free flight

4 Jul/Aug 81

in this issue

17th World Gliding Championships

Fundamentals of Atmospheric Convection Part 2

vol libre

President's Notes:

Terry Tucker, after ten years of managing the SAC office, will be leaving us in June. The original SAC 'office' was a room in Terry's basement, and Terry was our first paid staff person — part time. With her devotion and effort the role of the SAC office became increasingly significant and, inevitably, the job grew. For several years Terry was our only full time staff, an invaluable source of information and support to the Board of Directors, and to the President in particular.

Terry's tasks covered a multitude of activities. Most of her time was spent in the office dealing with club affairs — memberships, insurance, supplies orders, inquiries and so on. Director's meetings required Terry to give up her weekends three or four times a year, and travel anywhere from Vancouver to Quebec City to assist the Directors with information when required and to record the significant points of sometimes very long and involved discussions. Terry was always in evidence at the Annual General Meeting and probably knew more of the faces than anyone else present. For many people, communicating with SAC meant writing to Terry Tucker.

Rarely did Terry complain. She understood that soaring pilots can forget about time zones and make 'evening' telephone calls that would drag her from bed at 1.00 am! Membership changes and additions would arrive in the mail on the back of an envelope or a scrap of paper with no club name or address. Fortunately with her knowledge of clubs arid the people running them, Terry would generally get things straightened out. It did slow things down, however, and sometimes a late night telephone caller would find Terry not in bed, but still in the office sorting out a newly-arrived set of hieroglyphics.

As SAC's activities diversified and increased in number, both the President and Terry found there was need for more help, though it was a long time before SAC took the plunge and hired an Executive Director — Jim Leach. Jim has been on the job now for a little over a year, during which time he has not only had to assume the responsibilities of Executive Director, but also learn what the SAC is all about, how it operates, and what it does. Terry has been invaluable in this learning process for Jim.

However, as the job description of the Executive Director evolved, Terry inevitably found that her own role was altered, and the job did not hold the same challenge and satisfaction for her as it had done for the past ten years. The decision to make a move was a hard one for Terry, but she feels that it is the right one for her now.

Many of us in the organization have known Terry as a personal friend for many years, and respect her greatly for her contributions to SAC. We thank you, Terry for all you have done for us; we wish you well in future employment, and look forward to maintaining relationships with you as a fellow soaring pilot.

R. W. Flint

Russ Flint
President

S.A.C.

free flight

4 Jul/Aug 81

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

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Cover Paderborn opening ceremonies. A Salto struts its stuff.
photo: Gerd Schaefer

Total circulation of the Jul/Aug issue was 1400.

Letter from Ursula

As the fourth issue leaves my hands for the printers in Ottawa (later than planned so Tony and I could get the World Championships story written), I feel I should say a few words about my early experiences in editing free flight…

- First, many thanks for your great response to my pleas for contributions: good letters, good safety articles, poems, cartoons and tales are landing on my desk.

  We are hard-pressed to find enough space in the magazine to print the many worthwhile articles. Please do not get discouraged if you work hard on a story and I can't promise to use it, or I cut it down to the bare bones. Please bare with me until … the free flight budget limits us to 24 pages; 28 pages allows much more copy, but we can't do it unless the cost of the extra four pages ($400!) can be covered by increased advertising revenues! By the way, be sure to return the blue survey (ff 3/81) to the SAC office. Some of the data will provide excellent info to help sell prospective advertisers.

- You can see I have been experimenting with style and layout, and it's not quite right yet. Are there any graphics experts out there with some opinions?

- My apologies for the very large number of typos in issue 2/81. It was printed in a rush to be on hand for the AGM and the proof reading was minimal.

- To most of you, in many corners of the country, third class mailing is excruciatingly slow. However, going first class would cost about $280 more per issue! So, if I had the extra cash, and you had the choice — would you rather get a fat and slow free flight, or a thin and quicker one? Please let me know. I look forward to the time when "the choice" will not be necessary!

- Twice now our efforts were realized getting the magazine out according to schedule (see 1/81). Unfortunately #3 was delayed one month in Ottawa due to production problems (I wished I could sit on the printer's desk …)

- Contributions for any deadline must reach me by the 10th of every other month! Please allow at least 8 to 10 working days for normal mail to Claresholm. If time is tight, Special Delivery often works in four days (!)

Your ideas are more than welcome … send them to me any time, don't wait for your friend to do it.

Where are you artists! You photographers! Now is the time to capture the beauty in our sport … free flight is waiting to print exciting front covers.

18 June 81

SAC NATIONAL OFFICE MOVES!

Our new address is:

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The
SOARING ASSOCIATION OF CANADA

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.

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.

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.

President Dr. R. W. Flint

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L'ASSOCIATION CANADIENNE DE VOL À VOILE

est une organisation à but non lucratif formée de personnes enthousiastes cherchant à protéger et à promouvoir le vol à voile sous toutes ses formes sur une base nationale et internationale.

L'association est membre de "l'Aéroclub Royale Canadienne" (RCFCA), aéroclub national représentant le Canada au sein de la Fédération Aéronautique Internationale (FAI, administration responsables des sports aériens à l'échelle mondiale pour les aéroclubs nationaux). Selon les normes de la FAI, le RCFCA a délégué à l'Association canadienne de vol à voile la supervision des activités de vol à voile, telles que tentatives de records, sanctions des compétitions, délivrance des brevets de la FAI, ainsi que la sélection d'une équipe nationale pour les championnats mondiaux biennaux de vol à voile.

vol libre est le journal officiel de l'association.

Les articles publiés dans vol libre sont des contributions dues à la gracieuseté d'individus ou de groupes enthousiastes du vol à voile.

Chacun est invité à participer à la réalisation de la revue, soit par reportages, échanges d'opinions, activités dans le club, etc... Un "courrier des lecteurs" sera publié selon l'espace disponible. Les épreuves de photos en noir et blanc sont préférables à celles en couleur ou diapositives. Les négatifs ne peuvent être utilisés.

L'exactitude des articles publiés est la responsabilité des auteurs et ne saurait, en aucun cas, engager celle de la revue vol libre, ni celle de l'ACVV, ni refléter leurs idées.

Toute correspondance faisant l'objet d'un sujet personnel devra être adressée au directeur régional dont le nom apparaît dans cette revue.

Pour chaque article reçu, nous retournerons un accusé de réception et donnerons la date probable de sa publication. Les textes et les photos seront soumis à la rédaction et, dépendant de leur intérêt, seront insérés dans la revue.

Les articles de vol libre peuvent être reproduits librement, mais la mention du nom de la revue et de l'auteur serait grandement appréciée.

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Opinions

NASA GLIDER PANNED

Dear Ed,

Needless to say, now that Columbia has returned from space, NASA (that's No After-entry Soaring Allowed) think they have discovered the wheel. However, all of us sub-orbital shuttle pilots have been doing dead stick landings for years and I might add, without 5 computers and a microwave landing system! In fact your writer here, Lennie, wrote down some of numbers, and they equal L/D ratios of some of my most memorable flights.

Altitude	Dist. (mi)	Speed	L/D
165000'	410	Mach 10	1:6.3
135000'	221	6	1:21.2
124000'	177	4	1:20.1
107000'	112		1:8.5
51000'		2.8	1:3.65
25000'	15	0.6	
22000'		325 kts	
16000'		271	
9000'		280	
T.D.		210	

Dick Johnson will no doubt give us some more accurate numbers once he figures out how to keep the bug tape from flowing off the leading edge at around Mach 10. But suffice to say it flies about as good as your average barn door with the hinges closed coming down as fast as a hockey stick on an NHL player's nog.

When I figured the usual L/D of about 1 in 4 up to about 1 in 20, I guessed he got some lift coming over the mountains or a thermal 1/2 the size of California, but there was no wind and it was severe clear.

If they think they can claim some of the numerous records that Lennie holds but has never officially put in for, they are mistaken. Ha – they towed too high for starters.

Yours truly
Len Tickler
"Lennie" to my friends

PENELOPY PEEVED

Dear Ursula,

I really enjoyed your Jan/Feb issue, which regretfully took a long time to reach us (21 April 81) we are still awaiting the March/April and I know from Lloyd it was mailed a long time ago.

… By the way, I wondered if you were aware that "Percy Peabody" is a pen name — we don't know who he is — he stole the name from our other "Vancouver Soaring Scene" anonymous contributor — Penelopy Peabody. I believe Penny was quite upset by it as she didn't write me any letters for a few months after!

We are pleased to see the FAI Badges listed — I think this is one thing every member must appreciate; a bit of an incentive to each of us to get our name in print by getting out there and flying …

Christine Timm, VSA

I painfully realize the unacceptable delay of free flight's *mailing. (see my comments in the editorial on page 2). So far, research at the Post Office remained fruitless and I feel that SAC is committed to deliver the magazine first class to every member. But who is prepared to absorb the additional costs of around $280? Myself or the SAC National Office would greatly welcome any comments on this issue.*

INTEGRITY & EXPERIENCE

Mr. Percy Peabody has an article "A Poke at Private Owners and Others" in **free flight** 5/80 and invites a reaction to his position. As a Canadian in a German club and a Canadian military club, British and Canadian trained instructor, private owner and a person that loves his sport I wish to comment:

The central flaw that leads to a high accident/incident rate, even with the private owner, is instructor quality, and in particular CFI quality. Mr. Peabody's quote from Mr. Bill Scull in *Sailplane & Gliding* magazine should be memorized by all CFI's and their instructors.

I have been privileged to fly with instructors in Canada and Europe and have seen the full spectrum from brilliant to abysmal. Some thoughts have developed and strong convictions born from the school of hard knocks and front line experience.

First, I think Canada is 10 to 15 years behind the English in their system on instructor selection and training. Recent conversation with a Director of a SAC instructor school indicates he receives candidates unsuited or unready to be instructors and has no authority to deny a SAC rating. Let's give him this authority. In addition let's make this course a pass/fail thing — if a candidate cannot fly with some reasonable accuracy, determined by the director, and cannot pass a written exam on the essential knowledge he should have — send him home.

How to pick instructors? Four basic criteria need to be observed.

First, naturally is his experience/skill — hours in the logbook and mastery of physical flying. The present minimum Canadian standard is too low. Few pilots are back seat material below 50 hours pilot-in-command. Start Class 3 at that. Work up to Silver Badge and 50 hours instructor experience for Class 1. Skill will come along but if he cannot do an accurate turn or spot land, more practice.

Continued on Page 17

SAFETY COLUMN

THE ROPE TRICK

Even the best of hangmen claim only to do a good job at one end of the rope, but an incident report of last season details a method by which it might be possible to use a towrope in such a way as to produce a fatality at each end of the rope. Fortunately, the final proof of the method's effectiveness has not yet been supplied.

In brief, the towplane dived away before the glider had released taking with it the glider tow hook mechanism which, swinging on the end of the rope, proceeded to beat-up the towplane. Apparently the release mechanism struck a gas line fitting before glancing off to inflict a two-foot tear in the fabric of the upper wing surface. On landing the whole mess was found to be entangled about the fin and rudder. Not good! Granted that the release misunderstanding should not have happened (but has before and will again), there should obviously have been a simple snapping of the rope with little danger to anyone. That the rope did not snap was apparently due to the fact that the rope was 'overstrength' and there was no weak link attached.

But what is an 'overstrength' rope? The incident report suggests that a breaking strength of 1200 lbs is standard. Is it? Should it be? Texts on gliding are of little help in the matter, of six consulted three made no mention of rope strength; two (by Piggot) mentioned 1000 lbs for normal conditions with a much stronger rope for turbulent conditions; 'Joy of Soaring' has it that the required breaking strength must be over 80% and less than 200% of the gross weight of the glider being towed — using this the breaking strength of the rope for a fully loaded Blanik should be between 880-2200 lbs! Not helpful at all.

The incident quoted makes it imperative that the whole question of rope strength should be raised, as it made clear by the President of the club involved who wrote, "a very grave concern is felt over the potential tragedy…" Part of the recommendations for avoiding future incidents of this kind is to lay down firmly the acceptable type of rope to be used.

All we need now is an expert on ropes to write us a good article on the selection and testing of towropes with advice on their inspection and maintenance. Any volunteers? □

by Eric Newsome

PROBLEM WITH 2-33 BALLAST ATTACHMENT

I am writing to detail a safety problem with the Schweizer 2-33 which we have had the good fortune to encounter without an accident.

The difficulty is in the design of the attachments for the standard Schweizer ballast. This box is designed to carry 14 lbs of lead in a box between the pilots' legs. It is anchored to the structure at the forward end with two very light rivets or rivet 'snaps'. Our experience with this attachment is that following a few years of use the rivets eventually work loose and are fretted off. The result may not be readily apparent until the glider is subject to a sudden gust on tow after a harder than normal landing. In this case, the front end of the weight box drops through the Kydex plastic trim and rests on the release cable. When the glider encounters the gust on tow, the weight drops further onto the release cable and causes a premature release.

I would suggest to all operators of 2-33's that they visually confirm the integrity of these forward anchors. If they are found to be worn or loose, the rivets should be replaced with cherry lock or cherry max rivets, which have a much higher strength than the originals. If these are not available, the ballast weight should be removed, and the placard limits for the aircraft without ballast should be observed. □

by Don Band
York Soaring Association

A Superior pilot is one who stays out of trouble by using his Superior judgement to avoid situations which might require the use of his Superior skill.

THANKS to KURT MOSER
for this
CONFESSION

NEVER ALLOW DISTRACTIONS WHEN RIGGING A GLIDER

This story goes back about 5 years. It was one of those beautiful days in the middle of the week. The weather had not been good on the previous weekend. Four of us in the club were anxious to get some flying in and somehow managed to get the day off work.

John had just bought a nice Ka6CR and he was eager to get a good soaring flight in it.

We got to the field, assembled John's ship and put him on the flight line. While there were still enough hands available I assembled the wings of my own bird, also a Ka6CR. One of the other fellows gave John a winch tow while I proceeded with the assembly of my ship.

John was back on the ground while I was still busy attaching the elevator to my bird.

Obviously, John was not yet familiar with his glider and could not stay up. We put him back on the flight line ready for another tow. Circumstances were such that at this particular time I was the only towpilot available. I left my glider and went down to the other end of the runway to give John another tow. A large beautiful cu had formed directly over the field and this time John had no trouble finding the thermal.

By the time I got back to my own ship everything looked to be in place and being anxious to join John, who was now rapidly climbing away, I never bothered to double check on my assembly.

While on tow, I could tell that I was already in lift on the way up and as the cable dropped away below me I immediately registered 500 up. I had made about two turns when I felt a definite resistance on the stick, especially when correcting pitch. As I came around again the blood shot to my head and my heartbeat tripled within the split second of sudden realization of what was wrong. Instantly, my hand moved to the side pocket where I already knew what I would find: The missing elevator attaching bolt which I had forgotten to install.

As the initial shock subsided, I gingerly opened the divebrakes and since I was still within the pattern area rolled to a stop on the ground soon thereafter.

"What happened", they asked, when they saw my ashen face. Well, I eventually told them.

