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February — March 1968 3s 6d

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SAILPLANE & GLIDING

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THREE DIAMONDS AT FIFTEEN

By STEPHEN H. PARKER

MY soaring career began in a rebuilt L-K when I was six years old. The first flight was on a typical Texas day with tremendous thermals, and tremendous sink. My Pop seemed to be having great fun; but personally, I was beginning to feel like a yo-yo and was scared to death of that decrepit old machine with wings that creaked and flapped with every bump! After several flights, I overcame my fear of these characteristics and actually began to enjoy gliding.

When I was nine years old, we bought a 2-22 kit and worked on it all winter, so that we could open a soaring school. By this time, I was fighting to get a ride every chance I had. I was still too little to see out of the cockpit, so we built rudder pedal extensions, seat extensions, and added 40 lbs. of lead for balance. Ian Burgin, an Australian working as an instructor, began attempting to teach me to fly—which I am sure he regretted after some hair-raising experiences! This was really a little young to start flying, because I was soon ready to solo; but the FAA said I had to wait another five years for this privilege.

Actually, the five years went pretty fast — every time the front seat was empty, I threw in my lead and extensions for another flight. I retrieved the winch line, and—to Ian's pride and my mother's horror—I became a winch operator. All of my earnings for this work went to pay for my flying time—and was Pop ever strict with his bookkeeping! In the summer of 1965, our family took the SSA charter flight to England to visit the Internationals at South Cerney and take a quick tour of the British Isles and the Scandinavian countries. I used all my trip allowance for flights in sailplanes. I flew a Capstan at Dunstable (Ian was then instructor there), a Blanik at Lasham and a Capstan at Portmoak.

Due to bad weather, I soloed in a 2-22 the day after my 14th birthday. Pop then taught me the techniques of handling spins. By this time, I was also ready to solo a power plane. Two weeks after my solo flight in the 2-22, I had a *real* solo in a 1-23. On the day of my first 1-23 flight, Pop carefully briefed me; Mr. Roy Schlemeyer very carefully briefed me; and Mr. J. C. (Red) Wright briefed me. I was well briefed! On the second flight, I decided to make the 1-23 go up, whether it wanted to or not, and tightened my turn to get into the core. Suddenly, I was looking straight at the ground and everything was going around in circles! I thought I had done something really bad, but when I landed the ship, Pop was rolling with laughter and yelled, "That'll learn ya!", and hooked up the tow-line for my next tow! I learned later that Mom and Grandmother drove up just in time to see me go into my spin. Pop really had to do some fast talking to them!

About a month later I decided I was ready to try for my Silver C distance, which was the hardest flight I have made! I got into the air and headed for Andrews, 35 miles to the north. Red Wright, Doc Williams and Pop were all up there to help me. Soon I got low, and they all started telling me about their thermals; by the time I got to them, the thermals had disappeared and my flying friends had returned to the safety of the airport. I managed to struggle into Andrews with enough altitude to make a 360° turn and land. In the meantime, Pop had gone back for

the tow-plane to retrieve me.

I flew my five hours over Marfa, Texas, during a regional meet, while the eligible pilots were on a cross-country task. During the first 1½ hours I did just fine—it was a beautiful June day with good thermals. After almost three hours I got cold, hungry, stiff, and radioed the ground control that I was coming in. I was at an altitude of a bit over 15,000 feet; so Mom and the "ground pilots" advised me to drop to about 3,000 feet and kept talking to keep me up there! Pop heard the conversation from near Wink—400 feet off the ground, hot, thirsty and hungry, and told me to quit "bragging" and keep flying! When I landed, after staying in the air five hours, Pop had circled the field, gained altitude, and was on his way out for distance; but since this flight had made me the youngest Silver C pilot in the USA, he gave up his distance "leg" and came back to join a celebration—or maybe he just didn't want to miss a big thick steak!

My next serious flight, in July, was an attempt for Gold Distance and Diamond Goal to Fort Sumner, New Mexico. Again I was alone! I got lost and got very low. A farmer was barbecuing a chicken, and I could see potato salad and beans on the picnic table. Since I had left without lunch, I looked for a spot to land and sample some of that good-looking food; but as luck would have it, I hit a thermal and missed a good lunch! As I gained altitude, I reached my goal with no difficulties. Mom had called some long-time ranch friends near Fort Sumner, and they were at the airport waiting for me. That was a big mistake on Mom's part, because poor "Miss Sue" was a nervous wreck! You see, her son Ronnie, who is my age, rides bucking bronchos for fun instead of "bucking waves". However, as she watched me make up for my lost lunch, she decided I was all right!

I flew almost every day all summer and on Saturdays that fall. All the older pilots at the field talked, taught and encouraged me. In November, due to the fact that I am an honour student, I was granted permission to leave school two days to take the Altitude Indoctrination Course at the Cannon Air Force Base, Clovis, New Mexico. The following Christmas of 1966, Pop and I went to Black Forest Soaring Camp near Colorado Springs, Colorado, to try for our Diamond altitudes and my Gold altitude. The wave "slept" for the first six days we were there, and we just enjoyed the other Diamond "hopefuls", including Anne and Denis Burns of England, Colonel "Doc" Wiley of Albuquerque, New Mexico, and Bernie Paiewonsky of Bethesda, Maryland. The day after Bernie left (this had been his fourth trip!) and the last day we were to be there—the wave "waved". I was soon in our 1-23 and began my trip over Pike's Peak. We hit the rotor before getting into the wave, and it made me wonder if I really wanted that Diamond altitude after all! After reaching the wave, I rode it to 35,000 feet where it was 52° below zero. The batteries in my electric socks froze, and my breath frosted the canopy. I was still going up at 150 feet per minute when I had to nose the 1-23 down. Knowing I had succeeded, I then took time to look at the beautiful and awesome snow-covered Rockies. (In spite of its majesty—that is a wild and wicked world up there!) This flight gave me the Gold and Diamond altitudes, completed my Gold C badge

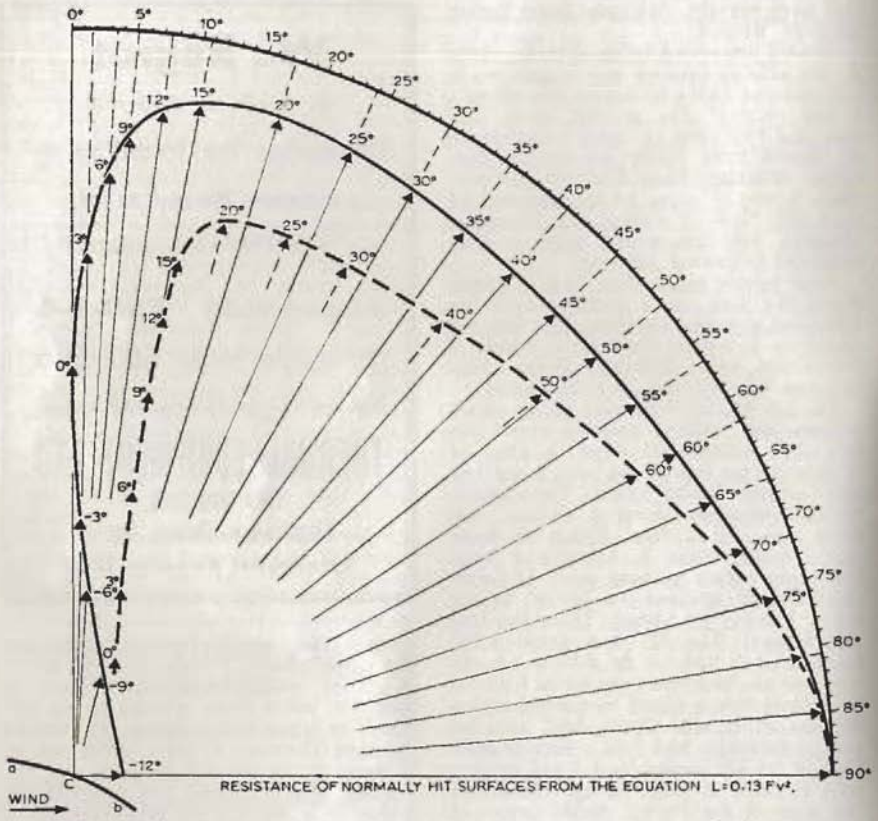
and gave me the Colorado State Junior Altitude Record.

After I descended to an altitude where it was safe to remove my oxygen mask and use the radio to report the altitude I had reached, the ground pilots said that had Pop been carrying a barograph he would have easily gotten his Diamond altitude! That day, 1st January, 1967, I was 14 years 11 months and 14 days old. Now—I wanted that Diamond distance, but that would have to wait until the following summer.

After school was out in May, I began flying the Sisu, so I could use it for Diamond distance attempts. My first try ended in a cotton field right beside a farmhouse near Wheeler, Texas. This was one thermal and 29 miles short!

