-landing check and read off "Flaps". Would it be so difficult for them to pull the lever back at the same time, if conditions warrant such an action? Every (honest) person who has flown a Blanik has at some time grabbed the spoiler lever instead of the flaps, and the reverse. This possibility would pose no danger for the students on take-off for the movement of the lever is forward and pushing forward on the already closed spoiler lever could cause no harm in the case of a mistake; no danger on the downwind leg with lots of height for correction; and a definite danger on the ridge where opening the spoilers instead of the flaps could have drastic consequences. Curiously it is on the ridge – the most dangerous situation – that students are allowed to use the flaps!

It has been said that, "Flying requires airspeed, altitude and brains and you should never run out of two at the same time". Are we loading the dice against students in the brains department by requiring them not to think about, and use, flaps? Are the experienced pilots also guilty of the same lack of thought?

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WINNIPEG GLIDING CLUB
Box 1255, Winnipeg, Man. R3C 2Y4

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THE SOARING ASSOCIATION OF CANADA

CANADIAN EASTERN REGIONAL SOARING CHAMPIONSHIPS 1981

will be hosted by

The Gatineau Gliding Club

at

PENDLETON, ONTARIO

From: Saturday 27 June 1981
To: Monday 6 July 1981

Motel, hotel and camping facilities are available. A full information package is being prepared and will be sent to those interested on request. For further information contact:

THE NATIONAL OFFICE (SAC)

SAFETY COLUMN

Peter Cameron

reprint from Rideau Valley Soaring School

The season is over. The gliders and tow planes are gone. The field has an odd lopsided look and even the windsock looks forlorn.

From every point of view, it was a good summer. The flying was fun and we had a good safe season: no major accidents, just a bunch of little incidents to warn us that fate is looking over our shoulders. For example, the rope break at low altitude where a weak link gave up the ghost, or the safety pin missing from the strut bolt on the 2-33, found by chance on the line as it waited to fly. Then of course, an unhappy pilot of our trusty towplane CF-OGW found out just how effective the brakes really were. It is understood the propeller has since been repaired. If there is any thread of commonality with these little incidents, then it is the human factor. Surely flying is one of most exacting of pastimes. It demands perfection, from the time you arrive on the field till you leave at the end of a day.

I once knew a pilot who always wore flying gloves. He pulled them on as he came out of his car and took them off after the aircraft were tied down. In summer he had the thin kind with all the holes in the back. He claimed that wearing them was a constant reminder to himself that he was a flyer. Certainly he was the most meticulous pilot I have ever known. Lucky for him he hadn't become addicted to a winter flying suit — he would never have made it through the summer.

In closing this column for the season, it only remains for me to say that I have enjoyed these little safety chats, and to thank all my faithful readers. Over the winter, I hope to answer the thousands of letters I have received about the column.

Best wishes for a good winter season.

WARNING NUMBER ONE!