I silently thanked my maker for sparing me, and then the Schleicher people for having the foresight to mount the elevator retainer pins pointing forward, against the airflow,

Never again, since then, have I left my glider while assembling or without the double check of all controls and safeties, especially the elevator bolt. □

AN AVIARY OF GLIDING TYPES

by Eric Newsome

• All glider pilots belong to the species 'Aeronauticus'. Having said that, it should also be said that the species then degenerates into a plethora of fascinating sub-species. Indeed, one of the joys of club life is to observe, identify and categorize the various sub-species, a refined form of bird watching in which the observed can reciprocate.

AERONAUTICUS HOTSHOTICUS

This bird, unfortunately, is not a 'rara avis' and shows no sign of ever becoming extinct. The sub-species is best identified by a large gaping hole just above his chin that is in constant motion and from which issues a never-ending stream of sound. The most readily identified sound is that of the simple word "I" and it has been observed that if "I" could be removed from his endless birdsong he would be struck mercifully dumb.

The eyes of 'Hotshoticus' exhibit certain peculiarities in that they do not see flying instruments as do other eyes: rates of climb are doubled, speeds appear greater and altitudes higher. Curiously, the time perception of 'Hotshoticus' shows a certain waywardness: in conjunction with speed tasks time appears to be less while in conjunction with duration of flight claims it seems to be greater. Many of these strange phenomena might have gone undiscovered had it not been for the fact that 'Hotshoticus' is often equipped with a powerful and much used radio by which he is able to report his instrument readings to lesser pilots nearby who see things on a different scale. The only temporarily effective means of silencing his radio monologue is to ask him to look up to see if your wheel is retracted just after he has made an announcement about his great height and general soaring ability.

'Hotshoticus flies with a flair that in the lesser sub-species would be unfairly characterized as plain bad airmanship. Quite naturally he considers that rules are made for others who need them more. His idea of a standard landing circuit is a high speed pass across the field flicking the top of the long grass followed by a zooming climb and a steep turning approach to the runway. It has happened that 'Hotshoticus' had been so dazzled by his own virtuoso performance that he has forgotten to put down his wheel and so has landed amid a fine shower of fibreglass particles. On the occasions when his wheel is firmly locked down his landing run is predictably unorthodox as he cuts in front of the line of gliders waiting to take-off and, skillfully using his wheel brake (which this time happens to be working), comes to rest with the sailplane's nose only a few inches from the door of his glider trailer. Very impressive.

Scientists are somewhat puzzled by the position of 'Hotshoticus' on the scale of glider pilot evolution. Is he the apex of development to which all will eventually climb, or is he a case of arrested development? It is reliably reported that most glider pilots exhibit some small streak of 'Hotshoticus', whether it be as a latent development or a vestigial remnant, and this streak can be intensified by adding alcohol to the bloodstream by an oral injection through the neck of a bottle.

Here's to 'Hotshoticus'. May his deeds be as great as his words. □

17th SEGELFLUG — WELTMEISTERSHAFTEN

by Tony and Ursula Burton

Paderborn lies at the edge of a plain which extends to the northwest. To the southeast, south and northeast are hills or rolling countryside which provide generally good soaring conditions. However...

WEATHER
The weather, during most of the contest, was dominated by a series of fronts which passed, usually slowly, through the Paderborn area. The frontal waves were so timed that the mornings were generally given to the clearing of the previous night's rain and clouds, and to slow drying of the ground. Middle cloud associated with these fronts either lingered or intruded upon the area, and on many days pilots saw little sunshine out on course. On average, a day had cu based at 3000 feet under variable middle and upper cloud, 1 to 2 knots lift, followed by overdevelopment and rain. Only two or three days provided anything remotely resembling a race for the Standard and 15 Metre Class pilots.

THE PILOTS
Eighty-one pilots from 25 nations were on hand, though some usual participants such as Australia were absent due to South Africa's political situation. At the last moment, USSR, Czechoslovakia, Hungary and Mexico pulled out. Only Poland of the Eastern Block countries was present.

The Open Class had only twelve entries, but the competition was expected to be hot between George Lee (Great Britain), Klaus Holighaus and Bruno Gantenbrink (both West Germany), and Dick Butler (USA). Lee, flying a Nimbus 3, would be fighting hard to make it three in a row as No. 1 in the Open Class. Also flying Nimbus 3's, Holighaus and Gantenbrink had strong hopes of getting the Open Class Trophy back to Germany (these pilots are sports stars in Germany, rating live TV coverage). One day in Canada maybe ...

Dick Butler flying a modified ASW-17 was also considered a strong contender based upon his skill in previous contests.

The 15 Metre Class had forty-two pilots entered and the competition was expected to be hard fought indeed with many seasoned competitors flying. Goran Ax (Sweden) and Karl Striedieck (USA) were possible winners, and Bernard Fitchett (Great Britain), Jacques Rantet (France), Henri Stouffs (Belgium) and others could not be counted out. Helmut Reichmann, winner in this Class at Châteauroux, chose not to participate in Paderborn and left the contest open for a new champion.

In the Standard Class with 27 pilots, the odds favoured Baer Selen (Netherlands) who won in Châteauroux, Franciszek Kepka and Stanislaw Witek (both Poland) with proven experience in team flying, François Ragot (France), Hans Gloeckl (West Germany) and Leonardo Brigliadori (Italy), who was second in 1978.

For Canada, Ulli Werneburg and Paul Sears were new to world championships and both would have a taste of competition at its best, and Hal Werneburg and Jim Carpenter would be trying to put their experience to good use.

The old hand at this contest was the Swiss pilot Hans Nietlispach who has flown in ten previous world championships. Now a man of imposing girth, he had to have a made-to-measure LS-4 built for him, the cockpit being made deeper and wider.

SHIPS
The Nimbus 3 was the star in the show, and Holighaus was going to do his best to prove the technical skills of Schempp-Hirth. Gerhard Waibel, the designer at Schleicher, was unfortunately unable to have his new ASW-22 ready in time for the contest, so there was no battle for company honours this time around. Lee was to fly the ASW-22, so it was to Holighaus' credit that he gave his chief rival a Nimbus 3 to fly.

Dick Butler was flying a "stretched" ASW-17. Coming to Germany last fall in search of a competitive ship, he found no sellers, in an amazing bid to come up with the biggest and best for the contest, he designed and hand-built two carbon and glassfibre 1-1/2 metre inboard wing sections to mate with the ASW-17 structure. The additional 3 metres of wing root was completed between November and March of last winter. It was generally considered that an ASW-17 with a 23 metre span would probably equal a Nimbus 3, and would make Butler a very strong contender if his flying skills were equal to his construction efforts.

The 15 Metre Class could almost be called a one-ship contest, with thirty of the forty-two pilots flying the ASW-20. Seven Ventuses (Venti?) were the second most numerous ships.

The Standard Class was dominated by the LS-4 with sixteen entries. Selen's ASW-19b had been modified with a row of tiny holes on the bottom surface of the wings just ahead of the flap hinge line. Air blown from these holes was expected to reduce drag at high speed by reducing the extent of the separation in this area. There was some question as to whether this modification was a "lift-enhancing device" and therefore forbidden under the Standard Class rules. Just before the contest began, the international jury had some OSTIV aerodynamic experts look into the matter, and it was decided that the modification was legal because it was built into the structure and not controlled or adjustable by the pilot.

CONTEST ORGANIZATION
The Paderborn airfield did not exist until 1973 when the city of Paderborn provided financial backing to the local aeroclub to develop this general aviation and gliding centre. The airfield consists of a huge well-manicured grass field with excellent hangars and other facilities.

Germany is home for much low level military and other commercial aviation traffic which the local glider clubs must contend with and accommodate. However, for the duration of the contest most military flying in the contest area was restricted to night exercises to avoid conflict. Other air traffic control restrictions were also eased to provide maximum freedom to the contest pilots. Without this cooperation from military and ATC officials it would have been impractical for Germany to host a championship, and it is to the organizer's credit that the bureaucracy was minimized.

Fred Weinholtz was Contest Director and he, together with eighty volunteers, 40,000 manhours of labour and 1/4 million dollars in expenses put together a first class contest organization. The world's most expensive set of turnpoint photographs were provided to the pilots. They were taken by the vertical take-off Harrier jets flown by the RAF at nearby Gütersloh.

A prize which was usually awarded daily by the Contest Director was the "Pechvogel" or Booby Bird. This was a stuffed penguin and it was presented, along with a raised umbrella, to the most out-of-luck pilot of the previous day.

PRACTICE DAYS
The practice period was dominated by several days of relatively warm dry air from the southwest, which gave unusually good visibility and relatively good soaring conditions to allow the pilots to iron out their flying. Lee scored some psychological points when he flew 760 km on the first practice day on a 1000 km triangle attempt. He found the weather on the second leg too weak to continue the task and he returned home.

OPENING CEREMONIES
They come out of much the same mold, with flag presentations and interminable speeches from great lights to dim bulbs. This is followed by an airshow where the host country does its best to "aah" the crowd. Paderborn was no exception here, and all were impressed by the mass balloon ascent and superb aerobatics by a Salto H101 and by two LO-100's. The high speed inverted beat-up by the Salto was a heart-stopper.

THE CONTEST BEGINS
24 May 1981
"It's raining, it's pouring, the weather man is snoring; then he bumped his head and strangely said, in the afternoon we're all soaring." (Mike Apps)

TASK
Open Class 270.4 km, 15 Metre 241.3 km, Standard 209.7 km

After the sunny opening ceremonies, a warm front passed during the night followed by a cold front at briefing time. The task committee believed a short afternoon task was possible. It sounded rather incongruous, as the sound of pouring rain on the hangar roof nearly drowned out the mike.

A second briefing at 1100 hours reconfirmed the afternoon soaring prediction and everyone

was given one hour to rig in the mud. First starts began at 1400. Soon all classes were radioing back their problems with overcast and rain, and the outlanding report map in front of the hangar did not have room for all the outlanding pins around the first turnpoint.

In the Open Class, no one completed the course. Gantenbrink found himself low and thought to take advantage of his local area knowledge and headed for the cooling towers of a power station. It was in vain, however, as he had forgotten that it was Sunday and the station worked only at reduced power. Holighaus did best with 208 km and Butler was a disappointed last place finisher with only 87 km.

In the 15 Metre Class, timing proved to be very important in getting around the rainy first turnpoint. No one finished, and only 24 of the 42 pilots flew the minimum 100 km which devalued the day, giving 524 points to Einar Ronnestad (Norway) with his flight of 183.7 km.

In the Standard Class more favourable weather at the turnpoints allowed 9 out of 27 to finish. Witek earned 1000 points for his speed of 64 km/h.

When Jim Carpenter landed about half way up the second leg at Hamm airport, a crowd came running to the wet sailplane and nearly carried it and Jim to the hangars. Before he could even unstrap himself, he was handed a "Bratwurst und ein Bier"; German airfield hospitality at its finest.

25 May 1981
Ragot's LS-4 has the registration of F-WEIB, the German word for woman, however a woman of questionable character… when he lands out he will probably have to put up with a few raised eyebrows from the farmers —

TASK
Open Class 252.5 km, 15 Metre 244.0 km, Standard 200.6 km

The contest area was in the same airmass as yesterday but it was predicted to be slightly drier. Everyone on the grid waited for the first sign of thermal activity which was delayed by thicker than predicted cirrus. As the 15 Metre Class was launched, it was announced on the grid that the Open and Standard Class tasks were cancelled. There was a scramble to clear gliders off the grid as it was expected that the poor lift would cause many of the 15 Metre pilots to come back for a relight. Only a couple had problems however, and slow starts were made towards the first turnpoint. Again many showers on the first leg washed gliders out of the sky and only eleven pilots got around the first turnpoint.

Eleven pilots were required to make up the necessary 25% going 100 km or more to make it a contest day. Landing reports became an item of supreme interest as first one pilot and then another reported in with the magic number bettered. Hal landed 7 km past the turnpoint in the middle of a rainstorm for 103.4 km. By the time ten pilots had reported over 100 km, only Stouffs had not been heard from. He finally called in late with the third best distance of the day to make the task official.

Andy Haemmerle (Austria) won with a flight of 188.4 km. Unfortunately, the devaluation formula produced a day factor of 0.0238, giving him a grand total of only 24 points for 5 hours of effort. No winner in a major contest has worked so hard for so little!

Hal reported that his flight was one of the most interesting ones he had ever made, as he scratched from mile to mile following the front edges of rainy cumulus which always produced a little lift just before the sailplane got wet. It's too bad that such interesting flying was worth only 9 points (and 9th place).

Ulli's flight was too short to earn anything — but this was the day to do it.

The story of the contest — outlanding pins litter the task map near the first turnpoints.
photo Tony Burton

26 May 1981
"The pilot's choice for an off-field landing is a beet field — small crop, little furrows and generally dry."

Moist unstable air behind a stationary front to the east; significant possibility of overdevelopment and high stratus.

The day turned out to be a racing day at last with only eleven pilots failing to complete their tasks.

The Standard Class launched first at 11 sharp. By this time cumulus had developed into a dark street under overcast skies upwind of the airfield. Both Paul Sears and Jim Carpenter elected to start as soon as possible as they did not expect the day to improve very much. This was not the case and they paid for it with slow times. Most pilots started 1/2 hour later and the sunny breaks on course paid off for them with stronger lift. Paul had the honour of being the first pilot to return to Paderborn although he placed 20th with 65.3 km/h.

Stig Oye (Denmark) won the day with an excellent speed of 83.27 km/h, significantly faster than the rest of the field. Selen was the slowest finisher and he dropped very far from his expected placing.

In the 15 Metre Class both Fitchett and Striedieck had the terrible luck of flying straight into the ground after start. Fitchett's 3rd place on Day 1 plummeted to 36th. The more predictable weather today put most top pilots close to each other in speed and it was Holland's day with first, second and third place won. Brian Spreckley (Great Britain) now lead the pack with only 1509 points for 3 days of flying.

Lee took first from Holighaus and he will hang on to the top spot for most of the contest. Crowds waiting at the field and the organizers were treated to some rather hairy displays of finish and circuit flying. Wrong-way circuits and conflicting landings lifted the collective eyebrows of the contest stewards. Herr Weinholtz at next morning's briefing suggested that a two-place sailplane with instructor was available for those who recognized their sins.

27 May 1981
"This place should be called Paddleborn." (Hal Werneburg)

No contest, as the stationary front to the east spreads moist air aloft and heavy rain falls throughout the day.

28 May 1981
"The Canadian pilots have a total of 4300 hours of gliding experience — the crew have 5500." (anonymous slightly slanted statistician).

A weak ridge of high pressure has developed, but the air is very moist, and showers and thunderstorms are predicted. High cloud moves over the course and everyone is shot down. No pilot in any class flies 100 km, and it is a no contest day.

29 May 1981
"The role of those in the bottom half of the results list is to create the necessary conditions for the existence of a top half." (Hans Nietlispach)

TASK
Open Class 270.2 km, 15 Metre 246.4 km, Standard 221.8 km

With frontal weather to the south all tasks are set northwards.

Today was also a race day albeit a slow one, and only thirteen pilots failed to complete the course. The Standard and Open Classes were launched into a 2800 foot cloud base, so the 15 Metre Class launch was delayed for 30 minutes. The delay was not good however, as the cumulus overdeveloped quickly over Paderborn. So when the 15 Metre Class gate opened all pilots started almost "en masse", drifting through and heading north to the sunshine as quickly as possible. The day was good at first over the Teutoburger hills, but it was still a day of gaggle flying over the weak and overdeveloped areas along the course. Sixty kilometres out on course Hal radioed, "I am heading into the unknown", as he could see no sign of lift in the flat sky ahead.

