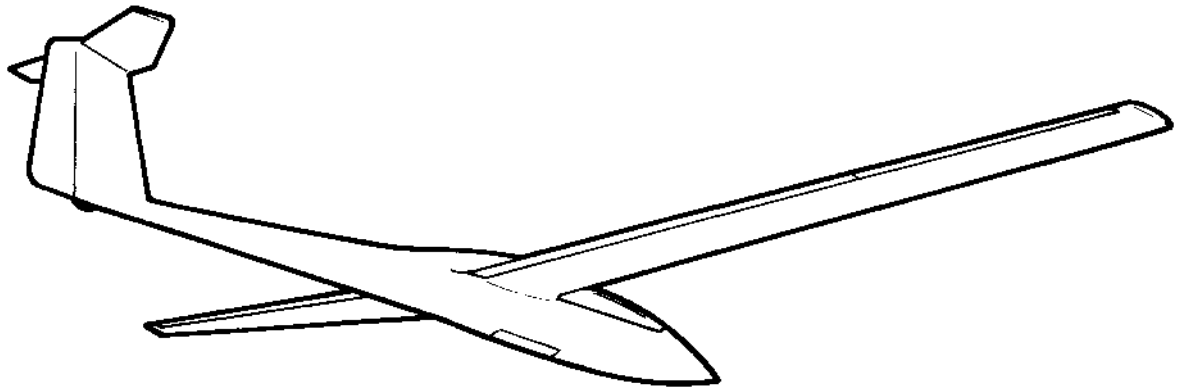
SOARING

MAY 1975

ONE DOLLAR

CIRRUS 76



THE WORLD'S HIGHEST PERFORMING STANDARD CLASS SAILPLANE HAS NOW BEEN REDESIGNED TO INCLUDE THE VERY LATEST TECHNOLOGICAL AND AERODYNAMIC ADVANCEMENTS!

FLAPS
Interconnected with ailerons for improved climb and the ultimate in glide path control and landing safety.

BALLAST
Increased for improved performance under strong conditions. New longer tanks reaching all the way to the nose of the "D" tube, eliminating another internal join which can lead to surface waviness. Outlet nearer root, fill port nearer spar.

FUSELAGE
The forward fuselage has been changed to the aerodynamically cleaner shape of the Janus, the highest performance two-seater in the world. Tests have shown that this new shape gives greatly improved laminar flow over the forward portion of the fuselage, thereby improving performance at all speeds.

BRAKES
Of course, the new flaps replace the former dive brakes BUT the wheel brake system has been improved for greater landing safety. (Be careful, you now can scrape the nose!)

WINGS
New fillet design to improve slow speed performance.

New system of wing construction to reduce "working" of the wing surface under the influence of heat and moisture.

A much cleaner and smoother wing, like the Janus, for improved high speed performance.

TAILPLANE
New connection system for easier elevator assembly.

CONTROL SYSTEM
New improved system in the cockpit and the wing.

APPEARANCE
The new Cirrus 76 will look almost the same as its forefather—the nose fairing will be slightly sharper and of course, you'll be able to see the flap line on the wing surface.

***Meets CIVV rules for newly announced 15 meter open class.

The past competition record of the Standard Cirrus has been nothing short of remarkable. It has won more national, regional and local championships than space permits us to mention—more than any other sailplane.

These new improvements on the Cirrus 76 will keep this Standard Class design at the top of the competition ladder for years to come. The previous design record of Klaus Holighaus and the production reliability of the Schempp-Hirth factory assure you that the Cirrus 76 will be a winner in every respect!

Deposits against delivery positions now being accepted on a first come, first served basis.

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THE JOURNAL OF THE SOARING SOCIETY OF AMERICA

The Soaring Society of America is a division of the National Aeronautic Association (NAA), which is the official U.S. representative of the Federation Aeronautique Internationale (FAI, the world governing body for sport aviation). The NAA, which represents the U.S. at FAI meetings, has delegated to the SSA supervision of FAI-related soaring activities such as record attempts, competition sanctions, issuance of FAI Badges, and selection of a U.S. team for the World Soaring Championships. SOARING is the Society's official journal. SSA Affiliate: The National Soaring Museum, RD #1, Elmira, New York 14903.

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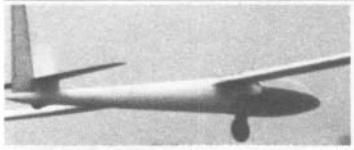
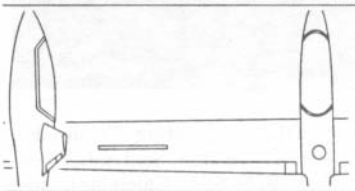
SOARING





Cover: Nimbus II near the eastern slope of the Sierra—photo by Don Downie courtesy of the AOPA PILOT.

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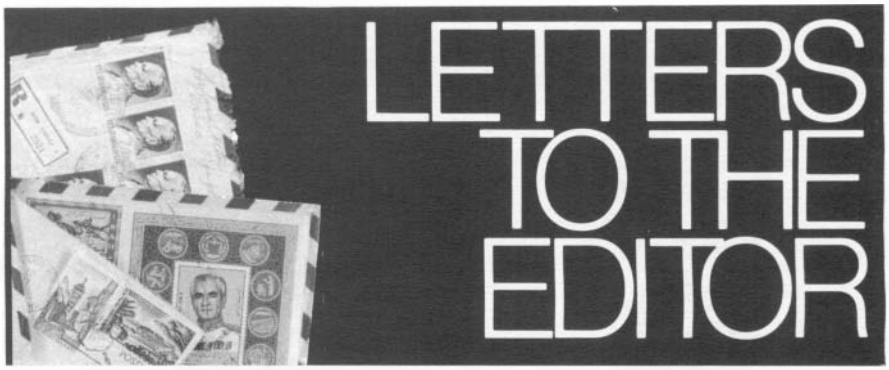
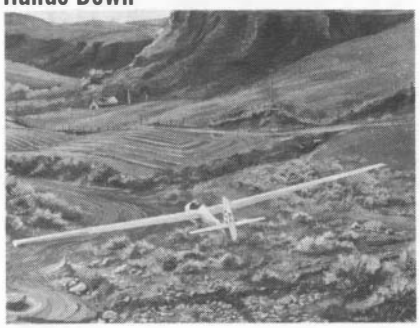
TELEPHONE NEWS SERVICE

Attention is called to the after-hours recorded telephone news service at SSA headquarters. The SSA staff records the latest developments in the soaring world on a weekly basis (usually on Friday evening) when anything newsworthy comes to our attention; less often in slower times. During national and world championships, we strive to record the latest results on a daily basis. After a tape has been on for one week (from Friday evening to the morning of the following Friday), if we do not make a new recording, we will leave the system off, so that if you call on a weekly basis, you will not have to pay to hear the same tape twice. The number to call is (213) 390-4449, between the hours of 6:00 p.m. and 8:00 a.m., Los Angeles time, and all day weekends. To reach a staff member who might be in the office during these hours call (213) 390-4440. If you call the first number for the tape, and don't get it after three rings, hang up, because it means it isn't on operation or someone else is listening to it. If the latter, you'll then be on the second number (through a rotary system) and may get a staff member instead.

D.M.



Winning—Gear, Pants, and Hands Down



Dear Sir:

In Jack Olson's painting "Columbia Basin Country" (on the September section of the 1975 SSA Calendar), just where can that *Libelle* be headed in that terrain? A close scrutiny reveals that one of two things has occurred: a revolutionary off-field landing procedure has been devised or Five Fracture is in a race with the steer to its right to see which can completely disintegrate in the briefest elapsed time. Notwithstanding the fact that it is not especially biodegradable, am I still wrong in concluding that Five Fracture is on the very verge of winning that race—gear, pants, and hands-down?

STEPHEN J. OEHMEN

Chattanooga, Tennessee

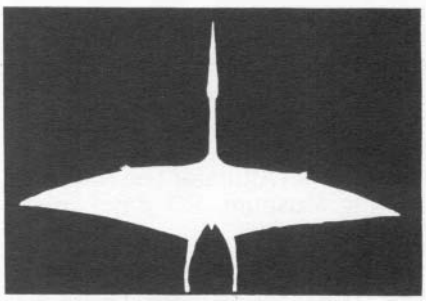
★ *The painting is based on a real event. The pilot, Joe Robertson, and his Libelle are real. The coulee-laced country of eastern Washington is genuine. I must confess that my picture is a reconstruction based on a verbal account. My excuse for not being at Joe's landing site is simple: During our regionals I was following Joe when my altitude got down to about 6000 ft. AGL, so I landed. But Joe is different and doesn't quit plowing on until his altitude is so low he can't bank without risking a groundloop. Joe was following the advice given to tenderfoot hikers: "If you get lost follow the nearest creek downstream to civilization." The trick in gliding is to make sure the downslope gradient at least matches the glider's L/D.*

As for the bovine bones: Probably some hungry glider pilot who landed there previously got hungry while awaiting his crew's arrival. I'm glad you didn't ask, "Did Joe make a safe landing without dinging his bird?" I'd rather keep you in suspense and retain my reputation as a graphic sadist.—Jack Olson

The Earliest Standard Class Definition?

Dear Sir:

Newspaper reports recently disclosed the discovery of partial skeletons of the world's largest flying creature, a 15.5-meter span pterosaur. An abstract of the report by Douglas A. Lawson in *Science*, vol. 187, pp. 947-948, March 14, 1975, states: "Three partial skeletons of a large pterosaur have been found in the latest cretaceous nonmarine rock of West Texas. This flying reptile had thin, elongate, perhaps toothless jaws and a long neck similar to the *Pterodaustro* and *Pterodactylus*. With an estimated wingspan of 15.5 meters, it was undoubtedly the largest flying creature presently known."



Upon examination of the report it turns out that the wingspan was an estimate based on the size of some preserved (but incomplete) wing bones. I am inclined to think that Lawson exaggerated the wingspan. My own extrapolation of his data shows the Texas pterosaur had a true span of 15 meters (possibly in anticipation of the CIVV rules). One can be sure that the beast had disposable water ballast and retractable gear. The flapspoiler configuration was in dispute then as now. The hinge line of the flaps was not at the bottom wing surface, and the flaps and ailerons were interconnected. The dive brakes were associated with the gear (hence both flaps and brakes were allowed).

We see, then, that the CIVV and the SSA have yet to catch up with the original Standard Class definition as exemplified by the West Texas pterosaur. We need not be reminded of the still long necks of the current species (extended while acquiring airframes under current rules) nor of their toothless inability to do anything about the class definition processes. Is extinction still the only way out?

R. T. ALLEMANN

Richland, Washington

The First Should Be The Last

Dear Sir:

In "Treetop Retrieve" (*Soaring*, Feb. '75), you finally let it creep in by letting some joker think it would be very funny to describe automobile back-seat gymnastics and a house of ill-repute as turnpoint landmarks. It should have been left out because it didn't make the story funnier.

If this is a first, let it be the last. Let's stick to nice *clean* soaring.

RAY RANDOLPH

San Rafael, California

An Inner Thermal

Dear Sir:

When I read that George Applebay had chosen to name his new super-sailplane *Mescalero*, (*Soaring*, Mar. '75), I knew he had found the secret of the "Inner Thermal." A Mescalero Apache is one who used mescaline (peyote) and was capable of getting higher and higher without ever leaving the hangar. I'm working on a new sailplane myself to be called the *Cannabis Sativa*. It is designed to serve as a transition to the higher-performance *Mescalero* and will be constructed of concrete blocks, since wing loading and L/D are irrelevant.

DON AITKEN

Woodside, California

Oldest Active Glider Pilot?

Dear Sir:

I have been asked if I might be the oldest active glider pilot in the country. (By active I mean one who regularly flies sailplanes.) After a lifetime in aviation and subsequent retirement, I wrote to my old friend Captain Ralph Barnaby and asked if a man could learn to fly sailplanes at 71. He gave me great encouragement, and I joined a class at Elmira in July 1969, then transferred to Kutztown, Pennsylvania, where I earned my Private Pilot (Glider) Certificate in November 1969 at the age of 72.

I get a kick at Kutztown when people nudge each other as I climb in the cockpit of a 1-26 or 2-33 and whisper, "Look at the old man," they say, "he must be 80." I'll be 78 in August but hope to make the 80 mark. So now, who is the oldest active sailplane birdman in the U.S.?

KARL H. WHITE

Seaside Park, New Jersey

That Trans-Australian Flight

Dear Sir:

I noticed in the December '74 issue of *Soaring* a short item concerning the Trans-Australia Gliding Expedition made in January of 1974. The information supplied by the Australian Information Service is incorrect. The expedition was not successfully completed. As pilot of the light aircraft "following the glider," I would like to say that for a large part of the time it was actually the other way around. The *Blanik* was actually towed for several hundred miles behind my DeHaviland *Tiger Moth* over the more inhospitable sections of the desert, and by another aircraft for a section in New South Wales. Also, due to lack of time, it was actually derigged and trailered from Port Augusta to Wagga, again a distance of several hundred miles. In all, I would say that only about 650 miles out of the total of approximately 2000 was flown in free flight.

Australia has still not been crossed by a glider in free flight, nor even by aero tow from coast to coast.

GRAEME D. MARTIN

Sandy Bay, Tasmania

Beating Sealed Flaps—A Legislative Victory?

Dear Sir:

I understand that our SSA Directors voted to permit the interlocking of flaps and ailerons for the coming Standard Class Nationals at Minden, seemingly ignoring current CIVV rules. At the same time, they refused to discuss an equally arbitrary issue, the use of flaps in ships such as the H-301, by allowing Rudy Allemann's relevant motion to die on the floor for lack of a seconding motion. Although the issue was later discussed in open session, I can appreciate why the Directors might not have wished to authorize this change without more systematic consideration of the problem. Those of us with a vital interest in this change hope that the Directors will assign a high priority to this issue.

Now the PIK, the *Nugget*, the 1-35, and the forthcoming Schreder HP-18 are all beautiful and sophisticated examples of the ultimate in the state-of-the-art of sailplane aerodynamics and structure. Uncomplicated, old-fashioned Standard Class machines, they are not; cheap, they are not. They are, quite simply, the products of aerodynamic progress, the pressure of the consumer, and purchasing power. Their designers and fabricators have achieved their considerable success in spite of, rather than because of, the ever-changing rules of the Standard Class. Therefore, because of these magnificent machines, the Standard Class is truly dead and a *de facto* 15-Meter Class has been created. There is no doubt that Schreder and others have made truly significant contributions in glide path control with their particular flap design. I know because I am co-owner of a Schreder-designed sailplane, and the glide path control leaves nothing to be desired. I also fly an H-301 which employs a different solution to the problem, but one I am perfectly comfortable with. The Open *Libelle* was and remains relatively cheap. But, oh! The trivia having to do with where the flap is hinged and whether one may also use spoilers challenges the imagination. I have flown Standard Class without a whimper against the Standard *Libelle*, the *Cirrus*, AS-W 15, Schreder, LS-1, and what have you, with my flaps sealed. But somewhere, there must be someone who will agree that with the new Super-15's the game has changed.

If I were a PIK driver—and, truthfully, I'd probably enjoy that—I would be embarrassed to beat a 10-year-old *Libelle* with sealed flaps and have to go to bed with the nagging suspicion that I had won only a legislative victory.

MALCOLM A. BAGSHAW

Stanford, California

Send a Little

Dear Sir:

I hope *Soaring's* readers caught the announcement about the 2nd Feminine International Gliding Competition at Leszno, Poland. The contest is scheduled for June 15-29 and Erica Scurr (top photo, above) and Britt Floden will be representing the U.S. They are experienced soaring pilots and highly motivated. "The first contest was a terrific experience," Britt told me. "I just wonder how much I learned last time." In a letter Erica wrote, "I'm very excited about the project. I want to go very much and am prepared to put in a lot of effort to do so."

Both have already been working hard at fund raising and self-preparation. Even though the expected cost per person is $6000 for air fare, rental of the *Cobra* 15 sailplane, etc., they are willing to come up with as much money on their own as they can—not too easy a task these days! Because of this, a fund drive has been started to help these pilots and their crews. If we will all send a little, it won't be such a tremendous job. So please dig in and help out. Make your tax-deductible donation payable to SSA Women's Team Fund and send it to SSA, P.O. Box 66071, Los Angeles, Calif. 90066. Thank you for your help.

BETSY HOWELL

Oak Brook, Illinois

Anonymous Letters

Dear Sir:

The comment about Taos in the March issue of *Soaring* from the "Annoyed Watcher" should never have been printed. I think it is a bad policy to accept letters of this type from people who are too little to identify themselves.

The comment made by this anonymous person pertaining to our tidiness, was totally false. Glider people are probably more environment conscious than most groups. Our clean-up detail left the airport spotless, which by the way, was a lot cleaner than we found it.

CULLY CULWELL

Dallas, Texas

Homebuilder, Put Away That Axe!

Dear Sir:

After five years of working weekends and nights I have just completed my own sailplane, an HP-14. I have flown it. What a pleasure to fly! It was worth it. There were times when I wanted to take an axe and chop it up. Now I'm glad I didn't.

THOMAS R. WARD

Saugus, California

The Club Libelle

Dear Sir:

Bob Buck's delightful 'brief encounter' with the *Club Libelle* (*Soaring*, March '75) leaves me with this serious question about a future 'staple' ship: He describes a "pretty steep turn at 75 kmh with .57 meters per second sink" which he translates to 125 fpm. OK? No. My calculator says .57 m./sec. = 112.4045 fpm, a 10% difference. Figures in the brochure give minimum sink (level flight?) of .56 m./sec. at 64 kmh, or 1.84 fps, or 110 fpm. Sounds right, but how did Bob get only .01 m./sec. higher sink when 11 kmh faster in a tight bank? If only he hadn't used figures in the article to two decimal places, we could write off the data as a quick-look impression. What gives?

JOHN JOSS

Los Altos California

★ *A pilot report is not to be compared with the type of flight testing epitomized by Paul Bikle's celebrated reports. Bob Buck's quick trip to Saulgau and his sharing of the experience was a quick-look impression. "I can't provide picayune accurracy under such flight conditions," says Buck. "Air masses move up and down. We never really know what's going on except under careful, Bikle-type controlled tests."*

Accolade

Dear Sir:

Thanks for the article on the 1975 Soaring Convention. Accolades for the Convention's program should also go to Phil James, our Program Chairman, who did such a splendid job of coordinating all aspects of the Program Sessions.

MARILYN SMITH

Fremont, California

Barograph Rotation Time

Dear Sir:

This article may be worth putting in the letters-to-the-editor section of *Soaring*, it may stop somebody from making the same mistake I did.

After several years of making barograph traces of all long flights, in the summer of 1974 I went through the following scenario for a Diamond Distance attempt.

Cameras checked, oxygen checked, declarations checked, and barograph set on two-hour rotation. The two-hour setting is per the SSA recommendations revised and dated March 1974. All my previous shorter distance flights had been made on the four-hour setting.

The SSA regulations say all barographs have ample running time and, after all, the Winter model 12 that I was using could be run on two, four, or ten hours per revolution, so obviously the barograph would run at least ten hours, right? Wrong! To my dismay, when set for two hours per revolution, the barograph stopped in about seven and a half hours—just short of my flight time plus the base line marking period, therefore no Diamond.

My first reaction was that I had not wound it up enough, but after thinking about it for a while I decided to test the barograph. Eureka! I found on the two-hour setting the maximum I could get after several tries was eight hours and fifteen minutes. On the four-hour setting over twelve hours and on the ten-hour setting over thirty hours. Additional tests on other Winter barographs of the same model gave substantially the same results.

This experience suggests several alternatives:

(a) Throw away your model 12 Winter barograph.

(b) Set it on two-hour rotation and listen closely for the last hour of your flight, praying quietly at the same time.

(c) Set it on the four-hour per revolution setting and ignore the SSA recommendations.

NORMAN L. DONATT

Bellevue, Washington

★ *A slow rotation can make evaluation of a barogram difficult, but pilots experiencing the long-flight problems of Norman Donatt should use the four-hour period and take pains to ensure a clear trace in the preparation of the barogram foil or paper.—Judy Felts.*

A Special Kind of Lift

Dear Sir:

When the cost of life memberships in SSA was raised to $200, some of the lifers (including myself) who had paid $100 kicked in the extra hundred voluntarily to maintain the earning power of our membership to cover at least the annual cost.

Now that Life Membership has gone to $250 I am enclosing a check for $50 made out to the Life Membership fund of SSA to keep me current.

I'm hoping this letter will motivate at least a few other "Lifers" to do likewise.

BILL COVERDALE

Naples, Florida

In Behalf of Straight Wings and V-Tails

Dear Sir:

William Foley's article "Understanding the Standard Class" in the Jan. 1975 *Soaring* is a simple and clear statement of the wide range of aerodynamic effects on sailplane performance. It does incidentally show the difficulty of defining an optimum performance—why wouldn't the *Cirrus* be better for a 20% chord increase if this has no real effect at high speed while it improves the low speed performance so greatly?

The care so often lavished on optimising planform shape, which in theory is supposed to result in much less induced drag than, for example, the parallel chord shape, is unfortunately not rewarded in practice by any practical difference. This has been shown by performance measurements by Bikle, Torode, Zacher, etc. which reveal typical induced drag values some 30% to 40% higher than the perfect goal, even 50% in the case of the *Kestrel*. Figure 6 in the article has to be interpreted carefully if the theoretical effect of planform is not to be over-rated. Although the difference looks large, the actual effect at minimum sink and best glide speeds is only a few percent, and even this is swallowed up by the effect of Reynolds Number on those tiny wingtips.

Drag due to R.N. increases very quickly indeed as the chord decreases to normal wingtip values at low speed. This effect is greater than at high speed where R.N. is seen to have such a remarkable effect on the 20% chord changes to the *Cirrus*. It need be no surprise that the low speed drag of a tapered wing with a tip chord only half that of a parallel chord wing is no better or may even be worse than that of the latter. When the excellent stall and low speed handling qualities of parallel wings are utilized, the climbing performance in practice can be hard to beat.

If any designer used a V-tail to reduce tail area, it must have been because he failed to understand them. To obtain the same tail and fin volume, a V-tail requires about the same total area as other configurations. Any area reduction could only be achieved by increasing the aerodynamic efficiency of the surfaces, for example by using a high aspect ratio, which was not the case in past examples. As a V-tail can go to much higher sideslip angles than an ordinary fin without stalling, it does not need the low aspect ratio of the latter. It can also easily be made all-moving which results in exceptionally good directional stability, because there is no tendency to trail with the sideslip.

Next time any reader finds himself struggling to circle neatly and without sideslip in his modern sailplane, he should blame fashion for making T-tails "in," because he could otherwise have been circling hands-off and carefree with a V-tail behind him. And to anybody who says that they are bad news in a spin, I would just say that you should not be surprised by this if your tail is only 75% of the size it ought to be. With conventional areas, recovery is immediate.

Preston, England JOHN GIBSON

Equation Typo

Dear Sir:

There is a typo error in the Lift Coefficient Meter article (*Soaring*, March, '75) in the V_z equation in Figure 5 on page 24. The correct form is:

$$V_z = \frac{C_D}{(C_L \cos\gamma)^{1.5}} \sqrt{\frac{W}{S\rho/2}}$$

DAN ALTSTATT

Sacramento, California

Australian Ballast Control

Dear Sir:

In view of the continuing correspondence concerning the practice of loading sailplanes in excess of their maximum all-up weight, our experience at the recent 14th Australian National Gliding Championships may be of interest to *Soaring* readers.