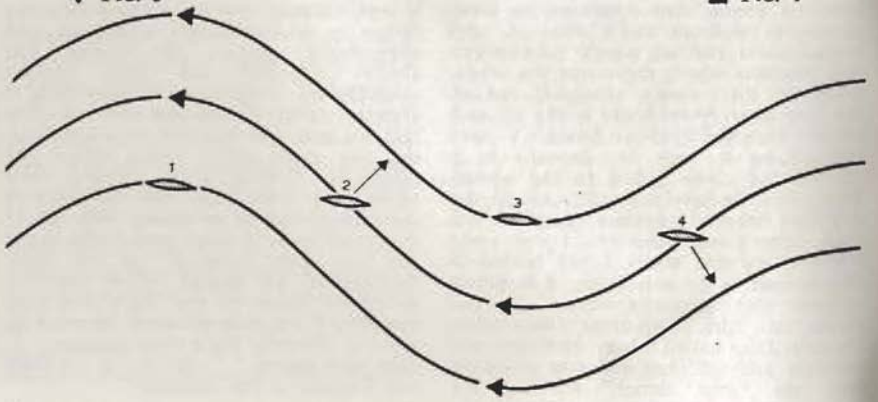
On 3rd August I decided to try again —there was nothing exciting about the first 200 miles, but then a line of thunderstorms barred my path I got low and almost landed near Tucucamari, New Mexico, at about 4 o'clock. But there was still a faint flicker of hope that I could make it. I began a long, low glide before picking up a 50-f.p.m. thermal that enabled me to get to the storm I could see ahead. There the real ride began! The lift was about 1,500 f.p.m. and I had to fly 140 m.p.h. to stay out of the clouds. At times I would be sucked into a cloud to come barging out the other side. Rain, hail, thunder and lightning had me surrounded! Finally the lift ceased, and I had to prepare to land. It was raining so hard in the area of the Farley, N.M. airport, I couldn't locate it. I headed north and found a ranch that appeared to have people as well as cattle near it, and landed on a twisting ranch road where one shoulder was higher than the other. I opened the canopy, struggled out of the ship after seven hours in the air and walked to the ranch house. I was charged by a huge St. Bernard as I crossed the cattle guard to the house. Two young ladies came out, calmed the dog and asked if I were stuck in the mud. After I explained who I was, what I was flying and where I had landed, I was invited in to call home. I couldn't operate that particular type of telephone, so Mrs. Christmas (the ranch owner's wife) called Mom, gave her my location and told her she was going to feed me "sour dough" biscuits for dinner. The whole family helped me check my charts. I was 16 miles north of Farley, and I knew I had flown at least 330 miles (later proved to be 345 miles) and had just become the world's youngest Diamond C pilot at the age of 15 years 6 months and 16 days.

I feel that attaining this achievement is due to a number of circumstances. I have spent my life in Odessa, Texas—a true "Mecca" for sailplane pilots; my father is a determined, dedicated and enthusiastic airman; my mother has always expected the very highest achievement from me in anything I attempt. Even though she says she has had her first and last ride in a sailplane, she has spent many hours beside the telephone helping crews locate their pilots, who were here from all parts of the world; and to go along with all of this good luck—I guess you could say, I am just plain "hooked" on this most thrilling of all sports! After spending about 25 hours in the BS-1 this past summer, I am now looking forward to my first 500-mile flight next summer . . . then who knows . . . the sky is the limit and Canada is the distance!


RESISTANCE OF NORMALLY HIT SURFACES FROM THE EQUATION L=0.13 Fv².
WIND

▼ FIG. 3

▲ FIG. 1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DYNAMIC SOARING

By J. V. INGLESBY

The possibility of using atmospheric turbulence for soaring is discussed.

Historical background

To trace the beginnings of this subject, we must put back the clock to a year or two before the turn of the century, the dawn of aviation history. Otto Lilienthal was then bravely making his historic glides down a specially constructed hill with his frail hanging gliders.

This was but one side of his work. He experimented with aerofoils, and discovered some of the basic principles of aerodynamics. To-day, we have wind tunnels which enable us to make precise measurements on exact scale models in a uniform and turbulent-free airstream. Lilienthal did the next best thing; he tested aerofoils out-of-doors in the wind, generally far from turbulent-free or uniform. He found out (among other things), through studying birds' wings, that curved surfaces make better aerofoils than flat ones. His best results were obtained with a camber of 1 in 12. Fig. 1 is taken out of his "Birdflight" (ref. 1) and is reproduced here for its historic interest. Note that zero incidence gave a useful lift with virtually no drag – a startling discovery – if it can be believed. But Lilienthal affirms, "Our own experiments place the fact beyond doubt that there are surfaces which are lifted vertically *by the wind*, and are not pushed back". (The italics are mine.)

In 1912 and 1913 two scientists independently published the first explanations of the mechanism whereby energy for soaring could be extracted from an airstream fluctuating vertically; the effect was named after them, the Knoller-Betz effect (ref. 2).

Moving on to 1922, a German named Katzmayr, seeking an explanation for the soaring flight of birds, demonstrated under controlled conditions in a wind tunnel that a wavy airstream (a wave being induced by a cascade of oscillating blades upstream of the working section) had the effect of reducing the apparent drag, and this would become negative, if the amplitude of the wave were increased sufficiently. He made his measurements with a damped balance, thereby obtaining mean values. The effect then appears to have changed its name and become known as the Katzmayr effect.

Interest in these discoveries became world-wide. The French made similar experiments, and obtained quite large values of thrust. (This is shown in Fig. 2.) The Americans were interested enough to have the French results translated (ref. 3). Here in England, Farnborough made a general appraisal. Cowley in R & M 969 (ref. 4) in his concluding remarks says, "The calculations and deductions of this note show clearly that the effects found by Katzmayr are rational, and one would expect therefore

NOTE ON KATZMAYR EFFECT

Effect found by French Experimenters of varying the direction in the wind periodically.

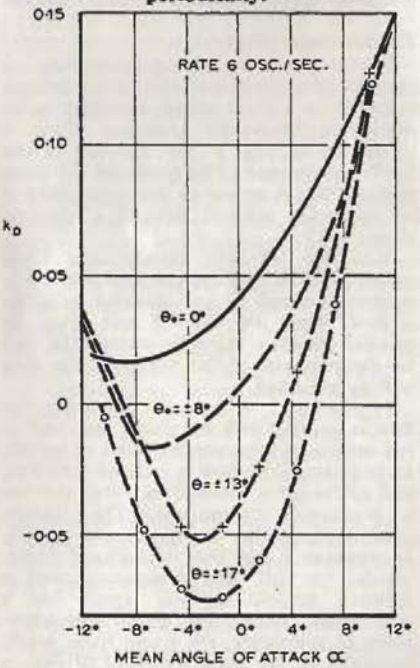

FIG. 2 *Note the negative drag*

See opposite page:

FIG. 1 *Tests made out-of-doors in the wind by Lilienthal. Note the zero drag at zero incidence.*

FIG. 3 *The Katzmayr effect*

These drawings have been copied from R & M 969, 1925.

that the performance of an aeroplane, other things remaining constant, be better in bumpy weather than on a calm day".

Thereafter interest flagged, until to-day Katzmayr and his effect are almost forgotten.

The Katzmayr effect

To see how it works, let us consider an aerofoil of symmetrical section set at zero incidence in a wind tunnel, and then set in motion a sinusoidal airstream. This is illustrated in Fig. 3. The aerofoil in the figure is supposed to be fixed and the wave moving, but it comes to the same thing if we move the aerofoil through a standing wave.

Now the resultant aerodynamic force on an aerofoil may be resolved into components normal to and parallel with the airflow. They are the lift and drag. In general, the lift is many times the drag, and for the purposes of this argument the drag will be neglected.

In position 1, at the crest of a wave, the flow is parallel with the chord line, and as the section is symmetrical, there is no lift. In position 2, the flow is inclined upwards, and so the lift is inclined forwards and has a propulsive component. The trough, position 3, is like the crest with no lift. In position 4, the flow is inclined downwards; the 'lift' acts downwards with a forward inclination, and again has a propulsive component. From considerations of symmetry, the mean force acting normally to the main direction of flow is zero, but a net propulsive force is apparent.

This in essence is the Katzmayr effect. It will be superimposed on the characteristics of the aerofoil in steady flow. For a bird or a glider, if the mean value of this propulsive force is equal to or greater than the mean drag, then dynamic soaring becomes possible.

Let us then consider a typical aerofoil held motionless in a sinusoidal airstream.

$$\frac{z}{Z} = \sin 2\pi \frac{x}{X}$$

$$\frac{dz}{dx} = 2\pi \frac{Z}{X} \cos 2\pi \frac{x}{X}$$

are the expressions for a sine wave.

Assuming quasi-steady flow and a constant $l\alpha$

then $C_L = \alpha l_\alpha$

where $\alpha = \alpha_o + \theta$

If θ is small, so that $\sin\theta = \theta$ and $\cos\theta = 1$,

then $\theta = dz/dx$

$= w/V$

$w_G = V\theta_{max}$

$C_T = \theta C_L$

$C_D = C_{Dz} + kC^2_L$

For dynamic soaring,

$(C_T - C_D)_{mean} = o$

Whence $w_G = V \times \sqrt{\frac{2C_{Do}}{l\alpha - kl^2\alpha}}$

where $C_{Do} = C_{Dz} + kC^2_{Lo}$

Applying this result to a glider†

$C_{Dz} = 0{\cdot}0128$

$k = 0{\cdot}0183$

$l\alpha = 5{\cdot}65$

$S = 135$ sq.ft.