The crews headed out to the hills on the third leg to provide weather information for the returning pilots and this information was very helpful; all the Canadians had a finish.

Gantenbrink took his turn at 1st place in the Open Class with 75.36 km/h; Lee was only 31 seconds slower.

In the 15 Metre Class Fitchett won convincingly, and Striedieck in 2nd place got only 912 points. The top scores are again close. Overall, Spreckley maintains a narrow lead of 18 points over Ronnestad.

In the Standard Class, Marc Schroeder (France) gains the lead over his teammate Gabriel Chenevoy. Today three of the Standard Class pilots failed to go around the finish line marker which was located just off the airfield and were penalized by only being awarded distance points for the day. Ragot was so low he touched his wing on the crop flying around the marker, and landed short with a ground loop which luckily caused no damage.

30 May 1981
The Directors' Dilemma — "Speed tasks set should be of such a length that most of the competitors can be expected to finish." (Contest Rules and Regulations, para. B 1.3.3.2).

"No task will be set shorter than 200 kilometres" (CRR para. B 3.2).

TASK
Open Class 292.8 km, 15 Metre 264.1 km, Standard 234.8 km

The contest area is in a weak high pressure area and the air still carries a lot of moisture. Sepp Froeschl, the Canadian weatherman, advised a late start, and Jim pulled out of his early launch position to the back of the grid. About 10 ships each in the 15 Metre and Standard Class had relights — enough for a good Canadian Regionals.

Out on course, Jim and Ulli (flying together at the time) found little useable lift and slowly got lower. They reported about 30 sailplanes were milling around for an hour in a hair-raising gaggle between 500 and 1200 feet agl. Finally, most managed to tip-toe out leaving the unlucky behind on the ground.

Hal had pressed on and was well ahead until meeting solid overcast down the second leg and had to land. One half hour later he saw gliders creeping overhead who managed to connect with the recycled weather.

Fitchett didn't quite make it around. He said, "I was on final glide with a second sailplane, knowing that I was short of about 500 feet to finish". Just short of the airfield there was a weak thermal and they slowly gained a little height. The higher pilot, Andy Davis (Great Britain) pressed on and just made the finish line. Fitchett was heard to transmit, "I cannot risk it", and landed 3 km short.

Jim said, "Both my and Paul's barograph trace almost touched the base line and somehow thank goodness the ground dropped away … but in the last 35 km there was plain nothing. I could see the airfield but knew that I could not make it. I hit a swallow flying today and the noise was as deafening as the hit of a baseball but there was no damage to the ship and I could not even see any traces of the strike on the nose of the fuselage". Both Paul and Jim landed about 5 km short.

In the Standard Class the 6 pilots managed to finish, lead by Brigliadori at 69 km/h, well ahead of the 2nd place speed of 51.8 km/h, which moved him from 4th to 1st place in the standings. Mogens Hanse (Denmark) and teammate Oye were the last finishers after spending over 6 hours in the air. It was mentioned that their flights were impossible because their average speed was below the LS-4 stall speed!

In the 15 Metre Class only Ake Pettersson (Finland) managed to finish. Fitchett's near miss earned him 969 points and jumped him to 11th place from his 38th place of two days previous. Ax finished 3rd and he and Pettersson now share the 1st place spot.

George Lee extended the lead on Holighaus by another 32 points, finishing at just over 71 km/h.

31 May 1981
"This is very unusual weather for Paderborn at this time of the year." (Fred Weinholtz)

TASK
Open Class 338.3 km, 15 Metre 267.6 km, Standard 241.6 km

With a southerly warm flow of moist and unstable air, there was overdevelopment, showers and thunderstorms in the early afternoon. Just over half the gliders managed to finish however, so one could call this a semi-race day.

Paul was unlucky for the second day in a row as once again he landed within sight of the field. When he was 15 km out he had 2000 feet which would normally be sufficient for a finish, but he was told that there was rain on final glide path. He attempted to gain more insurance height but nearby lightening quickly chased him away. On the last few kilometres of his glide he was actually below Paderborn field elevation and flying over fog lifting from the moist ground. He was forced to set down in a short and narrow field, only 4 km out.

In the Standard Class, Gloeckl won the day at almost 79 km/h and moved to within 3 points of 1st place Brigliadori.

Jim was lucky. He was 5 minutes behind Paul but had just enough altitude to return, and he provided an exciting finish for many photographers when his ASW-19 approached the field through the double arch of a strongly coloured rainbow.

The course of the 15 Metre Class was similar with perhaps a little better chance of lift. But again thunderstorms soon became the concern of all pilots after the second turnpoint. Ulli felt a little lost without a yaw string which disappeared on launch. He diverted well off course after the second turnpoint and managed to finish 15th. Hal remembers a Salto from a local club joining a gaggle of 15 sailplanes on course and outclimbing the lot. Jan Goudriaan (South Africa) won with a speed of 76.74 km/h.

In the Open Class the order of finishers was a picture of the previous day. Lee wins at 97.26 km/h and now leads Holighaus by 190 points.

1 June 1981
"… sitting on the grid for hours waiting for some sunshine, then thermalling downwards in prestart gaggles…" (a pilot's impression of the contest to date)

TASK
Open Class 455.8 km, 15 Metre 375.2 km, Standard 338,7 km

The Open and Standard Classes were finally launched as middle cloud moved off and cumulus appear upwind. This early sign of lift turned out to be the beginnings of a large cu-nim which slowly but steadily spread towards Paderborn and damped out convection for many miles.

By 1400 a mass landing of Standard Class ships began and they all moved in front of the 15 Metre grid for possible relaunch. Soon it was too late for the 15 Metre task and it was cancelled, and shortly thereafter a no-contest day for the Standard pilots was also declared. In all the rush and confusion, a few Open Class ships had flown east to the Teutoburger hills, managed to get a good climb there and returned to start and drift off on course almost unnoticed.

… the rest of the day's events is a classic tale of contest strategy, low cunning, and drama …

It was soon realized by all that four Open Class ships were now on their way: Holighaus, Gantenbrink, Butler and Kluk. The remainder were on the ground under a continuous sprinkle of rain, and Lee was in 1st place, 190 points ahead of Holighaus in the air. So much for the facts. Now two competition regulations were exercised at their extreme limits:

1. A "contest day" required that 25% of the class fly at least 100 km. The four airborne pilots gave a margin of 1 on this rule.
2. The day factor formula provided that if these four pilots flew the minimum, the winner would only get 167 points. If only three made it, the devaluation would be complete — exactly 0.0 (zero) points could be earned on a legal contest day!

Would Lee accept the possibility of Holighaus closing the gap and not take a launch under a now questionable possibility of getting away from Paderborn?

Eight Open Class ships sat on the grid getting wet until the slowly moving cu-nim passed to the south and the sun came out again around 1600. The conversation amongst the pilots, particularly the British team, was very interesting. There was discussion that any launch this late over a deadened area would be a futile exercise. It was also realized that any additional pilot flying out on course and making the minimum distance would only improve the day factor significantly. For example, if one additional pilot launched and all made the minimum distance, the winner's score would increase from 167 to 333. Therefore a pilot flying a relatively short distance could lose more points to the top pilot than he would gain on his own flight. It was also obvious that Henryk Musycynski, the second pilot of the Polish team, would launch again if possible for exactly these reasons, to be a "sacrificial lamb" so to speak to boost Kluk's scoring possibilities.

Meanwhile the deadline for launch was approaching and the 15 minute warning was broadcast. The pilots sat on the grid wondering what to do, while crews kept wings dry. Lee wished the rain would continue and shut off launch possibilities. But David Innes (Guernsey) was getting ready anyway; he simply said: "One must fly."

With less than 10 minutes to go and the tugs warming up, the airfield loudspeaker announced that Kluk had landed out. This produced both cheers and a scramble to the telephone office to find out if he had exceeded 100 km. With 3 minutes to go and pilots preparing to fly regardless of the merit, it was determined that the Polish pilot had not made it and NO points could be scored by the three still in the air. Immediately, a relieved Lee and five others stepped out of their cockpits and pulled off the grid. Innes and Angel Anglada (Spain) launched.

The interesting part was whether they would stay airborne so soon after the showers and could they get a start. The Spaniard soon landed and no one could see Innes. He now was the possible fourth man, a relative noncontender who could strongly effect the results of the leaders. The British team radios the offer to Innes of "a marvellous cup of tea in a few minutes when you land." Innes declined, but was unable to start before the gate closed.

The three flyers on course, knowing they were flying a no-point day, continued the task nevertheless and Gantenbrink finished at 1910, followed seconds later by Butler. Holighaus landed 20 km short. The two finishers were awarded bottles of champagne and much applause the next morning.

2 June 1981
"It seems the forecaster cannot win, I think yesterday's cu-nim was the only one in all of West Germany." (Sepp Froeschl)

TASK
Open Class 361.2 km, 15 Metre 339.4 km, Standard 339.4 km

Drier and much warmer air arrived from the southwest and no rain was forecast. A higher trigger temperature was needed to get the day started, and the wait began once more. Finally, the Standard Class was launched into weak blue thermals at 1245 and soon began dropping out of the sky until only one pilot was aloft, Paul Sears. With everyone on the grid and the day getting shorter he believed he would get a big jump on the rest of his Class. However, the thermals were still too weak on course, and he also returned, and launches began again.

A wedge of moist upper air which had not been forecast moved quickly into the area from a front to the west. This provided the necessary conditions for cu-nim and by 1700 the task area was dominated by large storm cells. Most competitors found the early flying scratchy until they reached the hills. Once in the hills, conditions were good for a short time, and Jim reported 8 knots and a 7000 feet cloud base. But the elation was short-lived; the rapidly developing thunderstorms soon gave long glides through dead air and most competitors landed on the second and third legs. Only four pilots, all in the 15 Metre Class, managed to make it home as a result of the very late start.

Hal and Ulli did well, flying over 300 km of the task. D'Orleans-Borbon (Spain) won the day, slowly appearing out of the black sky on final. Ax was unfortunate enough to find heavy sink on final glide while crossing the path of the thunderstorms which drifted across the course line near Paderborn. He was seen coming in flying impossibly low, following the terrain down from the hills to the east, hopping fences and trees from field to field, and he finally landed 400 metres short of the airfield. His score of 927 points was good enough to retain the lead however. Fitchett, the last finisher, now jumped to fourth place and everyone was wondering whether he could maintain his consistency after his early disaster, and get anywhere near the leader.

The overall lead is unchanged in the Open Class, although Holighaus narrows the margin by 22 points.

In the Standard Class, Brigliadori had a disappointing 20th place distance, and the one and two positions go to the French, Schroeder and Chenevoy.

3-4 June 1981
"It's been 21 years since the World Contest was last held in Germany — that's about the time I ever want to see a Wiener Schnitzel again!" (anonymous)

A cold front passed Paderborn overnight producing severe rain, hail and lightning. In Herbram-Wald, a nearby village where the Canadian team stayed, the ground was white with hail and some golfball-sized stones broke windows. The combination of soggy airfield, muddy outlanding fields and low clouds made a contest day too risky and tasks were not set. The next day the front remained over the contest area with no early break-up expected. The newspapers were full of flood headlines and stories of water damage in towns around the area.

5 June 1981
"My pilot has gone crazy — he wanted to derig the glider!"

(Ursula Meier, Chilean Team Manager, on the start grid)

TASK
Open Class 236.5 km, 15 Metre 211.9 km, Standard 206.2 km

Paderborn lies in a narrow wedge of air between two fronts, and it was hoped that the middle cloud would break up to the south during the afternoon and allow a short task. The organization sent a powered aircraft over the task area. Herr Weinholtz was obviously not too pleased with the results because he recommended to pilots in the morning's briefing that in many wet valley fields a gear-up landing would be preferable. Breaks in the cloud began around 1345, all classes launched and pilots started out on course as quickly as possible. The improvement was short-lived however, and all pilots land out. Only the Open Class flew enough distance for a contest day.

There are many stories of tricky landings in small fields. Paul and Fitchett ground-looped with no damage, Pettersson suffered the only major damage with a compression failure in the skin at the wing root of his ASW-20. A long night repair effort got him airborne the next day. Hal had to land in a short sloped field and is fortunate to escape with some scratches on his Ventus.

The 15 Metre Class leaders, Ax and Ronnestad, had poor distances which would surely have knocked them out of contention, so it was fortunate for them that it was a no-contest day.

Half of the Open Class went over 100 km and the maximum 500 points was earned by Holighaus with 163.9 km. Lee was second, but significantly further back and he finally lost the lead he had held since the second day by a slim margin of 5 points.

Jim Carpenter — steely eyed aviator — prepares for launch into the clag.
photo Tony Burton

6 June 1981
"Holighaus Beaten With His Own Stick!" (Local German newspaper headline)

TASK
Open Class 213 km, 15 Metre 213 km, Standard 202 km.

The last contest day had the frontal wave passing Paderborn with clearing predicted to the northwest. The organizers hoped to set a small task to the north provided it cleared early enough. By 1400 all classes were launched under scrappy cu with a 1800 foot base, and gaggles of sailplanes milled around at very low altitude. Gliders at the bottom were often lower than 300 feet above ground. It's not very often that spectators get a side view of gliders thermalling. At this time Hal radioed that he was climbing above the cloud on the side of a cu and was able to start with Ulli at 2700 feet.

Progress out on course was slow for everyone. It should be noted that airfield elevations are not shown on German aeronautical charts. The pilots set their altimeters to zero at Paderborn. Very often over the lower ground to the north a pilot's altimeter would get close to zero even though still airborne. Hal radioed that he could climb in the weak thermals alright so long as he did not look at his altimeter.

By 1600 cirrus cut off flying for all gliders on course. Only Butler trickled home at 59 km/h and finally won a day.

Hal and Ulli landed in the same field shortly past the second turnpoint, each earning 15th place for the day. Both crews also arrived about the same time which made for a small party in the field. While the gliders were being derigged, an Open Class ship was seen tracking back and forth on a small 150 foot ridge to the east. As we drove out of the field and approached the ridge, we saw that the sailplane was XX, and Holighaus treated the Canadian 15 Metre Class pilots and crews to a 15 minute lesson in ridge-polishing with a Nimbus 3. He could not escape the trap and was forced to land, and we continued home for the last time. His effort that day was not quite good enough as Lee flew his ship 18 km further down the last leg and he regained 1st place by earning 100 points more than Holighaus.

Striedieck in the 15 Metre Class landed 33 km from home and finally won himself a day (derated to 548 points) and the champagne. Fitchett moved into 4th place with a good flight of 170.8 km. Ax was 11th but earned enough points to retain the lead.

Only half the Standard Class flew the minimum distance and the day went to Brigliadori with 151.3 km. Swein Kristiansen (Norway) had been sitting in the wings, and with good flights the last two tasks moved into second place overall, bumping Chenevoy down one.

THE WINNERS
The Open Class was won by the new Nimbus 3 and there was some general satisfaction that George Lee regained the lead on the last day to best the well-televised German effort. No one quite understands why flying a Phantom helps him scrape, but Lee must be happy with his job. Ax and Pettersson were proud to be one and two for Sweden in the 15 Metre Class. Ax was never better than 3rd on any day, but managed to keep his poor scoring to the devalued days. He took the lead on Day 5, and always scored enough to maintain that position.