Some months before the contest, the organizers realized that overloading could be a major problem if no action were taken to prevent it, and further, they considered it irresponsible to ignore the issue. Whilst the organizers had no particular desire to act as policemen and were most reluctant to interfere with the actions of individual pilots, it soon became clear that if a fair contest were to be conducted some checking and weighing of aircraft would have to take place. Quite apart from the safety aspect which, from *Soaring's* pages, appears to be debatable, it was considered that no pilot should be forced to overload his aircraft to remain competitive, or, conversely, be disadvantaged by remaining legal.

A section of the rules was devoted to the subject and gave the organizers sweeping powers to weigh any or all gliders at their discretion on the launch-grid. Penalties were envisaged up to complete loss of points for the day for a serious transgression but, thankfully, were never required in the Championships.

Not only were the rules circulated to all contestants well before the competition, but an article appeared in *Australian Gliding* clearly stating the intention of the organizers to control overloading and listing the all-up weights of each aircraft likely to compete so that any dissension could be cleared up before the event itself. Some correspondence did ensue after the publication of this list, but all queries and disagreements were resolved prior to the competition.

Sets of scales were made available to contestants during the practice period. Most pilots took a great deal of trouble to ensure that they were within the legal weight limits when it was realized that the organizers meant business. Initially some random weighing took place on the launching grid where all pilots were deemed to be 'ready for takeoff.' Ultimately a ballot was held for each class every day and about half a dozen aircraft weighed. This became quite routine towards the end of the contest and the pilots took it in good spirit and were, without exception, entirely cooperative.

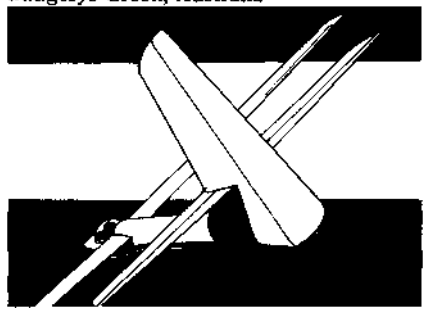
Some doubts were expressed as to the accuracy of weighing in a strong wind but it was found that, if the wingtip of the machine being weighed was pointed directly into wind and held by one tip only, the variation between weighing in the open or in an enclosed hangar was not more than ten pounds at the most. Such an amount was hardly relevant and no contestant was found with significantly more excess weight than this at any time.

Weighing became quite an event each day and relieved the tedium of waiting on the launching grid. Notable incidents: one contestant was handed his lunch *after* weighing by a crew member who ostentatiously bent double with the strain of carrying it; a female contestant being weighed separately (a general practice for all contestants) and enduring the comments of the assembled throng; and Standard Class winner Ingo Renner creating quite an impression by being the only contestant exactly on his all-up weight—to the pound.

The experiment in the control of this ticklish problem was undoubtedly a success, and, one may hope, quite a relief to the contestants, who were no longer wary of being outgunned by the opposition! The time taken to implement the weighing of a small number of gliders each day was minimal and no disruption to launching occurred.

ROGER A. WOODS
Competition Director,
14th Australian National
Gliding Championships

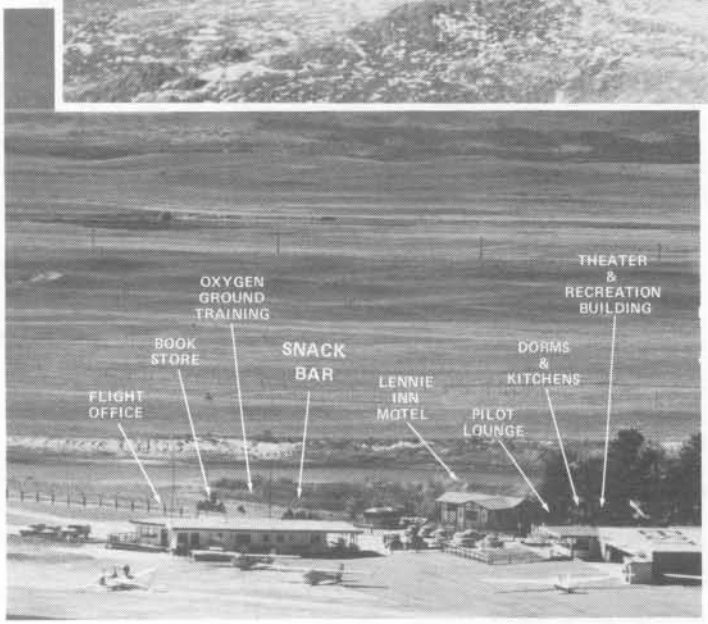
Badgerys Creek, Australia



PETER WARD

BLACK FOREST

Has it all!



Success through professional guidance!

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SSA IN ACTION

NATIONAL SOARING WEEK

The Soaring Society of America has designated June 30 through July 6, 1975, as National Soaring Week. The purpose of the Week is to call attention to the sport of soaring. All soaring enthusiasts, and especially soaring clubs and soaring schools, are being urged to make a special effort to help realize this purpose.

Planning for National Soaring Week might be divided into three phases as follows: 1, pre-Week publicity; 2, activities at soaring sites during the Week; and 3, post-Week accommodation of interest generated by the Week.

The first action should be for motivated individuals to call meetings of other interested persons to decide what, if any, activities they would like to promote for their soaring site. That would help determine what pre-Week local publicity should be developed. Here are some ideas and suggestions, but use your imagination, too, and let SSA know what you plan so others can be informed of it, also.

Static displays of sailplanes that visitors can look inside; sailplane rides; demonstration of various types of towing; open house; barbecue; pancake breakfast (Boy Scouts often do this for functions); paper glider contest (clean-up problem); July 4th celebrations, fireworks in evening; show movies in the hangar (the new SSA promotional film, "The Joy of Soaring," should be ready by then. Plan to buy a copy for unlimited local use); award prizes for pre-Week competitions (sailplane rides, merchandise from local merchants, SSA and local club memberships); drawings for door prizes; demonstrate dumping of ballast from a competition sailplane on a conservative simulated contest task finish; conduct a local soaring competition with special spectator appeal, such as spot landings, duration, short triangles, yo-yo events, etc.; designate a local girl as Miss National Soaring Week and have her act as receptionist and hostess for visitors; try to have local soaring pilots make flights for badges or state records during the Week and keep the public informed of the results; and have a public-address system at the site with some knowledgeable announcers to keep visitors informed about what's going on and explain what soaring is all about.

Pre-Week publicity might include the following: announcements on local radio and TV stations; offer short film clips to TV stations as fillers; news releases to the local media on planned activities for the Week; photos and articles submitted to the newspapers and area/regional magazines; get in their calendar of events; offer sailplane rides to prominent local persons and have the media there to cover it (governors, mayors, senators, congressmen, legislators, county supervisors, city councilmen, businessmen, sports personalities, entertainment personalities, etc.); enlist the aid of the Chamber of Commerce to publicize the Week and help conduct the activities, provide prizes, etc.; make up some posters to put up around town; print some flyers/announcements to leave at businesses for people to pick up; print a give-away sheet of information on soaring and the local club or school to hand out at the field during the Week; and conduct contests (with prizes to be sailplane rides during the Week) such as essay contests for high school students, Scouts, airplane pilots, or YMCA members, perhaps having as a

DON MONROE

Lloyd Licher

subject "I Want to Soar Like Jonathan Because. . . ."

These are ideas that came to mind when first considering National Soaring Week, but an announcement from SSA headquarters will not "somehow" be translated into activity and festivities at all the soaring sites in the U.S. *People* get things done, so if anything is to be made of National Soaring Week, it will be the result of various individuals being sufficiently motivated to do something for the Week. SSA is really the sum of all its members; what they do for SSA is what SSA does. Let's make soaring a household word by introducing it to as many newcomers as we can.

—L.L.

DUAL REGIONAL CHAMPIONSHIPS

Competition in the Standard Class has been growing in the U. S. in recent years. The SSA has sanctioned the Standard Class Nationals since 1970. Regionals for Standard Class only have been held since 1971. Dual regionals, i.e., separate Open and Standard Class contests, were first held in 1973. Soaring competition has now evolved to the point where, this year, the SSA Contest Board has ruled that *all* regional soaring championships are to be duals.

This year's contest rules specify that a regional soaring championships shall have separate Open and Standard Class contests. A minimum of 10 entrants will be required to make a championships and to name a champion in a class (Standard or Open). With less than 10 but more than five entrants in a class, the winner will be awarded an SSA Bronze Medallion rather than the Silver Medallion awarded to the regional Open or Standard Class Champion.

With ten or more entrants in a class, pilots will earn seeding positions in Categories 2 and 4 in accordance with the entry priority rules that have been used for the past three years.

If a class has fewer than ten entrants, only one Category 2 seeding position may be earned (two positions are earned for 10-19 entrants), but only if five or more names remain after all Category 1 names are removed. If a class has fewer than ten entrants and less than five names remain after Category 1 names are removed, no Category 2 positions will be earned.

—D.M.

SIGMA MAY BE SOLD

SSA Technical Board Chairman **Jim Nash-Webber** reports that Operation Sigma, Ltd., may wish to put the British research sailplane *Sigma* up for sale. **Frank Irving,** who heads the project, wrote to Nash-Webber that the aircraft sustained damage to its undercarriage, ventral fin, and canopy, plus fuselage abrasions when its drogue chute inadvertently deployed during takeoff. "It has not yet been decided whether to repair it," Irving wrote, "so it may be offered for sale 'as is' or in a repaired condition."

The *Sigma's* basic concept—a variable-chord wing—was proven mechanically feasible, but airflow disruption arising from poor sealing and the buzzing of flexible fairings in high-speed flight have reportedly prevented the *Sigma* from achieving its predicted performance. "It is thought," Irving's

letter continued, "that the machine would be of interest either to an organization wishing to carry out further research on the variable-chord concept, or to an individual or group prepared to modify and develop it for a contest sailplane . . . It cost $140,000 to build, but that figure is obviously no guide to its present value, and Operation Sigma would be prepared to accept a realistic price, bearing in mind the present condition and repair status."

Inquiries should be made to F. G. Irving, Department of Aeronautics, Imperial College, Prince Consort Road, London SW7 2BY, England.

U.S. SAILPLANE CENSUS

Ray Shamblen, SSA Sailplane Census Chairman, prepares his annual report for the winter meeting of the Society's Board of Directors. In his report this year Shamblen states, "These numbers reflect aircraft that have been in the U.S. Civil Aircraft Register for 1972, newly reported, or personally observed. Several hundred aircraft are on back file until their status is confirmed."

Ray's research shows 2699 sailplanes, of which 841 are multiplace. This represents an increase of not quite two percent over the 2516 listed last year. Motorgliders increased from 63 to 69.

[*No reliable figures are available for hang gliders. Estimates of their numbers range from 10,000 to 40,000 made up almost exclusively of Rogallo-type kites.—Ed.*]

The top forty sailplane types:

492 — Schweizer 1-26	23 — Schweizer TG-2
308 — Schweizer 2-33	22 — Phoebus C
138 — Schweizer 2-22	22 — Ka-7
117 — Std. Libelle	22 — AS-K 13
109 — Blanik	21 — Pratt-Read
88 — BG-12	18 — Tern
84 — Std. Cirrus	15 — Austria SH
80 — Schweizer 1-34	15 — Phoebus A
73 — Cherokee II	14 — Kestrel
64 — Ka-6	13 — Phoebus B
64 — Schweizer 2-32	12 — Bowlus BA 100
61 — LK-10A	11 — L-Spatz
55 — Schweizer 1-23	11 — Austria SHK
53 — Libelle	11 — Slingsby Dart
43 — AS-W 15	9 — Sisu
36 — HP-14	9 — Bergfalke
33 — HP-11	8 — AS-W 12
32 — TG-3A	AS-W 17
28 — Ka-8	Austria S
27 — Cirrus	Concept 70
25 — Laister LP-49	LS-1
25 — Diamant 16.5	M-100S
23 — Schweizer 1-19	

HIGHEST SOARING HONOR

Each year the world's national aero clubs nominate candidates to receive the Lilienthal Medal. These nominations go to the CIVV which selects and recommends a recipient to the General FAI which in turn makes the presentation at its annual Conference.

The 1974 award has gone to **August Hug** who is called the father of gliding in Switzerland. Hug has dedicated his life to aviation, joining the Swiss Aero Club in 1928. He was instrumental in establishing motorless flying in Switzerland and served for 25 years as President of the Swiss Aero Club Gliding Committee (the equivalent of the SSA in the U.S.).

DON MONROE

VINTAGE SAILPLANE NEWSLETTER

The *Bungee Cord*, a newsletter devoted to reporting and promoting vintage sailplane activity, made its appearance with Volume I, Number I in March. It carries news of the Second Annual Vintage Sailplane Regatta scheduled at Harris Hill, New York, for the 16th through 18th of this month. This event will coincide with the National Soaring Museum's Spring Symposium, a regular meeting of the NSM trustees, and a formal dedication of the facility.

The Vintage Sailplane Association is sponsored by the NSM and membership is $5.00. The *Bungee Cord* is edited by **Geoff Steele** of Arlington, Virginia.

DOWNWIND DISTANCE DASH

The Free-Distance Task is alive and well! The 35 members of Refugio Soaring Circle in Texas have announced a nine-day contest (June 21-29) aimed at taking advantage of the prevailing southeasterly winds and cloudstreeting that characterize this period. It is noted that several of the Circle's members have capitalized on this situation to make successful 400-mile flights. Contestants are not required to return to the field but simply get landing cards signed and mailed back. The contest will be handicapped and trophies will be awarded to winners and runners-up in several classes, including a 1-26 class. For more information contact Contest Director Ken Arterburn (515) 526-4445.

ULTRALIGHT: How much flying can you buy for $13.95 per pound? SSA'er Emmett Tally says his new 100-lb. BIRDMAN can get you airborne with its 15-hp, two-cycle engine, keep you airborne between 18 and 60 mph, propel you cross-country between 18 and 60 mph, and (with engine off) sink at approximately 2.4 fps while coasting down a 14:1 glide slope. When the accompanying picture was taken at Daytona Beach, Florida, the prototype had been flying a month. "The remarkable light weight was achieved," writes Tally, "through the use of advanced plastics in composite structures without reductions in strength." A complete homebuilder kit is being marketed at $1395.00.

POTOMAC PIPELINE

Excerpts from weekly reports forwarded to SSA from Washington by David Scott:

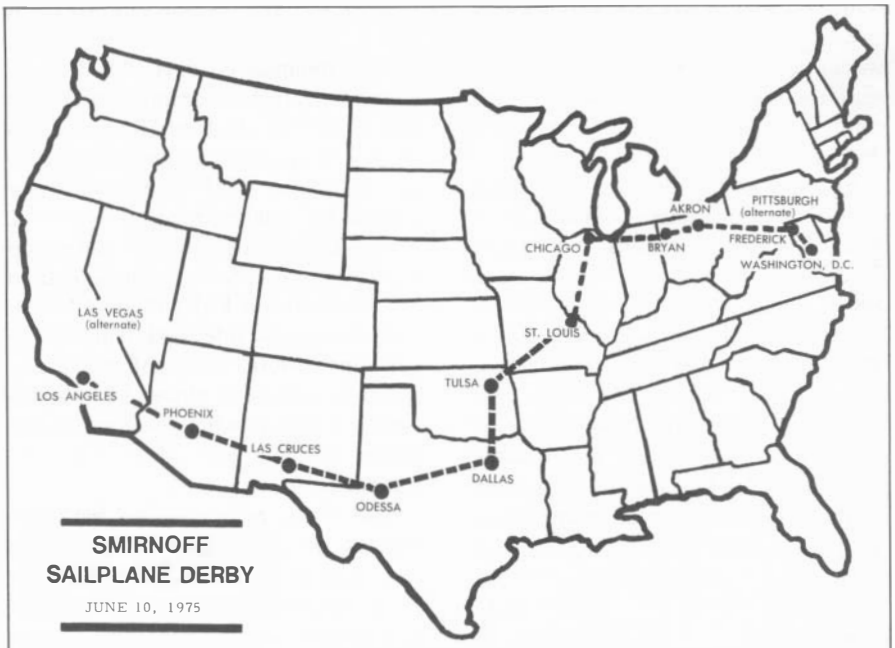
Single-Place Checkout: Last March EAA petitioned the FAA to permit pilots who fly only single-place aircraft to take the biennial check ride with the check pilot remaining on the ground and observing the flight. No check-out on a dual-place aircraft would be required but these pilots would be restricted to flying single-place aircraft.

This petition for rule making has been stalled in the FAA for many months with the excuse that it had low priority. In FAA language this means nothing will be done because something more important is always shoved in ahead. Nevertheless, constant prodding at the FAA has at last gotten a promise that along with a number of other minor amendments to Part 61 of the Federal Aviation Regulations the single place check-out will be proposed as a NPRM in about 30 days. Probably it will be 60 to 90 days before this appears in the Federal Register.

Weather Broadcasts: The U. S. Weather Service is greatly expanding its continuous radio weather broadcasts on VHF frequencies 162.40 and 162.55 mHz. At present there are 73 radio

stations continuously broadcasting weather information. Another 52 stations are planned by June 30, 1976, with an eventual total of 331 stations covering 90% of the population in the continental United States. Although these broadcasts are not tailored for aviation weather, they are helpful to pilots because they do give weather system trends and are available 24 hours a day. Radios capable of receiving these broadcasts are reasonably priced—around $20 in most cases. Some radios are specially designed for these broadcasts and have only the weather broadcast frequencies.

ADAP Legislation: The Administration bill on the new Airport Development Aid Program bears number HR. 5017. Copies have not been printed but the text should be available soon. The major change in the Administration bill is that the proposal for general aviation departure fees of $5 and $10 has been dropped. Instead, the Administration proposes to raise the federal gasoline tax from 7 cents a gallon to 15 cents a gallon. When and if the



Here is the course to be followed by the five contestants in the 1975 Smirnoff Derby. The takeoff for the race is scheduled for June 10th in Los Angeles. Contestants will include: 1974 Derby Champion Bill Holbrook (Schweizer 1-35), George Moffat (PIK-20), Helmut Reichmann (PIK-20), Karl Striedieck (AS-W 15), and Rolf Hossinger.

states take over the general aviation airport aid program, the federal tax would be dropped to 10 cents a gallon with the states expected to levy the extra five cents in order to pay for their state aid to airports.

In connection with taxes on general aviation, Representative Ullman, Chairman of the House Ways and Means Committee, introduced a bill, HR. 5005, which would impose a federal tax on non-commercial aviation fuel of seven cents a gallon starting on January 1, 1976. This would increase to 15 cents a gallon on January 1, 1977, 22 cents on January 1, 1978, 30 cents on January 1, 1979, and 37 cents after March 31, 1980. In addition, there would be a 20% tax on the sale price of all aircraft and accessories. The intent of this bill is to reduce energy consumption.

All general aviation groups here in Washington were taken by surprise on this new tax proposal and none of them had an opportunity to submit testimony because no hearings were held. There will be a meeting next week of all general aviation groups to plan strategy on opposition to this bill.

Intermodulation Products: The Federal Communications Commission has a notice in the Federal Register this week calling attention to interference in air-ground VHF communications caused by intermodulation products. These are spurious signals picked up by VHF receivers that can be caused by two powerful FM and/or AM stations that create intermodulation products in certain geographical areas, radiating signals produced by two dissimilar metals touching each other and design characteristics of certain solid state aircraft receivers.

The FCC recommends that purchasers of airborne receivers make sure that the set has been designed in accordance with Radio Technical Commission for Aeronautic's paper DO-157 which contains recommendations concerning receiver rejection of unwanted signals.

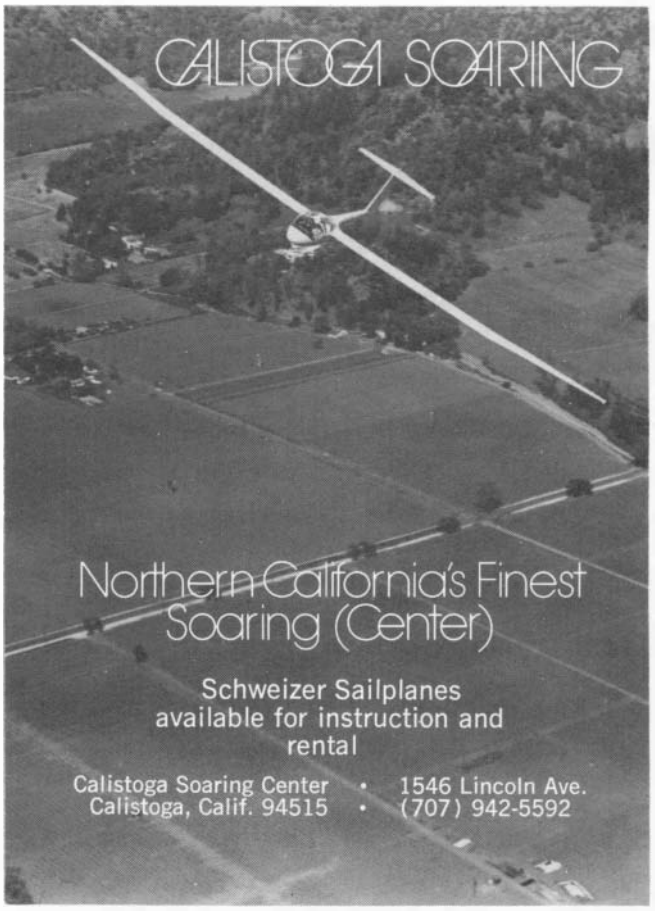
Plane Sense: The FAA has updated its Advisory Circular "Plane Sense" AC20-5C. This is a valuable booklet since it explains all the paperwork involved in purchasing and registering an aircraft with the FAA. Chapters include aircraft registration, bills of sale, airworthiness certificates, special flight permits, airworthiness directives, service and difficulty reports. The booklet concludes with an up-to-date listing of all FAA General Aviation District Offices.

IN MEMORIAM

I am writing to report the death of **Charles Abel** here in Naples, Florida. A long-time glider pilot and National Airlines Captain, it was he who piloted the first flight of the Detroit-Cleveland Sky Train Flights on which air mail was carried by glider. Harold Johnson flew the towplane, a Ford Trimotor, and the glider was a Franklin. The flight took place on August 30th, 1937; the mail was delivered to a special post office facility at the Cleveland Air Races. His Silver C was #245 and his Gold Badge #50.

Charlie was a great friend of all soaring people down this way. We shall miss him.

BILL COVERDALE



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by George Moffat

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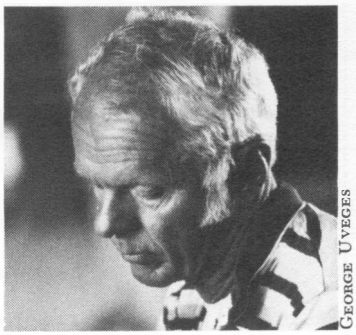
Pinch-hitting for Bill Ivans, Bob Buck represented SSA at the midyear Paris meeting of FAI's Gliding Committee. It turned out to be a decision-making session.

The CIVV Report

by W. S. IVANS, JR.