$W = 645$ lb.

and if $V = 40$ knots,

then for dynamic soaring,

$w_G = 4{\cdot}1$ knots.

†The figures are the best available for the sailplane *Stella* (Type EoN 465 Phase 1) (ref. 5).

Fluctuations of the wind may be far from sinusoidal, and to see how much difference there may be, similar investigations have been made for the extremes of triangular and rectangular wave forms. The factors on the sine wave value of w_G are found to be $\sqrt{(3/2)}$ and $\sqrt{(1/2)}$, giving 5·0 and 2·9 knots respectively. The sine wave value will probably not be far removed from the mean.

It is concluded that it will be possible to fly straight and level without loss of height in gusts with vertical velocities fluctuating rapidly between $\pm$ 4 knots roundly.

Such conditions are perhaps rather exceptional. Nevertheless, the effect is always with us, and it may be useful to see what benefit can be derived from it. Assuming a sinusoidal variation in vertical velocity,

$C_{Lo}/[C_{Do}-\frac{1}{2}(w_G/V)^2(l\alpha-kl^2\alpha)]$

is the expression for the glide ratio.

It follows at once that, to make the most of it, one should fly fairly slowly. Table 1 shows how the glide ratio improves with increasing vertical gust velocity. An airspeed of 40 knots is assumed. Because of the square law, the improvement starts rather slowly, but may build up very rapidly.

TABLE 1

Vertical gust velocity (knots)	*Glide ratio*
0	33
1	35
2	43
3	69
4	536

With this, we leave Katzmayr, and for the next step we turn to a pioneer of French aviation, Louis Breguet.

Le vol à voile dynamique

The old-time aviators spent much time studying bird flight, and Breguet uses considerable analytical ingenuity trying to rationalize the phenomenon.

In his paper (ref. 6), he begins by discussing the nature of the wind. If an air mass M has velocity U, its kinetic energy of translation is $\frac{1}{2}MU^2$, but this will not assist a bird in flight as it has no way of detecting U. But mass M is composed of innumerable elemental masses δM each with its own velocity δU relative to U, and this a bird in flight will sense. $\Sigma\frac{1}{2}\delta M(\delta U)^2$ he calls the internal energy of the wind. Perhaps it is this boundless energy which enables the albatross to sail across the ocean wave.

Consider a bird in rectilinear flight. δU acting on the bird may be resolved into its three principal components along the flight axes, u and v horizontally and w vertically. Each of course fluctuates in a somewhat random fashion, but any fluctuation, however ragged it may be, may be equated to a plain sine wave and its harmonics by a mathematical process known as a Fourier analysis. So it is that the most complex atmospheric turbulence may be expressed in simple mathematical terms.

This is the foundation on which he builds. Each component is considered in turn, first the fundamental and then the harmonics. Breguet makes a significant contribution in that he investigates the case where the bird in "sailing flight" is free to have vertical movement. The main results of his analyses are enumerated.

(1) A soaring bird, such as a gull, is able to extract energy for soaring flight from all three components, but
(2) an arched 'gull' wing is needed to use v, the lateral component.
(3) u, the longitudinal component, is much less effective than w.
(4) If w is lacking, this can be remedied by flapping.
(5) A bird in soaring flight gains nothing by cyclically trimming its wings to the fluctuations. It does better holding them still.
(6) Each harmonic may be considered as if it existed alone. The total effect will be the sum of the separate effects.
(7) The higher the gust frequency, the more effective it is for dynamic soaring.

(6) and (7) apply to v and w only.

The last result was arrived at for w by taking into consideration vertical motion. In long period gusts, the body tends to ride up and down with the gusts, so reducing the effective amplitude.

$$w_G = V \times \sqrt{\frac{2C_{Do}}{l\alpha - kl\alpha^2}\left\{1+\left(\frac{g\rho STVl\alpha}{4\pi W}\right)^2\right\}}$$

is Breguet's expression for the sinusoidal vertical gust velocity needed for dynamic soaring. Using this formula, Table 2 then shows the effect of period. An airspeed of 40 knots is assumed. It is seen that for gusts to be effective they must be of fairly high frequency.

TABLE 2

Gust period (seconds)	*Soarable vertical gust velocity (knots)*
0·25	4·2
0·5	4·2
1	4·6
2	5·8
4	9·0

Longitudinal stability also plays a part; a glider tends naturally to align itself to the direction of flow. This will cause further loss with lengthening period.

The nature of atmospheric turbulence

The structure of a turbulent atmosphere is highly complex, and there is still very much to learn, but this article would not be complete without saying something about it.

Flow may be described as either streamline or turbulent; in the atmosphere it is nearly always turbulent. Turbulence is a viscous effect, and the flow pattern is a function of the transverse velocity gradient.

If a turbulent atmosphere may be thought of as a street of discrete eddies, then from considerations of viscosity, the gust velocity would be expected to be proportional to the square-root of the wind gradient, but the wavelength would be inversely proportional to the gust velocity.

In fact, turbulence is a random process with eddies continuously forming and then breaking up into smaller ones, and gusts occur over the whole spectrum of wavelengths. Burt has pointed out that, in given conditions, short period gust velocities should vary as the 1/3rd power of the wavelength (ref. 7). Hence it is deduced that the general level of gust velocity will vary as the 2/3rd power of the wind gradient, and for soarable conditions one should look for a high wind gradient.

Turbulence is also sensitive to lapse rate. A large lapse rate facilitates the formation of turbulence, whereas an inversion checks its growth.

Then much depends on the nature of the country below.

Instrumentation for dynamic soaring

A criterion for determining whether or not conditions are soarable is the root-mean-square value of the incremental g to which the glider is subjected. It may be shown that its value is given approximately by

$$\text{rms } g = \sqrt{(D/L)/\alpha_o}$$

This takes care of gust shape as well as the glider's vertical motion. An rms reading accelerometer would be invaluable.

At 40 knots (say) for the *Stella*, an rms g of 0·44 would indicate soarable conditions.

The technique of dynamic soaring

It is not possible to say much at this stage. The best speed to fly is around the maximum L/D mark, and one can fly straight and level, or circle slowly in the area of maximum turbulence. Suitable conditions may be found in the vicinity of fracto-cumulus.

Perhaps the way to make a start is to note carefully the response of the glider to whatever turbulence happens to be encountered.

To sum up . . .

There is little doubt that, given the right conditions, dynamic soaring would be possible, but in such conditions one must expect a pretty rough ride, and there could be an element of hazard. Even moderate turbulence will markedly improve a glider's performance.

Symbols

C_D	drag coefficient
C_{Dz}	profile drag coefficient
C_L	lift coefficient
C_T	thrust coefficient
g	acceleration due to gravity
k	induced drag factor
l_α	$\partial C_L/\partial\alpha$
S	wing area
T	period
u	longitudinal component of δU
U	mean wind speed
δU	gust velocity
v	lateral component of δU
V	airspeed
w	vertical component of δU
w_G	peak value of w
W	aircraft weight
x	coordinate of points on sine wave
X	wavelength
z	coordinate of points on sine wave
Z	amplitude
α	angle of incidence from no lift
θ	angle of inclination of sine wave to x-axis
ρ	air density
o	(suffix) for steady flow

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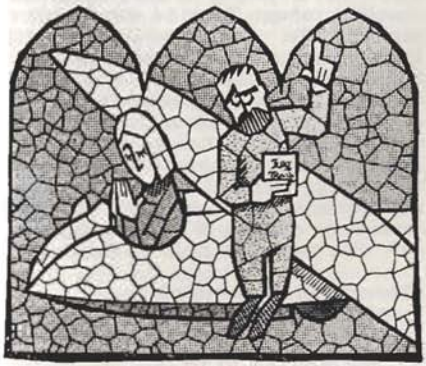
The Miracle Of A First Solo

AND it came to pass after many days, that the time was fulfilled when I should be brought forth and delivered into the hands of one, James, the brother of Alfred John, and chief among a tribe of Birdmen, to be examined according to the laws of the BGA.

And lo! I stood before him arrayed in hideous raiment of grey poplin according to the custom. And when he had inquired diligently of me what time I had last ascended into the heavens, I offered unto him my logbook, wherein the elders had recorded all manner of strange sayings concerning my transgressions.

And he commanded me, saying, "Get thee hence and sit in that place which I shall show thee." And lo, there appeared in the way a winged chariot, wherein were appointed places for two people, and all manner of strange instruments, though not of music. And when I had been led to the foremost place, I was held captive therein by bonds passing over my shoulders and round my midst. Then James, the brother of Alfred John, came and entered in behind me saying, "Tell me truly, hast thou done thy cockpit check?"



And I meekly answering said, "Yea, verily, I have done what my lord hath said." And when all was ready, this same James, brother of Alfred John, desired of me that I should ascend together with him into the heavens, to ride upon the waves of the air and descend again unto the place from whence we had come. Therefore I gave the word and behold, a light shined out upon the way. Suddenly, with a sound like thunder, there appeared before our eyes a swift fiery chariot, possessed of two devils, which had attached itself unto the

. . . words of the Wise Men

winged chariot wherein we were being borne on high, and in the twinkling of an eye we were up as it were on a high mountain.

And when we had been released from the fiery chariot, we did sail in the heavens as the birds of the air. And we descended from the heavens and alighted upon the grass of the field, and abode there till we could release ourselves from bondage.