The weather treated this Class the poorest, as top-ranking pilots were given very little opportunity to sort themselves out with some good races. During their eight flying days, no one returned on three days and less than a handful on two others. As Ulli remarked, "In any contest with normal weather you would never see pilots like Ben Greene, Dick Butler and Jacques Rantet so far down the list. Bernie Fitchett's effort to scramble up to 4th from his zero point day was a remarkable display of fine gliding."

Ulli made the best Canadian showing with a very respectable 11th place overall, and he just missed earning one of the top ten diplomas by 12 points. Our congratulations to him on a very fine first effort.

The Standard Class laurels were earned by Marc Schroeder, second Kristiansen, and third, Schroeder's teammate Chenevoy, all new to the world contest scene. Baer Selen somehow

could not find the key to flying the weather here and was never a contender. The top five pilots were less than 120 points apart and any of them could have been first. All scored consistently high on all days but one, and Brigliadori's 20th place finish on 2 June was particularly unfortunate for him.

LESSONS LEARNED

Ulli and Paul, who are new to world class competition, were asked what they learned by being here.

Paul said he was surprised that he could fly so far under such poor conditions. He remarked that he had never flown in gaggles much in the past and preferred not to do so but here it was absolutely necessary, and being with expert pilots he learned a lot about it. Gaggle flying here promised faster flights. He also realized that the time of start can be quite critical as on two days he left too early and lost points as the result. He expected to do better than he had but found the tough competition a help to his flying.

Ulli remarked, "You should always shoot for the top ten in any contest, but here it was not so easy. In Canada we have the "disadvantage" of better weather and so I had very little experience in making luck work for me in these inconsistent and hard-to-work conditions." He thought that he did not push hard enough in questionable lift and that his flying must become more aggressive, but he was not dissatisfied with his overall performance. He did not find the maps that good for navigation, and said it sure helped to fly with other people who knew where they were going. He also learned a lot about flying in huge gaggles before the start gate and he was thankful that most pilots could fly very smoothly in them.

CONCLUSION

In the Standard Class, only 41% finished during the contest, in the 15 Metre Class 29%, and Open Class 45%. In a classic display of meteorological cussedness — the two obviously sunny soaring days were reserved for the opening and closing ceremonies. □

NOTICE
AIRCRAFT TYPE APPROVAL PROCEDURES

SAC members are advised that, effective immediately, the procedures for initiating aircraft type approvals are as follows:

a. Member submits application to National Office with cheque for $250.
b. National Office forwards request to Chairman of Technical Committee.
c. Chairman of Technical Committee initiates action required to obtain type approval.

CONTEST SCORES — 17t

OPEN

NO	CON	PILOT	NAT	GLIDER	D
1	26	Lee, George	GB	Nimbus 3	2
2	XX	Holighaus, Klaus	D	Nimbus 3	1
3	YY	Gantenbrink, Bruno	D	Nimbus 3	3
4	06	Schubert, Alf	A	Nimbus 2	6
5	KS	Kluk, Stanislaw	PL	Jantar 2b	4
6	GB	Bourgard, Paul	B	Nimbus 2	5
7	DB	Butler, Richard	USA	ASW-17	12
8	MH	Muszczynski, Henryk	PL	Jantar 2b	9
9	PB	Spychiger, Walter	CH	Nimbus 2c	7
10	66	Goudriaan, Klaas	ZA	ASW-17	10
11	34	Innes, David	GBG	Nimbus 2c	11
12	AA	Anglada, Angel	E	ASW-17	8

15 METRE CLASS

1	71	Ax, Göran	S	ASW-20	12
2	LL	Pettersson, Ake	S	ASW-20	17
3	NL	Pare, Daan	NL	Ventus B	7
4	19	Fitchett, Bernard	GB	Ventus B	3
5	78	Stouffs, Henri	B	ASW-20	8
6	59	Spreckley, Brian	GB	ASW-20	4
7	63	Hämmerle, Andreas	A	Ventus A	33
8	MK	Kuittinen, Markku	SF	ASW-20	11
9	JJ	Widmer, Joao Alexandre	BR	ASW-20	40
10	90	Ronnestad, Einar	N	ASW-20	1
11	VX	Werneburg. Ulrich	CDN	ASW-20	25
12	CC	Sörensen, Ove	DK	ASW-20	4
13	BE	Obrist, Basil	CH	DG-200	37
14	27	Goudriaan, Lourens Jan	ZA	ASW-20	25
15	AS	Schulthess, Alfred	CH	Ventus A	12
16	AH	Striedieck, Karl	USA	ASW-20	21
17	MS	Musters, Kees	NL	Ventus A	17
18	AR	Huybreckx, Eddy	B	DG-	32
19	76	Bluekens, Michel	B	ASW-20	25
20	82	Colombo, Vittorio	I	ASW-20	41
20	37	Junqueira, Claudio Alfonso	BR	ASW-20	12
22	IX	Gavazzi, Marco	I	ASW-20	38
23	VD	Timmermans, Adrian	NZ	ASW-20	10
24	AJ	D'Orleans-Borbon, Alvaro J.	E	ASW-20	25
25	TU	Uoti, Tapani	SF	Glasfl. 304	6
26	W2	Werneburg, Helmut	CDN	Ventus B	34
27	VW	Gimmey, H. Ray	USA	ASW-20	34
28	JR	Rantet, Jacques	F	Ventus A	2
29	JE	Pedersen, Jan	DK	ASW-20	23
30	RJ	Riera, Jorge	RA	ASW-20	31
31	C6	Haggenmüller, Reinhard	A	ASW-20	9
32	MR	Reynoso, Mario Nestor	RA	ASW-20	25
33	PP	Bulukin, Birger	N	ASW-20	17
34	MM	Schuit, George	NL	ASW-20	21
35	MA	Asikainen, Mikko	SF	ASW-20	16
36	61	Peter, Ernst-Gernot	D	ASW-20	24
37	AL	Lopez B. de Quiros, Antonio	E	ASW-20	25
38	CD	Radic, Srdjan	RCH	Ventus	34
39	JA	Enya, Jin	J	ASW-20	17
40	V6	Persson, Bert	S	ASW-20	12
41	DH	Urbina, Reynaldo	RCH	Mini-Nimbus	39
42	GE	Geiben, Rene	L	ASW-20	41

STANDARD

1	SM	Schroeder, Marc	F	LS-4	5
2	LF	Kristiansen, Swein E.	N	LS-4	8
3	SG	Chenevoy, Gabriel	F	LS-4	2
4	BL	Brigliadori, Leonardo	I	LS-4	6
5	KX	Oye, Stig	DK	LS-4	9
6	MG	Glöckl, Hans	D	LS-4	4
7	ZL	Hämmerle, Heinz	A	LS-4	13
8	VI	Witek, Stanislaw	PL	Std. Jantar	1
9	80	Davis, Andrew	GB	LS-4	10
10	BB	Kepka, Franciszek	PL	Std. Jantar	7
11	C7	Hansen, Mogens	DK	LS-4	18
12	6A	Nietlispach, Hans	CH	LS-4	12
13	LE	Melum, Havard	N	LS-4	22
14	FL	Ragot, François	F	LS-4	2
15	IH	Pankka, Asko	SF	ASW-19B	18
16	7U	Scares, Raimundo de Paula	BR	ASW-19	21
17	41	Perotti, Giovanni	I	ASW-19B	16
18	RR	Rizzi, Roberto	RA	LS-4	14
19	IS	Carpenter, James	CDN	ASW-19B	23
20	31	Bradley, Richard	ZA	ASW-19B	25
21	S2	Sears, Paul	CDN	LS-4	17
22	LB	Andersson, Goran	S	Std. Jantar	15
23	AM	Mattano, Aimar	RA	LS-4	20
24	11	Greene, Ben	USA	LS-4	11
25	SB	Selen, Baer	NL	ASW-19B	24
26	25	Avgerinos, Constantine	GR	DG-100	26
27	L7	Schaaffhausen-Christiano V.	BR	ASW-19B	27

h SEGELFLUG WELTMEISTERSCHAFTEN

DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	DAY 8	DAY 9	TOTAL
878	1 1000	2 996	1 1000	1 1000	0	7 889	2 331	8 591	6685
1000	2 852	3 907	2 968	2 957	344.8 km 0	4 915	1 500	10 491	6590
849	3 796	1 1000	3 958	3 929	73.24 kph 0	1 1000	7 176	6 650	6358
717	5 715	8 680	4 933	4 805	0 0	3 917	7 176	5 707	5650
842	6 698	5 787	11 438	7 614	54.9 km 0	5 900	6 251	2 833	5363
785	11 326	7 697	6 857	6 619	0 0	2 920	3 298	9 574	5076
234	4 752	4 805	8 712	12 045	73.13 kph 0	8 888	11 90	1 1000	4526
330	7 627	6 745	10 530	10 380	0 0	9 881	5 278	3 720	4491
366	8 595	12 117	7 855	5 635	0 0	10 878	4 288	11 484	4218
318	9 463	9 578	9 674	10 380	0 0	6 899	10 166	7 641	4119
242	10 420	10 555	5 892	8 420	0 0	12 488	7 176	4 710	3903
342	12 0	11 551	12 169	9 405	0 0	11 816	12 36	12 482	2801
279	6 17	4 974	16 817	3 921	9 931	5 927	11 357		5223
256	12 8	7 939	17 805	1 1000	16 803	3 994	10 375		5180
477	12 8	1 1000	22 778	33 346	13 860	10 848	2 519		4836
573	8 10	38 0	1 700	2 969	20 725	4 983	4 509		4769
440	3 23	18 836	27 700	5 851	2 994	16 717	32 53		4614
650	4 18	6 941	7 867	22 478	33 291	6 875	3 513		4533
175	1 24	8 932	30 678	6 701	10 907	15 739	11 357		4513
284	21 7	29 704	29 681	13 522	4 990	7 866	9 376		4430
65	4 18	11 893	11 849	17 498	7 937	25 534	5 489		4283
643	6 17	19 835	9 863	41 272	11 884	26 519	25 138		4171
235	32 0	24 804	31 677	26 440	15 840	13 812	15 352		4160
550	25 6	23 812	14 835	31 433	14 854	32 484	23 182		4156
167	12 8	16 842	32 674	23 476	17 783	10 848	13 353		4151
235	29 4	33 537	19 801	33 346	1 1000	16 717	8 414		4054
279	12 8	5 967	13 838	26 440	8 935	31 488	33 52		4007
253	25 6	38 0	2 912	9 564	5 987	16 717	1 546		3987
256	1 24	2 994	4 892	33 346	26 609	9 850	36 14		3985
183	9 9	17 839	33 665	7 621	12 882	19 606	24 161		3966
235	12 8	26 762	5 884	4 886	37 186	7 866	27 114		3941
0	32 0	9 904	20 795	11 537	21 640	2 998	33 52		3926
279	32 0	28 736	12 847	16 499	19 728	27 516	19 321		3926
142	29 4	10 898	15 830	11 537	18 768	34 443	21 239		3861
300	32 0	21 819	10 854	25 460	22 635	28 496	20 275		3839
235	32 0	12 888	8 866	13 522	35 265	1 1000	35 31		3807
497	21 7	13 10	26 717	20 483	3 992	40 0	26 130		3712
169	9 9	15 848	24 747	39 286	31 369	12 828	15 352		3608
169	21 7	32 597	23 764	28 439	23 634	22 565	7 420		3595
601	31 1	27 739	25 724	15 507	39 116	33 474	6 422		3584
250	21 7	14 852	21 792	8 615	28 457	24 560	37 0		3533
206	32 0	25 801	34 641	18 484	24 633	14 766	37 0		3531
350	32 0	19 835	36 602	10 541	27 590	38 346	22 229		3493
23	32 0	31 643	35 628	30 434	25 617	21 567	17 345		3469
256	12 8	35 469	3 904	24 474	6 953	40 0	18 338		3402
253	12 8	3 975	18 804	38 337	29 450	40 0	13 353		3180
264	12 8	22 817	28 696	20 483	41 64	20 568	31 61		2261
242	12 8	38 0	6 880	28 439	38 155	35 423	29 82		2229
235	9 9	37 60	37 556	33 346	32 292	30 491	28 83		2072
169	28 5	34 499	40 127	18 484	36 242	36 402	30 81		2009
256	32 0	30 678	39 222	39 286	42 52	29 495	37 0		1989
279	25 6	38 0	42 0	33 346	30 444	23 562	37 0		1637
86	32 0	38 0	38 230	32 386	40 110	37 352	37 0		1164
0	32 0	36 270	41 20	42 262	34 282	39 200	37 0		1034
972	7 860	1 1000	16 751	2 993	5 863	10 330			5769
916	10 847	10 822	13 823	7 943	2 998	3 406			5755
986	7 860	3 919	16 751	3 982	5 863	8 371			5732
934	12 832	6 896	1 1000	4 973	20 555	1 463			5653
865	1 1000	15 731	5 889	6 947	9 825	5 395			5652
976	4 877	5 904	7 875	1 1000	23 482	2 446			5560
335	9 858	2 921	2 931	11 900	3 885	16 126			4956
1000	5 868	13 737	23 343	13 886	12 792	15 136			4762
485	11 836	9 869	3 912	21 431	4 873	10 330			4736
917	3 880	20 703	19 355	13 886	24 480	12 249			4470
291	23 456	19 706	5 889	5 951	1 1000	24 51			4344
355	16 723	14 732	12 824	20 487	16 726	7 383			4320
255	16 723	4 917	8 865	24 151	12 792	3 406			4109
986	2 885	24 416	14 812	23 158	17 723	20 97			4077
291	26 0	7 883	15 790	9 906	8 843	9 353			4066
256	21 631	12 790	11 857	15 711	25 428	6 391			4064
313	13 794	17 717	18 673	12 890	20 555	22 96			4038
334	19 655	21 671	24 319	8 909	18 583	14 198			3942
249	22 535	8 870	10 859	16 658	7 856	19 98			3852
88	15 733	16 730	4 894	27 0	14 753	17 125			3323
304	20 643	25 289	8 865	18 516	22 505	18 117			3239
332	26 0	18 708	21 345	9 906	10 802	25 0			3093
264	14 736	22 417	21 345	19 490	19 564	23 89			2905
360	6 862	11 811	25 297	25 142	26 0	13 248			2720
106	24 409	22 417	19 355	22 168	11 796	20 97			2348
85	25 230	27 47	26 286	17 642	15 738	25 0			2028
49	18 687	26 132	27 284	26 25	26 0	25 0			1177

FUNDAMENTALS of ATMOSPHERIC CONVECTION

Part 2

by Robert Dorning

— reprinted from Australian Gliding, Aug 1980 —

This is the second in a series on fair weather convection. The first article explained all the necessary concepts required for a rigorous discussion on this topic. In this article we shall complete the description of the diurnal variation of the lower atmosphere's vertical temperature profile and then proceed to explore hitherto unexplained questions concerning the fair weather convection process.

THE NOCTURNAL INVERSION

Early morning temperature soundings obtained over land invariably have common features. Namely a **low level layer** where temperature increases sharply with height (between points A and B in Fig. 1) and above this where, on the whole, temperature decreases with altitude. These two features are the pattern of virtually all early-morning temperature traces.