GEORGE UVEGES

W. S. Ivans

This meeting of the World Gliding Committee was held in Paris on March 14-15, 1975. A. Gehriger presided. Robert Buck was the U.S. representative in place of W. S. Ivans who was unable to attend because of illness (flu). Bob Buck reports vigorous debate and decisions taken on subjects which have been under consideration by the CIVV for a number of years:

1. Redefinition of World Championship Classes.
   a. After December 31, 1977, there will be three classes in a World Championships:
      1. **Open Class** (with World Cup for best 19m performance).
      2. **15-Meter Class,** no restrictions except span.
      3. **15-Meter Restricted Class,** which is the 1972 definition Standard Class (no flaps; ballast OK; retractable wheel OK). A **Club Glider** sub-class is to be established, with a World Cup for best performance. It will have a 15-meter span limit; other limitations will be provided by CIVV after the national aero club recommendations have been received.
   b. The 1976 World Championships will have Class definitions as at Waikerie in 1974: Open Class (with 19-meter Cup) and Standard Class (flaps permitted as alternative to dive brakes).

These are far-reaching decisions indeed. The Class 'home' for gliders such as the 1-35, Nugget, HP-15, -16, -18, PIK-20, etc. will shift after the 1976 Championships to the 15-Meter (unrestricted) Class. The H-301 Libelle will qualify for the new 15-Meter Class and can also fly (with locked flaps/no chute) in the 15-Meter Restricted Class.

The advent of a 15-Meter Club Glider sub-class represents an attempt to return to the concept of a simple, inexpensive, durable glider still suitable for competition; whether any such design can remain inexpensive and still be capable of winning world competition is open to serious doubt. Room must be found in our U.S. competition structure to accommodate the new Class(es).

Debate revealed a very strong 'anti-flap' sentiment on the part of England, Germany, Belgium, Sweden, and other countries, with only Finland, Holland, and Italy supporting the U.S. position favoring flaps. A U.S. proposal to use 1974 (Waikerie) Standard Class rules as definition for the 'new' 15-Meter Restricted Class was voted down 7 to 13.

2. A new edition of the Sporting Code for Gliders was approved, the culmination of an effort spanning several years. Two new speed records (around 750 km. and 1000 km. triangles, no leg less than 25 percent or longer than 45 percent) and a new triangle distance record (same leg length percentage limitations) were incorporated into the Code, as well as a new Day Factor (see *Soaring,* p. 16, Dec. '74) for championships scoring.
3. Hang gliders were once again discussed. It was decided that they should be encouraged to form their own Committee, with help from CIVV where requested.
4. Rules for the 1976 World Championships at Räyskäla, Finland, were discussed and approved. Competition days are June 13-27, with a June 5-12 practice period. Housing will be in short supply except for contestants, crew, and officials.
5. The 1974 Lilienthal vote was given to August Hug, of Switzerland.
6. Six Vice-Presidents of the CIVV were elected: T. Johannessen, Norway; A. Welch, U.K.; F. Ragot, France; P. Morelli, Italy; E. Makula, Poland; W. Ivans, U.S.A.
7. Bob Buck was unanimously made Chairman of the CIVV Airspace Committee, after having served with distinction as U.S. Member.
8. President Gehriger, who has been elected a First Vice President of FAI, announced that he would not be available for reelection to the CIVV presidency at the next full meeting of the Committee, scheduled for March 5-6, 1976, and that the first order of business would be the election and assumption of duties of his successor. The Bureau (officers) is scheduled to meet on November 28, 1975, and on March 4, 1976.

In attendance: Mr. A. Gehriger, Pres. CIVV, Switzerland; Australia, Mr. M. M. Waghorn; Austria, Dr. Heinz Geusau; Belgium, Mr. H. Stouffs; Canada, Mr. J. M. Firth; Denmark, Mr. Per Weishaupt; Egypt, Messrs. A. F. Eljanna, Mr. A. M. Shereef; England (U.K.), Mrs. Ann Welch, Mr. I. W. Strachan; Finland, Mr. J. Kaskia; France, Mr. F. Ragot; West Germany, Messrs. F. Weinholtz, Dieter Memmert; East Germany, Mr. M. Blauert, Dr. H. Koblischke; Hungary, Messrs. V. Lakatos, G. Sebestyn; Israel, Lt. Col. Reuven Levy; Italy, Mr. Piero Morelli; Japan, Mr. A. Miyahara; Norway, Mr. T. Johannessen; Netherlands, Messrs. H. F. V. M. Schwing, N. G. Visser; Poland, Mr. E. Makula; Sweden, Mr. P. Oberg; U.S.A., Mr. R. N. Buck; U.S.S.R., Messrs. I. Kovalev, N. Zhulanov; OSTIV, President de Lange; FAI, President B. Duperier, Director General C. E. Hennecart, Secretary Sandra Prodrom.

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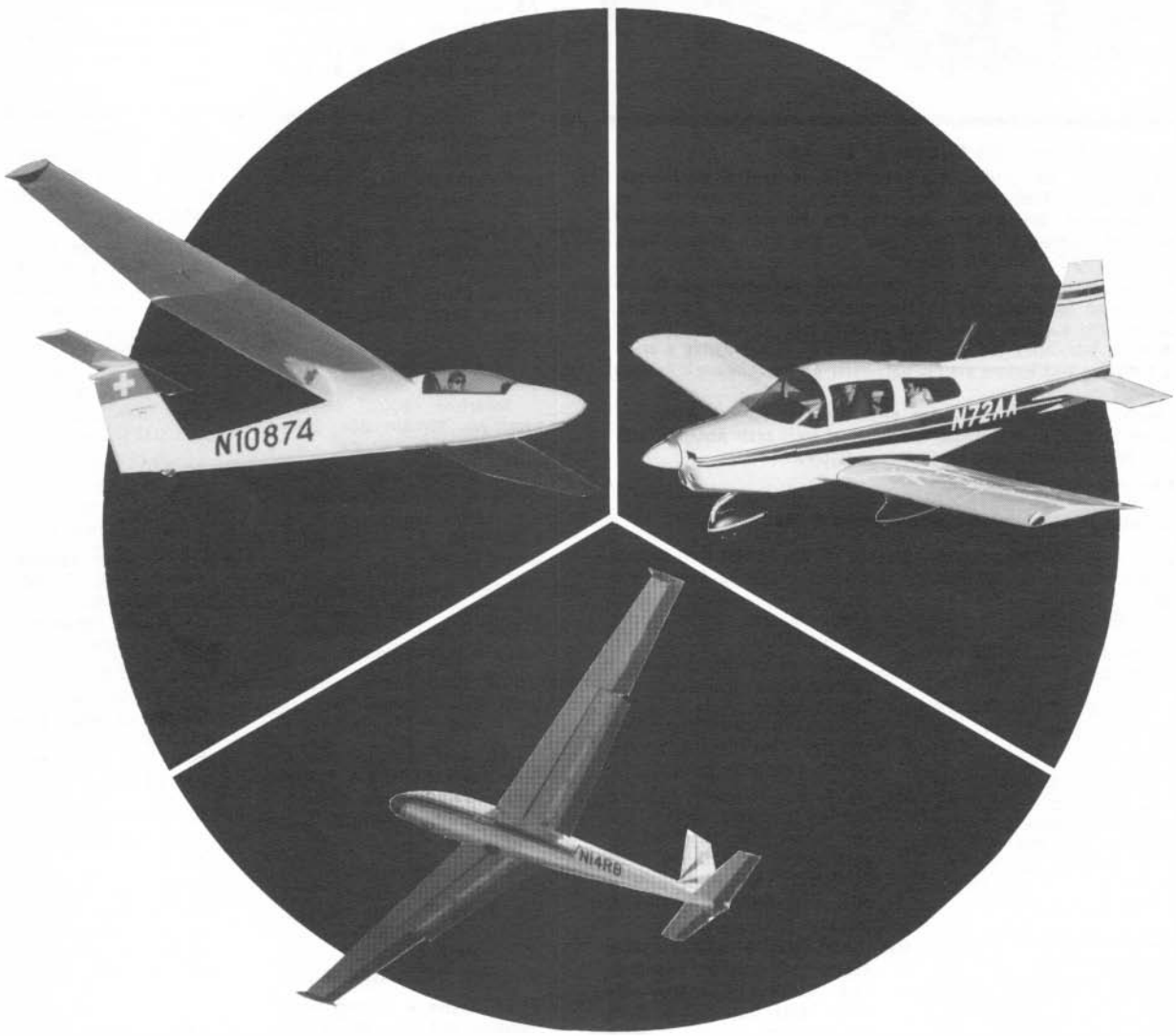

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CALENDAR OF EVENTS

Donald P. Monroe

MUSEUM TREASURE (From SSA Calendar for May 1975)

"Museum Treasure" was painted May 14th, 1973, in front of the National Soaring Museum at Elmira, N.Y. This was the same day that Mr. Gus Scheurer presented this primary glider to the Museum for permanent exhibition. The painting is not only signed by the artist, Millard Wells, but autographed by Gus, himself.

Millard is the artist who designed the SSA insignia. He and his wife Jeanne had been invited to attend the 1973 Symposium on World War Gliding Activities for the purpose of receiving a Certificate of Appreciation for their efforts in fabricating the first official SSA flag. It was during a break in these activities that Millard did his watercolor of Gus Scheurer's Primary Glider.

An incidental note of interest—upon discovery that all the water had been turned off around the Museum, Gus Scheurer went some distance, with bucket, to find the water used to do this watercolor.

—Watercolor by Millard Wells

Contests listed in bold-face type aresanctioned by SSA.

Apr. 26-27, Chico Distance Camp, Municipal Airport, Chico, Calif. Write G. Casamajor, Box 46, Chico, Calif. 95926.

May 3-4, Laguna Salada Soaring Festival, Mexicali, B. C., Mexico.

May 16, National Soaring Museum Trustees Meeting, Elmira, New York.

May 17, 18, Spring Symposium and Vintage Sailplane Regatta, National Soaring Museum, Harris Hill, Elmira, New York. Write L. English, National Soaring Museum, Harris Hill, R. D. 1, Elmira, New York 14903.

May 17-25, International Belgian Gliding Championships, Open and Standard Classes, Saint Hubert Airfield, Belgium. Write Belgian Gliding Clubs Federation, Rue Montoyer 1, 1040 Brussels, Belgium.

May 24-26, The 27th Annual Wright Memorial Glider Meet and 1-26 Association "Mini" Meet. Soaring Society of Dayton Gliderport, Waynesville, Ohio. Write Pat De Naples, 4864 James Hill Road, Kettering, Ohio 45429.

May 24-26, 6th Annual 1-26 Regatta, Warrenton Soaring Center, Warrenton, Virginia. Write L. Stahl, 10830 W. 2nd Street, Fairfax, Virginia 22030.

May 24-26, 7th Annual "Little Guys" Soaring Meet, Blairstown, New Jersey, Airport. Write Aero Club Albatross, D. Kiefer, 199 Stahl's Way, North Plainfield, New Jersey 07060. Call (201) 756-2712.

May 24-26, May 31-June 1, Region 8 Soaring Championships (bid, subject to approval), Municipal Airport, Ephrata, Washington. Write D. Barritt, 1808 Aberdeen Avenue SE, Renton, Washington 98055.

May 24-26, May 31-June 1, South Region 10 Soaring Championships, Caddo Mills Airport, Caddo Mills, Texas. Dual contest. Open and Standard Classes, separate scoring. Write S. Fly, 1408 Moss Rose Circle, Irving, Texas 75061.

May 24-26, Waverly West Handicap Soaring Contest at Waverly West Soaring Ranch, north of Fort Collins, Colorado. Write A. Herr, Waverly West Soaring Ranch, Box 1055, Fort Collins, Colorado 80521.

May 24-26, May 31-June 1, Region 11 Soaring Championships (bid, subject to approval), Douglas County Airport, Minden, Nevada. Write J. Christensen, 801 Klein Ave., Vallejo, Calif. 94590. Call (707) 642-0270.

May 26, Alaska Soaring Meet, Fairbanks, Alaska. Write D. Rice, c/o RCA Alscom, 629 E. Street, Anchorage, Alaska 99501.

May 26-30, Region 7 Soaring Championships, Sleepy Eye Airport, Sleepy Eye, Minnesota. Dual Contest. Open and Standard Classes, separate scoring. Write D. Taylor, 4944 Knox Ave. St., Minneapolis, Minnesota 55409.

May 27-June 8, Leadville Soaring Camp, Leadville, Colorado Airport. Write D. Johnson, Black Forest Gliderport, 9990 Gliderport Road, Colorado Springs, Colorado 80908.

June 2-6, Region 1 Soaring Championships, Sugarbush Airport, Warren, Vermont. Write Rachel Trahern, Sugarbush Inn, Warren, Vermont 05674.

June 10-14, Region 9 Soaring Championships, Estrella Sailport, Maricopa, Arizona. Write R. W. Townsend, 6215 Calle Redonda, Scottsdale, Arizona 85251.

June 10-25, Fourth Annual Smirnoff Sailplane Derby, Los Angeles to Washington, D. C., via Las Cruces, Odessa, Dallas, Tulsa, St. Louis, Chicago, Bryan, Akron, and Frederick.

June 14-22, Big Sky Rendezvous Wave Camp, Choteau, Montana. Write J. Robertson, 10022 Meydenbauer Way SE, Apt. 301, Bellevue, Washington 98004.

June 14-22, Midwest Badge and Record Camp, all classes, for Illinois and Indiana records. Write B. Brown, RR 2, Lawrenceville, Illinois 62439.

June 15-29, International Gliding Competition, together with the Finnish Gliding Championships, Rayskala airfield, Finland.

June 15-29, 2nd Feminine International Gliding Competition, Leszno, Poland. Practice June 8-14.

June 21-29, Free Distance Toward Home Contest, Refugio Soaring Circle, Refugio, Texas. Write K. Arterburn, Box X, Refugio, Texas 78377.

June 21-29, 2nd Annual Taos Soaring Fiesta, Municipal Airport, Taos, New Mexico. Includes overnight fly-in to Aspen, Colorado, June 24-25. Write C. Culwell, 4424 Larchmont, Dallas, Texas 75205.

June 23-27, Region 4 Soaring Championships, and 1975 Mid-Atlantic Soaring Meet, Municipal Airport, Frederick, Maryland. Write C. Morse, 9300 Fernwood Rd., Bethesda, Maryland 20034.

June 27-29, Central States Region 1-26 Soaring Championships, Taos, New Mexico. Write J. Foreman, 4335 Mesa Circle, Amarillo, Texas 79109.

June 28-July 5, National Soaring and Hang Gliding Festival, including Frankfort-Elberta National Soaring Hall of Fame Induction Banquet on July 5, Frankfort and Elberta, Michigan. Write Elaine Larson, 3223 River Road, Frankfort, Michigan 49635 (soaring), or D. Nelson, Frankfort, Michigan 49635 (hang gliding).

June 28-July 10, 10th International Championships of Mountain Soaring, Vinon Airport, 83730 Vinon sur Verdon, France. Write Remy Dayre, Secretary, Association Aeronautique, Verdon-Alpilles, 3 rue du Commandant Imhaus, 13006 Marseille, France.

June 30-July 4, Region 3 Soaring Championships, Harris Hill, Elmira, New York. Write L. Roy McMaster, Harris Hill Soaring Corp., R. D. 1, Harris Hill, Elmira, New York 14903.

June 30-July 6, National Soaring Week. Let's make a special effort to inform the public about our sport.

July 1-10, 6th U.S. National Standard Class Soaring Championships, Douglas County Airport, Minden, Nevada. Write D. Tunnell, 518 Pixie Trail, Mill Valley, Calif. 94941.

July 4-6, 7th Annual Fun Meet at Eagle's Nest airstrip, New London, N.H. Host club—Kearsarge Soaring Association, Inc. For room reservations, call Lake Sunapee Country Club, (603) 526-6040; write Harold F. Smith, Morgan Ridge Road, Crockett's Corner, New London, New Hampshire 03257. (603) 526-4219.

July 4-6, Westcliff Soaring Camp, Westcliff, Colorado Airport. Write G. Abels, 3100 6th Street, Boulder, Colorado 80302.

July 8-17, Canadian National Soaring Championships, Claresholm, Alberta. Write G. Thomas, 16623 93A Avenue, Edmonton, Alberta, T5R 5K1, Canada.

July 15-24, 42nd Annual U.S. National Soaring Championships, Hobbs, New Mexico. Write 42nd Annual U.S. National Soaring Championships, Box 1136, Hobbs, New Mexico 88240.

July 25, Summer Directors' Meeting, Hobbs, New Mexico. Write your Director.

July 26-27, 6th Annual Kentucky Bluegrass Meet, Harrison County Airport, Cynthiana, Kentucky. Practice July 25. Write V. Jones, RR 3, Box 300, Paris, Kentucky 40361.

July 26-Aug. 4, Cowley Summer Camp, Cowley, Alberta (wave and thermal). Write 1419 Chardie Place S.W., Calgary, Alberta, T2V 2T7, Canada.

July 28-Aug. 1, North Region 10 Soaring Championships, Sunflower Aerodrome, Hutchinson, Kansas. Write S. Bredfeldt, 13 Whitmore Road, Hutchinson, Kansas 67501.

Aug. 1-3, Saratoga Soaring Camp, Saratoga, Wyoming Airport. Write G. Abels, 3100 6th Street, Boulder, Colorado 80302.

Aug. 6-13, 10th North American 1-26 Championships, Caddo Mills Airport, Caddo Mills, Texas. Write A. C. Williams, Southwest Soaring, Inc., Box 665, Rockwall, Texas 75087.

Aug. 9-17, International Belgian Gliding Championships, Club and Two-seater Classes, Balen (Keiheuvel) Airfield, Belgium. Write Belgian Gliding Clubs Federation, rue Montoyer 1, 1040 Brussels, Belgium.

DEADLINES

The following application deadlines are in effect for preferential entry. Applications received subsequently will be treated by postmark date. See calendar for dates and addresses.

6th U.S. National Standard Class Soaring Championships May 2, 1975

42nd U.S. National Soaring Championships May 16, 1975

Regional Soaring Championships

Some regionals are placing a limitation on entries. The deadline for preferential entry is 45 days prior to the first scheduled day of competition for these contests.

Aug. 20-24, South Region 5 Soaring Championships. Cordele, Georgia. Dual contest. Open and Standard Classes, separate scoring. Write J. Satterfield, 6604 Fleming Road, Morrow, Georgia 30260.

Aug. 23-24, Aug. 30-Sept. 1, Region 12 Soaring Championships (bid, subject to approval), El Mirage Field, Adelanto, California. Dual contest. Open and Standard Classes, separate scoring. Write T. Schirtzinger, El Mirage Field, Adelanto, California 92301.

Aug. 26-30, Region 6 Soaring Championships, Ionia, Michigan. Write G. Anderson, 25142 Muerland, Southfield, Mich. 48076.

Aug. 30-Sept. 1, Annual Rocky Mountain Handicap Soaring Contest, Black Forest Gliderport, 9990 Gliderport Road, Colorado Springs, Colorado. Write M. Wild, Black Forest Gliderport, 9990 Gliderport Road, Colorado Springs, Colorado 80908.

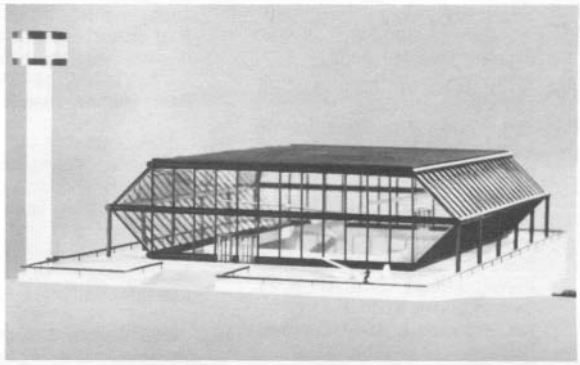
Sept. 6-13, 6th German Motorgliding Contest, Burg Feuerstein, West Germany.

Sept. 19-21, Forty-second Anniversary Celebration and Memorial Flight, U. S. Distance Record of 122½ miles from Waynesboro, Virginia, to Frederick, Maryland, flown by Richard du Pont on September 21, 1933. Write G. Wilburn, 1015 North Market St., Frederick, Maryland 21701.

FREE ITEMS FROM SSA

The Soaring Society of America has a variety of items available on a free distribution basis, including the following (request by item number or name from SSA, Box 66071, Los Angeles, Calif. 90066):

3. FAI Soaring Awards Application Form.
4. SSA Membership Application Form.
6. "SOARING . . . The S.S.A. . . . and YOU" pamphlet. Tells about the activity, glider pilot certificates, how soaring is organized, SSA, and how to get started in soaring.
7. List of Soaring Clubs.
9. List of Soaring Schools.
10. List of Books on Soaring.
14. SSA Officers, Directors, Committees.
23. SSA Merchandise Order Form.
24. Incorporation Procedures — Calif. non-profit clubs.
25. Suggested Bylaws for Soaring Clubs. For clubs being formed only.
30. List of Soaring Films Available.
34. Annual and 100-hour Glider Inspection Report Form.
35. SSA's ABC Training Program (how A, B, and C Badges are issued).
38. How to Start a Soaring Club.
39. State Soaring Records Rules.
41. SSA Chapters. Lists benefits and policies and tells how a club may apply for SSA Chapter status.
42. List of Foreign Aero Clubs and Soaring Centers. Sources of information about soaring abroad.
43. Poster to Promote Soaring, 11.5" x 15". Includes pad of tear-off forms for information kits. Has space for local information.
56. SSA Membership Benefits.
63. Contents of OSTIV Publications.
64. SSA Business Member Benefits.
65. Resale Prices for SSA Merchandise.
66. SSA's Traveling Photo Display. Describes the display, rules, and fees for its use.
74. List of **SOARING** issues available.
77. Long Flight Survey Form.
79. State Soaring Record Application Form.



Main entrance. Roof should provide a fine thermal generator.

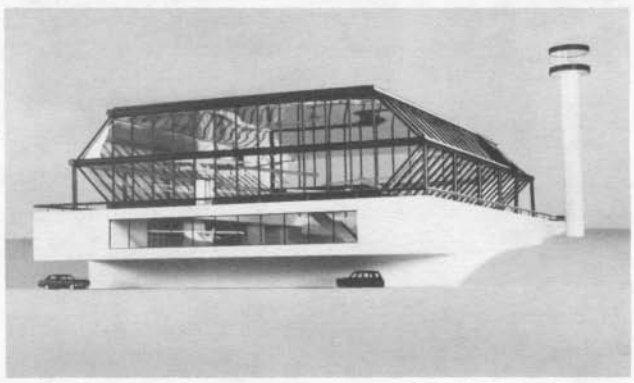
First it was an idea, then it lived in a hilltop WPA barracks, and now i
dwells in a reworked country home. But the National Soaring Museum i
destined for something more than hand-me-downs. Here its Director share
his vision. One of these days in the not-too-distant future the NSM will be . .

Moving On!