When the great winged chariot had been restored unto its appointed resting place, I was constrained a second time to enter into it with James, the brother of Alfred John, and ascend and descend yet again after the same manner. And when we had alighted, there came forth men, who ran and bore the winged chariot away unto its appointed place.

And as we pursued after it, James, the brother of Alfred John, opened his mouth and spake unto me saying, "It appeareth unto me that thou hast attended unto the words of the Wise Men and thou art not without understanding. Desirest thou to ascend to the heavens in solitude?"

And I said unto him, "That is the desire of my heart, but let it be as thou

shalt say." Then he answered me saying, "I will try thee yet again."

And when we had descended the third time and labourers were bearing away the winged chariot, then did James, the brother of Alfred John, walk after it in great silence, for he uttered not a word. Then did my heart sink within me, and I said unto myself, "Woe is me, for my misdeeds are exceeding great, seeing that the Chief Elder hath been rendered dumb, for he hath no words to express the great wrath within him." And I stood apart upon the way for I was ashamed.

Then did I hear James, the brother of Alfred John, say unto his servants that were round about, "Bring forth the winged chariot wherein is but a single place." And they did as they were bidden. Then did James, the brother of Alfred John, beckon unto me saying, "Come hither and enter into this chariot and sit, placing thy right hand upon the stick and thy feet upon the bars, that I may judge whether it be a fitting thing for thee or no." And I came with haste and entered in and did harken diligently.

And when the winged chariot had been attached to the swift fiery chariot possessed of two devils, then did James, the brother of Alfred John, command me to ascend into the heavens and continue there a course to the left, until I should

descend again upon the grass of the field.

And when this had been accomplished, then was I commanded yet a second and even third time to ascend both to right and to left. And having descended the third time, the winged chariot being yet within one piece, then did my heart greatly rejoice, though my legs were as water.

While I yet sat, slaves came to bear the winged chariot a Sabbath's day's journey back to that place from whence it came.

That same evening when I did enter into the temple of the Birdmen, then did I offer much silver, in order that much wine might flow to gladden the hearts of both men and women of the tribe. And there was great rejoicing . . .

Fuller

CVSM MEETING

1970 World Championships

At the meeting held on the 2nd and 3rd November, 1967, in Paris, Robert Buick (representing Bill Ivans, USA) reported that Reno and Marfa had made firm offers (for July, 1970), and that operational, i.e., launching and living costs would be comparable to Poland. There would be no guarantee that gliders could be rented, although it was expected that enough private owners would offer aircraft. The main costs would lie in getting to the States and travelling about there; a much more detailed offer was necessary. Robert Buick agreed to provide this before the February CVSM meeting. It was agreed that Marfa was preferable on account of the ports of Houston and New Orleans. Nearly all nations present said that they were agreeable to making every effort to go to the States, if some help was forthcoming from there. A firm decision on whether or not to accept the SSA offer would be made in February.

Photographic Evidence of Turning Points

The BGA proposals (as specified in the April, 1967, BGA *Handbook on Competition Flying — see right)* were accepted for both photographic and observed turning points. Additionally the

BGA Flying Committee's proposal to ensure that photographs were taken between the time of crossing the start and finish lines were also accepted. Evidence must be provided that the photographs of the turning points were taken between the time of the last crossing of the start line and the crossing of the finishing line.

Extract from BGA Competition Handbook:

R.18.1. Photographic Evidence. In this case it is the responsibility of the pilot to provide the organisers with evidence to prove that the turning point has been correctly rounded. The turning point is reached if a photograph is taken from the glider of the turning point itself when the glider is vertically above the observation zone. The observation zone is a quadrant (i.e., segment with 90-degree included angle) on the ground of infinite radius with its apex at the turning point. Such quadrant is orientated symmetrically to and remote from the legs of the course which meet at the turning point. There is no limitation in the height from which the photograph may be taken.

R.18.2. Direct Observation. For the purpose of being controlled at a turning point a glider must pass vertically over the point or the observation zone as defined in R.18.1, within a horizontal distance of 1 km. from the point, at a height not greater than 3,280 ft. above it.

Gliding in the Olympic Games

The position in the Olympics is that a maximum of 20 disciplines are permitted, and there is a waiting list for these. In addition, each Olympics can have two demonstration sports. For these no medals are given, and amateur status does not apply.

Germany would like to provide a demonstration of gliding, and would put forward proposals to the next CVSM meeting. If agreed, CVSM would sponsor the demonstration.

Motorgliders

Increasing use of, and records for, motorgliders was discussed. Motorgliders were, in principle, already regarded by FAI as part of gliding, and should be encouraged. It was very widely agreed that (a) for a gliding record a

motorglider could be used provided that it was not possible to restart the engine in flight and (b) there should be a special category of records for motor-gliders.

A Third Class in World Championships

It was agreed that sufficient experience of world championships existed to permit a third class to be included. Italy (G. Orsi) requested the re-introduction of the two-seater class, as the only practical way of stimulating new and necessary high-performance two-seaters.

Ann Welch proposed that the third class should not be fixed, but should be used in different ways, e.g., two-seater class, mono-type class, as required, provided that changes were not made less than three championships (approximately six years) apart, for development and manufacturing reasons. This was agreed.

The German and Polish Aero Clubs and the SSA were asked to produce ideas on this proposal.

The CVSM meeting got through a lot of work in a cordial and effective way. New ideas are plentiful.

"Pirat" Gehriger (Switzerland) was re-elected president, Seff Kunz (West Germany), J. Bojanowski (Poland) and Philip Wills (Great Britain) vice-presidents, Willi Grandjean, official secretary.

ANN WELCH

THE 1968 RATING LIST

What the Rating List Is Not

The BGA Rating List is not, and never has been, a definitive list of pilots in order of ability. The results of gliding competitions are a surer guide to that!

What the Rating List Is

Simply a mechanism that tries to ensure any pilot who currently stands a chance of becoming a National Champion has the opportunity to fly in the next National Championships.

If You Think Your Rating Points Are Wrong

1. Read SAILPLANE & GLIDING, Dec. 1966 issue, page 433.
2. Write to the Flying Committee, British Gliding Association, Artillery Mansions, 75, Victoria Street, London, S.W.1, and give full details of your contest scores and your own Rating calculations.

ROGER BARRETT,
Chairman, Flying Committee.

Pos.	Name	Rating
1.	Burton, G. E.	835
2.	Burns, Anne	792
3.	Goodhart, H. C. N.	762
4.	Williamson, J. S.	730
5.	Garrod, M. P.	706
6.	Delafield, J.	699
7.	Hanneman, P.	695
8.	Carrow, D. D.	690
9.	Gough, A. W.	686
10.	Donald, C. C.	675
11.	Cardiff, J.	622
12.	Innes, D. S.	615
13.	Kahn, W. A. H.	589
14.	Deane-Drummond A. J.	588
15.	Ellis, J. J.	583
16.	Greaves, C. M	580
17.	Lovell, C. D.	569
18.	Wills, T. J.	565
19.	Stone, A. J.	562
20.	Jones, R.	558
21.	Fitchett, B.	545
22.	Dawson, P.	535
23.=	Strachan, I. W.	534
23.=	Wills, P. A.	534
25.	Kearon, N. W.	527
26.	Burgess, P. G.	524
27.	Dimock, H. R.	523
28.=	Johnson, M.	518
28.=	Wheeler, J. H.	518
28.=	Willson, B. J.	518
31.	Atkinson, G. B.	517
32.	Lane, P. D.	509
33.=	Warminger, A. H.	504
33.=	Tanner, L. E. N.	504
35.	Redman, S. J.	502
36.	Scott, P. M.	495
37.	Smith, M. J.	494
38.	Bridson, D. S.	489
39.	Stevenson, J. N.	480
40.	Frank, L.	478
41.=	Withall, C.	475
41.=	Zotov, D.	475
43.=	Scarborough, G.	473
43.=	Barrell, G.	473
45.	Smith, N. W.	469
46.=	Newall, R. W. B.	463
46.=	Dunn, R. A. E.	463
48.	Stanley, J. H.	457
49.=	Slater, T. W.	455
49.=	Carr, V. C.	455
51.	Bird, M.	454
52.	Neilson, P. J.	453
53.	Neaves, R. A.	443
54.	Shepard, F. W. L.	432
55.=	Hood, L. S.	430
55.=	Wilkinson, N. A.	430
57.	Lilburn, D.	428
58.=	Simpson, C. R.	427
58.=	Austin, D. C.	427
60.=	Foot, R. A.	426
60.=	Williams, P. W.	426
62.=	Przewlocki, J. K.	422
62.=	Piggott, A. D.	422
62.=	Hale, R. J.	422
65.	Goldney, L. P.	421
66.=	Riddell, J. C.	417
66.=	Kronfeld, J. R. W.	417
68.	Harrison, K. A.	412
69.	Jones, J. D.	411
70.	Kay, B.	409
71.	Ince, D. H. G.	408
72.	Jerzycki, E. B.	404
73.=	Meddings, E. J.	403
73.=	Morgan, K. C.	403
75.	Riddell, D. M. R.	402
76.	Day, C. G.	396
77.	Bentson, C. W.	394
78.	Neumann, G. S.	393
79.	Somerville, A.	392