The way in which the Environmental Lapse Rate (ELR) is modified during daytime, as demonstrated by the temperature soundings in Fig. 1, is readily understood as the upwards convective transport of heat absorbed from the sun by the ground. The way in which the atmosphere reverts **overnight** to the early-morning state is not so obvious. If it is accepted that the temp-trace obtained just before sunset (1800 in Fig. 1) is something like what the previous sunset's sounding would have looked like, one can appreciate the manner in which the temperature structure of the lower atmosphere must be adjusted during the night to give the early-morning trace.

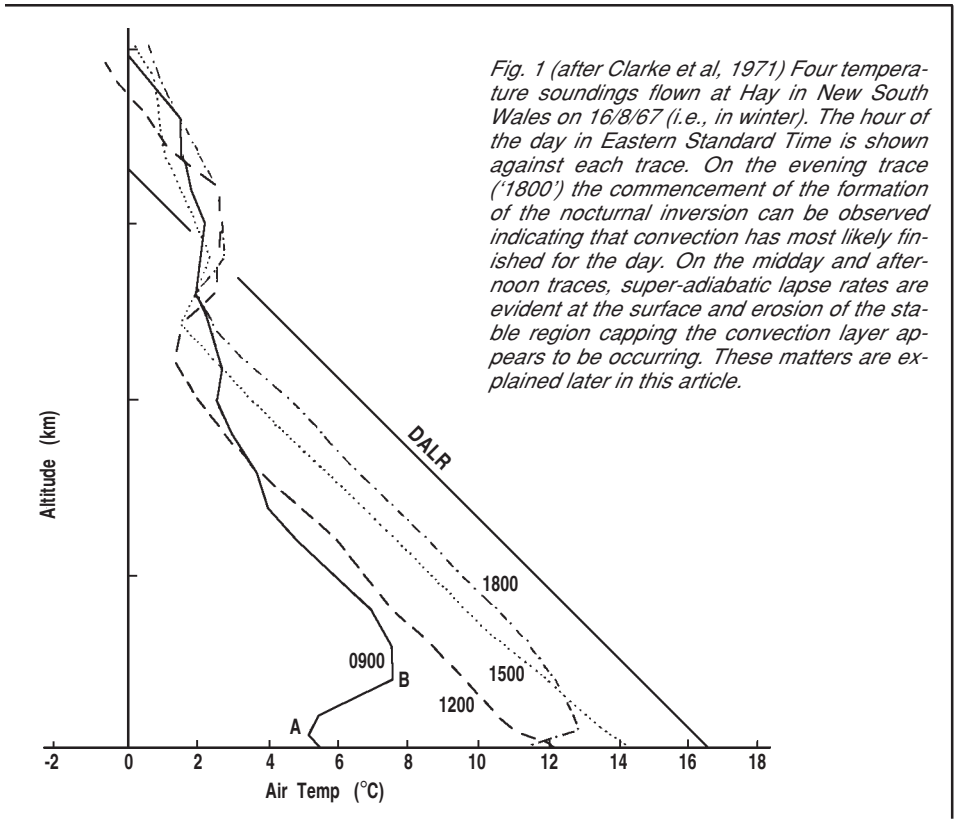

Fig. 1 (after Clarke et al, 1971) Four temperature soundings flown at Hay in New South Wales on 16/8/67 (i.e., in winter). The hour of the day in Eastern Standard Time is shown against each trace. On the evening trace ('1800') the commencement of the formation of the nocturnal inversion can be observed indicating that convection has most likely finished for the day. On the midday and afternoon traces, super-adiabatic lapse rates are evident at the surface and erosion of the stable region capping the convection layer appears to be occurring. These matters are explained later in this article.

If the early-morning sounding in Fig. 1 (0900) had been flown at dawn, the point of lowest temperature in the first layer (point A) would have been at the surface. In that case temperature would have increased upwards from the ground to point B (the shallow layer immediately above the ground, where temperature decreases with height, is the approximately adiabatic convection layer showing the extent to which convection has penetrated and mixed since sunrise). In meteorology, an increase in air temperature with altitude is known as a 'temperature inversion' or simply an 'inversion'. This early-morning low-level inversion is called the "nocturnal inversion" because it forms during the night. It forms as a result of a cooling of the earth's surface due to radiation emitted by the ground.

Like the sun, but at much lower intensities, the earth continually emits radiation. This tends to cool the surface. During the day the earth's surface absorbs much more energy from the sun than it emits and its temperature rises. At night the sun's rays are blocked off, but the earth still emits radiation causing the temperature of the surface to fall. The air in immediate contact with the ground is cooled. Turbulence in the low-level winds mixes this cooled air with uncooled air above and brings warm air down to the surface where it too is cooled. Wind induced eddies mix air cooled at low levels with air above, cooling higher layers. The nocturnal inversion commences to form either just before, or soon after, sunset and grows upwards from the surface throughout the night.

The inversion is an extremely stable layer which resists vertical displacements of the sort that generate it. It forms as a highly stratified layer whose stratification can occasionally be observed around sunset with the aid of smoke from stubble fires or chimney stacks. It may be seen as fine horizontal smoke sheets hovering a few metres above the ground, or where a chimney plume rises a small distance and then streams horizontally downwind remaining intact or slowly spreading out sideways. The growth of the nocturnal inversion appears to be somewhat erratic as large pockets of air can be displaced upwards and downwards, temporarily breaking down the inversion and causing sudden fluctuations in the surface winds. Its maximum vertical extent is reached just before sunrise and occasionally can reach to a depth of around 3000 feet.

Because the nocturnal inversion is produced by a combination of surface radiation and turbulent mixing of wind, variations in these two elements will influence the rate and extent of its formation. A cloud cover will absorb surface radiation and re-radiate some of the energy back to be absorbed by the ground. This will reduce the **net** radiation lost by the surface and the rate of cooling. Clear, cloud-free nights favour the formation of strong, deep inversions and the opening of a cloud cover at night can often result in a sudden drop in surface temperature.

Strong winds tend to be more turbulent than gentle winds and can cause greater mixing and the formation of a deeper nocturnal inversion. The nocturnal inversion is important because it represents a layer of cold air which has to be warmed in the morning by convection before thermals can break through to the greater heights where soaring flight is more reliable. A particularly strong nocturnal inversion can delay the onset of usable convection to 1400 or 1500 hours when only short cross-country tasks are possible.

THE LAYER ABOVE THE NOCTURNAL INVERSION

The layer between the top of the inversion (point B in Fig. 1) and the top of the convection layer of the previous day is also cooled overnight from the daytime dry adiabatic lapse rate to the early morning profile. The reason for the common sharp reversal in temperature gradient at the top of the inversion is uncertain. I have been able to find a few research papers on the formation of the nocturnal inversion, but none on the formation of the stable layer above. The two mechanisms involved in the nocturnal cooling of this layer are almost certainly turbulent mixing and radiative cooling. Turbulent mixing of this layer is similar to that which forms the nocturnal inversion, while radiative cooling involves a gaseous layer emitting more radiation than it absorbs, thereby cooling. It would be only speculation to comment on the likely contributions which either makes to the cooling of this layer. However, the shape of the early morning temperature profile of this layer is of interest because, whereas it is the nocturnal inversion which largely determines the timing of the onset of usable convection, it is the temperature structure of this next layer which is a major factor in determining the daily maximum thermal height.

As this layer cools at night various lapse rates are produced within it ranging from levels where an inversion exists to ones where temperature remains constant with height (an isotherm) and others where temperature decreases with height. The early-morning temperature profile of this layer represents the overnight attempt by the atmosphere to revert to a more 'normal' condition following the excess energy input during the day. Above the convection layer the ELR is a stable lapse rate and air temperature generally decreases with height up to the level of the tropopause. Above the convection layer the ELR is scarcely affected by diurnal factors and is a result of synoptic and long-term processes. The tendency therefore, is for the layer above the nocturnal inversion to attempt to approximate overnight to the relatively undisturbed temperature profile of the atmosphere above the daytime convection layer. This is affected by a number of factors, some of which will be discussed in a later article of this series. The result is a temperature profile where on the whole it can be said that temperatures decrease with altitude.

When doing the temp-flight in the morning it is customary to record temperatures in the height band which is useful for cross-country flight, up to say 6500 feet or slightly above, until a steady fall of temperature with height is encountered. This is in order to have a picture of the temperature structure of the atmosphere up to the level where the temperature profile blends in with the upper level pattern.

INCONSISTENCIES IN THERMAL HEIGHT FORECASTING TECHNIQUE

We are now in a position to pose the question why thermals work after the time of maximum surface temperature. The problem with the familiar thermal height forecasting technique is as follows: during the day the ELR is modified within the growing convection layer from the early morning temp-trace to an approximately dry adiabatic lapse rate. Above the convection layer the ELR remains essentially unchanged. At the time of maximum surface temperature the dry adiabat, representing thermals, is drawn on the height temperature diagram as far to the right as it will be that day. If a temp-flight was flown at this time the measured ELR would be similar to the heavy line in Fig. 2, if the light full line had been the early morning trace.

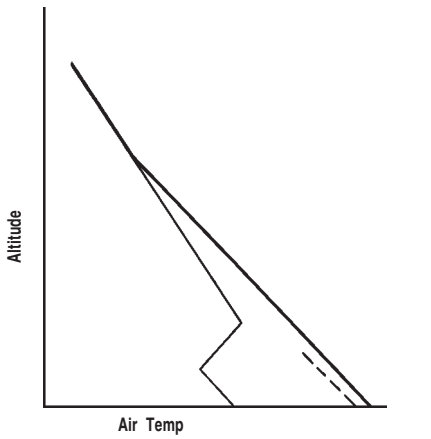

Fig. 2: A typical temp-trace when flown at the time of maximum surface temperature if the light line was the early-morning trace.

If we apply the thermal height forecasting technique, as surface temperatures commence to fall, the point on the temperature axis from which the dry adiabat would be drawn will be to the left of the day's maximum temperature. Later the surface temperature falls because the radiant energy received from the sun falls off in the afternoon (this is explained in more detail in Part 3 of this series). Unless the air above the surface layer cools at least as quickly, an incipient thermal which lifts away from the surface will enter air which is warmer and will not be able to rise any higher. As we have seen in the section on the formation of the nocturnal inversion, air above the surface layer cools much more slowly. Thus, applying the logic of the thermal height forecasting technique, it would be only a small distance above the ground before warmer air is encountered by a dry adiabat drawn from a falling surface temperature (the dashed line in Fig. 2).

Therefore, according to this logic, convection should cease soon after the surface temperature commences to fall, ie., not too long after the time of maximum temperature — around three or four hours after local noon. As glider pilots know, this is not generally the case.

This apparent contradiction could be outlined in a number of different ways. Rather than elaborate, and possibly create confusion, I will proceed directly to what I believe to be the explanation.

THE SUPER-ADIABATIC LAYER

The answer appears to lie in the nature and behaviour of the shallow layer which exists during the day immediately above the surface, the super-adiabatic layer. This is a surface layer extending commonly up to 200 to 300 feet above the ground in which lapse rates greater than the DALR occur (how such unstable lapse rates can be sustained will be explained below). Hitherto in this article we have ignored the existence of this layer as this is in line with the logic of the thermal height forecasting technique. It is, in fact, this surface layer which is the source of thermals.

Although the layer is immediately above the ground, it is difficult to gain a picture of the vertical motions within it. Possibly the best way of studying this layer is by means of instrumented towers, even if they do have the disadvantage of being fixed to the ground and cannot drift with the wind. Many tower experiments have been conducted, but the ones of particular interest for our purposes were done as long ago as the late 1920s and early 30s. These were two separate experiments done at such different locations as the south of England (Johnston et al, 1938) and on the edge of the desert in Egypt (Flower, 1937). These quite independent experiments confirmed each others findings regarding the nature of the super-adiabatic layer although the depth of the layer and its daytime life span varied between the warm and cold climate. In this article we have chosen to examine the findings of the Egyptian experiment because they should be closer to Australian conditions and because they show the behaviour of the super-adiabatic layer in a more exaggerated manner.

Between October 1931 and October 1932, W.D. Flower used a 61m high instrumented tower at Ismailia in Egypt to record the air temperature continuously at a height of 1.1m

and also the difference in temperature over the intervals of height of 1.1 to 16.2m, 16.2 to 46.4m, and 46.2 to 61.0m. From these continuous measurements he calculated an hourly average over each month for each hour of the day. These averages can be thought of as being the natural state of the atmosphere at the location at that time. Fig. 3 is from Flower's paper and shows the results from the month of June which is the peak of the northern hemisphere's summer. He produced the same diagram for the other months of the year which show similar patterns, but with seasonal variations. We shall consider only the June case.

The three curves in the diagram are not plots of hourly average temperature at each sensing level, but rather the hourly average lapse rate (the amount temperature falls within a given height band) between each level. This may appear confusing, but it presents more useful information. The curves span the full 24 hours of the day and the two arrowheads indicate times of sunrise and sunset for the middle day of the month. The double-ended arrow indicates the monthly average time of maximum surface temperature, which in June at 1.1m was 1436 hours.

In Fig. 3 the convention has been adopted that where air temperature decreases with height (a positive lapse rate) the value is plotted below the horizontal zero axis. Where air temperature increases with height (a negative lapse rate) the value is plotted above. Therefore, where a curve is above the zero line, an inversion exists within that height band. Where it is below the zero line, air temperatures decrease with height. It will be remembered that the DALR is equal to a fall in air temperature of 1°C per 100m. This is represented in Fig. 3 by the straight dashed line. Where a curve is below this dashed line a lapse rate exists which is greater than the DALR, ie., it is a superadiabatic lapse rate.

Referring to Fig. 3, as would be expected the nocturnal inversion develops its steepest lapse rates just before dawn. The lapse rates are greatest near the ground (Trace I), which is the heat sink, and decrease with increasing distance above the ground. After sunrise, as the ground begins to warm, the surface layer takes up heat which is distributed upwards by wind induced turbulent eddies. As the surface layer warms from the bottom upwards the lapse rates within it are gradually converted from those of an inversion. Not too long after sunrise the lapse rate of the lowest sensing interval (Trace I) becomes positive and then quickly goes super-adiabatic. Some time afterwards, Traces II and III cross the zero line and quickly become super-adiabatic also.

Therefore, not too long after sunrise a super-adiabatic layer has formed immediately above the surface with the top of the layer being above the top of Flower's tower. As the lapse rate of the top sensing interval (Trace III) becomes only slightly super-adiabatic, it is likely that the maximum depth of the layer is not much greater than the height of the tower.

Before discussing in more detail the pattern of development of the lapse rates at the different levels within the super-adiabatic layer, we shall attempt to explain the motions within it which we have said are difficult to obtain a picture of. We shall do this by explaining how such an unstable layer can be maintained.

The atmospheric convection process transports away from the surface most of the heat absorbed from the sun's rays. The existence of the super-adiabatic layer shows that the transport of heat is inhibited close to the ground. In the section on stability it was shown that an unstable layer (which the super-adiabatic layer is) generally cannot exist for long in the atmosphere. Wind-induced turbulence will displace air parcels upwards and downwards which, in an unstable layer, will cause an air parcel to be subject to a buoyancy force which will tend to accelerate it in the direction of the disturbance. Whether the air parcel does move vertically in response to this force depends on the balance with the turbulent forces. Both the turbulent and convective motions will cause gradual mixing of the layer and the erosion of the unstable lapse rate.