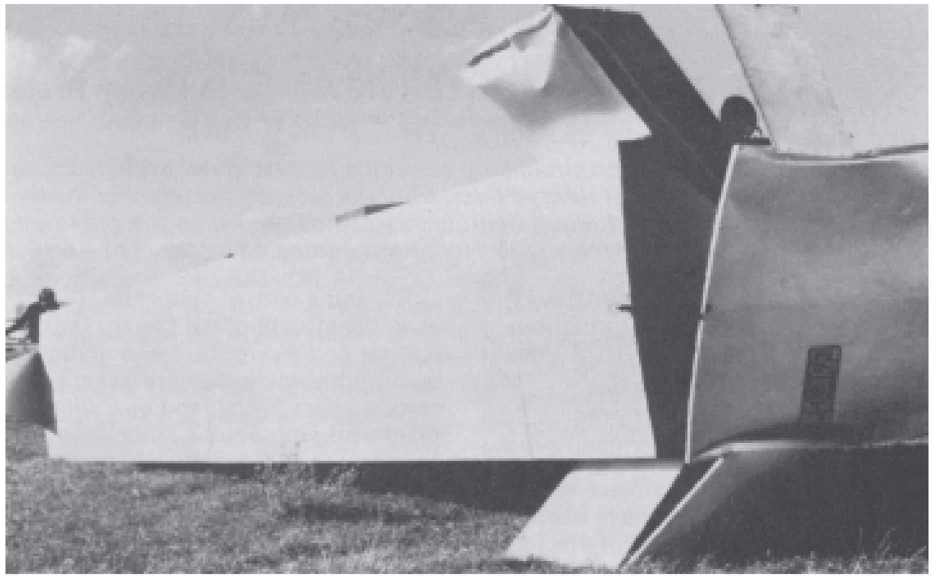

photo: Tony Burton

John Weber of Cu Nim is this issue's "DEJECTED PILOT OF THE MONTH". He tried to roll his HP-11, but only made it three-quarters of the way around because it was still in its trailer. 60 mph chinook winds at Claresholm airport in November defeated insufficient tiedowns. Moral: NAIL THOSE TRAILERS DOWN SECURELY

WARNING NUMBER TWO!

photo: Tony Burton

So you think all is serene at the club trailer park on those warm weekday nights? Last year, an unnamed pilot left the club trailer (a brutish thing) parked next to a cute little "Winnebago". A strong wind swung the two together, and the ensuing misalliance brought forth this rather unnatural progeny.

COMING EVENTS

Mar 13-15, 1981
SAC AGM, Constellation Hotel,
Toronto, Ontario

May 16-22, 1981
Eastern Basic Instructor Course (more ,page 18)

Western Instructor school (more page 18)

Advanced Instructor Course
(more page 18)

May 24 - Jun 7, 1981
17th World Gliding Championships
Paderborn-Haxterberg, West Germany
Contact: Al Schreiter

Eastern Regional Contest
(more page 14)

Western Regional Contest
(more page 20)

Oct 3-4, 1981
SAC Directors Meeting

1982 SAC Calendar Photos.

HANGAR FLYING

FREE FLIGHT INTERVIEW — with Henry Preiss on HP-19 Progress

FREE FLIGHT INTERVIEWS HP-19 BUILDER

A lot of rumours have been circulating about the newest glider expected to appear out of the Schreder "Skunkworks" in Bryan, Ohio. It turns out that Henry Preiss, who was recently president of the Windsor Gliding Club for five years, and now manages Dick Schreder's drafting instruments company, will be the only builder of the HP-19. The glider to appear for homebuilders will be called the HP-20. Henry was contacted by telephone on 6 January to tell us what's going on.

FF: Good morning Henry. We have been getting conflicting information about progress on the HP-19. All we know for certain now is that it is going to be an all-metal, T-tail, 15 metre ship, with a new airfoil. We saw the beginnings of the fuselage when we passed through Bryan last April. We understand that you have become involved in the production of the prototype, how did that come about?

HENRY: Well, I had experience in glider construction. I built the RHJ-8 2-place which you can see in the new SAC calendar and I am now flying its successor, the RHJ-9, which I also designed and built. Last year Dick asked me if I would help him in working on the HP-19 prototype. I agreed providing that two were built, one for me and one for him. I thought that I would have a lot more incentive to work on the project if I got something tangible out of the process.

FF: We heard that two different wings are being built for the HP-19. Can you explain that?

HENRY: Considerable design work was done on a wing similar to the HP-18 or RS-15 wing, but using a new airfoil and a carbon spar. After the wing construction had begun, Dick had second thoughts; it was going to be prohibitively expensive to supply carbon spars in kits, and new wing planforms with double taper were coming out in Germany that promised less plan-induced drag. So the wing was started over. Rather than abandon the old work, I proposed to complete the wing for my glider. Dick would then be able to compare performance with his prototype carrying the updated wing design when both got flying. The new glider would be called the HP-20.

FF: So you have the only living HP-19?

HENRY: Right.

FF: What exactly is the difference between the two wings?

HENRY: The HP-20 wing will employ a metal box-spar, and have a double taper, and be smaller at just over 100 square feet. The HP-19 will use the carbon spar (the only one built) that was originally intended for use on a proposed "light weight" HP-18A, which was never developed. This wing has an area of about 108 square feet.

FF: Can you tell us more about the new airfoil?

HENRY: A lot of work was done between Dick and Columbus University, I believe, on a computer-assisted design. The university had 2 or 3 people involved in the project. After a good number of runs through the computer, Dick has an airfoil he is satisfied with.It has some resemblance to the Wortmann airfoils, but has a more rounded leading edge. It's about 18% thick I believe.