Pos.	Name	Rating
80.	Feakes, R.	388
81.	Collins, G. T.	382
82.=	McLuckie, R.	381
82.=	Armstrong, M. S.	381
84.	Watson, Patricia	380
85.	Shephard, E. G.	376
86.	Wills, C.	375
87.	Orme, H.	373
88.	Bacon, G. McA.	369
89.	Jackson, B.	368
90.	Tull, V. F. G.	367
91.=	Snodgrass, D. C.	365
91.=	Simons, M.	365
91.=	Kerridge, D. C.	365
94.	Hatch, D.	364
95.=	Ismail, A. D.	363
95.=	Ellis, C. A. P.	363
97.	Seth-Smith, M. P.	359
98.=	Paul, I.	358
98.=	Wilkinson, K. G.	358
100.	Powell, R. H.	357
101.	Scallon, D.	355
102.	Jeffries, J. R.	353
103.	Wills, S. F. E.	349
104.=	Stafford-Allen, R. C.	348
104.=	Bailey, N. L.	348
106.	Corbett, T. W. E.	347
107.=	Purnell, A. D.	346
107.=	Welsh, J. H.	346
109.	Smith, D. A.	345
110.=	Rutherford, R.	343
110.=	Zealley, T. S.	343
112.	Pennycuick, C. J.	342
113.	Morris, J. F.	340
114.	Gildea, C. J. S.	338
115.	Marpole, D. J.	337
116.	Brownlow, B.	332
117.	Pope, M. H. B.	331
118.	Pozerskis, P.	328
119.=	Robinson, E. J	326
119.=	Burton, A.	326
121.	Whiffen, A. H.	325
122.	Wills, S. B.	320
123.=	Oulds, A. M.	319
123.=	James, D. B.	319
125.	Smoker, J. L.	318
126.	Williams, T. H.	314
127.	Camp, G. W.	313
128.	Holding, D. F.	311
129.=	Ross, G. A.	308
129.=	Deacon, A. J.	308
131.	Mitchell, S.	307
132.	Sheppard, T. W.	306
133.=	Brett-Knowles, R.	304
133.=	Dobson, B. F.	304
135.	Phipps, A. M.	302
136.=	Reilly, F. B.	300
136.=	Brenner, J. B	300
138.	James, P. W.	298
139.=	Elliott, C. R.	297
139.=	Evans, J. A.	297
141.=	McMullin, T. A.	296
141=	Mettam, H. S.	296
143.	Cornell, G.	292
144.	Letts, A.	290
145.	Burgess, A. E.	289
146.=	Minton, P.	288
146.=	Waller, R. S.	288
148.=	Dorman, C. G.	286
148.=	Stoddart, R.	286
150.	Willett, R. D.	285
151.	Fairman, M. C.	283
152.	Aldridge, K. R.	281
153.	Purdie, P. G. H.	279
154.	Sandford, R. A.	278
155.	Harwood, Rika	276
156.=	Irving, F. G.	275
156.=	Buckley, Phillipa	275
158.	Fielden, J. S.	271
159.	Stark, E.	268
160.	Keogh, B.	267
161.	Whitaker, A.	265
162.=	Crabb, D. J.	264
162.=	Willbie, R. T.	264
164.	Prestwich, R. H.	263
165.=	Spottiswood, J. D.	262
165.=	Mackworth-Young, G. W.	262
165.=	Treadaway, P.	262
168.	Barrows, J.	261
169.=	Redshaw, L. S.	260
169.=	Jefferson, J. B.	260
171.=	Doughty, A. W.	259
171.=	Tonkyn, W. N.	259
173.=	Lyndon, R. J.	258
173.=	Wild, J. G.	258
175.	Cousins, R.	257
176.	Locke, G.	256
177.	Morland, N. C.	253
178.	Revell, N.	250
179.	Wade, J. S.	248
180.	Bellamy, G. L.	247
181.	Docherty, T. P.	246
182.	Billington, A.	241
183.	Eccles, J. A. S.	238
184.	Edwards, A. F. W.	235
185.	Beckett, A.	234
186.=	Haynes, K. W.	232
186.=	Findon, J. A.	232
188.	Proctor, R. G.	231
189.	Millett, D. H.	230
190.=	Covington, A. B.	224
190.=	Bradley, R.	224
192.	Watson, A. J.	223
193.	Bellew, J.	222
194.	Tee, H. S.	220
195.	Hancox, C. O.	216
196.	Partridge, P.	215
197.	Malpas, W. E.	212
198.	Horan, M. A.	210
199.=	Smith, T. F.	208
199.=	Collins, J.	208
201.	Blake, K. W.	205
202.	Perrott, R. H.	204
203.=	Falkingbridge, C.	201
203.=	Jeffers, P.	201
203.=	Marriott, S. H. C.	201
203.=	Watson, B. B. C.	201
207.	Clarkson, R.	196
208.	Daniell, J. G. B.	189
209.	Knipe, F. H.	186
210.	Bobbin, T. G.	185
211.	Hurd, V.	180
212.	North, E. A.	179
213.	Collins, J.	177
214.=	Harwood, J. E. G.	176
214.=	Ward, F.	176
216.	Hurwitz, P.	174
217.	Argent, J.	173
218.=	Crease, A. B.	170
218.=	Hughes, N. P. D.	170
220.=	MacDonald, A.	166
220.=	Webster, J. W. A.	166
220.=	Wigglesworth, D. S.	166
220.=	Wilton-Jones, M.	166
224.	Tarnow, A. F. W.	165
225.=	Staines, R.	163
225.=	Wilson, A. T.	163
227.=	Bennet, J. A.	161
227.=	Parker, R. O.	161
229.=	Booth, L. C.	158
229.=	Pick, R. C.	158
231.=	Gardiner, R. G.	157
231.=	Westwood, M.	157
233.	Crabb, L. G.	148
234.	McMillan, A.	147
235.=	Barton, K.	146
235.=	Smith, I. L.	146
237.	Scarfe, D. H.	144
238.=	Monk, L. J.	141
238.=	Inglesby, J. V.	141
240.	Waring, D.	140
241.	Martin, P. A	137
242.	Neighbour, E. C.	135
243.=	Bowley, D.	133
243.=	Thomas, T. I.	133
245.	Donnelly, D. A.	132
246.=	Connolly, D.	130
246.=	Maltby, H. W.	130
246.=	Swift, W.	130
249.	Eyers, I.	128
250.=	Brighton, B. W.	127
250.=	Tweedy, J.	127
252.=	Christy, Naomi	121
252.=	Whitfield, G. R.	121
254.	Sadler, D.	119
255	MacPherson, G. C. J.	116
256.	Nowell, B. F.	115
257.	Richards, G.	113
258.	Campbell, H. D.	110
259.	Paine, N.	107
260.=	Ryan, C. L.	105
260.=	Brooks, J.	105
262.	Latimer, B.	104
263.	Baker, M. J.	101
264.	Smith, R. J.	100
265.	Ramsden, J. B.	99
266.=	Gould, N.	97
266.=	Adams, A. B.	97
268.	Rouse, J.	96
269.	Shepherd, D. G.	93
270.	Dickson, R.	91
271.=	Belbin, E.	88
271.=	Fay, F. W.	88
273.	Taylor, C. G.	87
274.	Stenhouse, E.	83
275.	Curwen, R. W.	79
276.	Bullivant, P. J.	77
277.	McClaggen, B.	75
278.=	Manley, N. K.	73
278.=	Hancock, J. M.	73
280.	Fletcher, H.	62
281.	Mason, W.	57
282.	Hanson, P.	56
283.	Cunningham, E. A.	51
284.	Barrett, D.	50
285.	Blown, J.	49
286.	Davies, B. A.	47
287.	Wood, R.	45
288.	Colvert, T.	39
289.=	Rowbotham, W.	36
289.=	Smith, M. J.	36
291.	Wilson, C. G.	35
292.=	Fitchett, F. L.	34
292.=	Walker, B. F.	34
294.	Baker, E.	24
295.	Trott, R. R.	18
296.	Pratt, E.	16
297.	McIntyre, J.	11
298.	Glennie, G. A.	8
299.	Larkinson, R.	8

BICYCLE BRONZE C

By ANTHONY EDWARDS

IT is reported that the British Bicycling Confederation (hereinafter referred to as BBC 1) has been so impressed with the spectacular increase in safety and reduction in paper-work brought about in gliding by the British Gliding Association's Bronze C endorsement that, acting under delegation from the Bicycle Board of Control (BBC 2), they have decided to introduce a Bicycle Bronze C (BBC 3).

The requirements are said to parallel closely those of the gliding test, and consist of practical and written sections. Thus, for the practical, the candidate must be alone on the bicycle. BBC 1 expressed some surprise that in gliding "the flying test . . . must be carried out by a categorised Instructor" (Requirement 4), and they have modified this so that the candidate himself carries out the test. We are fortunate in being able to print, below, an example of the first part of the written test: "Principles of Riding".

Without a BBC 3, no cyclist may ride cross-country or enter cloud.

BBC 3 GENERAL QUESTION PAPER

Indicate which you consider to be the correct answer.