In the free atmosphere the processes which may form an unstable layer would do so only slowly and so there would not be a strong input which would sustain an unstable lapse rate once mixing had got under way. The unstable layer would gradually be converted to a neutral layer. By contrast, at the surface during the day, the ground is an intense heat source which continuously supplies heat to the layer immediately above the surface compensating more or less for the heat carried away by convection. The erosion of the super-adiabatic layer is resisted by the proximity of the ground as a continuous energy source.

An unstable lapse rate could be maintained indefinitely in still air, but wind-induced turbulence tends to break down an unstable layer. Wind-induced turbulence is in the form of eddy motions, however. Near the ground these eddies cannot be very large because the interference of the solid boundary breaks them into smaller eddies. The disturbance caused to the air is therefore limited and only small vertical currents (both upwards and downwards) result and the upwards transport of heat is restricted. Lapse rates many times the DALR can (and do) thus occur close to the ground. Higher in the surface layer, turbulence is less inhibited by the earth's surface and the eddies can be larger causing the displacement of greater volumes of air and the possibility of much larger convective currents. The size of the turbulent eddies increases upwards through the super-adiabatic layer. Larger eddies cause the displacement of greater volumes of air and greater mixing. The upwards transport of heat will be greater than at lower levels and hence the lapse rate will not be as super-adiabatic as below. Therefore the Environmental Lapse Rate within the super-adiabatic layer is one of decreasing super-adiabatic lapse rate with increasing distance above the ground. The top of the super-adiabatic layer is where the lapse rate becomes dry adiabatic. It is the boundary between the **organized** convection of the neutral convection layer above and the largely disorganized convection below.

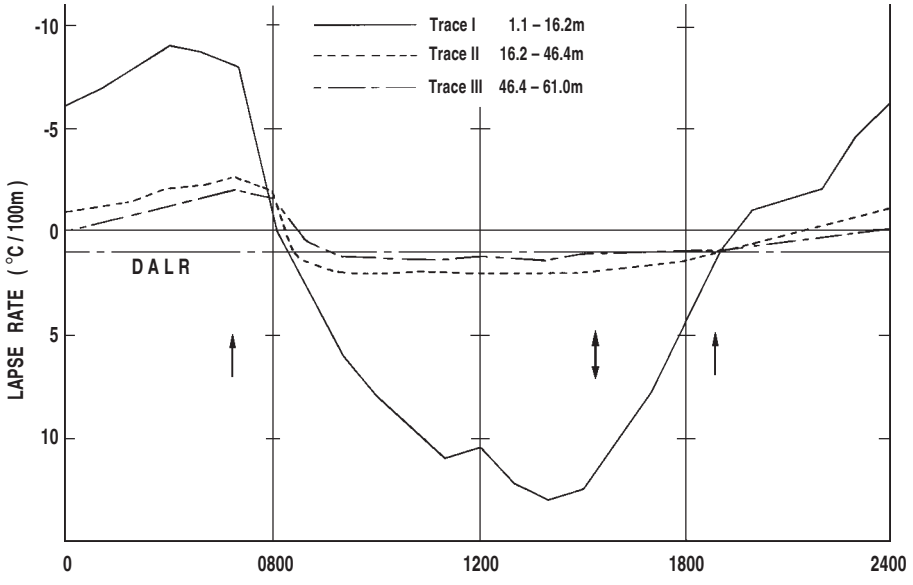

Fig. 3 (after Flower, 1937): Mean diurnal curves for the month of June 1932, showing lapse rates of air temperature above the experimental site at Ismailia, Egypt. Arrowheads indicate times of sunrise and sunset for the middle day of the month. The double-headed arrow indicates the monthly mean time of maximum surface temperature.

1. It is not correct to say that the convective motions in the super-adiabatic layer are totally disorganized. There is obviously a connection between the thermals in the convection layer and the super-adiabatic layer, ie., thermals extended down into the super-adiabatic layer. Apart from this **imposed** organization, however, the convective motion within the super-adiabatic layer must be disorganized. This suggests that the source of the thermal is not the ground (a stubble or brown field), but rather within the super-adiabatic layer. The problem then is to relate this observation with our regularly vindicated experience of being able to save ourselves from an outlanding by scratching around over dark fields.

The vertical motions that occur in the super-adiabatic layer are a reflection of its 'forced' super-adiabatic lapse rate. Because the layer is so unstable these motions are eruptive and disorganised. They appear to be erratic and to occur in bursts with relatively large pockets of air surging upwards and downwards. This can sometimes be observed in the dust behind a farmer ploughing. As the dust drifts with the wind it can suddenly be carried upwards and then, only a short time later, be plunged down to ground level again. The super-adiabatic layer thus appears to be a disorganized layer in which random vertical gusts are the norm.

There are, however, other motions within the super-adiabatic layer with which we are familiar: there is the occasional dust devil which may sometimes stand only a few metres high or, less often, stretch upwards from the ground 200m or so, obviously penetrating through the top of the super-adiabatic layer and existing as a continuous entity both within and above. There is also that which we understand to be a gentler manifestation of the same thing — the sudden and short-lived 'whoosh' and swirling of the surface wind which marks the passing of a thermal. For glider pilots the fascinating question is what is the nature of the transition between the organized vertical currents we call thermals and the shallow lake of agitated hot air below which feeds them. We will touch on this later, but will now return to consideration of those things which can be learned from Fig. 3.

TIME OF MAXIMUM THERMAL STRENGTH

Once the curves for the two upper sensing levels in Fig. 3 have gone super-adiabatic they change only slightly and slowly throughout the day. The curve for the lowest sensing level (Trace I), however, alters dramatically and follows the heating cycle of the ground quite closely. As the sun rises higher in the sky the lapse rate becomes more and more super-adiabatic until about an hour before the time of maximum surface temperature, a lapse rate of 12-1/2 times the DALR is achieved. This would be the explanation of why maximum thermal strengths occur near the time of maximum surface temperature. At this time the temperature excess of an air parcel which ascended from near the ground, into the air above the superadiabatic layer, would be at its greatest for that day — its buoyancy and subsequent rate of ascent would be at a maximum. After this time the super-adiabatic lapse rates decrease steadily until dusk.

WHY THERMALS WORK AFTER TIME OF MAXIMUM SURFACE TEMPERATURE

The highest super-adiabatic lapse rates in the lowest level in Fig. 3 occur a little before the time of maximum surface temperature. Soon after, the super-adiabatic lapse rates of this level steadily decrease, but the whole layer remains super-adiabatic (ie., the three curves remain below the dashed dry adiabatic line) until almost sunset. Here is the explanation of why thermals continue to work after the time of maximum surface temperature. Regardless of the fact that the surface temperature may be falling, as long as the surface layer is super-adiabatic it will be possible for thermals to grow out of this layer. This can be seen by considering Fig. 4 which shows a mid-afternoon temperature profile similar to that of Fig. 2, but with the difference that the temperatures within the super-adiabatic layer have been plotted giving an unstable profile for a small height above the ground (this is what an accurately measured and plotted afternoon temp-trace would look like — compare with '1500' in Fig. 1). If an air parcel ascends without mixing from within the super-adiabatic layer (say point A) to a small distance above it, the temperature of the air parcel will fall at the DALR (along the dashed line to say point B), but the temperature of its new surroundings will be that of the temperature profile at that level — point C. The temperature of the air parcel is now higher than its new environment and so it will also accelerate upwards.

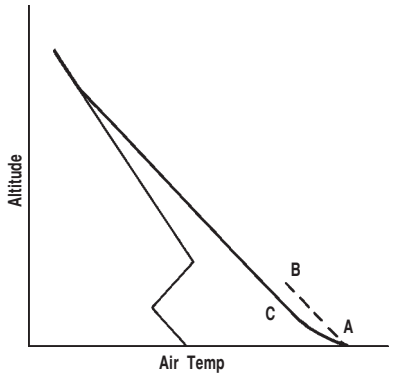

Fig. 4: A typical mid-afternoon temp-trace showing the shallow super-adiabatic surface layer. The light full line is the early morning trace. The dashed line AB shows the temperature change of an air parcel which rises, without mixing, out of the super-adiabatic layer.

The conditions for the formation of a thermal remain present in that the unstable super-adiabatic layer can supply volumes of hot air which upon lifting out of the layer will be warmer than the new surroundings. As long as the layer remains super-adiabatic this will be so. No matter that the super-adiabatic lapse rates may not be as great as they were earlier, as long as there is a super-adiabatic lapse rate at the surface, air which rises from this level will, in cooling dry adiabatically, be warmer than its new environment above the super-adiabatic layer. In answer to the question why thermals work after the time of maximum surface temperature, it can be said that although the surface temperature is steadily decreasing after this time, it is some time before it falls sufficiently for the surface layer to cease being super-adiabatic and thermals will continue until this happens.

Referring again to Fig. 3, the traces for the three sensing intervals all commence to become less super-adiabatic either a little before, or just after, the time of maximum surface temperature. They do not cross the dashed dry adiabatic line, ie., become stable or 'sub-adiabatic' until actually a short time **after** sunset — the ground is still warm enough to supply heat to the atmosphere for a short time. Thermals should still be able to be found up to about this time (as many have thankfully discovered). After sunset Trace I rapidly becomes stable and not too long after crosses the zero line indicating that the nocturnal inversion has begun to form. It is some time later before the nocturnal inversion grows to the height of the upper sensing levels so that Trace II and III become positive.

Fig. 3 also explains something else that is common knowledge to glider pilots, ie. that although thermals continue after the time of maximum surface temperature, their rates of ascent steadily fall afterwards. This would be because the lapse rates within the super-adiabatic layer steadily decrease from about this time.

The results from the Egyptian experiment should be of interest to glider pilots in Australia (and Canada *ed.*) because over our vast plains, all things being equal, the super-adiabatic layer should behave in much the same manner. Ismailia is about the same distance from the Equator as Perth and Coff's Harbour. Fig. 3 is for a hot land in the middle of summer and is a monthly average case which should minimize the effects of wind from different directions and synoptic disturbances such as fronts. In Australia the extremes of the super-adiabatic lapse rates will vary from site to site, with the distance from the Equator (latitude) being the most important factor, but except possibly in the most southern areas, the timing of the growth and decay of the super-adiabatic layer will be much the same in the middle of summer. At the end of spring and the beginning of autumn, when the heating by the sun is below its summer maximum, the cross-over would occur later in the morning and earlier in the afternoon giving the oft-noted end of convection an hour or so before sunset. This timing of the onset and completion of convection is also affected by other things which affect the rate of heating such as cool, or warm, winds. Being of an occasional nature these will be covered in the third article in the series. Here we are interested in general features and in this sense the Egyptian findings are of considerable interest.

WHY THERMALS MAY GO HIGHER LATER IN THE DAY

On many occasions during the summer it can be observed that maximum thermal height will continue to increase until quite late in the day. The rate at which thermal tops rise is not as rapid as earlier in the afternoon and although thermal strengths fall off and thermals often become smoother, the gain in height is typically another 1000 or 1500 feet after the time of maximum surface temperature. This creates another inconsistency in the logic of the thermal height forecasting technique which may be expressed as follows: as surface temperatures fall after the time of maximum temperature, it could be expected that dry adiabats, drawn from these falling temperatures, would intersect the early morning profile lower and lower and thermals would decrease in height towards the end of the day. Having explained that all that remains later in the day of the early morning profile is that portion above the convection layer, such a formulation can be seen to be faulty. However, it is inherent within the logic of the thermal height forecasting technique and although its inadequate nature has been exposed there is no obvious explanation of why, as is frequently observed, thermal tops should continue to rise after the time of maximum temperature.

The probable explanation is one based on the speculation (Ball, 1960) that a small, but significant proportion of the heat taken up by the convection layer throughout the day is not supplied by the ground, but instead comes from above the convection layer. The way in which this happens is that the air in thermals

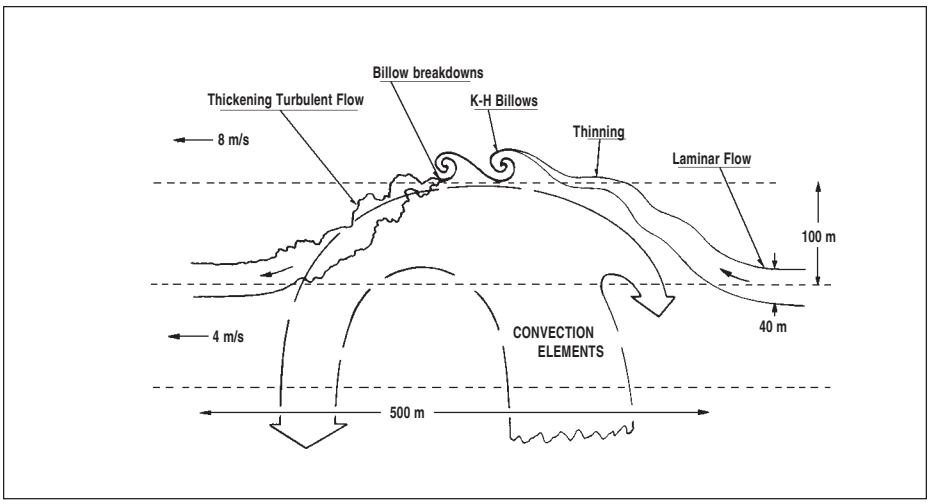

Fig. 5 (Payment and Readings, 1974): Schematic representation of a 'convection element' pushing into the nocturnal inversion, forming an 'inversion hummock' and entraining relatively warm air which is carried back down into the convection layer.

does not simply stop when it encounters the relatively warm stable region which acts as its lid, but due to inertia 'punches' and rises some way into it before subsiding back down into the convection layer. This causes a certain amount of mixing which carried warm air from the upper stable region down into the convection layer. Fig. 5 shows one pair of researchers' (Payment and Readings, 1974) thoughts on how this occurs. They, and others, in making measurements near the top of the convection layer have recorded warm downdrafts which they have interpreted as this downward transport of heat from the stable region above, thereby confirming that this exchange is likely.

But the reverse must also happen. If the convection layer is warmed by the downwards transport of heat, then the stable region above must be cooled by the entrainment of the relatively cool air from thermals. This would have the effect of eroding away the bottom of the stable region. The warm air supplied from above is carried downwards and mixed throughout the convection layer by the thermal circulations (refer to Fig. 3 in the previous article of this series), but because of the stability of the region above, the cool air from below will mix with and cool only a shallow layer. As the erosion of the bottom of the stable region occurred, thermals would be able to rise higher before encountering relatively warmer air.

This process of erosion of the bottom of the stable region above the convection layer would occur whenever thermals are working. In the morning and early afternoon the reason for thermal heights increasing is primarily due to the rapid rise in surface temperatures, but as these level off and begin to fall the erosion of the stable region above the convection layer would continue and thermals would be able to rise steadily higher, although not as rapidly as earlier in the day.

It should not be expected that this will happen on every occasion. Ball suggests other atmospheric processes which will tend to counteract this lifting of the interface of the convection layer and the stable region above. One is divergence at these levels — the explanation of which is outside the scope of this series. Another is adiabatic heating of the middle levels of the troposphere by subsidence associated with anti-cyclones — this will be explained in another article of this series.