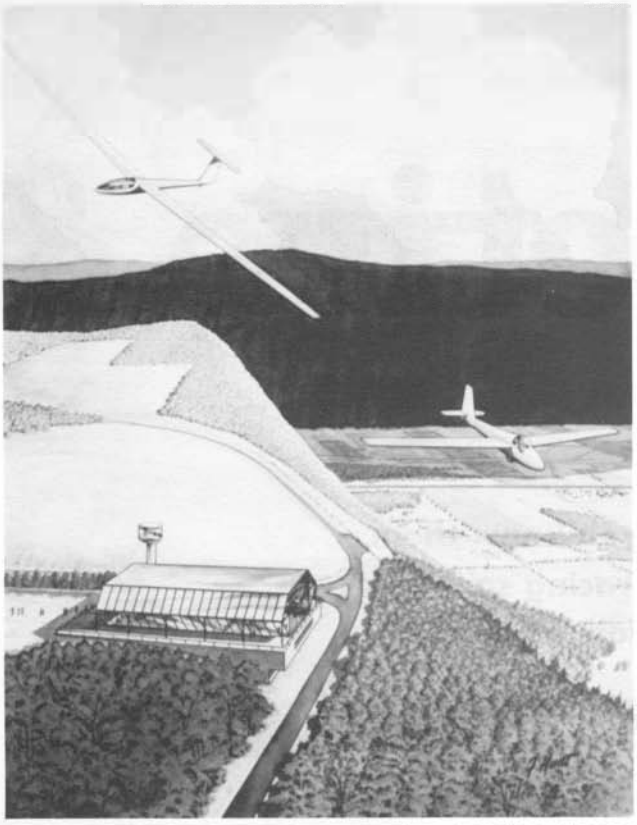
by LIAM ENGLISH, J

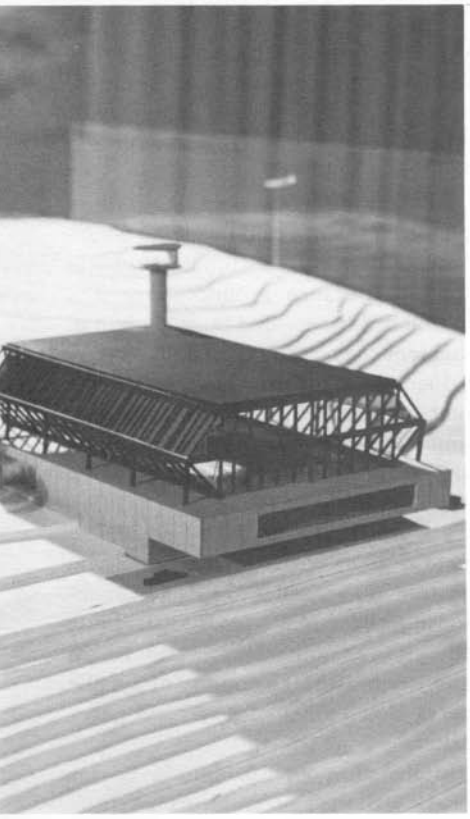
Interior view. Sailplanes and exhibits can be changed and moved as required. Photo by R. Huppertz.

The northwest side overlooks the ridge and valley. Observation tower on right gives view of activity on the glider field. Photo by R. Huppertz.



A Frank Hurtt drawing of the museum building in situ.





te model surrounded by five-foot contour s. Photo by Don Monroe.

The object over the man's head is elegant. It shines in the natural light playing over its white surface.

"It's beautiful! How does it stay up?"

He pushes a nearby button and a videotape machine starts rolling. Color pictures flash on a screen and a voice begins to describe how the sailplane hanging nearby won the first leg of the Smirnoff Derby the year before by efficiently utilizing ridge, thermal, and wave lift. Each form of lift is described quickly but clearly on the videotape, but the major theme of the exhibit is the drama and thrill of flying cross-country in a sailplane.

Across the way, a group of 40 people are standing before a 50-foot long relief model of the Appalachian Ridge, staring intently at one of a series of screens; this one happens to be located behind a miniature Bedford Gap. Slides roll by in sequence as the current holder of the World's Out-and-Return Record explains the decisions he made to help him get across successfully. A woman toward the back of the group nudges a person next to her and whispers, "Look at those green hills—sure beats city living."

In another area, knots of people move about from viewing station to viewing station. More questions, more answers. "These are the decisions I made," says the record holder on the tape. "This is what I did," says the taped voice of a soaring pioneer at another viewing station. Names like Calley, Montgomery, the Wrights, duPont, Barringer, and Moffat are heard as history slides by.

Outside on the deck, a couple sits at a table eating lunch and looking out over the valley. A sailplane flies by, almost close enough to touch. The man, a three-Diamond pilot from Florida, shakes his head, knowing how hard it is to scratch up a ridge in an 8-knot breeze. "Good luck!" he shouts. He can see the determined face of the pilot as he wings by.

Fantasy? For now, yes, but scenes like this will be common when the new National Soaring Museum facility is built on Harris Hill, site of much soaring activity and the birthplace of the Soaring Society of America.

Since the late 1960's a number of soaring enthusiasts from around the country have discussed the kind of museum that would be worthy of the magnificent sport of soaring. From the beginning, it seemed important that the museum stress two major things: preserving a rich tradition and involving visitors in the spirit and technology of motorless flight.

This dual purpose meant that a great deal of thought had to be given to the problem of designing the experience that visitors to the museum would have. It quite early became evident that it was not enough to simply place sailplanes and gliders around a floor and allow people to walk between them. Soaring, it was felt, deserved better treatment than that.

The building concept pictured on these pages is the result of a fruitful collaboration between Dick Huppertz, an exhibit designer and soaring pilot from California, and Eliot Noyes, a distinguished architect and soaring pilot from Connecticut. They have worked to develop a tool that will be both functional and exciting for the hundreds of thousands of people expected to visit the museum in the years ahead.

One day, a young boy will leave the museum with his father. It's a warm day and they pause awhile to cool off in the breeze that constantly blows over Harris Hill. A sailplane circles lazily overhead, gaining altitude with every turn. The boy pulls his father's sleeve and says, "That's the most alive museum I've ever seen . . . I want to be a pilot."

It could be. It can be.

A View from the Summit:
by GEORGE B. MOFFAT, JR.

Perspective &

Pilot's Report: When you've flown them, you know them. An assessment of two of the world's best racing sailplanes by the World Open Class Soaring Champion.

The AS-W 17 vs. Nimbus II

(Reprinted from WINNING ON THE WIND.)

In the 1972 World Championships at Vrsac, Yugoslavia, two new designs —the *Nimbus II* and the AS-W 17— appeared to dominate the Open Class competition. And if their success in the 1974 World Championships at Waikerie, Australia, is any example, they seem likely to maintain their supremacy for some time to come. Having won the 1973 U.S. Nationals in a '17 and the 1974 Internationals in a *Nimbus II*, I now have considerable experience in both types and feel that a comparison might be interesting.

In general, during 1972 most pilots seemed to feel that the '17 had a slight performance edge over the less exotic-looking *Nimbus*. This opinion was based in part on tests between the two craft by Dick Johnson and A. J. Smith. Few realized at the time that Dick's ship was some seventy pounds lighter than later production models. Then too, heavy rains during the Yugoslavian meet tended to favor the '17 with its less critical wing section. In addition, three of the four 17's entered against a field of ten *Nimbuses* finished 1-2-3 in the 1973 U.S. Nationals. (It should be noted that none of the *Nimbuses* were flown by serious contenders.) However, in the 1974 World Championships the tables turned and all the *Nimbuses* seemed to have a noticeable edge on all but one of the 17's. What had happened? What factors of design and flight characteristics accounted for these performances?

First, let's consider the AS-W 17. One is struck by the sleek contours, beautiful lines, and immaculate workmanship. In the air, the remarkable maneuverability for so large a ship immediately becomes apparent; its older 1962-design Wortmann wing section does not suffer as much performance loss due to insects or rain as does the 1967 section used on the *Nimbus*.

However, to offset these strengths there are a number of weaknesses. Certainly the first-noticed problem is the ship's great weight and difficult rigging. [*See "The Wife-Saver Trailer Fittings" by Joe Conn in* SOARING, *Jan. '75 —Ed.*] This weight, combined with the too-close fit of wing to fuselage, made rigging a near impossibility in hot weather until considerable fiberglass had been filed away. Unfortunately, the heavy weight also interferes with the flexibility of performance. With a 200-lb. load of water, the minimum wing loading is 7.1 lbs./sq. ft. compared to 6.1 for the *Nimbus*, giving the latter an edge in weak thermals. Conversely, the '17 carries only 240 lbs. of water for a maximum loading of 8.6 lbs./sq. ft. The *Nimbus* can be supplied with extra tanks to bring the loading to 9.3 for strong conditions— although these tanks created a bit of a rhubarb at Waikerie.

Another difficulty with the '17 results from the low and drooping wings. I found that even a stubble field was likely to produce ground loops if a tip touched the ground during a bump. The tendency is increased by lower-surface dive brakes that hang some eight inches below the already low wing (the *Nimbus* has only upper-surface brakes and a much stiffer wing). Adding to landing difficulties is a wheel brake of hopelessly inadequate design. None of the brakes on the four 17's in the '73 U.S. Championships ever really worked. Landing roll on a smooth surface can be an experience as 1500 pounds of kinetic energy slowly dissipates and spectators scatter.

In the air poor visibility is by far the 17's most aggravating characteristic. This is particularly frustrating in weak weather when one wants to keep an eye on sailplanes out ahead. In the '17 they are in a blind spot— one that does not exist in the *Nimbus*. Poor downward visibility can cost many seconds at turnpoints. I watched

—continued on p. 34

Retrospective

How can we tell what lies beyond the present class-definition turmoil? Looking back can help. Maybe there's a 13-meter future in the shape of things to come.

Contest Retrospective

The mid-point of a decade seems a good time for a retrospective look at soaring in the United States. This last half decade in particular has been one in which contest soaring has finally come of age in this country as indicated by our having placed first in one class or the other in three out of the last four World Championships, as indicated by the enormous growth of the Standard Class, and as indicated by the great increase of interest and participation in contest flying. Today many of our regional contests are both larger and more competitive than the Nationals were little more than a decade ago. How best to look at the events and developments of five years? Perhaps a look at the two classes and their trends, a look at contests, and a little crystal-ball gazing into the future might be a good way.

The Open Class

Five years ago the Open Class was so utterly ascendant in the United States that anyone wishing to prove superiority as a pilot had to fly in the Open Class and win, regardless of whether finances limited him to a 15-meter ship. The Standard Class was so looked down upon by the mighty in the SSA Establishment that the National Standard Class Championship was only rather grudgingly agreed to for the first time in 1970. *Real* pilots flew the big ships.

NED JACOBY

AS-W 12

604

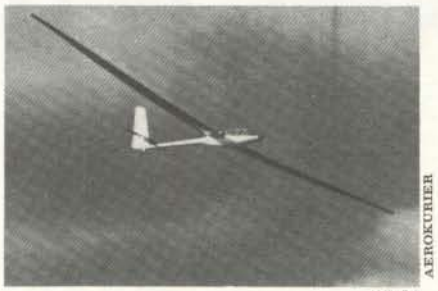
TOM BRANDES

Meantime, some developments were taking place that were to spell trouble for the long wings. In the 1970 World Championships in Marfa, Texas, *Nimbus I* and the Glasflügel 604, followed by a pack of AS-W 12's, showed convincingly that the new generation of Open Class sailplanes was upon us. Despite the handling difficulties of the *Nimbus,* it won the Internationals by a convincing margin. Normal 18-meter ships were left hopelessly behind. By

1972 the World Championships made it evident that nothing under 20 meters need apply to serious competition. Interestingly, however, this quantum jump in equipment development has not been followed by any further innovations. The Open Class has proved to have largely stagnated in design development since 1970. Only one really new and successful ship has appeared—the AS-W 17—and that was little more than an enlarged AS-W 12. One of the great excitements of flying in the Open Class had always been the feeling of being on the leading edge of technological development. Now the Open ships were virtually alike and available to anyone with $30,000 or so to put into his flying.

Sigma


BJ-3



SB-10

True, there have been some far-out designs sort of stumbling along in the wings, occasionally surfacing in an article that would scare the devil out of the *Nimbus* and '17 owners. But their successes seemed largely restricted to the minds of journalists. In England, the most interesting sailplane technologically—the *Sigma*— has gobbled up untold quantities of time, money, and energy to produce performance little better than a Standard Class ship. Frank Irving told me last winter that the project seems hopelessly stalled for need of $100,000 or so to rework the wings completely. In Germany the 90-foot span SB-10 has been flying for a couple of years but has not shown any serious performance edge over the *Nimbus* or '17. Surely if it really *were* all that remarkable wouldn't the Braunschweig people have gotten it into a contest or two? In Africa the steady stream of BJ's from Patrick Beatty's shop seems to have dwindled to a trickle, never quite having lived up to paper performance estimates. Albert Neukom's 23-meter variable-geometry ship, built a couple of years ago for Switzerland's Rene Comte, sits untouched in a hangar awaiting the detailed clean-up which *might* allow it to realize the planned performance.

Neukom

The gradual decline in popularity of the Open Class that became so obvious last summer appeared as handwriting on the wall as early as 1971 when A. J. Smith proved conclusively by winning the Nationals that Bikle's figures were perfectly correct—an AS-W 12 had a fifteen-percent performance margin over a Standard ship and also over most of the older Opens.

The following year muddied the waters a bit. At the Internationals it became obvious that only the 20+ meter ships had a chance. Meanwhile, back in Nevada, Ray Gimmey was showing that the gods still loved the little guy, winning handily in his trusty *Libelle*. Those who took more than a cursory look at the standings noted that the four best U.S. pilots were absent in Yugoslavia, that very few 20-meter ships were there, and those that were were not in the hands of ranking pilots. A handy thunderstorm that shot down most of the late-starting big boys helped immeasurably on one day. Winner Gimmey, nobody's fool, immediately started shopping around for an AS-W 12 with which to defend his crown.

In 1973 at Liberal, 23 out of 70 entrants were 18 meters or more, nine of which placed in the first ten, 14 in the first twenty. Last summer 19 out of 46 ships were 18 meter or more, ten placed in the first ten (all 20-meter ships), and 17 in the first 20. What had been only a hint five years before was now a certainty. Size wins.

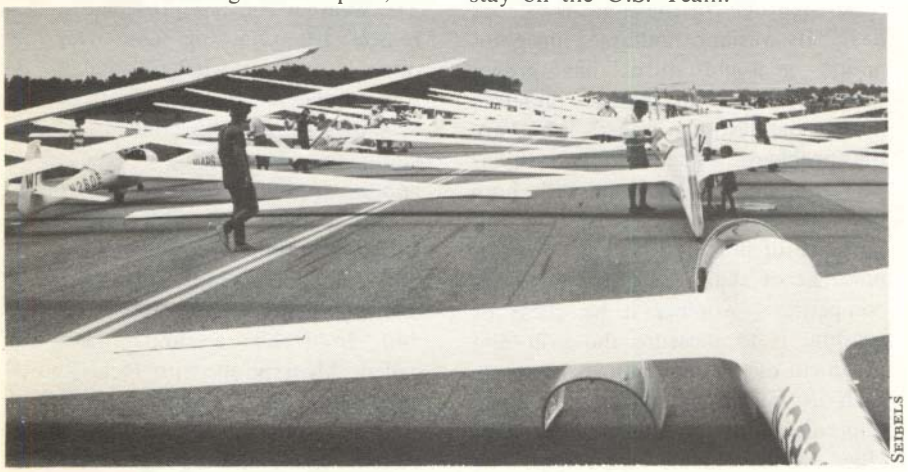
As this lesson became more and more clear the number of entrants began to drop off. Relatively few pilots had the $25-30,000 required for the blue chips and still less had the skill and time of an A. J. Smith, a Wil Schuemann, or a Dick Butler to modify and stretch a relatively cheap AS-W 12. As more and more pilots recognize the hopelessness of trying to compete in the Open Class without a big ship and as costs of contests—especially travel—increase, I would look for a further decline in the popularity of Open Class flying.

One ray of hope exists. As competi-

tion in the Standard Class gets tighter and tighter and the contests harder and harder to get into, some pilots may realize that it is a lot easier to be a big fish in the relatively small and uncompetitive Open Class pond. Thus, there may be a resurgence of interest among the well-heeled. This phenomenon has already occurred in Germany.

The Standard Class

Meanwhile with Goliath tottering, what of David? Those of us who spent some time in Europe during the 1960's came back to tell people in the SSA that the real competition was in the Standard Class, only to be greeted with disbelieving stares. I recall being surprised in 1968 when, flying in the Standard Class because I was low man on the seeding totem pole, I discovered that several of the European pilots thought I must be the outstanding American pilot because I had chosen to fly Standard. In the International Hahnweide contest that year we had 60 Standard entrants and some 19 Open.


SEIBELS

Not until 1970 did the SSA grudgingly decide to humor the pipsqueaks by authorizing a Nationals. Put on at Elmira, it was a very casually run two-bit affair, far less well run and organized than most regionals. The total organization was left to Joe Conn and Clarence See who tried manfully to do all the things a full contest committee normally does. The whole effort was thought too minor league to bother having a meteorologist. Entrants came to a surprising 43, of which 26 were non-fiberglass ships. Despite the consistently weak and hazy weather, the Ka-6's and one Ka-8, flown by Karl Striedieck, never really had a chance. The only nationally-known pilot in the contest won every day but one.

For reasons that still remain vague, the next contest was held in Washington state, just about the most distant possible point for a great many pilots. A good many Standard Class enthusiasts thought the choice was planned so there would be few entrants and the SSA could prove that there was no real Standard Class interest. In fact, 38 ships showed up at Ephrata, almost all from the West Coast. Only eight were non-glass. Unfortunately only two well-known pilots entered, one of whom, Rudy Allemann, won. All the other top-seeded pilots were at the Open Championships even if they had to fly Standard ships, as that was the only way to get on or stay on the U.S. Team.

In 1972, with the Standard Class contest finally centrally located at Marfa, the turnout was 63 (nine more than for the Open Class) with only three non-glass ships. For the first time in the contest history of the United States soaring movement we had a really one-design competition, with top-ranked competitors flying high-performance ships. Since all the ships were of similar cost as well as performance, a student like Tommy Beltz no longer had to put up with a hopelessly handicapped ship as he had when he had flown his SH-1 so well against the better-heeled in the late 1960's. Just to celebrate the arrival of flying dedicated to skill rather than income, Tommy won, with newcomers Wally Scott II and Ray Gimmey hot on his heels.

1972 was without question the year that the Standard Class really arrived. With a national championships finally as big and important as the Open Class came a much increased interest in the Class. Importers noted less and less interest in the increasingly heavy and complex Open ships and more and more in highly competitive Standards.

In 1973 a rain-plagued Nationals at Chester, South Carolina, saw another big turnout of 56 ships, but, more important, it saw the big-name pilots of U.S. soaring flying in the Standards at last. Of the members of the 1972 U.S. Team, only Dick Johnson failed to show up at Chester. In contrast to three years before when I had won so easily at Elmira, I placed second to Karl Striedieck's win, with A. J. hanging on in fourth and Ben Greene in seventh. Karl and a lot of others had come a long way since 1970.

Last year's meet in Hobbs merely put the cap on a trend that had been clear for a couple of years. Not only was the Standard contest bigger (60 entrants to 46 at Adrian) but the class of pilot was in a whole different league. At Adrian there were three past National champions flying, at Hobbs there were nine, including all but one member of the U.S. Team who had to withdraw at the last moment for personal reasons. If at Adrian the contest people were begging for entrants, at Hobbs there could have been another twenty or more ships had the rules permitted. The fact that the current World Open Champion and current National Open Champion placed 9th and 13th behind Dick Johnson's win might indicate the quality of the competition. The stepchild of 1970 had become the giant of 1975.

At the moment there seems little indication that the quality and quantity of Standard Class competition will not remain high for the rest of the decade at least. As long as there is no drastic change in the rules such as allowing variable camber flaps and ailerons, present-day glass ships should remain highly competitive. Over recent years all the major manufacturers have produced a winner (Standard *Cirrus* in 1970 and '72, *Libelle* in 1971, AS-W 15 in 1973, and the PIK-20 in 1974). So far none of the new flapped designs such as the PIK have shown any clear-cut superiority, although the latter ship did seem to have an edge at the very high speeds used in Hobbs.

(One week after I wrote this article, the Board of Directors of the

SSA voted in San Francisco to allow linked flaps and ailerons in the Standard Class effective immediately. This move, at complete odds with the CIVV's plan to authorize such linkage in 1977, at one stroke of the pen destroyed the fine competition between evenly matched ships which has been available for five years. At the same time, this move made three of the four types that have won the Standard Class Championships no longer competitive and thus drastically reduced their dollar value. The SSA's action seems remarkably shortsighted since it put the owners of over 90% of the competitive Standard Class ships at a great disadvantage for the 1975 Nationals at Minden. Only those lucky enough to have a PIK-20, a Nugget, or (if someone manages to get one cleaned up enough to be contest-worthy) a 1-35 will have any real chance. Actually, not all the owners of those ships will be able to retrofit a linkage system in time for the contest. Needless to say, those with money enough to buy a PIK-20, regardless of price (an offer of $20,000 was recently made to dealer Martti Riekkinen for his demonstrator), or lucky enough to have put in an order two years ago (myself), or well enough known to be able to borrow one, will have an enormous advantage.

Now that this last real barrier to a 15-meter open class has been removed, a large jump in prices may be expected. For a number of people, the SSA's latest move will probably mean the end of serious contest flying. In the time I have been flying I have seen the price of a contest-worthy ship go from 80% of a year's salary (1962-72) to 125% of a year's salary (for my new PIK-20). For me, and I imagine a lot of others, this is about the limit.)

Contest Rules

The basic rules used for contest flying in the United States had already been brought to a very high standard by 1970, thanks to the efforts of people like Paul Bikle and Bill Ivans. The basic changes in the last half decade have not been so much in the rules themselves as in the changing emphasis on types of tasks selected. Especially in the last year, as gas prices have reached European levels, a lot of Americans have realized what has been known for years in Europe—contests are for flying, not driving. Prior to last year I used to count on putting 4000 miles on my car during a Nationals. Last year, with the no-relight rule, I doubt if we drove 500. Another happy casualty of these new energy-conscious times was free distance, that expensive and luck-riddled monstrosity left over from the days when a hundred-mile flight was something to brag about.

Can we then say that all is well in the rules department and no more thinking need apply? Hardly. One task left over from the sixties still plagues us, along with a new task that has most of the old free-distance problems. The cat's cradle, invented nine years ago as a free-distance replacement by Paul Bikle, continues to be used in championships, although mercifully more sparingly in these gas-conscious days. Its variant, multiple turnpoint option goal-and-return, has grown very popular with contest directors during the last two years. What are the problems with these two tasks? The fundamental problem with both tasks is that they increase the importance of luck and decrease the importance of skill. The purpose of any competition, whether it be chess or soaring, is to measure the skill and judgment of the competitors. In sports such as sailing or soaring the basic unpredictability of the weather provides an unavoidable luck factor. The rules of a contest should be conceived to minimize the importance of luck if the object of the contest is to discover the most skillful entrant. An obvious and easy way of minimizing luck, used in races in all other sports in the world, is to have all the contestants race to the same goal. I have yet to hear of a marathon where runners started from a given point and ran 26 miles in any direction they pleased. A look at the score sheet after a cat's cradle or multiple turnpoint option day will almost invariably show a much wider spread in the placings of the better pilots than would a speed day. Now the theory of both these tasks is that they give the pilot a chance to exercise his judgment of the weather and pick the proper course. This would indeed be possible *if* the contest committee were to broadcast hourly weather data from each of the turnpoints, but, since such information is never available, one generally guesses and hopes for the best. Other factors that make these optional turnpoint tasks poor choices are:

1. Lack of micro-meteorology information.
2. The unpredictability of the location of afternoon cu-nims.
3. The advantage that local knowledge can give.
4. The lack of sufficient closely-placed turnpoints to make ready deviation possible if one turnpoint proves to be weathered in.