Principles of Riding

1) The front fork angle is:
   A. The angle between the top of the front fork and the horizontal;
   B. The angle between the top of the front fork and the vertical;
   C. The angle between the bottom of the front fork and the vertical?
2) The angle of bank when cornering:
   A. Varies depending on the radius of turn alone;
   B. Varies depending on the speed alone;
   C. Varies depending on the rate of turn alone?
3) As the speed of taking a certain corner increases:
   A. The load on the saddle increases;
   B. The load on the saddle stays the same;
   C. The load on the saddle decreases?
4) For the same speed, a small-wheeled bicycle compared with a standard bicycle has (assuming the weight of the wheel to be the same):
   A. Greater rotational energy of the wheels;
   B. The same rotational energy of the wheels;
   C. Less rotational energy of the wheels?
5) The instantaneous forward speed of the top point of each wheel:
   A. Varies with the road speed alone;
   B. Varies with the road speed and the wheel diameter;
   C. Varies with the road speed and the gear employed?
6) The secondary effect of turning the handlebars (due to the gyroscopic forces generated by the front wheel) is to:
   A. Increase the angle of bank;
   B. Reduce the angle of bank;
   C. Do either, depending on the direction of turn?
7) The main function of the inclination of the front fork is to:
   A. Bring the handlebars nearer the saddle;
   B. Reduce shocks;
   C. Increase stability?
8) The force required to keep a bicycle turning is produced by:
   A. Gravity;
   B. Friction;
   C. The rider?
9) During a turn the front wheel is rotating:
   A. Faster than the back wheel;
   B. At the same speed as the back wheel;
   C. Slower than the back wheel?
10) The air in each inner tube is rotating relative to its wheel:
   A. In the same direction;
   B. Not at all;
   C. In the opposite direction?

Readers of SAILPLANE & GLIDING are particularly requested not to communicate this example of a BBC 3 paper, which was made available to us by BBC 1 with the permission of BBC 2, to potential candidates.

RHODESIAN NATIONALS

By Mike McGeorge

WARREN HILLS, 16TH - 28TH OCTOBER, 1967

SATURDAY, 14th OCTOBER last, saw the first arrivals of pilots from all over Southern Africa. The potentially strong South African contingent included Bobby Clifford with the HP-11 —on his first gliding visit to Rhodesia.

Klaus Keim brought the Zugvogel, and Chick Brydges the Std. Austria in which he came second last year. Ted Pearson, last year's champion, wrecked his trailer and contents on the way to Rhodesia and is thus out of the running. He had been working on his SHK for over six months!

Boet Dommisse's BS-1 had not arrived on time, and we only saw Boet briefly when he came up from Johannesburg to pick up Klaus Keim and the Zugvogel.

Klaus was involved in a head-on collision with another car not far from the airfield on the first contest day, in which, unfortunately, the other driver succumbed to his injuries a few days later. Klaus and his passenger received painful wounds but he managed to stay in the contest although he needed some help to get into the cockpit. He won the third day—comfortably?

Other arrivals included Vic Brierley, from Zambia, Std. Austria; Jim Harrold, Olympia 463; Viv Penberthy, from Gwelo, with a Skylark 2 and a Limited Class gaggle from Bulawayo, headed by the club CFI, John Wright, in an Olympia 2.

The Salisbury pilots were Jimmy Arnett and Alf Thompson both with Vasamas, and Trevor Steer with a Ka-6.

16th Oct.: The weather proved reasonable and to set the ball rolling a 100-km. Triangle was set. Vic Brierley won in 1:05:00. Chick Brydges had a faster time but was disqualified for a wrong turning point photo; this mistake, his one and only, was to cost him the championships!

17th Oct.: In mediocre conditions, a short 172-km. Out-and-Return was set. First was Bobby Clifford with 2:13:00 followed by Brierley and Harrold. Arnett was forced to land while pushing it a bit too hard.

18th Oct.: A 234-km. Out-and-Return saw Harrold and Clifford landing out, with Klaus Keim coming in first in 3:19:00. Second, Brydges. Third, Arnett.

19th Oct.: Conditions were improving with cloud base at 7,000 ft. above ground. Brierley won the 212-km. Triangle with a good margin in 2:15:00. Keim followed 33 mins. later, and Clifford came third, nearly an hour behind the winner.

20th Oct.: Another Triangle, this time 102-km., which was won by Clifford in 1:02:37 with Brierley 35 secs. later and Thompson another 28 secs. behind—all quite close!

21st Oct.: This proved to be the zenith of the competitions. With a very promising forecast by the met. boys a task that everyone had been waiting for was set—a crack at the world out-and-return record. The current holder, Georgeson, New Zealand, flew 749.91 km. The pilots were given optional turning points: Chatsworth—400 km., Ft. Victoria—500 km., Towke River Bridge—575 km. and the last Rutenga—760 km., enough to break the existing record.

Cloud began to form early, and it wasn't long before everyone was away.

Cloud streets were forming as the day wore on with cloud base rising to 8,000 ft. above the deck. The first returning machine proved to be Klaus Keim, who was still far from fit, came in at 3.30 p.m. having turned at Ft. Victoria. He averaged 100 km./h. over the whole trip, which is good travelling! Brierley overflew the start and landed at Umvukwes, a total of 596 km., thereby gaining the Rhodesian Free Distance record. He had also turned at Ft. Victoria. Arnett turned at Towke but had to land a few miles from base, making 583 km. for third place. Clifford pipped him by 4 km.

Four distance Diamonds were won that day—but no world record!

The next day was a rest day, but not for everyone. Viv Penberthy was determined to bag a Diamond—he had fallen short the previous day. Two non-competing pilots, John Saunders and John Colban, joined him, and all three could claim their Diamond that evening.

23rd Oct.: From now on the weather began to deteriorate and the 300-km. Triangle which was set proved to be too ambitious and everyone was forced down by storms. Brydges made the furthest distance, 253 km., Keim, 216 km. and Arnett, third, with 146 km.

24th Oct.: The weather had cleared again and cloud base was about 10,500 ft. above ground. A 192-km. Out-and-Return was set which Clifford won with 2:56:00 followed by Keim and then Brierley.

25th Oct.: Another 180-km. Out-and-Return was set, and although there was a tendency to over-convect, lift of up to 6 m./sec. was encountered by a number of pilots. First, Keim with 2:19:00 followed by Brydges and Brierley.

26th Oct.: The weather being unfavourable for a long task, a 100-km. Triangle was set with the first three places going to Clifford, Brierley and Brydges.

27th Oct.: With a low cloud base and storms threatening a 140-km. Out-and-Return was today's task. Vic Brierley, trying to better his time, went round again, but bad weather brought him down and he damaged his Austria. This could have cost him the championships for he was in the lead by a small margin; however, the following day was a washout and this concluded the championships after 11 days of very good flying.

Vic Brierley receives the Winner's Trophy from Mrs. L. Battershill, wife of the Chairman of the Central African Soaring Association. Looking on, Alf Thompson, who was Task-Setter.

Seven Diamonds were claimed for distance and goal flights, three Silver C's were claimed in the Limited Class, and John Wright, of Bulawayo, managed a Diamond goal in the Olympia 2.

Final Leading Results

		Pts.
Brierley (Zambia)	St. Austria	9506
Clifford (SA)	HP-11	8817
Brydges (SA)	Std. Austria	8763
Keim (SA)	Zugvogel	8567
Arnett (Rhod.)	Vasama	?
Harrold (Rhod.)	Olympia 463	?

OUR winter season of lectures and films continues with a very varied selection of titles. Even if you are not a member why not come along and see what we have to offer for £2 per annum, country members only £1. Visitors are always welcome. On January 31st, J. M. Bruce, assistant curator of the RAF Museum, is coming to tell us about the magnificent array of aircraft they already have in their possession and their hopes for the future. Squadron Leader Ray Hanna, leader of the RAF Red Arrows Aerobatic Team, needs no introduction on the 7th February. He will show some exclusive colour film of their displays. On 14th February Jeffrey Quill, of Spitfire fame and now Sales Manager, Military Aircraft, British Aircraft Corporation, will talk about, amongst other things, the Concorde—this is a talk not to be missed. There cannot be many people in gliding who have not heard of Tom Potts of Lasham—any talk by him is sure to be a wow, so make a note of the 28th Feb. "Ballooning is Fun", says Malcolm Brighton of M. A. Brighton Ltd., Blackbushe, who is coming along on the 27th March to show a film and tell us how his firm is reviving the Montgolfiere hot air balloons. On the 20th March, Commander Benson will come along to give the second part of his talk on hovercraft, this time its application to Agriculture.

Y. C. B.

Diary of Lectures and Film Shows Wednesdays at 8 p.m.

Jan.	31.	The RAF Museum, by J. M. Bruce, M.A., Asst. Curator, RAF Museum.
Feb.	7.	The RAF Red Arrows, by Sqn. Ldr. Ray Hanna, supported by his team and films.
„	14.	Anglo French Collaboration in Aviation, by Jeffrey Quill, with film.
„	21.	USAF Films.
„	28.	"The Slavs Have a Word For It". An evening with Maj. Tom Potts.
Mar.	6.	Psychological Approach to Gliding. Instructional lecture by J. Jeffries, CFI, London Club.
„	13.	Recovery of DC-3 from ice-cap. Film by Islandic Airways.
„	20.	Hovercraft and Agriculture, by Commander Benson, with film.
„	27.	"Chitty Chitty Bang Bang", by M. Brighton (Ballooning).