FF: Was Dick looking for an airfoil that was a bit more forgiving to construct? There has been a lot of talk of skin separation under the leading edge of the HP-18 wings.

HENRY: Dick is a bit sensitive on the subject, which he believes has been exaggerated a great deal.I doubt that was a consideration in the design; the lower surface contour is very similar to the one used on the HP-18, and was the result of the aerodynamic optimization of the airfoil using the computer.

FF: Let's talk about the rest of the glider. We saw the fuselage in its early

cont'd on page 20

PROMOTING THE SPORT — The Chinook Arch — by Ursula Burton

Stories or articles about soaring given to the local press will bring greater knowledge and interest by the public on the soaring movement.

The following article appeared in the Claresholm newspaper. It was quite appreciated by the people here, as some did not know the physical actions of the well-known chinook arch, others were wondering what the many gliders were doing over Claresholm.

THE CHINOOK ARCH

Did you know that at this time of the year the western Claresholm sky is gifted with a most phenomenal cloud at heights around 5000 feet above ground to unlimited altitudes? This huge lenticular cloud with its smooth edges is the famous Chinook Arch. It is, in fact, an atmospheric roller coaster, an aerial "surf" sometimes hundreds of miles long, produced as an ocean of rapidly moving air "breaks" over the Rocky Mountains.

You may have noticed that water, flowing quickly over a submerged rock in a stream, will form several smooth ripples on the surface of the water behind the rock.If the conditions are right, the atmosphere will do the same thing as it pours over the mountains to the west:

High speed winds blow against the mountain chain and force the air thousands of feet up. Then the air rushes downwards on the east side, and instead of levelling out as usual, bounces up again thousands of feet, again and again. The air cools when rising and the water vapour within condenses and forms a cloud, the great Arch that you see.

This mountain wave and its Chinook Arch "signpost" is not only exciting to look at from the ground, it is also the time when glider pilots around here use some of the energy of the rising wave to ride it upwards to great heights in their sailplanes …

You may see a lot of these white birds flying on quiet wings in the Claresholm areas this winter.

Although I have been a long time soaring pilot from a flat landscape, my friends just introduced me to this wave soaring, and I want you to share my

cont'd on page 18

CLUB NEWS

REPORT ON THE FIRST QUEBEC SOARING COMPETITION

Club de Vol à Voile de Québec — Quebec Soaring Club — St-Raymond Airport, Québec

by Alex Krieger

The Quebec Provincial Soaring Competition was organized for the first time in 1980. The site was the St-Raymond airport, flying field of the Quebec Soaring Club — Club de Vol à Voile de Québec. The contest rules were essentially those of the Soaring Association of Canada and scoring was done using the SAC handicap system. Task setting was in two classes, Open and Sports, gliders with a best L/D below 35 competing in the Sports class.

A total of 16 gliders registered and participated, 9 in the Open class and 7 in the Sports class. Represented were 19 pilots (single and team flying) from 5 Quebec Zone clubs (Ariadne, Asbestos, Champlain, Montreal, Quebec) and one from Ontario (U. Werneburg). The gliders participating are shown in the table of results.

The period planned comprised 4 days, — June 21-24, 1980 and the organizers hoped for two contest days. However the weather did not cooperate and did not follow the forecast.

Before the contest, Environment Canada weather forecasting in Montreal was contacted, and with assistance of Dr. S. Froeschl the forecasting service of the MoT in Montreal and Quebec could be used. Dr. Froeschl was present during the first two days and helped with the preparation of the tephigram, gave the weather report and assisted in task setting. During the last two days the weather report was given by Mr. Eddy Walsh who came over from the Quebec Airport.

On the first day, Saturday June 21st, good thermals were forecast and 190 km and 110 km triangles were set for the Open and Sports classes respectively. All gliders were launched starting at 11:30 by the Quebec club L-19 and Citabria towplanes, the 16 gliders being launched in about 45 minutes, However the thermals did not develop and after 1-1/2 hours of soaring between 500 and 1500 feet all the gliders were forced down and the contest day was cancelled.

On the second day the conditions remained similar, with inversion at 3000 ft. hazy and stable conditions and after launch having been postponed several times the contest day was also cancelled.