A couple of examples from last summer's contests might help to illustrate the problems. In the Open Championships the Contest Director called a multiple turnpoint option with each point about 70 miles from the field and 70 miles from each other. The weather forecast provided no real reason for choosing one over the other. Local knowledge, available to some, indicated the southernmost turn as somewhat more promising. A pilot going to one, finding it socked in and having to deviate to the other, would fly about 190 miles compared to 140 for the one who guessed right. If both averaged 50 mph for their flights, one would get 1000 points, the other 740. In Hobbs a similar task was called. Most pilots with local knowledge chose the northernmost of two courses, were blocked by an unpredicted storm, and had to deviate to the southern turn. My speed for the flight was exactly the same as Karl Striedieck's who won, but since I flew some sixty miles farther I got 856 points. Ben Greene and Wally Scott II, with endless hours of flying in the area, made the same choice and lost similarly.

One of the biggest troubles with both these tasks is that they are very good cop-out calls for weak or insecure contest directors. Contest directors have to call tasks on the basis of very early weather reports. There is naturally a strong tendency on doubtful days to "let the pilots use their weather judgment" and thus escape criticism for a bad call. We have had contest directors who named up to eight turnpoints as multiple option possibilities. All too many contest directors, frequently under heavy pressure from the organizers, consider any day which meets the minimum requirements of x ships going 60 miles

—continued on p. 33

En Avant!

Eddie Allen and the American machine at Clermont-Ferrand in 1922

by EDDIE ALLEN

drawings by GEORGE OGLESBY

In 1921, the feasibility of soaring flight had yet to be proven. True, Wilbur Wright had reportedly made a 10-minute soaring flight at Kitty Hawk, but twelve years had elapsed and to most people the necessity of an engine and propeller for sustained flight seemed well-established. However, the Wright record remained a spur for some, and with the end of World War I the quest for soaring flight began anew. In the Röhn Mountains of Germany, experimenters laboriously hauled materials and gliders to a 3000-ft. high site called the Wasserkuppe. Here, despite Spartan postwar conditions, they established a camp and by summer's end in 1921 topped the Wright record with flight durations of 13, 15, and 21 minutes.

These achievements sent ripples of excitement throughout the aviation world, some of which reached across the Atlantic to Eddie Allen, a student in the Massachusetts Institute of Technology. Allen, who was destined to become one of the legendary engineering test pilots of the next three decades, had completed his freshman and sophomore years at the University of Illinois and had already begun a test-pilot career with the Army Signal Corps and the National Advisory Committee on Aeronautics. But an inner urge to delve into the mysteries of aerodynamics and aircraft structures drove him to MIT where he immediately joined the Institute's Aeronautical Engineering Society.

The news from the Wasserkuppe had also reached French enthusiasts whose national aero club promptly announced an international meet for the summer of 1922. The upshot of these events was the design and construction of an American entry which was taken to France by Allen and three other MIT Engineering Society members. In addition to participating in the French contest, Allen flew (and crashed) on the Wasserkuppe and attended the first English gliding meet at Itford Hill in September.

Upon return, Allen wrote three comprehensive reports for the MITAES detailing his experiences and findings in France, Germany, and England. Unfortunately, these intriguing documents have never been published and exist only in typescript. Photocopies have recently been made available to SOARING, but because of their length it is possible here only to excerpt from the report on the French meet. We begin with an early section of the manuscript: Allen has won a Society-sponsored glider design contest whose prize is the construction of the aircraft. Following completion of the machine in the MIT pattern-making lab in June, the glider was taken out for its first free-flight testing . . .

The machine was loaded on an old army truck and carried to Ipswich. From there it was taken by touring car as far as the road permitted, then by boat to Hog Island. Then the pilot* and his assistants waded through marsh and up the hill, carrying the pieces of the machine. During most of the trip there was a steady downpour of rain, but in spite of everything the machine was set up. A fire was built for warmth while waiting for the 15-mile an hour wind which is necessary to get the machine easily off the ground.

It is perhaps necessary to explain why so inaccessible a place as Hog Island was chosen for the first flight. Several parties had previously been sent out to search for suitable terrain

*Eddy Allen evidently found it difficult to use the first-person "I" in writing his story. Throughout this article the reader should remember that "pilot" stands for the author.—Ed.

from which glides could be made but had found no smooth clear hillsides over which there was a prevailing wind. Hog Island was without trees and over 200 feet high. It was reported to have the ocean breeze constantly, but on this rainy Sunday the ocean breeze seemed to be elsewhere. Five unsuccessful attempts were made to get the machine off the ground by towing.

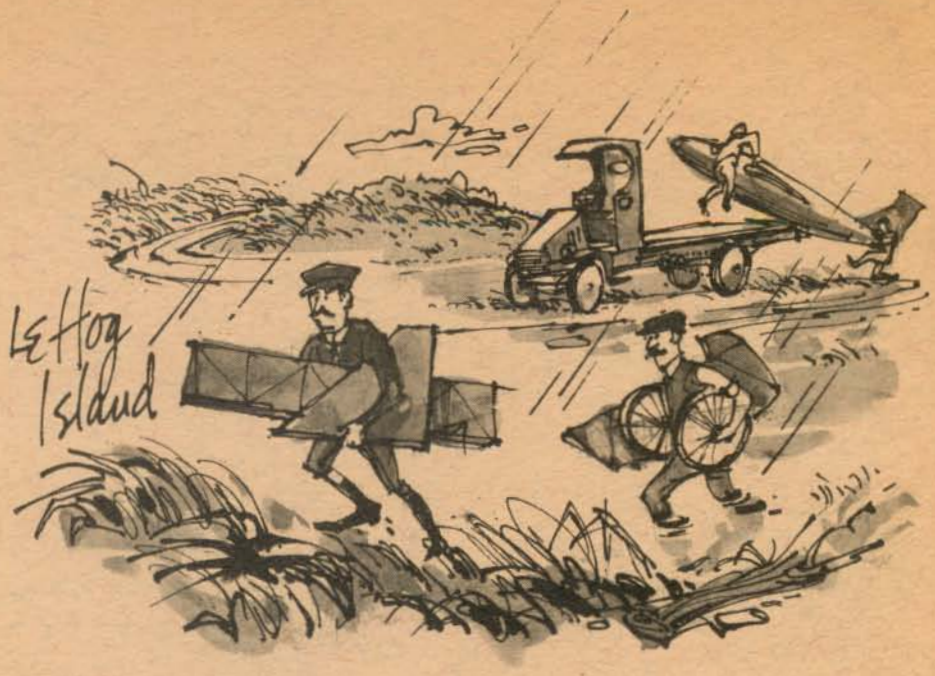
The glider as originally built was fitted with skids for landing. In towing it over the stones on Hog Island both skids were broken. Much discouraged, wet, and unhappy, the party put the broken Kiwi in an old barn in the vicinity and returned to Rockport.

The next morning a forty-mile gale was blowing. With high hopes of making a flight, we returned to Hog Island. Then followed a series of adventures illustrative of the difficulties of glider flying. The approach was made from the Rockport side, where only a short stretch of water separated the mainland from Hog Island. In a stolen boat three of our party of five made the crossing with the intention of sending one member back to pick up the other, the stolen boat being the only conveyance at hand. But the high wind made return impossible. By a series of signals Mr. Weaver, whom we had left behind, was informed that he must make his way across from the opposite side. Meanwhile the glider was repaired in the barn with scantlings and such wood as could be found. Then it was carried out into the wind, where it took the combined efforts of all to hold it down while the pilot climbed into his seat. Fortunately, before the first flight was actually made, the wind velocity dropped to about fifteen miles an hour.

The first flights

With four men pulling on the rope (which was attached to the corners of the fuselage like a bridle) the machine rose from the ground after a run of but a few yards. During this flight the glider acted merely as a kite, the men retaining their hold on the rope until a signal from the pilot. When the launch crew let the rope drop, the pilot effected a free landing. The glide had lasted about a half minute. The machine had not been more than ten feet from the ground. But this was enough to make certain of its stability.

In the next takeoff the pilot pulled



quickly back on the controls to gain the maximum height possible. At about fifty feet from the ground the launch crew released the rope and the pilot attempted a soaring flight. But he found the rudder control insufficient at low speed. He was forced to dive in order to regain control. Three more flights of almost exactly similar character were made. The lack of sufficient landing facilities and the poor control at low speeds limited the duration of the flights to about one minute each. The skid arrangement for landing gear broke at almost every landing and convinced us of the need of a heavier undercarriage.

On the return to the Institute, the flights were hailed as the first successful motorless flights made in America since the Wright experiments of 1909, and we were urged by Professor Warner to accept the invitation of France and enter the machine in the *Premier Congres Expérimental d'Aviation Sans Moteur,* to be held in Clermont-Ferrand, France, August 6 to 20. We accepted this invitation and sent in our entry on June 15.

Realizing the necessity for spare parts for repairs and replacements, we started the construction of a new wing exactly similar in dimensions but of a more efficient profile. The use of flaps to increase the lift coefficient when taking off, landing, and in gusts was made possible by increasing the size of the aileron to the full length of the semi-span. A novel arrangement of the controls on the joystick was designed, permitting the use of the flaps as ailerons. The actual construction of this wing took but four days, and the glider committee then turned its attention to the building of a spare fuselage. The designs were drawn up one Sunday in the wind tunnel building, and on Monday construction was under way. The new fuselage was an attempt to decrease the resistance and increase the gliding angle of the whole machine. It was made of narrow plywood bulkheads and spruce stringers built into streamlined form. The pilot was to sit with his head through a hole in the center of the wing. A new landing gear with wheels was made to eliminate the difficulties encountered on Hog Island. To provide sufficient rudder control, a new rudder and fin were built of approximately double the area and double the aspect ratio of the old ones. The ultmost speed was necessary. If the glider was to enter the French contest, the detail designs must be made, the material purchased, the construction completed, and the machine packed and transported to New York in time to sail for France July 15.

[*Raising funds for the shipping of the glider was difficult; the transatlantic freight bill left the resources of the team exhausted. But youth and enthusiasm were not to be denied. "I decided," wrote Allen, "to take the responsibility of making the entry, trusting that funds would be forthcoming when they were needed." The team sailed for France aboard La Savoie and arrived at Le Havre on July 22.*]

Arrival in France

French customs officials were rather puzzled as to how to classify a glider. The official mind is proverbially slow

to accept innovations, and a glider which neither is, nor is not an aeroplane, was almost too much for even French adaptability and intelligence. While these formalities were being attended to, I went ahead to Paris to arrange for accommodations at Clermont-Ferrand.

The American team was greeted with an especially enthusiastic welcome. France was particularly desirous of emphasizing the international nature of the meet and we were the most distant nation who sent representatives. On behalf of the team, I paid my respects to the American Embassy and Air Attaché in Paris, as well as the French aviation authorities, and was received with the utmost cordiality. All arrangements were made for the team to proceed immediately to Clermont-Ferrand.

Meanwhile the reports of the contest had been reaching the American public, and financial support, which had been somewhat lacking before the American team started, began to come in. We received by cable sufficient funds to provide for the immediate needs of the glider and team. Both arrived in Clermont-Ferrand two days before the start of the contest, and the work of preparing the glider for its first flight was immediately begun.

The opening day found but few contestants ready to fly. Indeed, the American glider and a Swiss hang glider were the only two whose preparations were entirely completed.

The terrain where the flights were made was of volcanic origin. Practically all of the peaks in Auvergne are capped with the remnants of a cup-shaped crater filled with ashes. They are reasonably smooth and the landing places are fairly good, but from the standpoint of soaring flight the choice was unfortunate. The hills are cone-shaped and lack the ridges necessary to obtain large areas of rising currents. The wind, in striking the cone-shaped peaks, is broken up into eddies and swirls which curve around the peak rather than rise over it. The wind, which is reported to average twenty miles an hour during August, by no means came up to its average except on a few days of the meet. It was only on those days that the good flights were made.

The twenty-five entries presented a most diverse appearance. But on closer inspection they divided themselves into four distinct classes: (1), sport planes with the motor removed and very slight changes made; (2), machines especially designed for soaring flight; (3), hang gliders, and (4), freaks of all sorts, the products of nontechnical inventors.

Sport plane adaptations

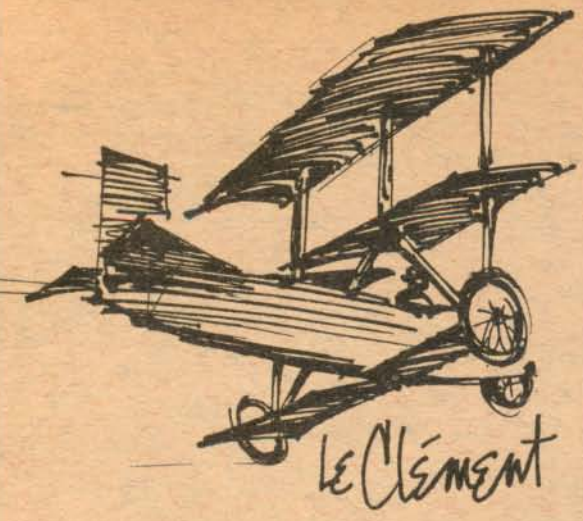
The sport planes were, without exception, the entries of established aeronautical houses, such as Farman, Potez, and Clement. The workmanship was up to the best French standards, which is to say, the best in the world. They were made in shops where the best materials, the best French designers, and the most skilled workmen were available.

[*Allen's report to MITAES describes five of these re-worked sport planes. The Clement triplane and Farman monoplane are typical.*]

The Clement entry was a little triplane which appeared in the Paris aero shows of 1920 and 1921 with the Anzani motor. The builder had removed the motor and reconstructed the front of the fuselage for the pilot's cockpit. A queer landing gear, with the wheels under the wingtips, was retained. There was also a wheel under the front of the fuselage and under the tail. In fact it would seem that almost whichever way the triplane landed it would right itself. The lateral control was secured by warping the two upper planes around their single spar. The tail was very short but of good general design. Dural tubing was used throughout. In spite of the very short span the loading was kept down to two pounds per square foot, which seemed to be the goal toward which all the designers aimed.

The Farman monoplane was recognized immediately as the best of the sports class. The large span of about forty feet and the chord of five brought its loading down to about 1.5 lbs. per square foot. A thin high L/D wing section was used and, necessarily, much external bracing. Mr. Henri Farman stated that in preparing his entries he had wanted to get primarily a low loading even at the expense of other qualities. This effort to secure light weight was characteristic of all French machines, and, as will be seen later, in striking contrast to the German method.

The very creditable showing made by sport planes with motor removed indicates one thing clearly. The designing of planes with motor has reached a high degree of efficiency while the designing of gliders is still in its infancy. Hence a good sport plane without motor can show a better performance than the average glider as it is now built. Nevertheless, the motorless sport plane can make but small contribution to the science of soaring flight. A glider which is especially designed for obtaining its lift from the force of the wind rather than from a motor, however unsatisfactory its present performance may be, points



forward to a development in aeronautics quite outside the possibilities of even the most efficient adaptation of the plane designed for motor.

Glider designs

[Allen provided details on five "true gliders." Two of these, the Dewoitine and Coupet, clearly show his recognition of the aerodynamic requirements for the sailplane.]

Of the true gliders, or machines designed especially for soaring, the best was the Dewoitine. The Coupet attracted more attention, was more successful in its performance, and was more interesting in its departure from conventional design. But of the two machines the Dewoitine was in the right direction. The distinction between these two, Dewoitine and Coupet, is the distinction between low resistance with high speed, and light loading with high lift. These two machines offer an excellent illustration of the differing trends of French and German experimentation. The French expected to secure soaring flight by building for lightness and high lift.

The Germans learned by experience that it was better to secure soaring flight by having a low sinking speed, which means a high gliding angle and high speed with usually heavy loading.

In the Dewoitine an almost perfectly streamlined form was secured in the fuselage. The roots of the cantilever monoplane wing were built into the top of the fuselage, giving room for the pilot's cockpit just in front of the front spar. The wings were detachable, joining with the center section close to the fuselage by means of a cleverly designed fitting. There was only a single spar, rather solidly connected to a heavy leading edge the connection of which with the fuselage took care of the internal drag bracing. The spar was set well forward, the rib to the rear being split into a double trailing edge which permitted ample warp for lateral control. The construction was very heavy and met with much disfavor on this account before the meet started. Even its own pilot felt that the heavy weight would make soaring impossible. Its performance, however, justified the designer's plan.

The Coupet was also a monoplane, but unlike the Dewoitine it had a high-lift wing with a deep section close to the fuselage, tapering in depth and chord to a narrow thin tip. The internal structure was of unusual interest. It is always difficult in building a thick wing to prevent the ribs from being disproportionately strong. If they are stiff enough to hold the wing fabric and prevent lateral failure, their strength is many times greater than necessary. Coupet met this difficulty by building ribs of plywood with stiffening members of spruce. The trailing edge was scalloped in the usual French style, with very narrow ailerons near the tips. Nevertheless, the lateral control proved surprisingly good. It was in directional control that the Coupet was weak. The fuselage was simply a shallow, fabric-covered, boat-shaped body with three longerons going back to a very small inadequate rudder. By taking hold of the tail it was possible to twist the body, consequently influencing the wings. This meant that whenever the rudder was moved to one side in the air, the fuselage twisted in the opposite direction to compensate. Mr. Coupet was finally influenced by the general advice of the other contestants to strengthen this part of his apparatus.

With a span of 30 feet and a mean chord of four, Coupet had the lightest loaded machine at the French meet. His weight was one pound per square foot!

Before leaving this class of machines, a word might be said of the structure of the American glider in comparison with the others. Of its performance we will write later.

The first of our machines, the one with the open fuselage, thick, high-lift wing, and short tail, was structurally sound and unusually sturdy for the rough conditions at Clermont-Ferrand. The second one, when equipped with the new landing gear, was not quite so satisfactory, requiring minor repairs after landings on rough ground and in underbrush. In design the streamlined machine was equal to the best of this class which appeared at the meet. Its faults were mainly those of the others also—those due to an overemphasis on high lift and low weight, and a lack of emphasis on high L/D.

Hang gliders, freaks, and MPA's

Of the four classes of entrants, the hang gliders were the fewest and from the scientific point of view the least important. The early experiments of Lilienthal and later of the Wright brothers were of this type. But it was speedily discovered that these machines are inefficient, unstable, and uncontrollable; they have no further contribution to make to the future of flying. But as an athletic feat requiring skill and courage and affording thrilling moments to both performer and spectators, hang gliders have their appropriate place in the world of sport. Francis Chardon, a Swiss athlete, flew a single-surface biplane of very crude design and construction. In general line it was patterned after the Pelzner machine of the 1921 German competition. This was the machine in which Chardon made over fifty flights of a average duration of 40 seconds. The spars and struts were very small. It is doubtful if the machine had a factor of safety of more than two. No attempt was made to secure a definite wing curve. The ribs were small lath bent between the spars, holding a single layer of cheesecloth. The gliding angle was about five to one. The total weight of the machine was only 24 pounds. From the stand-

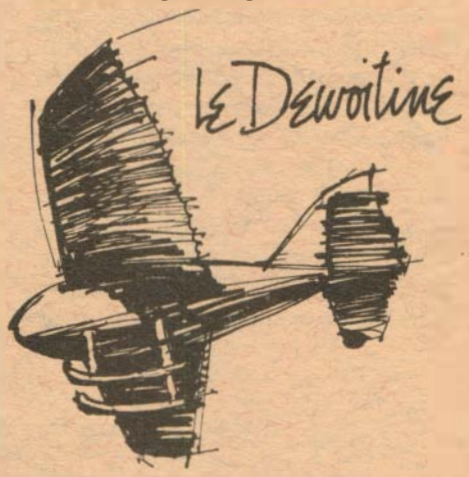
point of the contest, this gave it a distinct advantage over the true gliders in that it could quickly and easily be carried to the top of the hill by one man. This accounts for the remarkable number of flights which Chardon was able to make. Although he could fly only in the early morning or evening when there was little wind, he could make a second, third, or even fourth flight while the other gliders were being slowly carted or carried up the long ascent after their first flight. But it was finally recognized by the directors of the contest that in spite of their respectable cumulative duration time, hang gliders should at future gatherings be given appropriate recognition in a class by themselves.

The last class, and by far too large, were the freaks. The hangars were filled with them, and most of them never left the hangars. One saw them lurking in dark corners, behind the serviceable machines, strange shapes of birds and bats, like the creatures of a nightmare. There were flapping wing types, built in deliberate imitation of natural forms and an absolutely indescribable thing, a sort of golliwog body, painted a bright red in accordance with heaven knows what theory of the inventor. Contestants referred to it as the Cinnamon Drop. One device had the most extraordinary number of movable parts. The pilot might at will increase the dihedral angle, change the angle of incidence of the wings alternately or simultaneously, wag the tail up and down, or twist the whole body of the machine. In fact, by a violent movement of the stick back and forth, the pilot could flap the wings, shimmy and toddle all at once. He could do everything with the machine except fly.

There were two machines that closely resembled birds. One was like a pigeon and one like a duck. In the duck machine the designer had arranged a device by which the pilot could increase the surface of the wing by telescoping its tips in and out. These pathetic attempts at bird flight did not even have the value for science that intelligent experiments with negative results might have. Every engineer knows that a man cannot maintain himself in the air by his own strength, whatever a bird may do, because the proportion of his strength to his weight is not as great as that of a bird. Moreover, a bird's power is used at practically 100 percent efficiency, while the efficiency of any device for transforming the work of a man to air propulsion is necessarily very low. The sooner this simple engineering fact is impressed upon the mind of the general public, the sooner there will be an end of the centuries of wasted flying experiments on entirely unfruitful lines.

There were several other machines which attempted to use manpower for air propulsion. The aerodynamical value of all these devices was equal, being nil.

When one considers the amount of human effort and human ingenuity, to say nothing of the expense, that went into the construction of these machines, the freak exhibition becomes tragic rather than humorous. Most of these machines were the work of men of some natural ability and great persistence and enthusiasm for aeronautics, but utterly untrained in elements of engineering.



The contest opening

But to return to the meet at Clermont-Ferrand. Flying started on August 7. Chardon, taking advantage of the early morning calm, made six flights in his hang glider averaging 40 seconds apiece. Already Chardon had broken his main spar in two places by failing to land directly into the wind and consequently being unable to hold the machine. He had mended it with a few nails and a piece of string, not improving thereby its already somewhat limited factor of safety. (Indeed, at least one of the spectators regards it as a direct act of Providence that Monsieur Chardon is still among the living!) As soon as the wind began to rise, Chardon, who could fly only in a calm, was eliminated for the day. He took his machine back to the hangar and M. Bossoutrot brought his out.

Bossoutrot the Great! Bossoutrot the idol of French aviation! Bossoutrot, whose flight from Cairo to the Cape made his name a household word. He approaches his machine, pleasingly aware of the spectators, clothed for the occasion in the *dernier cri* of French masculine fashion, complete even to cane and spats. But his Gallic sense of the dramatic does not prevent his being genuinely deserving of the wide reputation he enjoys. Perhaps we may best present his flights by a fairly literal translation from a French newspaper. French reporters, like French pilots, delight in the picturesque and the dramatic, but are not prevented thereby from being genuinely effective and intelligent. Thus writes the reporter for the *Moniteur;* "The machine was pointed into the wind. Bossoutrot, smiling, mounted the plane. This seemed heavy, massive; a skeptical smile was on the faces of many as they watched him. Nevertheless the pilot gave orders to his aides, 'Give her the gas. *En avant!*' They ran for ten meters, for twenty meters, and suddenly, as if lifted and carried away by a mysterious force, the plane rose gently, majestically, without touching its wheels, so perfect was its equilibrium in the invisible air. At the end of several seconds it seemed to incline itself toward the earth but by a master stroke the pilot righted it. Unbelievably, it rose again in response to an auspicious gust of wind. Then, entirely satisfied with this conclusive attempt, Bossoutrot comes gently to a landing in the sweet and perfumed grasses which cover the sides of the mountain."