OBITUARY

DONALD CAMPBELL

AS briefly announced in our last issue, Donald Campbell and his wife lost their lives in the Caravelle crash in Sussex on the 4th November last.

He took up gliding around 1936 and soon found out that the only way to get into the air in those days was to be prepared and able to build and repair his own machine.

Along with his two brothers, who were equally enthusiastic, he helped to form the Dumbarton Gliding Club which operated from a field previously used by the famous Percy Pilcher. In 1937 the Dumbarton club became a part of the Scottish Gliding Union at Bishophill, and Donald and his brothers were soon familiar figures there with their privately-owned Prüfling and Hols der Teufel.

During those formative years, a visit to the Campbell workshops near Dumbarton was quite an experience. This was a large brick cowshed, with practically every stall occupied by a partly-constructed glider or Flying Flea.

Like most of the others associated with gliding in that area at the time, Donald worked for the Blackburn aircraft firm, and during the war years built an H-57 glider in his home. An active member of the SGU after the war, he decided to give up his job, and get into glider repair work on a professional basis—starting first with a year as ground engineer at the Midland G.C., and later he got going as a self-employed glider inspector—advertising under the title of "The Glider Doctor".

His mobility and qualifications were much appreciated in the early post-war years, when the growing clubs could not afford a full-time repair man of their own.

Always on the look-out for something new and exciting in the light aircraft world, he became the UK agent for the Benson Gyrocopter, and his workshops at Hungerford were entirely devoted to the construction of these novel craft.

His enthusiasm for the kind of projects with which his working day was made up was completely matched by that of Nan, his second wife. They were an ideal business couple, and well liked wherever they went.

Their loss has deprived gliding of two very happy and worthwhile personalities.

ANDREW THORBURN,
Scottish Gliding Union

* * *

JACK BOWER

JACK BOWER, chairman of the Doncaster and District G.C., died on 28th October last, after a short illness.

He joined the club in 1960 and became chairman in May, 1966, having been an instructor and power pilot for most of the time. He worked ceaselessly for the club and will be remembered by members for the keen interest he took in club affairs and for his efforts to promote the social side and mid-week flying.

During the last twelve months his work and influence in negotiations over the development of the airfield as an airport were invaluable and it is unfortunate that he did not live to see the results.

H. H. KEEBLE

SAILPLANE PRODUCTION AT VRSAC

By A. E. SLATER

AN old tradition, which I shared with the late Dr. Wolfgang Klemperer, was that whenever we attended a Space Congress, we would play truant by deserting those who would get off the Earth with millions of horsepower, and contacting the local gliding people who were content to get off it with no horsepower at all.

This year it was Belgrade's turn, and of course that meant contacting the renowned Boris Cijan, who has designed sailplanes, been on the Board of OSTIV, and seethes with ideas for the advancement of the science of soaring. He played up splendidly. His first plan was to take us westwards to see gliding at Novi-Sad, but we had already been there on an official tour, not to see gliding but to see (and hear) two enormous rockets fired from the middle of a wood.

So, instead, Boris arranged a visit to the national gliding centre at Vrsac, 50 miles to the north-east, near the Rumanian frontier. (There are funny marks over the "s" and "c" which cause this place to be pronounced "Vurrshatz".

This is where Philip Wills once took part in the Yugoslav Nationals. In S. & G. for December, 1955 (p. 170), he described the event, and the magnificent clubhouse with an eagle, which had once collided with a sailplane, hanging over the door. (But it is no longer there, having gone the way of all flesh and disintegrated.) The article was entitled "The World's Largest Gliding School"; but, alas, the subsidy to Yugoslav gliding which brought it into existence has been drastically reduced, and it may be remembered that a Yugoslav team was all ready to go to Argentina in 1963 but had to call it off for lack of cash.

Vrsac was running mid-week gliding courses only, with no flying on Sundays, but the main object of this visit was to see the workshops where, for the first time, gliders are now being built for

The H564 Cirus, adopted as the standard two-seater for all Yugoslav clubs.

export in addition to supplying the entire Yugoslav gliding movement. The factory is known as "Vazduhoplovno Technicki Centar".

Mr Zivota Veselinovic is in charge of the shops, where sailplane production is now concentrated on two standard types, a single-seater and tandem two-seater, though, left over from a past era, I noticed a Gastreb single-seat fully aerobatic advanced trainer of 1947 vintage. There were also some tugs, a parachute room, and, surprisingly, a large shed where pranged cars and lorries were being repaired or rebuilt—this is a profitable side-line which helps to finance the production of sailplanes and their maintenance and repair, and the maintenance of instruments, gliding equipment and parachutes for all civilian aircraft in the whole country.

We then settled down to a talk in Mr Veselinovic's office to the accompaniment of coffee and local wines. The workshop set-up is sponsored by the Central Aero Club of Yugoslavia, but is financially independent, so must pay its way.

Some years ago there was a design competition for the best Standard Class single-seater and the best two-seater trainer, both to be of advanced performance. The winners were the Delfin (briefly described in S. & G. Overseas News, Aug. 1964, p. 339), and a tandem two-seater whose name sounded like "Cirrus". This might lead to an unfortunate confusion with Schempp's latest single-seater, but when Mr Veselinovic handed me some photos of it, he had written on the back: "H564 CIRUS". So, if the "C" is pronounced as in Vrsac, its name should sound something like "Cheer us" if properly spoken.

The Cirus has a 17-metre span (55 ft. 9 in.), length 8.83 m., wing area 19.38 sq. m., aspect ratio 15.73, empty weight 350 kg. (770 lb.), aerofoil NACA 63-3-618. The prototype, built in 1962, was of steel, but production models have been of wood, though the designers are now becoming interested in glass fibre after some initial difficulty in getting information about it. All gliding centres in Yugoslavia, Mr Veselinovic said, are now using the Cirus for training, and for most first solos, though there were not quite enough for this purpose too and some first solos are still done on the Gastreb. The deficiency should soon be made good, judging by the number under construction. After their first solos, pupils pass to the Delfin.

Both these machines have by now undergone the necessary improvements and modifications to bring them as near perfection as is reasonably possible, so the time has come, in Mr. Veselinovic's opinion, to offer them on the export market.

The 15-metre Delfin took first and second place in the 1966 National Championships. I was given a stock of leaflets about it which are available in the London office of S. & G. until they run out. It has the same laminar aerofoil as the Cirus, giving best gliding ratio 33 at 87 km/h. and minimum sink 0.65 m./sec.

(2 ft. 1.6 in./sec.) at 75 km./h.; stalling speed 60 km/h. Empty weight is 215 kg., max. flying weight 325 kg., giving max. wing loading 25.3 kg./sq.m. (5.2 lb./sq.ft.). Limiting speeds: smooth air, 250 km/h.; rough air, 145 km/h.; aero-tow, 140 km/h.; winch, 110 km/h. Semi-aerobatic. The wing is in two parts, has a box spar, and is not twisted; it has Schempp-Hirth airbrakes. All controls except the rudder and trim-tab are operated by push-rods. The pilot has a sponge-rubber seat and is in the semi-reclining position, with the instrument panel between his legs. The horizontal tail surfaces are all-moving with a laminar aerofoil, and are attached to a rotating tube.

Thanks are due to Boris Cijan for arranging the trip, Gabriel Zdravko (co-designer of the Delfin) for driving us there and back, Vasa Stepanovic (National Champion and administrator at the gliding headquarters in Belgrade) for accompanying us, and Zivota Veselinovic for showing us the factory and telling us all about it.

FLYING THE CIRRUS

BY ANDY GOUGH

THE Cirrus I flew was the first production model and had a conventional - type tailplane; the prototype having a V-tail, similar to the SHK. The change was made to suit the American market, where now V-tails are viewed with unfounded suspicion.

On the day, or, I should say, evening, I flew the Cirrus, there was a long queue of distinguished pilots from many countries waiting their turn to evaluate this latest Schempp-Hirth glass-fibre sailplane.

The Phoebus 17 was also available, and as I was first to fly this machine and soared for over an hour, I was last to fly the Cirrus.

After a short but competent briefing from Klaus Holighaus, the designer, I stepped into the roomy, well-laid-out and comfortable cockpit of the Cirrus. The canopy was quickly closed, the cable connected, and in a rush to beat the fast-falling dusk, I was aero-towed off.

Immediately the Cirrus became airborne I was made aware of its superbly balanced control and its effortless handling qualities. I released from the tow at 3,000 ft. and selected "undercarriage up" without effort at the first attempt. The large, well-fitting canopy had good optical qualities and allowed excellent visibility; it is also provided with a well-positioned DV panel.

The large instrument panel did not in any way obstruct the forward visibility, a failing I have found in a few HP sailplanes.

The trim was effective and the Cirrus could be trimmed out to fly at a wide speed range "hands off".

After my previous experience of the Phoebus 17, the rate of roll of the Cirrus appeared fantastic; however, on timing my rolling attempts, I averaged 4 secs. from 45 to 45 degrees at an IAS of 90 km./h. Elevator and aileron stability were excellent and the rudder self-centring. All controls were light, well-balanced and moved without effort or noise; in fact, the best I have ever experienced.