At last on the third day conditions improved, although a strong NW wind developed and haze increased in the afternoon. The same tasks were set. The Open class ran into strong haze, increasing wind and weakening lift at the first turnpoint, the Lac-à-la-Tortue airport. The second leg, to Trois Rivière airport, over swampy terrain proved unsurmountable.

In the Sports class one pilot completed the course and two pilots landed along the third leg.

The fourth day saw a forecast of thunderstorms. Out and return tasks were set in both classes and all gliders were launched. However all landed short of the first turnpoint because of violent thunderstorm activity all over the region.

This first Quebec Zone contest proved very valuable for organizers and participants alike.It was also the first flying meeting of Quebec clubs on such a large scale. Even with only one contest day, the experience and the get-together proved well worth the effort. It was visibly demonstrated that contest flying and interclub meetings are indispensable as source of motivation and satisfaction in the sport of soaring.

Provincial Soaring Contest
Championnat provincial du vol à voile
ST-RAYMOND AIRPORT

Club de Vol à Voile de Québec
Quebec Soaring Club
21- 24 JUNE 1980

Contest day / Journée de compétition: 23 JUNE 1980

TASK / Parcours:
OPEN CLASS/Classe libre: TRIANGLE 191.5 km
St. Raymond — Lac-à-la-Tortue — Trois Rivières — St. Raymond
SPORTS CLASS / Classe sport: TRIANGLE 110 km
St. Raymond — St-Ubalde — La Pérade — St. Raymond

RANGE	PILOTE	Planeur Glider	Ident.	CLASSE	Points Total	Distance Km	Atterrissage Landing
1	Laviolette, M.	Std. Cirrus	IR	Open/Libre	1000	76	St-Narcisse
2	Gairns, R.	Std. Libelle	GE	Open	980	72	Lac-à-la-Tortue
3	Pille, W.	Kestrel 19	KQ	Open	862	72	Lac-à-la-Tortue
4	Werneburg, U.	Kestrel 17	AW	Open	704	56	Deux-Rivières
5	Bisscheroux, J.	HP-14	DE	Open	648	55	St-Stanislas
6	Palfreeman, B.	PIK-20B	AS	Open	438	36	St-Thuribe
7	Trent, J.	Std. Cirrus	ET	Open	394	31	St-Alban
8	Di Pietro, R.	Std. Jantar	DB	Open	228	32	St-Marc
9	Mathieu, J.P.	PIK-20B	CW	Open	—	0	St-Raymond
1	Pépin, D.	Ka6CR	DT	Sports	1000	110	St-Raymond
2	Roth, H.	Ka6E	KA	Sports	695	80	St-Alban
3	Pagé, G.	Pilatus B4	DR	Sports	670	72	St-Casimir
4	Palfreeman, R.	1-26	EI	Sports	168	18	Ste-Christine
5	Rochette, P.	Blanik	OX	Sports	128	18	Ste-Christine
6	Boily, G.	Blanik	YR	Sports	128	18	St-Léonard
7	Hyam, R.	Bergfalke	HC	Sports	—	0	St-Raymond

PROMOTING THE SPORT
cont'd from page 16

appreciation and knowledge about the weather world around us. The flight in such a wave is very calm and the climb is as smooth as an elevator ride. Sometimes, the only movement noticeable in the cockpit is the altimeter needle rotating around and around, as the sailplane climbs, maybe slowly at only 100 feet per minute or as much as 1000 feet per minute or more. Of course, at great heights we must use oxygen to compensate for the shortage in the air.

The most beautiful part of such a flight occurs when the wave lifts the sailplane up past the front edge of the wave cloud, which may be so smooth and clean and brilliant as to look like a perfect snow-covered hill.

I also must tell you how beautiful this country looks from above, the Porcupines are mole hills only and the Livingstone Range with its snow-covered peaks and sharp cliffs diminishes to a lovely rolling toy world. The view is unrestricted over the mountain peaks and over the green and brown checkerboard of the Albertan plains – and you are flying under a deep blue sky …

We live in a wonderful world here.