Although it appears to be receiving general acceptance amongst meteorologists, this concept of the erosion of the stable region above the convection layer is by no means cut and dried and is still a subject of investigation. However, it should be of interest to glider pilots as it may stimulate thought about thermals going higher later in the day. A number of cross-country pilots I have spoken to are not convinced that thermals do in fact often go higher later in the day. They put forward the possible explanation that during the heat of the afternoon only the height band of best lift is used and it is only when thermals weaken that they are worked to the top. Hopefully this article will increase awareness of this question which eventually could lead to a common understanding of what does actually happen. It is a quite relevant question because it has an impact on strategy for both speed and distance tasks.

CONCLUSION

In this article and the one before, a model of fair weather convection has been put forward which sees thermals as localized elements in a convection layer stretching over vast areas. The height of the convection layer increases throughout the day, but its maximum height varies from day to day over a wide range depending primarily on the movement of synoptic systems. The articles have explored the general features of the diurnal variations of the Environmental Lapse Rate of the lowest levels of the atmosphere. While it holds true as a general description there are variations in this pattern. These will be covered in following articles in this series. □

2. Amongst glider pilots it is common to hear that the convection layer is capped by an inversion. While this is often the case, as often as not it is an isotherm, or a stable profile of decreasing temperatures with altitude that prevents thermals from going higher. In order not to perpetuate this lack of theoretical clarity, in this series of articles the layer which acts as the lid on the convection layer will be referred to simply as a stable region.

Opinions

continued

Second is knowledge. He must know his subject, and I don't mean to pass the Transport Canada exam, although this is a good basis; no — he must have a deeper working knowledge of sailplane aerodynamics, flight and ground safety, speeds-to-fly, physiological considerations of flying, even basic aircraft recognition and such things as badge requirements and record soaring flights, etc. Actually most pilots do meet this but it still shocks one to fly with an experienced pilot who does ten 360° turns and clears his turn maybe five times if at all, or slows up in heavy sink or headwinds, and then bombs around the circuit at tremendous speed because he believes this is "more" safe, that sort of thing.

The third criteria is the ability to teach. The candidate must be able to communicate sufficiently to explain without misunderstanding all the basic points. This involves personality and enthusiasm to a degree but mostly involves the ability to adapt to the listener's level of absorption and understanding.

And fourth we have personal character. We have developed our sailplanes, books, organizations and schools to great levels of sophistication; but Sir, when it comes to our leadership we do not ensure pilot character. This is **vital** in instructors. What I do when a pilot is off checks is give him the maximum freedom possible, say at 5–25 hours pilot-in-command or first full soaring season, and watch him very carefully. Predominantly this freedom to grow results in pilots that think and learn. However if it transpires that his flying discipline deteriorates, his ego is unable to accept setbacks or better pilots, he becomes a "know it all", I take note. If in relations with other pilots, particularly more junior members, he strings great "lines of bull", I take note. If when given responsibility he displays all the characteristics of a bully, I take note. What I am looking for is personal integrity and all that implies for the future. If the future includes his instructors rating and he wants it for power, prestige, or because "students are free rides" — no go.

Is this how SAC should ask the CFI to pick his back seaters? I say yes, we must raise our standards and we can. Perhaps our Executive Director could put more time into this and less on our becoming another burden to the taxpayer? Pilots, also, must match their sailplanes. On private owners, in my experience very few lack the intelligence or understanding for seeing the need to meet the same standards as non-owners. If they do lack this, the CFI must have the authority to ensure its correction.

Am I asking the CFI to do too much or the impossible? Besides his responsibilities for flying standards and safety, picking instructor potential, etc., he has to improve his own cross-country soaring, guard against over/under regulation, and work to make the club atmosphere welcome and rewarding. The club executive is his key to success and the quality of these run the full spectrum, so he maneuvers through club politics. Isn't it just a fun job? But not impossible.

free flight must be a good magazine, one goes through a high range of emotions and thought when reading it. A good example that comes to mind is the article on "The Intro Ride" from 5/79. I did not respond and wished I had. However, several copies later (3/80) Mr. Stephen Newfield, CFI — KSC replied with a beautiful response far better than mine could have been and all I could say was "right on, sir!" I do hope the pilots in his club realize the treasure they have.

The latest **free flight** has a fine piece by Mr. Ian Oldaker of the Instructors Committee; obviously they know and care about the quality of back seaters and much of what I say has been heard before. A Transport Canada examiner visiting us here in Germany last summer had much the same caring and wishes. However, my guess is that 5 years from now I will still run into too many pilots of such habit and attitude from their early shabby training that they cannot be changed, except perhaps after they find themselves sitting in shattered plastic shards! And who is then really to blame — Transport Canada, a SAC committee, his CFI, me? Let's have more **free flight** articles on instructing; one can always find them on cross-country flying, soaring technique, and contests, we abound with heroes at this; one hungers to find them in the unglamorous and thankless training duals.

Thank you Mr. Peabody for your triggering idea; Ms. Editor for your patience; the rest out in SAC land — if you instruct and care for your students — you have the ball. □

Danny V. Webber
CFI Lahr Gliding Club

WORLD CONTEST AWE-FULL

I was fortunate to be in Germany near Paderborn during the time of the World Champs and decided to see what it was all about. My initial impression was a sense of awe and excitement — here were the faces and personalities behind the names of people I had heard and read about. And the aircraft! The newest, the fastest, the longest, they were all here; walking along the launching grid was like viewing a glider exhibit.

However, the awe of the famous and mighty was soon replaced by a growing awareness of an eminent sense of camaraderie, among all teams and competitors ... And it was not always a contest against other pilots in other flying machines, but rather a meet against the elements.

Watching the World Champs is a learning experience. Indeed it is difficult not to see or hear something new or to pick up fresh ideas. The experience is also inspiring — having seen what can be done makes one (me!) want to go out and further develop flying and cross-country skills.

Our Canadian team and the sport of gliding in Canada needs all the support and exposure it can get. After having "lived" such an event, one could hardly not be fired up and supportive ... This was truly an experience I won't soon forget.

Yours in Soaring
Kate Estebany
Montreal Soaring Council

CLUB NEWS . . . . .

ERIN SOARING SOCIETY

Erin Soaring is alive and well and flourishing in Amaranth. Contrary to some rumours, we are living in our new home northwest of Orangeville in Amaranth Township. Our old site is being landscaped into a beautiful gravel pit. We have just moved to our new field near the village of Laurel. Development of the site is proceeding slowly but steadily. The runway is presently 200 ft x 2200 ft and will be extended to 3000 feet. We are enjoying excellent cooperation from our neighbours and the Township Council.

We are not having a record year in the flight statistics due to the disruption of moving. We are doing well with an influx of new members. We are pleased to have Jack and Carol Dodds return to the "fold" after their stay in the Maritimes. We're pleased also to have Ian Oldaker as a new member. Most of you know Ian as Chairman of the Instructors Committee of SAC.

Even though we have moved some distance north, ESS is still the closest club to Downtown Toronto. (Caledon Gliding has moved to just north of Guelph). We are 60 miles from Yonge and Front — just 75 minutes in moderate traffic. Please drop in for a visit.

If you are looking for a club to join we can only promise hard work, minimal but improving facilities, good (Eastern) soaring, exceptional camaraderie and pot luck feeds that are second to none.

SOSA NEWS (excerpt)

In his first year in the back seat of a 2-33, Dr. Wolf Leers made 163 instructional flights. He bettered that last year with 187. And that earned Wolf the coveted Instructor of the Year award at SAC's annual meeting.

Apart from his instructional activities, Wolf has been busy as a towpilot and as chairman of the SAC'S Medical Committee for the past several years. His "Medical Facts for Glider Pilots" lecture is a popular feature of the SOSA ground school and he's also spoken at the SAC Eastern Region Instructors' School on the medical aspects of flying.

Senior staff microbiologist at The Wellesley Hospital, Toronto, Wolf holds a Ph.D. in virology in addition to his medical qualifications. He's also Associate Professor at the University of Toronto's Department of Medical Microbiology, a consultant to Transport Canada on gliders and a medical examiner.

ANOTHER ITEM:

"SOSA held a raffle for funding the Canadian Team. Prize: One year free membership ($350). Guess who won: Paul Sears!"

COLD LAKE

The Cold Lake club recently purchased a K-7 from Winnipeg. It had been in storage for a long time, and moisture caused some damage to one wing. After a winter of repairing and recovering by Jerry Vesely and Tony Burton in Claresholm, it got its test flight on 4 June, exactly 4 years since it was last flown. Now back at Cold Lake, the pilots are delighted with the new ship.

WIDE SKY FLYING CLUB

WSFC promoted their flying weekend on 30-31 May by getting the following story printed in the newspaper:

Excerpt from the Alaska Highway News, May 20, 1981

"Just pretend you're the Red Baron and aim the nose." Thus instructed, ninety-nine percent of trainee glider pilots master the thing that alarms most people, bringing their ship safely back to the strip. Not that landing is really the most difficult maneuver to be undertaken with an aeroplane, but it's well — fundamental. The clever stuff can come later...

"Uh, a glider's got no motor, right? What if you can't make it back to the strip? I'd sure feel safer with a motor," These are stock reactions from non-flyers to the sight of the Wide Sky Flying Club's Blanik which weighs all of 600 pounds and has a greater wing span than a Spitfire.

That's why a reassuringly simple direction like 'take aim and land' does much to shake the mystery out of the sport.

Here's the deal. If you are interested in learning to fly a glider, which you can do in about seven hours, assuming average competence, or even if you just want to take a trip up to say you've done it, present yourself at the airport on either of those two days between 1400 hours and 1700 hours …

The introductory ride will cost you $20 and for that you should get about twenty minutes in the glider with an experienced pilot. That should be time enough to be towed to 2000 feet above the ground; from this position you will not only enjoy an excellent view of the city and the river valley with the mountains in the background …

… you will also feel the lift of a thermal. That's a body of rising air, caused by temperature differences. At this time of the year they're frequently very strong, as sunshine follows rainy periods and ground temperatures vary quite a few degrees. As cool air passes over warm ground, its temperature is raised and it starts to rise. If a glider is circling in that mass of air, it goes up with it. Therein lies the trick — find the thermals …

LIMERICKS (again)

by "Phredde"

A lad both dashing and bold,
showed us all how a glider was rolled,
He stressed his wings so,
That the both did let go,
Too bad, for he wasn't that old.

There was a young pilot from Yale,
Who once tried to soar in a gale,
But conditions were rough,
He'd soon had enough,
His breakfast, he left in a pail.

A PROPOSAL FOR NATIONAL SOARING SITES

by Dave Collard

This proposal may be a solution to a many sided problem dealing with "How do we expand soaring in Canada?" There are many things that you can do in your local club and as has been done in many clubs already, but I feel there is an area in which SAC can provide some of the leadership.

SUGGESTION
Designate an existing or new gliderport(s) in both the Western and Eastern regions of Canada as SAC Soaring Site(s), at which soaring lovers could visit during the flying season for the purpose of learning new or improved methods in our sport.

OPPORTUNITIES
At such a place you, from the new student to the competition pilot, would be able to improve your flying skills.

These facilities would be ideal for you and your family to enjoy a vacation at the site (which would be in operation during specific periods and advertised as such).

It would invite enthusiasts not living within a reasonable distance from a soaring club to plan a vacation and book for a period desired.

Here you could reach almost any level of glider pilot proficiency. This knowledge could then be expanded by — future visits to this gliderport — by joining the club close to your home — or by getting others involved locally to form your own new club.

VARIETY OF COURSES
- Pilot training
  new, advanced, cross-country, competition, aerobatics, etc.
- Instructor Schools (all levels)
- Towpilot training winch training
- OO and competition officials courses
- Training for National team
- Alternating national and regional meets

WHO WOULD STAFF SUCH SITES?
I see a small permanent staff — complemented by members from SAC clubs, who wish to teach and improve their skills and still have a holiday.

Costs
The costs would be borne by the users. The small seasonal staff would have accommodation provided and a small reasonable wage.

SOARING WEEKS ACROSS CANADA
It is recognized that the above concept is not original as many clubs in Canada currently hold flying weeks during the summer months, and some of the larger clubs in Central Canada operate almost continuously during the summer season. The problem as I see it is that these soaring weeks are organized primarily for the club members as presently very little advertising in **free flight** is carried out to invite other SAC glider pilots to join these fun weeks.

POSSIBLE SITES

West	Vancouver (Hope)
	Calgary (Black Diamond)
	Edmonton (Chipman)
	Regina/Saskatoon area
	Winnipeg (Pigeon Lake)
East	Maritime location
	Quebec City
	Montreal area
	Ottawa area
	Toronto area
	Southern Ontario

Note: With the large population based in Eastern Canada possibly more than one site would be considered in the long-range planning.

WAVE SITES
In Western Canada we have an excellent wave soaring site at Cowley, Alberta (near Pincher Creek). There is a gathering of the clan during the last week in July, which combines good thermal and wave flights, plus many good social times. The Thanksgiving weekend again sees many familiar faces back at Cowley for wave flying.

The consistency of wave conditions on a year-round basis at Cowley could claim a record for the number of Gold and Diamond Altitude Badges obtained if it was used as regularly as such places as Black Forest Gliderport, Colorado, USA.

With the concept I have in mind, I can visualize the staffing of the Cowley site from say mid-September to the end of October/early November each year with the small seasonal staff from the summer site(s) and voluntary help from various SAC club members interested in wave flights and record setting attempts.

ADVANTAGES OF SUCH SITES

For SAC
You, the soaring pilot, would benefit from such sites as the SAC would provide you with excellent and knowledgeable staff. Costs for non-SAC members? They would just want to belong to our group and pay happily. This would show the Federal and Provincial bodies that SAC is promoting motorless flight in Canada.

For you, the glider pilot
You can visit beautiful places in Canada and still learn and improve your soaring skills and achieve your goals.

For you, the potential pilot
We would offer a location in Canada where pilot courses can be taken on a scheduled basis and at a level you can afford in both time and money.

For the Family
Invitation for a holiday in scenic environment and enjoyment of other sports such as swimming, hiking, photography …

TIME FRAME
Encourage SAC clubs to hold gliding weeks, providing a variety of flying events (lessons, duration, cross-country, etc.) and being advertised well in advance, both locally in the news media and in **free flight** for the benefit of all soaring enthusiasts, for new and "old" SAC members alike, and from all parts of the country.

You may even plan a soaring vacation, travelling from one flying week to another — an excellent way of meeting new friends.

1982: Attempt to have one site organized — East or West — on a short trial basis (July and August)
1983: Expand on the 1982 schedule

DREAM BECOMES REALITY
These site(s) could take on an international appeal for soaring pilots from all parts of the world. They would promote tourism and revenue dollars. The wave site in Western Canada would allow our Eastern friends the opportunity of having a vacation in the Rocky Mountains and at the same time obtain their Altitude Gold or Diamond Badge, all within Canada. What about Baie St-Paul?

Thank you for giving me your time, any suggestion to make it a working reality would be much appreciated. □

NEW CANADIAN RECORD SET

Jock Proudfoot (SOSA) and G.W. Fitzhugh set a new Canadian Citizen's Multiplace Straight Distance to Goal and Speed Goal on 2 May 1981. Flying a Blanik, C-GARR, from Point Ridge Airport, Pennsylvania, they landed in Gordonsville, Maryland, a distance of 304 kilometres. Congratulations.