Eliminating the poetry, what actually happened was somewhat as follows: Bossoutrot had somewhat underestimated the minimum flying speed of the machine. The assistants pulled it as fast as they could, but the machine failed to take off, and passed them, rolling rapidly downhill until it struck a bump which threw it into the air. By the time it struck the ground again, it had gained flying speed, and from this point on it glided through the air with a remarkably flat gliding angle.

The next flight was made by the American machine. We made a brief trial flight from a small knoll to pass the elimination requirement of ten seconds. The machine had a new rudder and fin, and we had rewired the ailerons to give better lateral control and to remedy defects which we had discovered in our flights in America. We were delighted with the way in which this new equipment improved the control. On this first flight the machine handled as nicely in the air as any scout. We immediately took it to the top of the mountain for a second, third, and fourth flight. The method of launching was the same used in the German meets of 1921, a rope fastened to a hook on the front. The rope dropped off as soon as the assistants had pulled the machine into the air. This method of launching proved very satisfactory. We have already remarked that the American machine was the only one which had actually flown before the meet, consequently we found we had all the prestige of experienced soarers. The other contestants, most of whom had only the vaguest idea of how they were to get their gliders into the air, were all waiting for someone else to do it first. The successful launching of the American ship called forth generous praise and prompt imitation. That night everyone in camp was making launching hooks like ours!

The next aspect of our machine's performance calls for a word of preliminary explanation. The maximum gliding angle, which of course involves maximum time in the air, depends on flying at the most efficient speed of the particular machine. In plotting a gliding angle against speed, the curve has a different shape for every machine. Sometimes it has a sharp peak at the maximum gliding angle, and sometimes a curve with the peak much flattened, giving a wide range of speeds without affecting the gliding angle. Our machine was the kind whose curve is peaked. It therefore presented to the pilot the problem of very careful handling so as not to go above or below the critical angle.

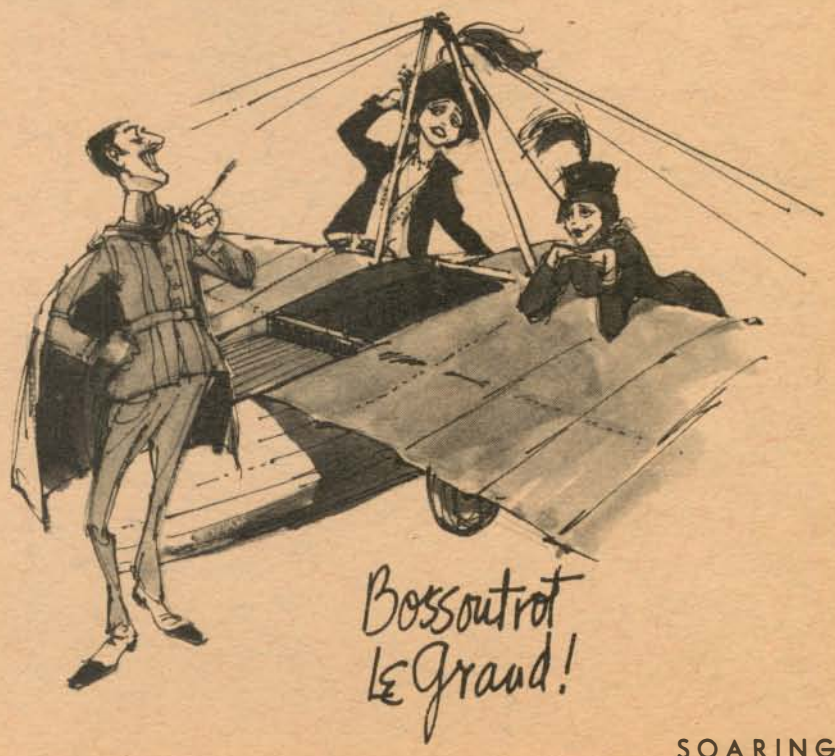
It was in the testing out of this best angle that the French reporters found material for their papers. The uncertainties of such flights appealed to the Gallic sense of the dramatic. Moreover, they seemed to feel that international courtesy required the presentation of verbal bouquets to their American visitors. Bossoutrot himself was not made the subject of more eloquence! Thus wrote the Paris *Excelsior* (to the no small amusement of the rather more matter-of-fact American team): "During the third trial, which was the most beautiful, he (Allen) gained height and maintained himself an instant at the level of the spectators placed at the summit. Then he flew some seconds in *pallier* [*i.e., without losing altitude*] with a sinuous movement. His last flight was the most dramatic. The apparatus took off before the assistants had drawn it two meters. He rose, gained two or three meters of height, went forward, then flew as if fastened to the flank of the mountain.

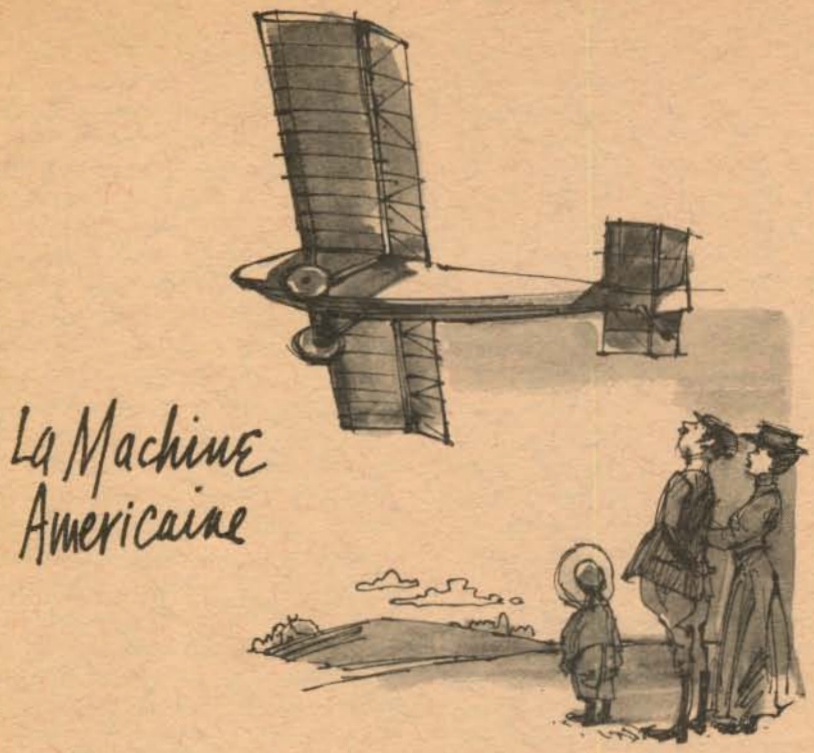
"The plane gave the impression of the stag fleeing before a gust of the wind. It paused, wavered, and was on the point of being carried away. But there was a man in the apparatus; more, a pilot, who opposed his naked will to the blind forces of nature. The plane, like a bark caught in the mercy of the tempest, faced the danger and accepted the combat. Allen dove, banked into the wind, descended, and ended his flight with a normal landing. He said on alighting '.... ...., but I was afraid!' [*Deleted by the American censor*]. How could that be believed when we had seen him three meters from the ground, signaling with his free arm to the neighboring spectators to come and hold his apparatus to prevent it from being turned over by the wind after landing? Thus ended a most captivating afternoon. "

Sportsmanship and accidents

On the second and third day the only flights were those of the Swiss and American entrants, who were working systematically to increase their totalization [*i.e., number of flights*]. This seemed to the *Moniteur* reporter a little too much of a good thing. *"Chardon, Allen, et Allen, Chardon,"* he wrote. "The Swiss and American aviators are in the spotlight. Our French team seems a little sleepy on the mountain, and if many machines have not arrived or yet flown, it seems to us a little goodwill will help them soon take to the air."

The American team took the hint, and, as the wind was very unfavorable, they gave themselves a rest of a day and spent their time mapping air currents and making minor adjustments on their machine. The indefatigable Chardon, who was used to climbing mountains all his life, made nine flights, thereby passing the Americans in totalization. Bossoutrot, whose machine was by this time repaired, came into the meet with an 83-second flight. The improvement in his skill on the gliders was immediately noticeable. His second flight gave him the single-flight duration record of 87 seconds.





Following Bossoutrot's flight, an interesting new entrant appeared, M. Sardier, a French ace also known as a cycle champion. He flew the little Clement triplane, a machine so heavy and inefficient that no soaring was possible in it. In order to get off the hill at all he had to resort to a special launching device. This was the substitution of a rubber Sandow exerciser cord for the usual rope. The effect was a very powerful slingshot which catapulted the machine into the air. This device, as well as ours, was borrowed from the German meet of the preceding year, and was also immediately copied by the other contestants.

On the eleventh, the Americans again jumped to the front with three flights, bringing our total time in the air to 12 minutes 27 seconds. By the time the fourth flight could be made, the wind had dropped. The assistants could not pull the machine fast enough on the ground to lift it into the air, and as it rolled rapidly down the slope, one wing struck one of the assistants in the back. The machine whirled around, skidded sideways down the mountain side, and went to pieces against some rocks. The pilot was uninjured and the man whom the machine had struck did not even know he had been hit, but the machine was wrecked beyond repair. Fortunately the Americans had a spare fuselage and a spare wing. They immediately set to work to assemble the new parts.

The totalization record appeared as follows: Allen 12 min. 27 sec., Chardon 11 min. 47 sec., Bossoutrot 10 min. 20 sec., and Sardier 3 min. 2 sec. At the time of its crash, the American machine led in all events. After it was out of commission its records were of course quickly passed by the other machines.

[*Three days after Allen's first accident, he and his teammates had completed repairs on their glider. By the time they climbed the hill, one glider had already crashed and another—one of the freak designs—had been unable to get off the ground. Bad luck pursued the Americans, too.*]

The American glider contributed a minor mishap to the day's list of disappointments. With the new wing and fuselage it was taken to the saddle of the mountain for a try. But it seemed to have caught the epidemic of trouble. It hit a rock on the takeoff and had to be lugged ignominiously back to the hangar for repairs, which proved so extended that the meet was almost at an end before it again appeared.

Running the wrong race

It had become evident that the meet had degenerated into a race for total time in the air, and that the man who could keep his machine in condition every day would win. Most of the contestants spent most of their time in the hangars making repairs—chiefly repairs on landing gears. The day's flying was very discouraging to those who were looking for real scientific results. It is true that during the whole meet there was very little wind. But even when the conditions were most favorable, the longest flight that had been made was one-fourth of the time of Wilbur Wright in 1910 in the Wright biplane glider over the sand dunes of Kittyhawk, and little more than one-tenth of the time made by the Germans last year. From the many new inventions one could expect nothing. It was easy to see that their conception, design, and construction was unscientific. Even those theories of soaring flight which had appeared most promising seemed to be proving incapable of practical application, and the best results were being obtained from machines of conventional though refined design.

The discouragement of those who had come to the *Congres* in a genuinely scientific spirit was increased when at the end of this day the official barograph record to date was announced. This showed the longest *pallier* was 38 seconds, made by the American glider. Needless to say, *pallier* and not time in the air is the true test of soaring flight. Long time in the air may be attained by simply gliding down from higher mountains or by piling up numbers of insignificant short glides; procedures which have no scientific interest whatever at present. *Pallier* on the other hand is the maintenance of continuous horizontal flight, and this is the great objective of research.

A problem was presented to the American pilot when the jury reversed an earlier decision and required him before making the official trial of his new machine to sign a statement as to which of the two gliders was to be considered in the awarding of prizes. The wrecked machine whose record closed leading in all events had now been passed by other contestants in all but one event. The new machine,

while it promised well, was yet untried. Moreover, only four days remained in which to establish new records. We postponed the decision until we could make a first flight or so to determine if there was even a sporting chance of doing anything with the new machine in the short time that remained.

On the nineteenth the repairs on the landing gear of the new American machine were complete. After a short flight of about eighteen seconds to determine its stability and control, it was taken off the top of the mountain. In a slight wind the machine handled beautifully. Its flying speed was higher than that of the old machine, but its rate of descent was somewhat lower. Its flight lasted a minute and fifty seconds. But the American team decided, as there remained only one more day of the meet, not to enter this machine. To have done so would have involved discarding the five days of creditable record of the old glider and a delay in shipment to the Wasserkuppe, to say nothing of the risk of breaking, and thereby losing the opportunity of flying on the German soaring site.

Then in the afternoon Bossoutrot made the one great flight of the meet. Finding an area of rising air on the east slope, he made three complete circles without any loss of altitude. On the fourth circle he lost the rising current and was unable to find it again before he dropped so low that further search was impossible. He made a beautiful landing after five minutes and ten seconds in the air. This flight was the only one which showed the possibility of utilizing the energy of the wind for remaining in the air any extended time.

It seems scarcely worth-while to weary the reader with the list of insignificant flights. But one observation can be made from them. As we look back over the list of the entire meet, a surprising consistency appears in the lengths of flights of each individual machine. Except for the star flights made under very special conditions, the list ran somewhat as follows: Chardon, 35 to 50 seconds; Bonnet, one to two minutes; and Bossoutrot one and three quarters to two and a quarter. One would naturally expect some consistency of this kind, because from the characteristics of the machine one could predict the length of flight it would make under normal air conditions. It is, of course, impossible to determine the gliding angle (the L/D) of a machine by measurements of flying distance and drop, because every gust of wind would change it. Nevertheless these averages furnish a very good basis of comparison of the machines because the flights were made under almost identical conditions.

The Aeronautical Engineering Society may be interested to note that in this comparison the American glider with its first wing and fuselage ranks somewhere between Coupet and the Farman biplane, and as was shown later, with the new wing and fuselage somewhere between the Farman biplane and Bossoutrot's monoplane, *Moustique*.

The lessons of Clermont-Ferrand

The awards were somewhat a foregone conclusion. Bossoutrot and the *Moustique* took first place in every event, and we are glad to report that the persistence and industry of M. Chardon gained him the fifth totalization prize.

Obviously the real results of the meet are not entirely measured by the awarding of the prizes. Too many fortuitous circumstances influence the actual flying records. For example, the two Dewoitines, because of their late entries and accidents, did not appear in the prize list although their performance was of striking merit.

Indeed, the first lesson to be drawn from the French meet is that if such contests are to have real scientific or even real sporting value, means must be carefully considered whereby emphasis can be placed upon real accomplishment.

First, of course, the terrain must be carefully selected. The prime requisite is such a conformation of the land as to give large areas of rising current. But landing facilities must also be seen to. Fields covered with rocks like those of Clermont make landing precarious for any but the strongest landing gear.

Then, adequate facilities for speedy repair should be provided in the immediate vicinity. Incidentally, entrants should be urged to bring with them extra parts and all such materials as a general repair shop cannot be expected to furnish.

Third, plentiful transportation facilities for taking the gliders up the hill should be provided, in order that when the wind is favorable all the gliders may fly in quick succession.

Obviously, with the experience of France to draw from, by attention to these simple but important arrangements the total time in the air of a meet could be increased manyfold.

Further, if a meet is to serve the real interests of the investigation of soaring flight, the awarding of prizes, which directs the efforts of present and future competitors, should place the emphasis upon *pallier* or flight above the horizontal rather than upon total time in the air. In the *Congres* there were only two prizes for *pallier,* totaling five thousand francs, as opposed to five for totalization and five for duration, totaling together twenty-two thousand francs. Finally, there was a prize for lowest rate of descent, much advertised. Since it had been actually accomplished that a machine has landed higher than it took off, such a prize has no aeronautical interest whatever.

While these hindrances to the scientific effectiveness of the French *Congres* should be pointed out very clearly, in order that those responsible for the arrangements of future meets may profit by them, it is a mistake to suppose that the accomplishment of the meet was other than creditable. Great positive contributions were made to the existing knowledge of the science of soaring flight through bringing together under similar conditions all the different types of gliders which were then being made the subject of experiment.

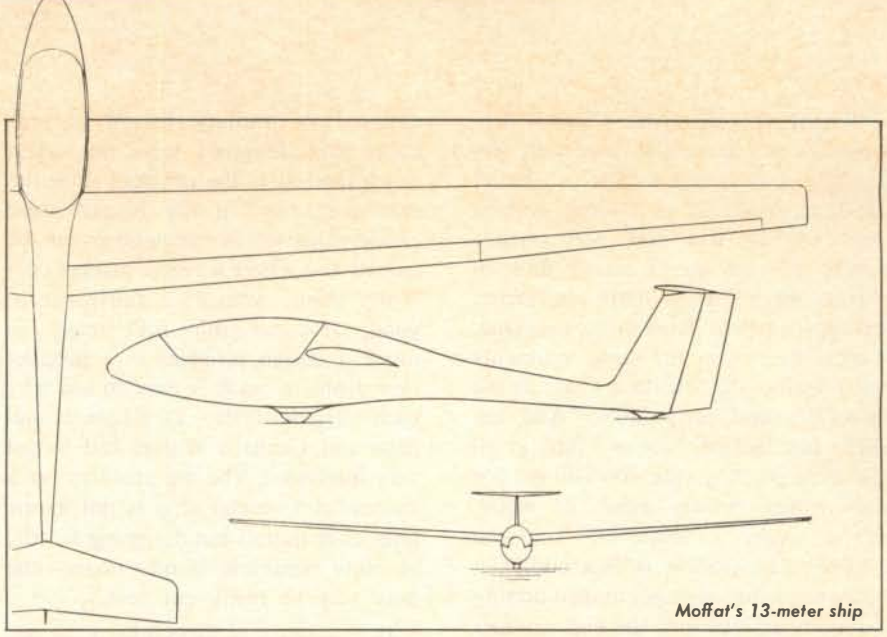
—continued from p. 24

a success regardless of whether it has been a fair test of flying skill. To the pilots and crews who have driven thousands of miles and spent a thousand dollars or more to compete, the arbitrary choice of a task which stresses luck over skill can be maddening. With the level of competition as high as it is today, points lost to luck are hard to regain on speed days. The 144 points I lost to Karl in the incident mentioned earlier would have raised my final standing from 9th to 5th place. Since the SSA rules people generally tend to move slowly in the matter of change, perhaps it behooves us pilots to put as much pressure as possible on contest directors to avoid the bad tasks that are still in the rules.

Since luck will always be with us even if we drop cat's cradle and multiple turnpoint options into well-deserved oblivion, perhaps a new approach to the problem might be in order. I long ago learned that the most realistic way to look at contest results was to give each pilot a "drop day" and then review the standings. All too often (as at Hobbs last summer on the first day, or Marfa in 1967), some fluke condition allows some pilots to get in and out of a turn and then shuts it down completely for the others. In Marfa this allowed some twelve pilots to get close to a thousand points and the other sixty less than 300. Allowing each pilot to drop his worst day's score would even out the effects of these flukes which can be so common in the thunderstorm-prone Southwest. This drop system has been used in Olympic-level sailing for many years and seems to give good results.

The Crystal Ball

What is, or what should be, the next stage of development in soaring? For my money (diminishing rapidly like everybody else's) we have a clear and obvious need for a good, modern 13-meter one-design class which will have a max L/D of 30 or a bit better and good high-speed performance. It needs to be a simple, light, easy-to-rig-and-fly ship which will, hopefully, be about 25% lighter and 25% cheaper than our existing Standard Class ships. Someone is doubtless going to say that we already have a good one-design class in the 1-26 so why do we need another? We need another class because the 1-26 is neither a good ship nor one-design. As a concept it represents the thinking and performance of 30 years ago, as a one-design it is a joke. The early 1-26's are almost a hundred pounds lighter than the latest ones—and climb accordingly. The only reason that 1-26 competition stays fairly good is that no one seems to care enough about winning to spend any real time or effort cleaning up his ship.



Moffat's 13-meter ship

I would like to offer for consideration the sort of 13-meter ship I have in mind along with some tentative specifications and weights. The cockpit area was swiped wholesale from the Standard *Cirrus* (because that ship is big enough for anyone), and the rest of the ship sort of sketched itself in around the parameters of 13-meter span, moderate wing area to keep the weight down, and fixed wheel to keep the cost low.

As I learned thoroughly in my sailing days, the first thing necessary for a successful one-design class is a well thought-out and tightly-enforced rule. Classes that have loose rules tend to produce very expensive boats especially designed to exploit the loopholes. How could we develop a good rule for our hypothetical-13 meter class? Well, here are some preliminary proposals just to show the nature of the problem:

1. Ships to be built by licensed manufacturers from molds using published tolerances and checked by national or international organizations.
2. Ships are subject to conformity checks at any Nationals. The three winning ships for the day will be automatically checked before the next flight.

   Measurements:

   a. Templates for profile checks (5 for wing, 3 for fuselage, 2 for horizontal tail, 2 for vertical tail)

   b. Measure the span, tail height and span, fuselage length, control surface size, wheel and brake (must be standard aircraft)
3. All ships flying in a contest *must* carry sufficient ballast to bring gross weight to empty weight plus 220 pounds. This rule prevents very light pilots having an advantage in weak weather.
4. Non-disposable ballast up to 30 pounds, or up to a useful load of 250 lbs., whichever is less, will be allowed. Ballast, pilot, chute, instrument panel, batteries, and equipment are to be weighed by officials prior to contest, approved ballast signed by the measurer and placed and sealed in approved position. Officials are to spot-check landing ships at their discretion for extra ballast.

These rules are not designed to be definitive, merely to show some of the considerations that will be necessary for a truly competitive one-design class. The ballasting provisions are fairly important as the wing loading varies quickly with change of weight due to the low area. For example, a 120-lb. pilot might have a wing loading as low as 5.1 lbs./sq. ft. whereas a 220-lb. useful load would bring the figure to just a hair under 6 lbs./sq. ft.

Whenever a 13-meter Class is proposed, a lot of people, especially designers, start saying that it can never be done, that cost and weight will be only slightly less and performance much reduced, etc. I would find all this gloomy expertise more convincing except for two or three memories. One, I recall hearing all the same arguments used against the Standard Class in the late '50's and early '60's. "Add another few feet of wing and look at all the extra performance you will get for only a few dollars worth of wood, fabric, glass, or whatever," said the experts. The trouble is that adding a bit to the wings always entailed adding a few other bits, and the end product always seemed to cost 25-35% more. For those that say a 13-meter ship cannot be built lightly or have high performance we must recall the fiberglass *Hidalgo* built in the mid-1960's at Akaflieg Stuttgart (*Soaring*, Sept. 1966, p. 15). While very lightly built for an empty weight of 226 lbs., this ship, which finished 9th in the Open Class of the German Nationals in 1966, shows that 13-meter ships don't have to be dogs. It also shows that the 330 pounds that I estimate for weight of a production 13-meter ship isn't impossible. The last memory that gives me hope for a 13-meter class is that of a flight in a 10-meter aerobatic Yugoslavian ship. While built very heavy for aerobatics (redline 450 km./hr.), this ship handled beautifully, climbed well, and had excellent penetration.

Why have we seen no good 13-meter designs? A primary reason is probably that designers have not taken much interest in the problem since the excitement lies in the bigger more exotic ships where reputations can be gained and where a ready market currently exists. Actually a fairly cheap, good, 13-meter ship isn't really so much a design problem as a production problem, so it is easy to see why such designer-artists as Klaus Holighaus and Gerhard Waibel fail to get very interested. The big problem for a successful 13-meter ship is not exotic lines or materials but designing for the absolute minimum in man-hours—the only way to really cut cost.