Ursula

SAC FLYING COURSES FOR 1981

by Ian Oldaker, Chairman, Instructors' Committee

1. Basic Instructor Courses

May 16-22, 1981 (to be confirmed)
York Soaring Association,
Arthur, Ontario
Course Director: to be confirmed
Probably July
Hope, BC
Course Director: Garnet Thomas
1 week
Before or after Western Regionals,
Regina, Sask (if required)

Continuing the regular instructor courses held in Eastern and Western Canada. These courses are for the new instructor or the pilot who intends to become an instructor in 1981. Will lead to check flights for recommendation for MoT Instructor Endorsement and SAC Class III rating.

2. Advanced Instructor Course

Dates to be determined
long weekend
Location to be advised
(Any bids or offers)
(Course Director Ian Oldaker)
(to be confirmed)

Both non-flying and flying activities will be geared to Class I and Class II instructors who are eligible for upgrading. The course will cover such topics as teaching beyond licence standards, flight testing of pilots, safety and emergency procedures, converting pilots to higher performance sailplanes, etc. Pilots will receive check flights for possible upgrading to SAC Class I rating.

3. Cross-Country Flying Course

Location and dates to be determined
Course Director: John Firth

Plans are being worked out to offer a course for those cross-country pilots who wish to improve their techniques, to learn how to plan a flight, improve their cross country performance, ship, instrumentation, etc.

For more information on any or all of these courses contact your CFI, any course director, or Jim Leach, SAC Executive Director. To attend a course, an application form, available from your CFI or SAC office, must be submitted and where appropriate, also signed by the club CFI.

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FAI Badges by Dave Belchamber

The following FAI Badges and Badge Legs were recorded in the FAI Register of the Soaring Association of Canada for the period Oct - Dec 1980.

GOLD BADGE

170	Harold Kirschner	Vancouver
171	Dave Hennigar	Winnipeg

SILVER BADGE

564	S. James Lewin	Air Sailing
565	Fred Lukianow	London
566	Geoffrey LeBreton	Toronto
567	Simon Davies	London
568	Adolf Niedermeier	York
569	Ken R. Palmer	Cu Nim
570	Scott McMaster	SOSA
571	Dennis Vreeken	Vancouver
572	George Reid	York
573	Mark Gluck	Erin
574	Gaetan Pagé	Quebec

DIAMOND GOAL / GOLD DISTANCE 300 km (186.4 mi) O&R or Triangle

Bruce MacGowan	Vancouver	ASW-19; Innisfail, Alta.
Harold Kirschner	Vancouver	Phoebus A; Innisfail, Alta.

GOLD ALTITUDE 3000 m Gain (9842 ft)

Bruce Nicmans	Vancouver	1-26; Hope, B.C.
Harold Kirschner	Vancouver	Pilatus B4; Hope, B.C.

SILVER DURATION 5 Hours

Alex Szabo	SOSA	1-26; Rockton, Ont.
Jean-Claude Savard	Quebec	Blanik; St-Raymond, P.Q
Claire Girard	Quebec	Blanik; St-Raymond, P.Q.
Thoms Reisner	Quebec	Ka6CR; St-Raymond, P.Q.
Douglas McNiven	York	n/a; Arthur, Ont.
Bruce Nicmans	Vancouver	1-26;Hope, B.C.
Brian Hollington	Vancouver	Pilatus B4; Hope, B.C.
Jean Provencher	Quebec	DG-100, St-Raymond. P.Q.
Ken R. Palmer	Cu Nim	B-4; Cowley, Alta.
S. James Lewin	Air Sailing	Ka6CR; Belwood, Ont.
Simon Davies	London	1-34; Embro, Ont.
Adolf Niedermeier	York	1-23; Arthur, Ont.
Scott McMaster	SOSA	1-26; Rockton, Ont.
George Reid	York	1-23; Arthur, Ont.

SILVER DISTANCE 50 km (31.1 mi)

Bruce Wilkin	Winnipeg	1-26; Pigeon Lake, Man.
Hugh McColeman	Edmonton	Blanik; Lamont, Alta.
Gunther Ostermann	Vancouver	Blanik; Innisfail, Alta.
Dennis Vreeken	Vancouver	Phoebus A; Innisfail, Alta.
Ken R. Palmer	Cu Nim	1-26; Cowley, Alta.
Fred Lukianow	London	Skylark 2; Embro, Ont.
Geoffrey LeBreton	Toronto	Ka-8B; Conn, Ont.
Simon Davies	London	1-34; Embro, Ont.
Adolf Niedermeier	York	1-23; Arthur, Ont.
Scott McMaster	SOSA	1-26; Rockton, Ont.
George Reid	York	1-26; Arthur, Ont.
Mark Gluck	Erin	n/a; Erin, Ont.
Gaetan Pagé	Quebec	Blanik; St-Raymond, P.Q.