A DISTILLATION OF DATA — OR — "HOW TO FLY THAT FIRST X-COUNTRY"

by D.R. Metcalfe *reprinted from the Winnipeg Gliding Club "Sock Talk"*

1. Try to travel in pairs — it makes preparation more exciting and the shock is not as great when the umbilical cord finally snaps.
2. When preparing your barograph, ignore the heckling — remember these are friends trying to be helpful.
3. Smile when you find you are 19th on a flight list of 20; also smile when both tow-pilots decide to gas up after number 18 has been launched.
4. When you are airborne, stay there — it is not necessary to land to notch the barograph.
5. On the second launch, try to have the tow drop you in lift.
6. Try not to become sensitive when your retrieve crew asks, from 7000 feet directly below, an hour after launch — "Do you have any plans for the rest of the afternoon?"
7. Notify Ground Control of your intention to leave, then contact Air Traffic Control for permission — give your position, identification and destination. They have no interest in the name of your next-of-kin or the fact you forgot to go to the bathroom.
8. Try to travel in pairs — preferably leaving at the same time from the same area and height, although both pilots may wish it — it's difficult to join hands as you leave your friends behind — forever.
9. Don't look back.
10. En route stay on Air Traffic Control frequency so they can try to keep you out of trouble.
11. Where there's lift there is also sink — the latter sits just outside our Glider Activity Area.
12. It's nice to travel in pairs even though your buddy is 1000 feet above and a mile ahead of you.
13. All southern Manitoba towns have three grain elevators always painted the same colours.
14. There is life over stubble fires — it's also hot down there and smoky.
15. It's nice to travel in pairs even though your buddy is now 2000 feet above you (and gaining) and 2 miles ahead.
16. There is lift over town — with people down there in black suits and long dresses chasing chickens — "Oh God, there'll be more angry visitors at Pigeon Lake."
17. Air Traffic Control asks embarrassing questions such as, "What is your location?"
18. There is always heavier sink as you approach your target area (beginning about 45 km from home).
19. It's nice to travel in pairs even though your buddy reports he is now over the landing area and still at 9000 feet.
20. There is always great lift 50 km from home.
21. Air Traffic Control asks difficult questions such as, "Are you inbound?" Their password for getting you out of their hair (and off their radar) is, "Good day."
22. There is always a rutted roadway at the end of every Municipal Airport runway.
23. All farmers wear baseball caps and drive 4-wheel-drive tractors which they park 7.5 cm from your wing tip. They also smile a lot.
24. All small boys in rural areas ride trail-bikes and travel in packs of 20.
25. All men from rural areas ask, "Where did your motor fall off?" — they laugh a lot. All women from rural areas sit in cars and wait. They neither smile nor laugh.
26. Retrieve crews always arrive after sundown.
27. All cross-country pilots are happy to see them, nevertheless.
28. Dinner is always cold at 01:15 hours — but taste's great.
29. You don't sleep much that night.

Epilogue
Air Traffic Control people are very kind, dedicated and understanding and they too must smile and perhaps even laugh a lot. □

FAI SPORTING CODE 1981

by Dave Belchamber

Several changes in the 1981 FAI Sporting Code are of special interest to pilots making FAI Badge claims.

TRIANGULAR COURSE — In addition to the standard triangular course around 2 turnpoints with return to the departure point, a special case of the newly-defined polygon course is acceptable for badge flights of 300 km or more. Namely, a triangle with 3 turnpoints arranged in a triangular pattern with return to the departure point. The official distance of the course is the sum of the three legs between the turnpoints only.

In other words, provided the flight terminates at the departure point, any 3 turnpoints may be chosen for the actual course. To minimize the total distance flown, the departure point would lie on the course line between two of the turnpoints.

For record flights, the existing percentage rules apply concerning the total distance of any one leg.

DISTANCE PENALTY — The difference between the start altitude and the altitude of the finish point; or if a remote departure point is used, the difference between the release altitude and the altitude of the finish point, must not exceed 1% of the distance flown for distances less than 100 km. For longer distances, if the loss of altitude is more than 1000 metres, the distance flown will be reduced by **100 times** the excess over 1000 metres for records, and **50 times** the excess over 1000 metres for gliding badges.

Simply put, subtract the altitude of the finish point from the start altitude (or in the case of a remote start, from the release height). If the result is greater than 1000 metre for flights greater than 100 km in distance, then subtract the excess height times 50 for badge flights (or 100 for record flights) from the total distance. The resulting distance is to be used on any claims.

SILVER DISTANCE — There is no longer a requirement for an off-field landing as the finish point to a Silver Distance flight. The distance leg of the Silver Badge will be awarded for any flight provided appropriate photographic and barographic evidence proves the completion of a straight leg having a minimum distance of 50 km. The "1% rule" still applies.

Previously, Silver Distance would only be awarded for either a straight out flight or an incomplete Gold or Diamond Distance flight provided one of the legs was 50 km long. Now, any flight such as a 100 km out-and-return or a larger triangle will qualify provided at least one of the legs meets the requirements of being 50 km or longer. It is therefore possible to use a turnpoint as the remote departure point and/or the finish point.

CLARIFICATION OF GOLD/DIAMOND DISTANCE
I have been asked on several occasions whether or not the Gold and Diamond Distance legs need to be declared prior to the flights.

All flights which include a turning point or a control point must be declared (General Section 2.3.9.1.) A control point is a goal or departure point (which may be remote from the take-off location). The turning and control points must be flown in the declared sequence. Distance may be claimed from an uncompleted course provided that the qualifying distance is flown and the glider is landed not more than 10 km off the line of the last leg (ie. an uncompleted Diamond Distance flight may qualify for Gold Distance).

The documentation submitted for processing should indicate that a claim is being made for a badge leg originally declared for a different badge.

FAI BADGES

by Dave Belchamber

29E Varley Drive
Kanata, Ontario K2K 1G4 (613) 592-5516

The following badges and badge legs were recorded in the Canadian Soaring Register during the period April 1, 1981 to May 29, 1981.

DIAMOND BADGE

37	Ian Spence	London	(World Number pending)

GOLD BADGE

181	Leonard Gelfand	Gatineau

SILVER BADGE

581	John Paulin	Lahr
582	Robert Lamplugh	Montreal
583	Leonard Gelfand	Gatineau

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

Leonard Gelfand	Gatineau	308 km	Skylark 3B	Pendleton, Ont.

DIAMOND DISTANCE 500 km (310.7 mi) Straight Line, Dogleg, O&R or Triangle

Jock Proudfoot	SOSA	505 km	Nimbus 2	Narromine, Australia

DIAMOND ALTITUDE 5000 m Gain (16,404 ft)

Ian Spence	London	5240m	1-34	Black Forest, Colo.
Christopher Eaves	London	5180m	Lark	Black Forest, Colo.
Simon Davies	London	5360m	1-34	Black Forest, Colo.
Hans Baeggli	Montreal	5540m	Nimbus 2C	North Conway, N.H.

GOLD ALTITUDE 3000 m Gain (9842 ft)

Jock Proudfoot	SOSA	3110m	Hornet	Narromine, Australia
Fred Sinclair	London	3565m	2-32	Black Forest, Colo.

SILVER DURATION 5 Hours

John Paulin	Lahr	5:20	Ka6CR	Lahr, West Germany
Brian Milner	–	5:15	1-26	Julian, Penn.

SILVER DISTANCE 50 km (31.1 mi) Straight Line

John Paulin	Lahr	60 km	Ka6CR	Lahr, West Germany
Robert Lamplugh	Montreal	105 km	1-26	Hawkesbury, Ont.

SILVER ALTITUDE 1000 m Gain (3281 ft)

John Paulin	Lahr	1400m	Ka6CR	Lahr, West Germany
Brian Milner	–	1675m	1-26	Julian, Penn.

C BADGE 1 hour Duration

1719	Jean-Louis Racine	Quebec	1:08	2-33	St-Raymond, Que.

FAI CERTIFICATE

1718	Robert Lamplugh	Montreal	transfer from BGA

NOTE TO OFFICIAL OBSERVERS

The 1981 FAI Sporting Code (for Gliders) is now in effect. It is available from the SAC National Office. ALL OFFICIAL OBSERVERS should be familiar with the new Code, and should have a copy of it and the SAC FAI Procedures Booklet as reference books on their duties.

The FAI General Section is also available.

— Member Clubs
— Directors and officers
— Committee Chairmen

current info in free flight #3 May/June 81

HANGAR FLYING

Compiled by Tony Burton

- **TURTLE ON RUNWAY**

  Private Aircraft: "Tower, you might inform the TWA aircraft about to take off from the north end that the object near my position that looks like a rock is really a turtle on the runway."

  TWA 707: "Tower we heard that transmission. Understand one turtle crossing the runway."

  Tower: "Based on available pilot's reports, turtle's course is oriented southeast, heading towards gate five."

  TWA 707: "Tower, can you give us info on turtle's speed and estimated time of runway clearance?"

  Tower: "Computer calculations indicate turtle's speed around 200 feet an hour — maybe less in this quartering headwind. If present course and speed maintained runway should be clear in eight minutes".

  TWA 707: "Unable to wait due to fuel depletion. Will employ evasive action on takeoff roll."

  Tower: "Roger. TWA cleared to take off. Be on alert for wake turbulence behind departing turtle".

- **SOLAIR 1, THE FIRST SOLAR-POWERED GERMAN SAILPLANE IS FLYING**

  Guenter Rochelt from West Germany designed, financed and built this ultralight craft himself in 3000 hours.

  Mr. Rochelt modified the original concept of the Swiss canard by Hans Farner (see SOARING Nov. 79). His ultralight craft has a wingspan of 16m, and 2499 solar cells on the upper surfaces generate 2.2 kW in full sunshine.

- **FIRST 1000 KM BY 15M PILOT**
  The first 1000 kilometre flight with a 15m ship was flown out of Narromine, Australia on 7 Dec 1980. The pilot, Paul Mander, completed the 1015 km course in an ASW-20 at a speed of 105.9 km/h.

- **SOUTHERN SOARING GREAT**
  The recent South African Nationals, held Dec 16-31, 1980 at Vryburg, recorded 14 contest days and one rest day (Xmas) for the third time in a row. Just the tasks set totalled 5881 km! Brian Spreckley, a 15m competitor from England, noted that typical conditions were averaging 8 knots to 14,000 feet. On day 8 of the contest, he flew a 550 km O&R at **139.7** km/h for **third** spot. (The winner did 145.7 km/h in an ASW-20.)

- '83 World Contest Site Changed
  The 1983 World Gliding Championships will be held at Argentina. The original site proposed, La Cruz, had poor weather at the recent Argentinian Nationals, so the 1983 organizers have chosen a dryer locale.
- British Nationals Rained-out
  The British Open and Standard Class Championships, which were held May 16-25, were a wash-out. Not one contest day was achieved in the wet weather.
- 1980 Poor Year for Accidents
  Not only Canada had a poor accident record last year. Both the US and UK gliding magazines complain of excessive insurance claims in 1980. The BGA recorded six glider and one tug fatalities.
- US National Landmark Program
  The National Soaring Museum, Elmira, NY is dedicating the first Commemorative Landmark Plaque. This marker recognizes a flight in a Pruefling on August 18,1928, by Ralph S. Barnaby, Philadelphia, PA that established an American gliding Duration record of 15 minutes, 6 seconds along the sand dunes of Cape Cod. Mr. Barnaby holds the US soaring pilot licence No. 1 signed by Orville Wright, and he also possesses the first 'C' soaring certificate.

  This flight was the first to exceed the American record for motorless flight of 9 minutes, 45 seconds set by Orville Wright at Kitty Hawk, NC, October 24, 1911.

- It is reported that in the beginning of the '50s gliding had been taken place in the People's Republic of China. Only pilots from Poland so far had visited them from other countries (and in 1981 two pilots from West Germany).

  Latest reports suggest that Anyang (near the Northern border of the Province Henan) will become a Chinese Soaring Center. For this reason they had just purchased modern aircraft in West Germany: Twin Astir, Janus, Nimbus 2C, to complement their current fleet of a Tandem Falke and the Chinese built Quian Jin (similar to SF27 Falke).

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SUBSCRIPTIONS to the monthly SOARING magazine US $25.00; available from Soaring Society of America, Box 66071, Los Angeles, California 90066

WANTED

A good working BAYSIDE 990-5. Contact Tom Foote, 31 Mt Pleasant Ave, Dartmouth N.S. B3A 3T3

SOARING PHOTOS
free flight is hungry for lively soaring photos to be shown off on the front cover. Please mail them to the editor, with your name on the back and detailed information of photographer and subject. Please indicate if you wish them to be returned.

COMING EVENTS

Aug 81, Hope Training Camp, hosted by VSA, Hope, B.C. Contact Dennis Vreeken, 205-131 West 6th St., North Vancouver, BC V7M 1K5 (604) 988-7057

Aug 3-7, RVSS Flying Week, Kars, Ontario. Contact Larry Rowan, Box 93, RR #1, Kars, Ontario KOA 2EO

Aug 3-7, Flying Week, Winnipeg Gliding Club. Contact Frits Stevens, 302 Boreham Blvd, Winnipeg, Manitoba R3P OJ6

Aug 29, XC Clinic (Mini Contest) hosted by ESC, Chipman, Gliderport, Alberta. Contact Dan Pandur, 7103 180 St., Edmonton, Alberta (403) 481 -2822

Sep 81, BC High Altitude Training Camp, Hudson Hope, B.C. Hosted by Wide Sky Flying Club, Box 6931, Fort St. John, BCV1J 4J3

Sept 5-7, XC Clinic (Mini Contest) hosted by ESC, Chipman, Gliderport, Alberta.

Sept 26, Wave Flying Seminar, hosted by ESC, Chipman Gliderport, Alberta. Contact Dave Lacy, 12137-87 St., Edmonton, Alberta, (403) 471 -3722

Oct 3-4, **SAC Directors Meeting,** Halifax, Nova Scotia

Oct 9-12, Cowley Wave Camp, Cowley, Alberta. Hosted by Alberta Soaring Council. Contact Dave Lacy, 12137-87 St., Edmonton, Alberta (403) 471 -3722

Mar 82, **SAC AGM Montreal, Que.** (to be confirmed)

Jan 83, 18th World Gliding Championships, Adolfo Gonzales Chaves (450 km SW of Buenos Aires). Preliminary info available from Editor. Ursula

THIS COLUMN OFFERS ACTIVITIES IN OUR CLUBS:

- One day special flying days
- Open house type event
- Local competition
- Flying weeks
- Competitions
- Camps
- Courses

Rough ideas only? A little event only? Tell us about it NOW
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If you miss the free flight deadline you may get your coming event item into the magazine by calling the "Stop-the-Press" number — which is also available for classified ads (613) 822-1797 (h).

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KAWARTHA SOARING CLUB — PIG ROAST
Annual Pig Roast, Sat. 15 August 1981, at the Airfield Omemee, Ont. Invitations to all soaring clubs. Tickets: $10.00 per person. Mail requests to: Kawartha Soaring Club, c/o Club Captain, Graham McKay, 17 Lincoln St., Pickering, Ont. L1V 2B9. Phone (416) 683-0375,

Back page (SAC Supplies) omitted