In summary, many things about the contest scene look very good at the midpoint of the decade. Far more people are involved in far more competitive soaring than was the case ten or even five years ago. While the SSA's abrupt ruling on the Standard Class seems to have had the effect of splitting the formerly highly competitive group into the haves and have-nots in terms of flap-aileron linkage (with the have-nots forced into ever more expensive ships if they wish to compete), perhaps some good will emerge. The rapidly growing expense of Standard Class flying may well provide just the impetus needed to start a really good 13-meter one-design class. If such ships become popular I can see fascinating possibilities for weekend and club competitions as well as truly competitive flying on the national level.

Hidalgo

AKAFLIEG STUTTGART

—continued from p. 20

Hans-Werner Grosse take several tries at positioning his '17 over one turn in Australia, each attempt taking a twenty-degree bank with resulting loss of altitude due to slipping. I figured I gained at least a minute on that one turn due to the excellent downward visibility of the *Nimbus*.

The last weak point of the '17 lies in cockpit design. Designer Gerhard Waibel creates strikingly beautiful ships of very high performance, but he seems uninterested in the ergonomic comfort of the occupant. Landing the '17 requires that one fly with the right hand and do the following things with the left: (1) lower gear, (2) select landing flap, (3) operate the dive brake normally. In touchdown the pilot: (a) promptly releases the dive brakes, (b) reaches for the flap lever to select full negative flap position to increase aileron effectiveness and ward off the threatened ground loop, and (c), drops flap lever and lunges for the wheel brake handle which is attached to the end of eight inches of springy wire. While bouncing around on a rough off-field landing, actually connecting with all these operations is rather unlikely! Small wonder that in Australia Hans-Werner got mixed up during roll-out and retracted the gear instead of applying the brake. On the *Nimbus* only dive brakes need operation by the left hand. The highly effective wheel brake is on the stick, all handy-like. Because of the stiffer wings and better aileron response, the ground-loop propensities of the *Nimbus* are mild, and landing position of the flap need not be altered under most landing conditions.

In short, the '17 is a ship of superb performance but one in which the pilot is likely to lose contest points because of inadequacies in detail design. Herr Waibel claims these details are not of great significance, but the majority of '17 pilots in Australia were planning to convert to the *Nimbus* at the earliest opportunity.

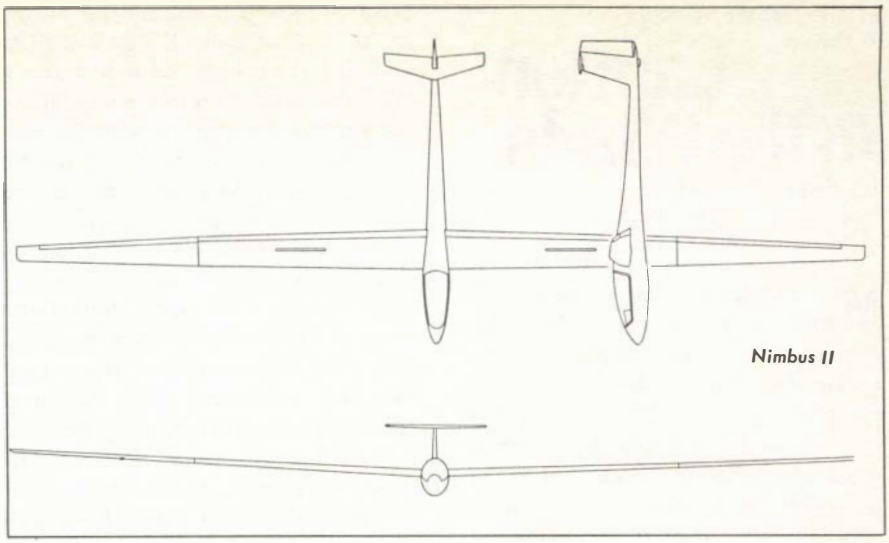
Why has the *Nimbus II*, seemingly of slightly inferior performance (especially in climb), finally done so well, but more than two years after the design first appeared? Part of the secret lies in the fact that the ship is well-built but relatively crude as it comes from the factory. The surfaces

are good, but the wing and flap-to-fuselage junctures are poor, no provision is made for exhausting vent air, and many other details of sealing need attention—more so than on the '17. Much of the reason for the difference probably results from the much higher labor rates at the Schempp-Hirth works and the economic pressure to produce a ship at a competitive price.

The *Nimbus* is an easy ship to clean up significantly, but very few people other than A. J. Smith did anything about it until 1974, and he did not have the time to undertake the more ambitious items.

Another important factor, only learned in the fall of 1973, was that the factory-recommended flap settings proved wrong by a large margin. The handbook recommends six degrees for climb, but ten degrees works far better. For running, the book recommends going to -4 at about 80 mph and -7 at 95. Actual tests showed 60-104 mph to be the proper range for -4 position. These discoveries, together with wing-root fairings worked out with the aid of Dr. "Put" Putnam of Princeton's Forrestal Laboratory of Low Speed Aerodynamic Research, made significant differences. In Australia, I found I could climb away from Dick Johnson's AS-W 17 with ease, especially in weak weather, although Dick had always outclimbed the *Nimbuses* at the U.S. '73 Championships. Even Hans-Werner's extended-wing '17 was not quite a match for my cleaned-up *Nimbus*. Interestingly, Ragot's '17 (apparently fresh out of the factory crate) was the only one I had trouble out-climbing. Despite the performance, Ragot was looking forward to taking delivery of a *Nimbus* after the contest.

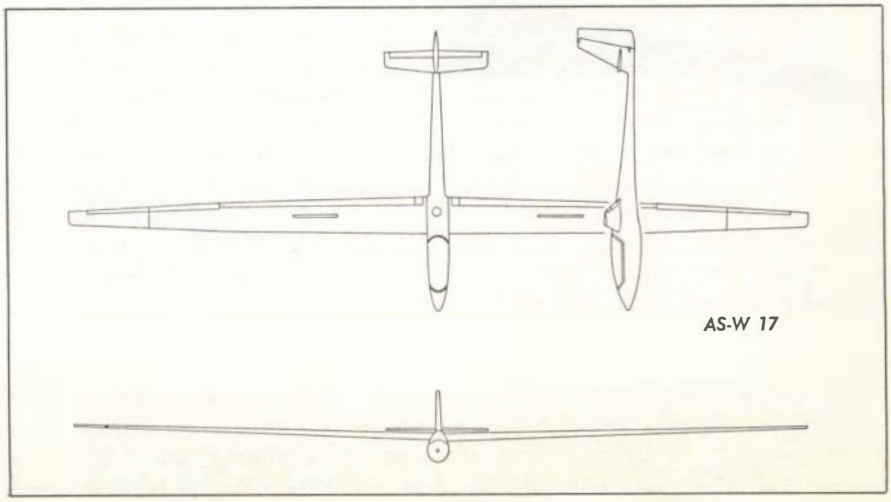
Since I could have flown either ship in Australia, what led me to choose the *Nimbus* over the '17? Highest on the list was the performance flexibility offered by the *Nimbus's* much wider range of wing loading. In fact, we were never able to use the extremely heavy maximum loadings due to Committee prohibition on flying at significantly over-normal gross weight. Tests at the heavier weights during practice showed the *Nimbus* to have superlative performance at gross weights up to 1140 lbs. Secondly, I liked the practicality of the *Nimbus,* long a feature of Schempp-Hirth ships. Everything



worked. The cockpit layout was good and the visibility outstanding. A third factor was a long and close friendship with *Nimbus*-designer Klaus Holighaus who offered much helpful data and advice during the preparation stages, despite the fact that he was himself flying against me in Australia for the German team. Designers are all stubborn as mules—they couldn't be designers if they didn't have an almost pathological belief in themselves—but Klaus has considerably more creative and less defensive reaction to criticism than Gerhard.

What next? I think that both ships badly need to be produced in Mark II versions. One imagines a ship with the maneuverability and basic climbing ability of the '17 combined with the practicality and flexibility of wing loading enjoyed by the *Nimbus*. There is no evidence at present that ships of significantly greater span will outperform the '17 or *Nimbus II* in contest conditions. I feel certain that either of these ships would outperform the original developmental *Nimbus I* with 72-ft. wings in all but the most extreme weather conditions, either weak or strong. Both the '17 and the *Nimbus II* offer excellent handling, maneuverability, and a glide ratio that has been measured at 48:1. Each is the product of enormous thought on the part of what certainly must be not only the two most brilliant living designers, but designers outstanding enough as pilots to represent their country in World Championship competition.

Open Class seems to be bumping into the farthest reaches of technological possibility with the AS-W 17 and the *Nimbus II*. Although these two great sailplanes represent the current limits, the fact that either has shortcomings, however slight, indicates the direction of continued progress and the assurance that even these ships will ultimately bow to refinements of the future.



Ridge runners normally stick their necks out when running. But after a 555-mile flight this one decided there was a limit. Now, he says, "Don't throw . . .

Caution to the Winds"

by KARL STRIEDIECK
map by CHARLIE WEINERT

Most articles on Appalachian ridge running by various authors, including mine, have emphasized the tremendous potential for distance and the seeming ease with which it has been attained. On March 8th I joined three other pilots in an attempt at the Out-and-Return record. It produced unusually high levels of adrenalin and it occurred to the pilots involved that something should be published emphasizing the hazards of this kind of flying to make sure the increasing number of ridge runners have both sides of the story and not a distorted idea that could lull them into dangerous situations.

The flight could probably be best described as an "assault" on the O&R world record. Wil Schuemann in an AS-W 12, Tom Knauff in a *Libelle*, Roy McMaster in a Standard *Cirrus*, and the author in an AS-W 15B made up the armada. The ships were launched in 12 minutes from Eagle Field, my mountain-top strip in Pennsylvania, and proceeded in loose formation to Altoona where a snow shower reduced visibility to less than three miles. Tom's radio quit at this point and so did Tom, so now we were a trio heading for Bedford. Clouds and snow showers increased and the trip across the gap was strictly by guess until within two miles of the next ridge.

Everything was easy for the next 30 minutes, but 30 miles beyond Kaiser we were confronted with a snow squall that was impenetrable. Electing to wait it out and get on top to take a look around, we climbed to 10,000 feet in wave and milled about. Wil was uncomfortable being above the small wave window with the slippery AS-W 12, but eventually we got high enough to look down course and were amazed to see a beautiful wave window and booming rotor right on track! In the next 36 minutes we covered 90 miles (150 mph) straight and level at 11,000 feet—which made up for a lot of the earlier frustration. However, good deals don't last; near Mt. Grove the wave disintegrated and it was back to ridge running. The winds were strong but suddenly, on a stretch of ridge that should have been good, we were down to 70 mph and just hanging on. Some sort of wind shadow had interfered. In 60 seconds we went from boomers to losers which is a not too uncommon situation in these mountains. When this happens above a forested valley it is not fun anymore. Approaching Narrows the sky became overcast and the visibility was occasionally reduced to one-quarter mile as we flew through snow squalls. At this point Wil decided he had stretched things far enough and turned back. Roy and I pressed on despite our better judgment and, after jumping three or four more gaps and flying up a dead end canyon in one mile visibility, decided belatedly that we had used up more than our share of good luck.

We turned back.

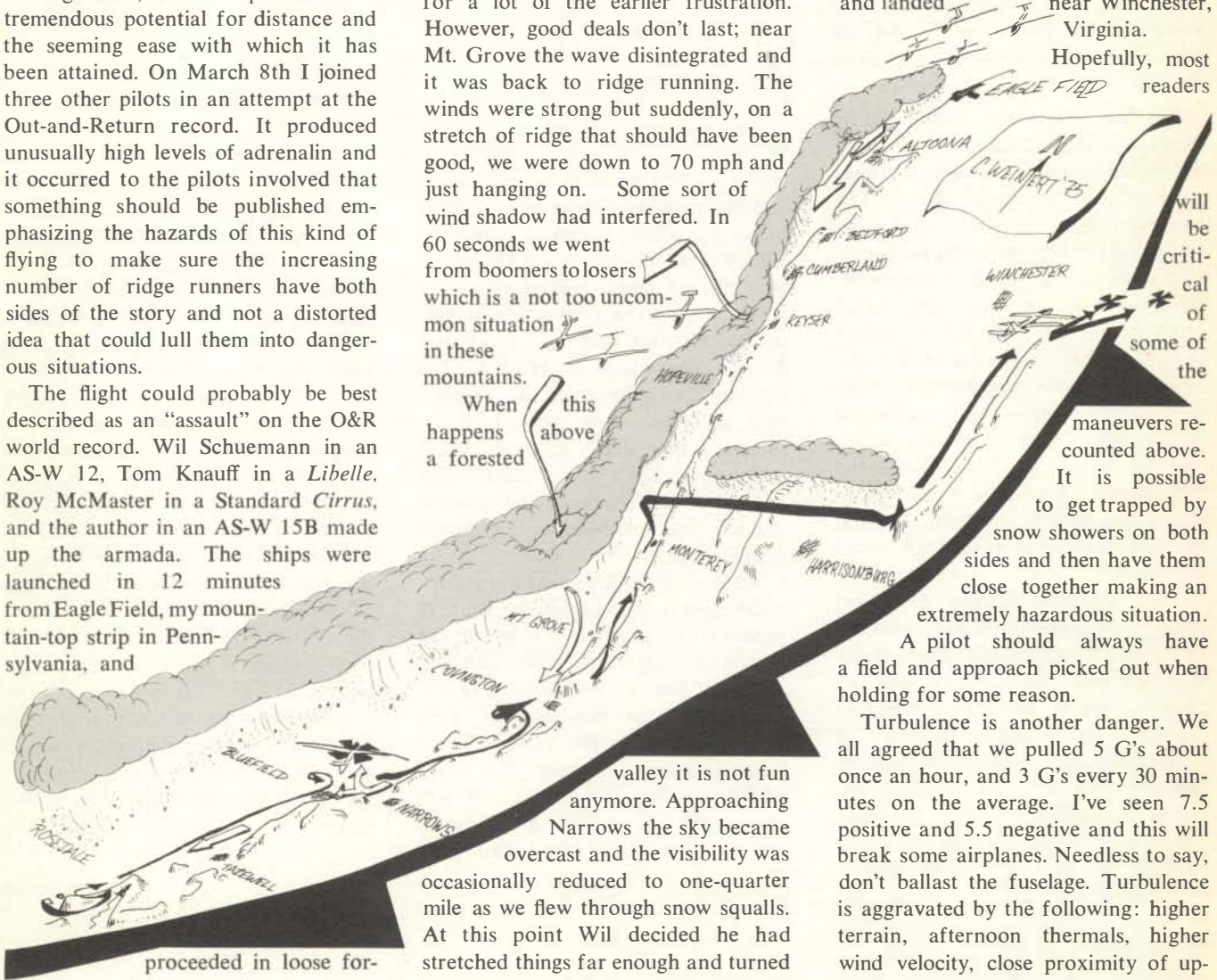
The return to Covington was delayed twice while we waited for snow squalls to dissipate, but eventually we ran into a blinding wall of snow that wouldn't quit. We made three sorties into it hoping to bust out the other side, but after 30 seconds of being unable to see anything but the trees rushing by our wingtips it was a 180-degree turn back to safety. Sanity returned finally and the drive to get home was replaced by a plan to minimize the retrieve. Thermaling up to 8000 feet, we headed downwind to the Shenandoah Valley and Interstate Highway 81. Once near the highway we ridge-soared north another 60 miles and landed near Winchester, Virginia.

Hopefully, most readers will be critical of some of the maneuvers recounted above. It is possible to get trapped by snow showers on both sides and then have them close together making an extremely hazardous situation. A pilot should always have a field and approach picked out when holding for some reason.

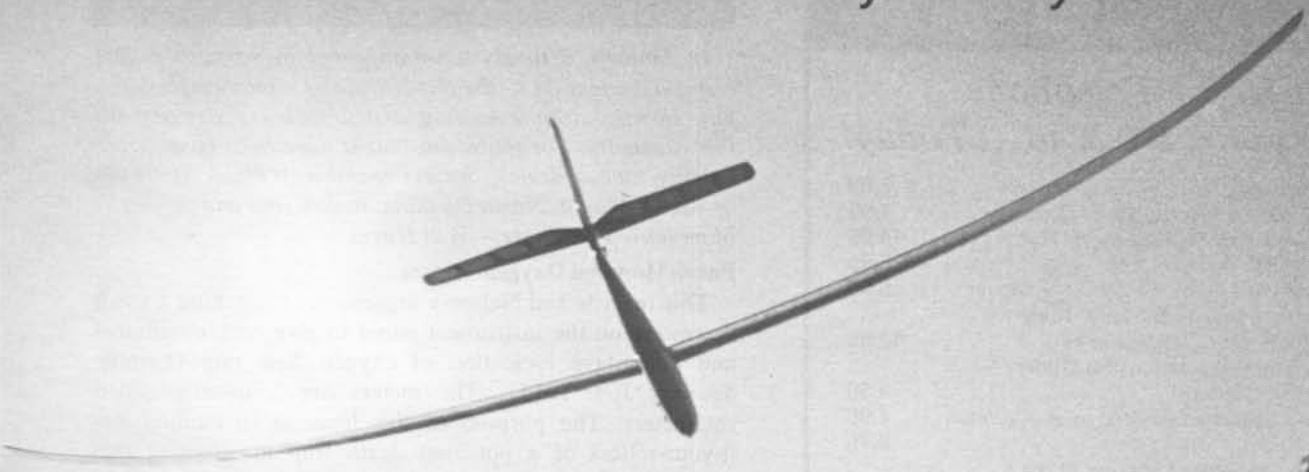
Turbulence is another danger. We all agreed that we pulled 5 G's about once an hour, and 3 G's every 30 minutes on the average. I've seen 7.5 positive and 5.5 negative and this will break some airplanes. Needless to say, don't ballast the fuselage. Turbulence is aggravated by the following: higher terrain, afternoon thermals, higher wind velocity, close proximity of upwind obstructions, and discontinuity in the ridge.

Ridge flying. like hang gliding or any flying, can be done safely if the pilot keeps the ship within its known operating limitations and doesn't get into situations beyond his capacity to cope.

If you know your ship and yourself and fly accordingly, you will experience terrific rewards in these beautiful mountains. The six golden eagles we saw on our March 8th flight were our reward.



*Don't let the beautiful body fool you.**



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SAFETY CORNER

Will Hayes

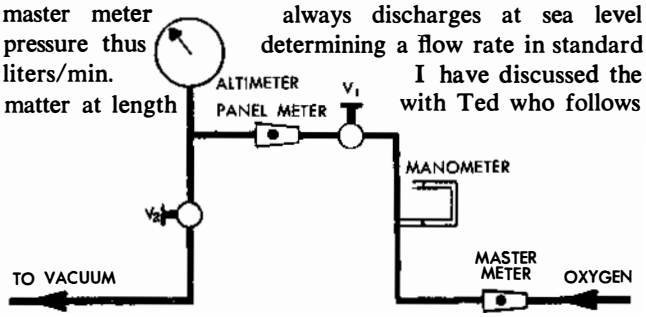
In January, a timely letter appeared in SOARING *calling members' attention to the importance of monitoring oxygen flow in high-altitude soaring and detailing a device with this capability. For those who might have been considering making such a device, Society member William M. Wells of Rocky Mount, North Carolina, makes vital and germane observations on safety.—Will Hayes*

Panel-Mounted Oxygen Meters

This regards Ted Nelson's suggestion of installing a small flowmeter on the instrument panel to give both qualitative and quantitave indication of oxygen flow rate (Letters, *Soaring*, Jan. 1975). The meters are frequently called rotameters. The purpose of this letter is to caution do-it-your-selfers of a potential death trap in adopting this approach. Ted restates the FAA oxygen requirement in liters/min. It should be added that this is in liters/min. at nominal sea level temperature and pressure, frequently called standard liters/min. The requirement is thus actually a mass flow rate.

Several years back I served on an NTSB board investigating a fatal accident at Minden involving a high-altitude wave flight where hypoxia was indicated. My task was to deal with the oxygen aspects of the accident. We were able to salvage the A8A regulator and calibrate it with a rotameter at sea level. In attempting to extrapolate the regulator output to altitude I was able to fix in my mind the fact that for the same flow in standard liters/min. the rotameter reads differently as the discharge pressure (or altitude) changes. Reading Ted's letter brought these thoughts back. The conclusion follows from principles of fluid mechanics, and with the knowledge that the flow in the meter is turbulent it is straightforward to predict approximately the expected meter reading. Also reference to the meter manufacturer's data leads to the same conclusion. In short, the pressure drop across the ball is proportional to the dynamic pressure $\frac{1}{2}\rho v^2$ in the meter tube. For a given mass flow rate, which may be expressed as ρv, the density is reduced due to the reduced pressure and the velocity is increased. This leads to a larger value of $\frac{1}{2}\rho v^2$ and thus a higher reading on the meter.

The result is that the meter indicates the pilot is getting more oxygen than he actually is. To be certain on this point, if one intends to fly such a system, it should be calibrated with a setup similar to that shown basically here. The calibration procedure is to throttle v_1 so that the master meter always discharges at sea level pressure thus determining a flow rate in standard liters/min. I have discussed the matter at length with Ted who follows



this approach. His results, which are approximately verified by the simple calculation, conclude that at 30,000 feet the flow is about half that which one reads in simple fashion from the meter. Therein lies the hazard. There is a small error from temperature which is in the safe direction because lower temperature results in increased oxygen density.

I like the basic approach, provided one takes account of this potential hazard.

TEACHING SOARING

Richard Sayer

Richard Sayer, who will be writing and editing this column, is a career gliding instructor with 6000 logged teaching hours. He learned to fly in Germany and began his first teaching assignment at Holiday Soaring in the Tehachapi Mountains of California. At present he is Chief Instructor for Wave Flights near the eastern slopes of the Rockies. He is an SSA Instructor, an FAA Examiner (gliders), an Accident Prevention Counselor, and has earned a Gold Badge with two Diamonds—all in a 1-26.

"The ultimate subjects of this column," writes Sayer, "will be the new student and his teacher (club, commercial, full or part-time). To be most effective, articles must be based on inputs from instructors and students, and I will welcome information on types of articles desired, any thoughts on good or poor teaching procedures, etc. Even if I don't find time to answer all letters, readers can be assured each letter will be carefully read."

Members with questions or suggestions should write directly to: Richard G. Sayer, 13120 North Holmes Road, Colorado Springs, Colorado 80908.

"It Never Happened Before," Why?

In recent years we have heard expressions similar to the following from licensed pilots, "I made a hard landing, bounced, lost control, and went off the runway. I've never bounced before. It never happened before." Another, "I got slack in the rope and had to release. It never happened before." Or, "The rope broke at 300 feet off the end of the runway. It never happened before."

The key to the above experiences are not what happened, but the expression, "It never happened before." If it never happened before, perhaps we instructors should ask, "Why?" As instructors, we pride ourselves in teaching the correct way. Perhaps we are putting too much emphasis on always doing what is right during initial training. Maybe we are trying so hard to teach the correct methods that we forget that someday when the student is a licensed pilot he may have to cope with some basic mistake that he hasn't encountered before.

We should be simulating mistakes and teaching how to cope with them as well as the correct way to fly. If the student never had to cope with mistakes during his training, then how can we expect him to handle problems after licensing?

In my 6000 hours of instruction I have tried to introduce mistakes as well as teach correct methods. It works. I seldom hear, "It never happened before," and if I do, I ask why.