SILVER ALTITUDE 1000 m Gain (3281 ft)

Marilyn Dougherty	New Brunswick	1-26; Havelock, N.B.
Tony Miller	Rideau	1-26; Gananoque, Ont.
Alex Szabo	SOSA	1-26; Rockton, Ont.
Michel Krieger	Quebec	1-26; St-Raymond, P.Q.
Thomas Reisner	Quebec	Ka6CR; St-Raymond, P.Q.
Claude de St-Riquier	Quebec	Lark; St-Raymond. P.Q.
Bruce Wilkin	Winnipeg	1-26; Pigeon Lake, Man.
Bruce Nicmans	Vancouver	1-26; Hope, B.C.
Gunther Ostermann	Vancouver	Blanik; Innisfail, Alta.
Brian Hollington	Vancouver	Pilatus B4; Hope, B.C.
Dennis Vreeken	Vancouver	Phoebus A; Innisfail, Alta.
Ken R. Palmer	Cu Nim	B-4; Cowley, Alta.
Simon Davies	London	1-34; Embro, Ont.
Scott McMaster	SOSA	1-26; Rockton, Ont.
George Reid	York	1-26; Arthur, Ont.

C BADGE 60 min. flight

1668	Duncan Lamplugh	Montreal
1669	Theodore Radvanyi	York
1670	Terrence Young	Borden
1671	Ken R. Palmer	Cu Nim
1672	Scott McMaster	SOSA
1673	Alex Szabo	SOSA
1674	Mark Rebs	York
1675	Heinz Schwarz	Grande Prairie
1676	Jean Gandubert	Quebec
1677	Bruce Bobick	Bulkley Valley
1678	John Ennis	Toronto
1679	Bruce Nicmans	Vancouver
1680	Gunther Ostermann	Vancouver
1681	Patrick Carpentier	Quebec
1682	Jean Poirier	Quebec

FREE FLIGHT INTERVIEW
cont'd from page 16

early stages of construction. It looked somewhat like a "low-profile" HP-11.

HENRY Yes. It's all-metal with a tapered cone rear fuselage, and uses the stretched skins of the HP-16 for the forward portion. The seat back reclines about forty-five degrees.

FF: Why did Dick decide to go with a T-tail configuration? The V-tail has almost been his trademark.

HENRY: It's entirely a marketing decision. T-tails sell better than V-tails, although there is no difference in performance. We still are convinced that the V-tail is more efficient, simpler to build, lighter, and has better ground clearance and gives less chance of damage to fuselage in a ground loop due to its smaller moment of inertia.

FF: Will the flap and aileron be interconnected?

HENRY: I don't know. I just saw some of the initial design drawings.If I can figure out what all the cranks are for, I may install it.

FF: How far along are you now?

HENRY: Well, the wings are done and the fuselage is about 75% complete.I expect to get it flying in the early spring.

FF: Well Henry, good luck on your HP-19, and we look forward to hearing more of the HP-20. I hope you'll write us a story soon with some pictures for FREE FLIGHT on your building efforts.

NOTICE

ANY EVENTS COMING UP?

Rough ideas only?

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(*Editing, printing, and mailing take time*).

STOP THE PRESS (613) 489-2038 Jim

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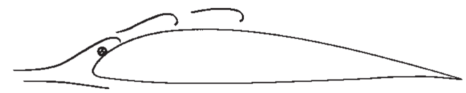
____

A Glider Tiedown Tip

by Tony Burton

It is often necessary to tie down gliders which will be unattended and could be subject to high winds as might occur during summer squalls or winter wave. Under these conditions, ropes have been strained to breaking by the large amount of lift developed by wings which are sitting at a large angle of attack (the 2-33 is a good example).



The common brute force solution of more rope is not always the answer, as the security of the anchors in some soils may be the limiting factor.

A better method is to prevent the wings from developing the excess lift in the first place. This may be accomplished to some extent by taping a length of rope along the top surface of the wing an inch or two to the rear of the leading edge. This causes separation of the airflow and becomes, in effect, a continuous spoiler. The reduced wing lift also results in less heaving against the tiedowns during gusts, which is a lot kinder to the wing structure itself.

How effective is this device in reducing wing lift? What is an optimum rope diameter? What is the best rope position? Can anyone out there with access to a wind tunnel help answer these questions?

Hans-Werner Grosse Does It ... Again!

Ever since 1976 Hans Werner Grosse has been making summer gliding trips to Australia in order to make attempts on world records. He appears to be making a habit of breaking his own triangular distance record each year. He arrived in Australia in early December, and by December 14th he had succeeded in surpassing his efforts of previous years and completed a flight around a 1271 kilometre triangle at a speed of 133.2 km/h.

If this flight is duly certified, it will set a new triangular distance record and also a speed record for speed around a 1250 km triangle.

Once again, he is basing himself at Alice Springs in the centre of Australia. For his record flights he used Wycliffe Well, on the Stuart Highway running north of Alice Springs for his first turnpoint and the northwest corner of Lake Amadeus about 80 km northwest of Ayers Rock as his second. He was flying an ASW-17.

CLASSIFIED ADS

Lloyd Bungey is in the news, with one of this month's featured aircraft. Lloyd finally flew his HP-14 2-seat — said it flew just fine with one up and was looking for a volunteer to try it out with two. Amazing how everybody suddenly became too busy to spare the time.

Vancouver Soaring Scene

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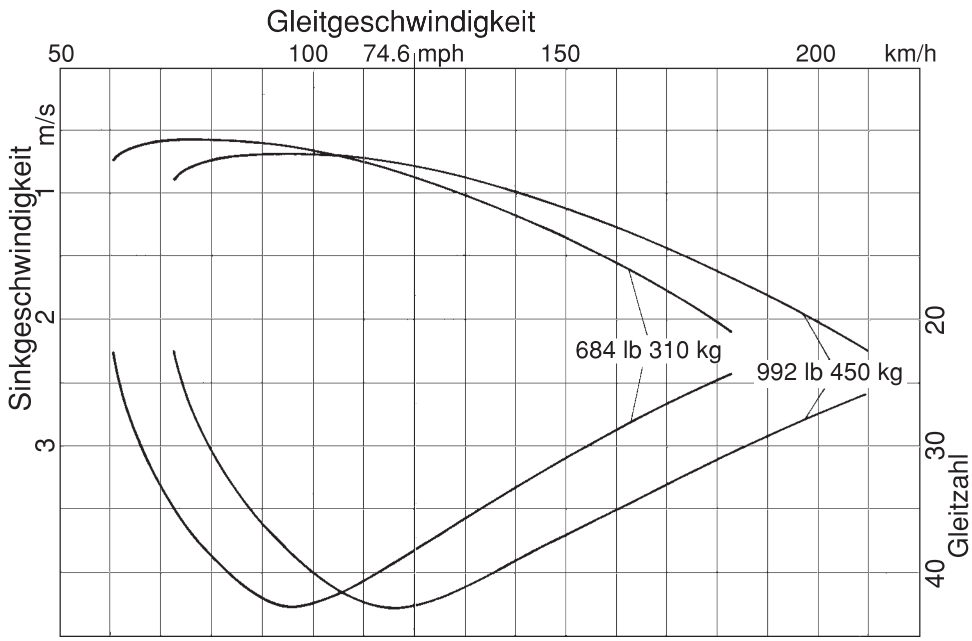
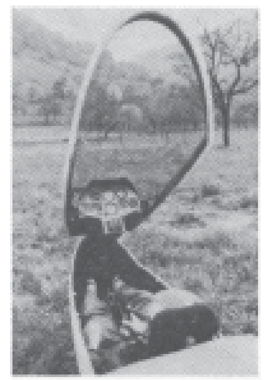
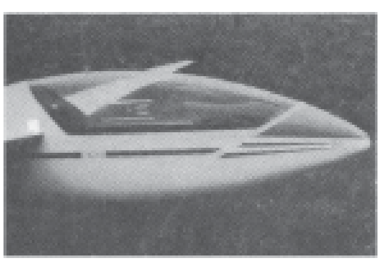




Photographs by
Peter F. Seliger
Courtesy *Flugrevue*



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