The following are some examples of this approach. Remember that this is not a complete list of possible mistakes, but only a beginning.

Teach actual slack lines on aero tow and have the student make the recovery. Have the student fly too far to the outside during a turn, then return to the correct position . . . too far to the inside of a turn . . . actual wave-off, etc.

Teach broken rope techniques on takeoff between 200 to 300 feet above the ground where a 180° turn back to the runway is applicable (also at 400 ft. and 600 ft.) Teach stalls from flat turns and with crossed controls, not just from coordinated flight.

Show the results of improper flaring on landings. Sooner or later a pilot will make an improper flare, rounding out too high, too late, or perhaps ballooning because of incorrect use of dive brakes. How to recover from these and make a good landing is extremely important to the new pilot.

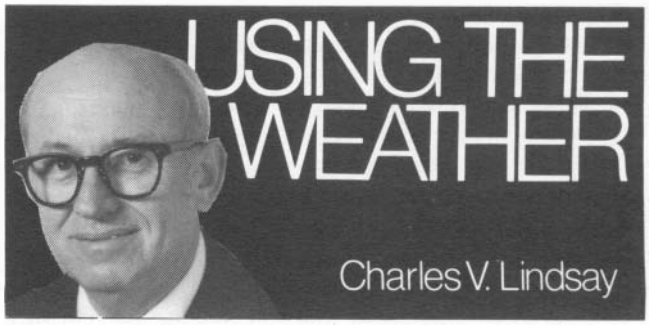
When teaching how to return to the airport with the correct altitude, why not do maneuvers to such an altitude that the student will have to make a pattern other than normal? Perhaps he will have to land directly from base leg, straight in, or downwind.

Teach the effect of flying too fast back to the airport, and how the uncompensated rate-of-climb instrument may show 1000 ft. per minute down, while best L/D speed may show normal rate of descent.

Show the student the effect of various speeds in the pattern. Approach intentionally too fast, so that the student will see problems with such an approach and landing.

Many instructors are already integrating this method of teaching into their syllabus of basic instruction. Many are not. Too often, we are hearing, "It never happened before."

If you feel that the above will make your course syllabus longer, it won't. It can be integrated so that when the correct methods are mastered the corrections for mistakes will be mastered, too. Thus, to be sure that you have taught the correct way, include at least some of the basic mistakes. If you do, seldom should you hear, "It never happened before."



WEATHER FOR RIDGE SOARING

Ridge soaring is the oldest form of soaring. Pilots used the currents moving up over ridges in 1920, some six years before thermal soaring was discovered. Although ridge soaring is not as popular as thermal soaring, it is done in some areas and can be an easy way for one to fulfill the five-hour duration requirement for the FAI Silver Badge.

Recently, there has been a renewal of interest in ridge soaring. In March of 1968, Karl Striedieck made an Out-and-Return World Record of 476 miles along the ridges of the Appalachian mountains.[1] On May 5th, 1973, Bill Holbrook established a new Out-and-Return World Record, a flight of 782 miles along those same ridges.[2] These record flights have demonstrated that ridge lift used in conjunction with wave and thermal lift along the ridges can produce long flights.

Ridge lift can be used as a stepping stone in the search for thermal and wave lift. One can fly ridge lift until the thermals begin and then go from a thermal directly into a wave to make much higher altitude *gains* than if he had been towed directly into the wave lift. Long flights along mountain ranges with limited options for off-field landing are not for beginners.

Conditions of wind and stability necessary for ridge lift: The direction and speed of the wind are the main factors in ridge soaring. A wind which flows at right angles to the line of the ridge is best; but if the direction is within 40 degrees of perpendicular, there may still be sufficient airflow up the ridge for soaring. The average wind speed from the base of the ridge to the top must be at least 15 knots. If the gradient wind (wind about 1500 to 2000 feet above ground) is 20 knots from the proper direction, the ridge will probably be soarable.

The height to which a glider pilot can soar on a ridge does not increase in simple proportion to the wind speed. Strong winds (vertical shear) tend to increase the turbulence without markedly raising the soaring level.

In addition to wind speed and direction, the air's stability is an important factor. Stable air usually provides the best conditions for slope (ridge) soaring. With a moderate wind, a sailplane may be able to soar up to three times the height of the ridge. A particularly favorable temperature profile is one where a neutrally stable layer of air at low levels is capped by a sharp temperature inversion. When these conditions are met, sailplanes may climb several thousand feet above the escarpment. Such conditions occur more commonly in the evening hours than during the heat of the day.

During the early morning hours, a marked nocturnal inversion over the valley may extend up to the level of the ridge. Then, despite a 20-knot gradient wind, the air beneath the inversion remains almost calm. There will be no flow of air up the ridge until insolation—incoming radiant solar energy—breaks down the inversion.

During the day, as surface heating proceeds and the air becomes less stable, the upper limit of soaring may extend to the top of the unstable layer. The lift over the ridge will be stronger and more turbulent as thermals, developing in the air flowing up the slope, reinforce the existing ridge lift. The degree of turbulence depends on the wind speed, the lapse rate, and the roughness of the terrain, and it is difficult to predict the strength of the lift.

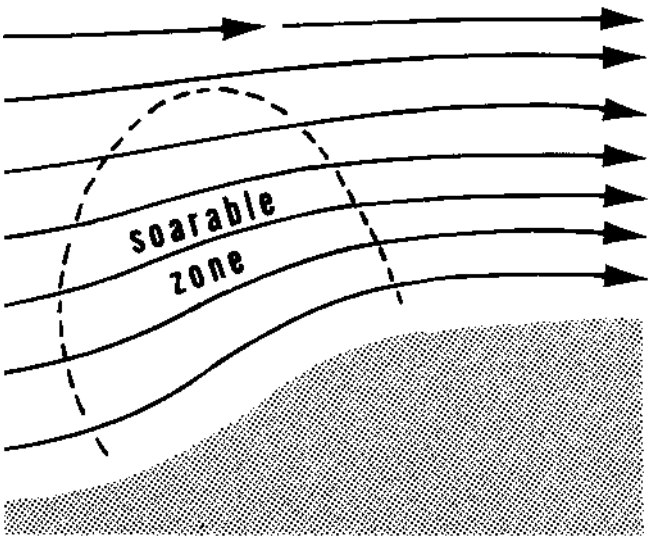
Inclination and profile of the ridge: The effect of the steepness of the hill or slope is difficult to assess. The best inclination for easy soaring is between 20 and 45 degrees (Figure 1). Within certain limits, the steeper the slope (Figure 2) the greater is the vertical component of the airflow, but this relationship breaks down when the slope is very steep. As the slope steepens beyond 45 degrees, the area of lift becomes more restricted and the turbulence greater. If the angle exceeds 60 degrees the slope may become difficult to soar.

A gradual change in the angle of the slope is best for soaring since the air can follow the profile smoothly (laminar flow) without breaking away in turbulent eddies (Figure 1).

Where the slope is steep, a rotor may form at the foot of the cliff and remain there. These rotors have been termed "bolster eddies." They alter the effective shape of the cliff, making it appear less steep to the oncoming air flow (Figure 2).

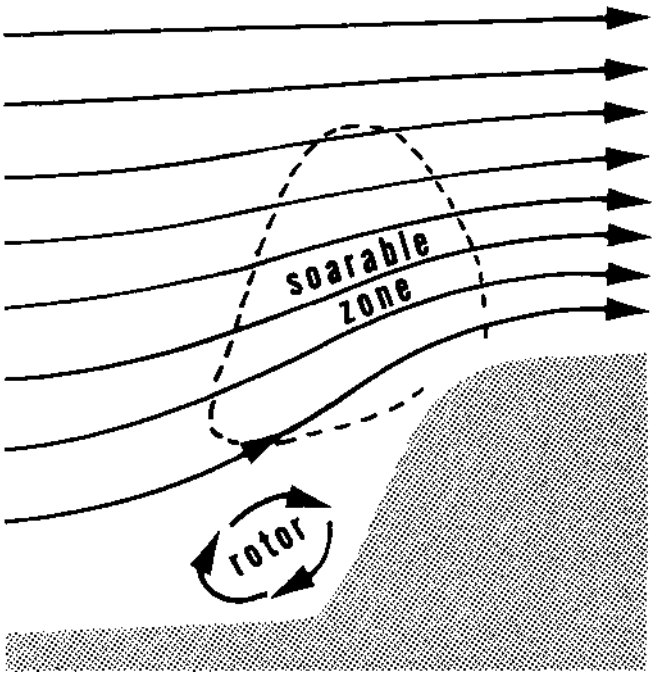
LAMINAR FLOW OVER GRADUAL RIDGE

Figure 1.



ROTOR AT BASE OF STEEP CLIFF

Figure 2.

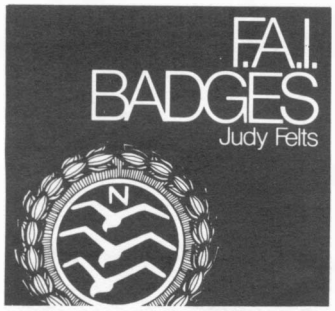


The weather briefing: When the pilot interested in ridge soaring calls his nearest National Weather Service Office or FAA Flight Service Station for a weather briefing, he can obtain the following information:

1. *Airmass moisture conditions:* Is the airmass over the area dry enough so that the ridge will be free and remain free of clouds? At times a small change in moisture can cause low clouds to develop suddenly and cover the ridge, especially during the cool seasons.
2. *Wind speed and direction throughout the day:* Since observational wind data will not normally be available for such a small area and for such low altitudes, conditions for the up-slope wind will have to be estimated. The surface wind in the valley must be averaged with the forecast wind at the first available level above the ground. Ask for the latest winds-aloft forecast for the first two levels above sea level (and higher if needed) for your area. If upper wind observations are taken nearby, this will aid significantly because you can get more detail of the low level winds.
3. *The likelihood of thermals or waves during the day:* If a wind vane and anemometer are available at your ridge site, it would help a great deal to relate the wind direction and speed to soaring conditions on the ridge. A local study by pilots relating local winds to the general weather patterns can help greatly in arriving at conditions to be expected.

References

1. Bennett Rogers, "The O & Rographic Record," *Soaring*, Vol. 37, No. 12, Dec. 1972, pp. 16-22.
2. Bill Holbrook, "The Way to Go," *Soaring*, Vol. 37, No. 7, July 1973, pp. 20-22.



INTERNATIONAL F.A.I. BADGES FOR SOARING

Earned in the United States
Approvals for Applications Received During Feb. 1975

DIAMOND BADGES

International Number Assigned

1589. Theodore Janczarek (U.S. 304)

GOLD BADGES

912. Raymond A. Schroeder
913. Karl H. Tiefert
914. Edwin D. Rathbun

SILVER BADGES

2770. Larry D. Brill
2771. James A. Cain, Jr.
2772. James A. Furr
2773. Phillip H. Edmonds

ALTITUDE DIAMONDS

5000-meter gain (16,404-ft.)

All Wave Flights
Thomas Devereux; 1-34; Colorado Springs, CO
Gary Hagemeister; 1-34; Colorado Springs, CO
Toru Ikeda (Certified to Japan)
Sabrina Jackintell; 2-32; Colorado Springs, CO
Gerald Kaufman; 1-34; Fort Collins, CO
L. Michel Kun (Certified to Mexico)
Henry Scarborough; 2-32; Colorado Springs, CO
Albert Thomas; 2-32; California City, CA
John Wastvedt; 1-34; Colorado Springs, CO

GOLD BADGE LEGS

Altitude: 3000-meter gain (9842-ft.)

Thomas Devereux (See Dia. Alt.)
David Edson; Ka-6E; Glen, NH (Wave)
George Evans (Certified to Canada)
Lionel Fram; 1-26; Colorado Springs, CO
Peter Guy; 1-26; Colorado Springs, CO (Wave)
Gary Hagemeister (See Dia. Alt.)
William Hearst; 2-32; Colorado Springs, CO
Gerald Kaufman (See Dia. Alt.)
Hans Luenger; 1-34; Colorado Springs, CO (Wave)
Neil Macdougall (Certified to Canada)
Cary McGregor; 1-26; Fort Collins, CO
John McMorran (Certified to Canada)
Ricardo Price (Certified to Mexico)
Edwin Rathbun; 1-34; Colorado Springs, CO (Wave)
Henry Scarborough (See Dia. Alt.)
Raymond Schroeder; 1-26; Colorado Springs, CO (Wave)
William Seed, Jr.; 1-34; Colorado Springs, CO (Wave)
Grayson Starner; 1-26; Glen, NH (Wave)
Herbert Tipton; BG-12B; El Mirage, CA
Luciano Tovar (Certified to Mexico)
Juan Vivanco; 1-34; Colorado Springs, CO (Wave)
John Wastvedt (See Dia. Alt.)
Ernest Webb, Jr.; 1-26; Colorado Springs, CO (Wave)

SILVER BADGE LEGS

Altitude: 1000-meter gain (3281-ft.)

James Cain, Jr.; Ka-6E; Chuluota, FL
Henry Cryer III; 1-26; Colorado Springs, CO
Thomas Devereux (See Dia. Alt.)
Lionel Fram (See Gold Alt.)
James Furr; St. Libelle; Miami, FL
Peter Guy (See Gold Alt.)
Charles Honts; 1-26; Lexington, VA
Gerald Kaufman (See Dia. Alt.)
George Ledford; 1-26; Elsinore, CA
Peter Martin; 1-34; Pearblossom, CA
George Stephenson; 1-26; Pearblossom, CA
Juan Vivanco (See Gold Alt.)
David Willding; 1-26; Pearblosom, CA
Dan Williams, Jr.; Ka-8B; Benton, TN

Distance: 50 kilometers (31.1 miles)

James Cain, Jr.; Ka-6E; Chuluota, FL
Thomas Chitty, Sr.; 1-23; Oviedo, FL
Phillip Edmonds; Ka-6CR; Benton, TN
James Furr; Std. Libelle; Miami, FL

Duration: 5 hours

Larry Brill; 1-26; Livermore, CA
James Furr; Std. Libelle; Miami, FL
Nancy Goering; 1-26; Estrella, AZ
Jimmie Gray; 1-35; Estrella, AZ
George Ledford; 1-26; Elsinore, CA
David Reece; 1-26; Estrella, AZ
Stephen Weston; 1-26; Elsinore, CA

Altitude/Duration

J. B. Bullock; Ka-6CR; Benton, TN
Dale Bush; Blanik; Eugene, OR

C BADGES

30-min. flight

7290. Neely H. Bostick
7291. Roger N. Buchanan
7292. Bruce D. Chapman
7293. Anne R. Collins
7294. Henry M. Cryer III
7295. Austen P. W. Damm
7296. Ted Davis
7297. Ray Dickerson, Jr.
7298. John L. Fleming
7299. Nancy R. Goering
7300. James J. Harkins, Jr.
7301. Harry C. Hogan
7302. Bradley S. Howerton
7303. Lloyd W. Howerton
7304. John H. Johnson, Jr.
7305. John Joss
7306. Peter H. Martin
7307. Garland J. McCulloch
7308. Robert L. Nussbaum
7309. Rick Paige
7310. Frank W. Randolph
7311. Gary Reuter
7312. Robert Schaefer
7313. Quay C. Snyder, Jr.
7314. Louis S. Terra
7315. Richard A. Whalen

B BADGES

5-minute flight

Gary L. Buck
Rodrigo A. Candelas
Ethel B. Carey
Bruce D. Chapman
Henry M. Cryer III
Richard E. Domanski
Michael S. Dumm
Norvan W. Fagan, Jr.
June A. Gaines
Nancy R. Goering
Kim Groomes
Stephen F. Hassell
John H. Johnson, Jr.
Peter H. Martin
Richard H. Miller
Martin J. Mouton
Robert L. Nussbaum
Walter A. Oppenheimer
Goran F. Ostlund
Robert Schaefer
Arthur Smiley
George H. Smith
Louis S. Terra

RECORDS APPROVED

Massachusetts; Single-place; Open/Sr.; Distance/Goal; 200 mi.; James H. McClintick; Open Cirrus; Aug. 10; Pepperell.

Massachusetts; Single-place; Open/Sr./Std. Class; Out & Return; 188 mi.; Charles C. Wales; Std. Libelle; June 2; North Adams.

Massachusetts; Single-place; Jr.; Alt.; 7250 ft.; Jon Forringer; Schweizer 1-23; April 29; North Adams.

Minnesota; Single-place; Open; Speed for the 200-km. Triangle; 62.6 mph.; Brian G. Utley; Nimbus; September 22; Stanton.

RECORDS CLAIMED

World; Single-place; Open; Speed for the 500-km. Triangle; 87.42 mph (140.70 kmph.); Malcolm Jinks; Nimbus II; Jan. 31; Australia.

World; Single-place; Feminine; Speed for the 100-km. Triangle; 86.99 (140 kmph); Susan Martin; Nimbus II; Feb. 6; Australia.

World, U.S. National; Multiplace; Feminine; Alt.; 34,200 ft. (10424 m.); Babs Nutt; Schweizer 2-32; March 5; Colorado.

U.S. National; Multiplace; Feminine; Alt. gain; 23,700 ft. Babs Nutt; Schweizer 2-32; March 5; Colorado.

OTHER LONG FLIGHTS

Non-Badge flights over 250 miles

March 8; Karl Striedieck, AS-W 15B, and Roy McMaster, Standard Cirrus; 555 mi. from Port Matilda, PA, to Rosedale, VA, to Winchester, VA; 10 hrs.; world out-and-return distance record attempt.

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TRA Soaring Center
Trenton-Robbinsville Arpt., Robbinsville,
N.J. 08691 Ph: 609 587-1250

Kutztown Aviation Services
Kutztown (Arpt.) Pa. 19530
Ph: 215 683-3821

Ridge Soaring Inc.
RD, Julian, Pa. 16844
Ph: 814 355-1792

Birchwood-Pocono-Airpark
RD 3, E. Stroudsburg, Pa. 18301
Ph: 717 629-0222

Warrenton Soaring Center
P.O. Box 185, Warrenton, Va. 22186
Ph: 703 549-5151

Bermuda High Soaring School
Box 134, Chester (Arpt.) S.C. 29706
Ph: 803 385-6061, 385-5764

Atlanta Sailplanes, Inc.
Box 25, Williamson, Ga. 30292
Ph: 404 227-8282

Louisiana Soaring Center
P.O. Box 1173, Covington,
La. 70433 Ph: 504 892-1629

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West Bend Flying Service
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New Micropower Vario Models 400/3 and 401/3
Ball Engineering's contribution to energy saving
This model performs like Model 100 or 101, except the power required has been reduced to only 1ma at 3 volts. Operates over 200 hours on two penlight cells. Uses Model 403 audio which requires 12-volt battery. Price same as Models 100 and 101.

Designed to be totally independent of other systems. Also available at same price are Models 400/6 and 401/6 which add a voltage regulator to allow operation from 5 to 25 volts DC at 5ma current.

New Interrupted-tone Audio Models 103 and 403
Model 103 used by vario Models 100, 101, and 200. Added middle knob sets threshold of interrupted tone. Allows operating at lower volume, gives an added alert signal; useful for Netto cruising.

Model 403 is identical except that it incorporates its own voltage regulator and requires its own 12-20v battery. Required for Models 400. Input signal is plus and minus .5v and may used with other varios.

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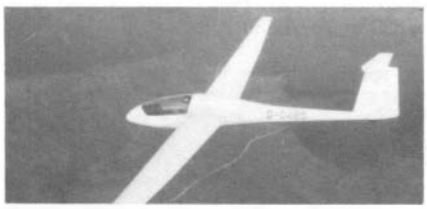

STANDARD CIRRUS. Write for brochure and delivery information. The Standard Cirrus placed second through sixth in the '73 Standard Class Nationals. FAA ATC'd with water ballast up to 860 lbs. Rainco, P.O. Box 20944, Phoenix, Arizona 85036.

9-EASY. Not-quite-world's-fastest Standard Cirrus. Standard category. 49 and 22 cu.ft. bottles. A-14 regulator with mask. Bertea ML-200 plus full instruments and water. $14,900. Complete with Day-Glo red under elevator and wing tips. Less without instruments. No damage. Phil Ecklund, (303) 388-8587.

STD. CIRRUS, factory water, tinted canopy, metal trailer, never damaged. (817) 387-3047.

STD. CIRRUS. Top ten at Nationals, regional winner. Schuemann statics, excellent venturi system, complete legal water ballast system, tail dolly, canopy cover, spare gear doors. Excellent condition. Only 400 hours. $12,900. (305) 365-3686.

STD. CIRRUS. Contest prepared, water, beautiful finish. With or without trailer, with or without instruments. $12,500. Call Phil Carnes, (305) 974-7529 or 737-8850.

CIRRUS B, 19-meter, trailer, instruments, oxygen, parachute. $11,000. One-half or ⅓ partnership possible. (714) 637-1520 or (714) 837-6956.

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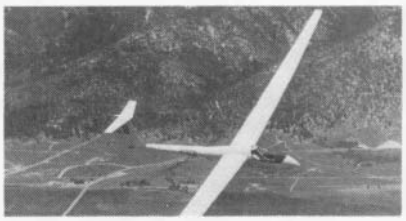

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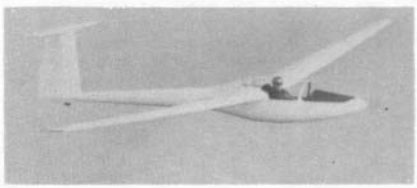

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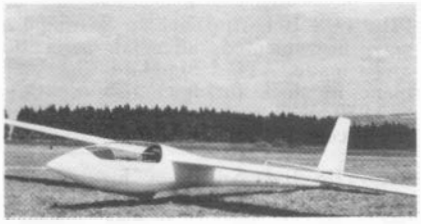

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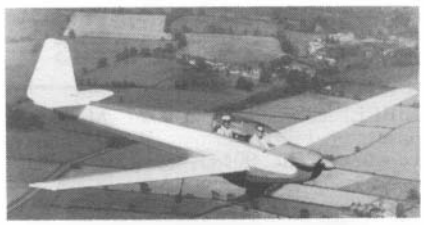

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GROUND SKIMMER, monthly magazine of the United States Hang Gliding Assn., Inc. (formerly Southern Calif. Hang Glider Assn.), 9500 members nationwide. Covers fuel-less, ultralight, self-launched activities and developments. 12-issue subscription with $10 dues, USHGA, Box 66306S, Los Angeles, Calif. 90066.

AUSTRALIAN GLIDING, monthly publication of the Gliding Federation of Australia. $10/yr. Box 1650, G.P.O. Adelaide 5001, South Australia.

THE GLIDING KIWI. The official journal of the New Zealand Gliding Assoc. Edited by John Roake. U.S. $6.00 (six issues). Box 545, Tauranga, N.Z.

HANG GLIDING books available from SSA. *Hang Gliding*, by Dan Poynter, $5.95; *Simplified Performance Testing for Hang Gliders*, by Jack Park, $2.15, *Hang Flight, a Flight Instruction Manual for Beginner and Intermediate Pilots*, by Joe Adleson and Bill Williams, $3.90; Proceedings of the Ultralight Flight Seminar held at Northrop Institute of Technology, January 12, 1974, $4.00. Californians please add sales tax. SSA, Box 66071, Los Angeles, Calif. 90066.

BOUND VOLUME of *Soaring* magazine for 1974. $17 from SSA, Box 66071, Los Angeles, Calif. 90066. Californians please add sales tax.

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