With plenty of height in hand I decided first to stall and then spin the Cirrus. Stalling characteristics proved normal and there was no noticeable tendency for a wing to drop, and there was aileron control still in the stall region of 60 km./h.

I entered a spin from a slow turn to port, applied full left rudder, holding the stick fully back. After two complete rotations, full spin recovery action was necessary to recover before the Cirrus came out of the spin. The air brakes were then eased out at 100 km./h. and the rate of sink increased to 5 m./sec. with no noticeable sign of pitch when opened or closed.

By this time it was looking pretty dark down below and I could see car headlights being focused on to the grass runway.

I had decided not to use the tail parachute as the airbrakes were quite effective. The undercarriage came down

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SINGLE-SEATER, FOKA 4 is built to conform with the standard class of OSTIV, and is designed for performance flights under any atmospheric conditions.

Wing span: 15 metres. Aspect ratio: 18.5. Best gliding ratio: 34

Never exceed speed: 260 kilometres per hour. Flying weight: 386 kilogrammes.

TWO-SEATER, BOCIAN

Due to its many flight qualities under varying thermic conditions, Bocian is suitable for all types of performance flights. The pilots' seats are in tandem, and there are coupled control columns, which make the glider ideal for basic training.

Wing span: 18 metres. Aspect ratio: 16.5. Best gliding ratio: 26

Never exceed speed: 200 kilometres per hour. Flying weight: 525 kilogrammes.

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and locked at the first attempt. I landed alongside the car and trailer and I have never seen a glider de-rigged and mounted on its trailer so quickly—about four minutes.

To sum up, there may be sailplanes with a slightly better performance curve than the Cirrus, but for comfort, superb handling and ease of de-rigging, the Schempp-Hirth Cirrus, designed by young Klaus Holighaus, will take some beating.

* * *

For previous reports on the Cirrus see SAILPLANE & GLIDING, April-May issue, 1967, page 88. Technical data, page 90. More about Cirrus, August-September issue, 1967, page 292.

GLIDING CERTIFICATES

DIAMOND GAIN OF HEIGHT

No.	Name	Club	1967
3/66	C. D. Lovell	Surrey & Hants	4.10

DIAMOND GOAL

No.	Name	Club	1967
2/242	M. Bird	London	20.8
2/243	P. J. Partridge	Coventry	20.8
2/244	G. A. Thomson	USA	3.9
2/245	R. P. Brisbourne	Surrey & Hants	5.8
2/246	M. B. Hill	Swindon	5.8
2/247	J. C. Rieley	USA	25.6

GOLD C COMPLETE

No.	Name	Club	1967
187	G. A. Thomson	USA	3.9
188	J. C. Rieley	USA	15.10

GOLD C GAIN OF HEIGHT

Name	Club	1967
T. Oulds	Crusaders	17.10
L. J. Monk	Clevelands	23.10
D. E. Morris	Clevelands	21.10

GOLD C DISTANCE

Name	Club	1967
M. Bird	London	20.8
P. J. Partridge	Coventry	20.8
T. J. Krzystek	Polish AFA	1.7.66
J. C. Rieley	USA	25.6

SILVER C COMPLETE

No.	Name	Club	1967
2084	C. McDougall	SGU	23.7
2085	S. A. White	Airways	13.9
2086	D. R. Staveley	Norfolk	30.8
2087	E. Barker	Lincolnshire	23.7
2088	S. Wheeler	Chilterns	22.7
2089	N. H. C. Harris	Bristol	4.8
2090	B. Hepton	Clevelands	2.7
2091	P. G. Abbey	Bicester	3.7
2092	R. D. Heslop	Eagle	29.8
2093	K. L. Beaven	Moonrakers	3.9
2094	R. B. Walker	Cambridge	22.9
2095	R. E. Greenslade	Moonrakers	30.9
2096	D. K. Souper	Midland	6.8
2097	T. G. B. Hobbis	Surrey & Hants	27.8
2098	B. A. Kelly	Moonrakers	29.3
2099	R. W. Smithers	RAE	22.7
2100	M. Burke	Worcestershire	5.8
2101	A. R. Graves	Kent	1.10
2102	D. R. E. Calf	RAFGSA	6.9
2103	P. Cracknell	Coventry	20.8
2104	C. Elsden	Surrey & Hants	20.8
2105	P. R. Banks	Coventry	18.10
2106	J. Burt	Kent	24.7
2107	C. E. Tudge	Bristol	22.7
2108	Mrs. Eliz. Saint	Bristol	4.8
2109	A. A. Powsey	Kent	4.8
2110	J. R. Wheeler	Clevelands	22.7
2111	G. G. Grant	RAE	26.8
2112	M. J. Watson	Norfolk	6.9
2113	D. F. Hanson	Bicester	3.9
2114	D. J. Thomas	Bedford	20.8
2115	B. G. Hext	Moonrakers	*Pending*
2116	R. E. Cross	Surrey & Hants	7.10
2117	D. Sandford	Burton & Derby	9.7
2118	A. J. Hartfield	Eagle	28.8
2119	A. W. Enevoldson	Moonrakers	24.10
2120	P. Ramsden	Ouse	30.9
2121	C. W. Morgan	Coll. of Aero.	17.10
2122	P. D. Jacobs	Wrekin	28.8
2123	J. R. Cook	Moonrakers	20.8
2124	W. P. Mazik	Bicester	8.9
2125	R. A. Harvey	Surrey & Hants	20.8
2126	G. Jezierski	Polish AFA	26.8
2127	A. W. Griffiths	Midland	8.7
2128	J. W. Wilmot	Leicestershire	21.10
2129	V. Smyth	East Midlands	29.10
2130	R. S. A. Bunker	Cotswold	28.8
2131	R. E. Neal	Surrey & Hants	1.6
2132	H. Hardiker	Worcestershire	4.8
2133	D. Evans	Thames Valley	5.8
2134	B. M. Shadbolt	Canada	27.8
2135	I. Gordon	Derby & Lancs	22.8
2136	J. F. Goudie	SGU	29.11
2137	J. G. Head	Northumbria	23.10
2138	C. E. Andren	Southern Com.	21.11
2139	W. C. Lombard	Eagle	7.9
2140	J. Nagda	Coll. of Aero.	28.8

AS IT WAS IN THE BEGINNING

'Translated' by J. D. PICKETT-HEAPS

IN THE BEGINNING . . . God created man with two legs. For many years, yea verily, for a multitude of generations, man was content to walk upon the face of the earth amongst the animals thereon, using his legs as need arose, to avoid those selfsame animals of the field.

And it came to pass that after many years, and verily a further multitude of generations, man overcame the beasts of the field and ruled over the face of the earth. And the race of men grew exceedingly in numbers, because of their skilful ways and divers accomplishments.

And amongst this race of men, there arose a strange breed that lusted after the space of the firmament, seeking the means wherewith to follow the flight of birds. These men were ridiculed by their elders and the wise men who said: "If the Lord had desired thee to fly, thinkst thou He would have delivered up unto thee the railroads?"

But after many years of tribulation and the breaking of many bones, they contrived to raise their bodies into the firmament by use of strange and subtle machines. The wise men and the elders saw in astonishment what had been accomplished and that it was good, yea and held promise of great things. For they reasoned that such machines might also rain down hailstones and great balls of fire on to the heads of their enemies, smiting them and driving them henceforth. And others there were who saw that such machines could also make a profit after the ungodly had been smitten. And these men subscribed much money, yea many talents of gold and silver, for they knew that such talents would be returned unto them some sixty-fold, some eighty-fold and some even a hundred-fold.

And the governing council of elders also decided they should arise and join the racket. So they created for themselves a mighty edifice which was called Ae-Tee-Cee. And this edifice grew exceedingly, and established for itself a religion called Airsafetee and in the name of this religion many wondrous things were wrought, and all bowed down and worshipped thereat.

And the rites of this religion waxed subtle and devious, little understood by any that worshipped thereat. But the power of its magic was great and the high priests and elders had need only to cry out the wondrous words: "In the name of Airsafetee", and all fell hushed and awed, and silence descended on the multitude.

And there also appeared a gentler breed of men who, like in the beginning, lusted after the joys of the firmament. But these were strange men in that they sought not profit from their machinations, neither took they with them great balls of fire. They too burned with a great zeal to follow the flight of birds. At first, the council of the elders and the high priests of the Ae-Tee-Cee took no account of them. But suddenly the wrath of the Ae-Tee-Cee rained down on them, seeking subjection of their race in the name of Airsafetee, and instilled terror in their hearts.

And the priests of the Ae-Tee-Cee took a scribe and commanded him, saying: "Go forth from henceforth, take tablets and scribe on them as many commandments as thy heart directs thee, that all should be in subjection to us." And messengers, having taken the tablets, hurried off into the wilderness.

And all were strictly enjoined to abide by the commandments, for were not these men stupid and ignorant in that they sought not profit from their labours? The high priests reasoned further, saying: "When these people ascend into the firmament, what is there to come between them and stop them clashing together? Are they not blind and helpless like babes? Besides, they are few in number, and in consequence have few votes for the council of the people, so wherefore should we be troubled by them."

And the gentler birdmen replied: "Have we not shown on divers occasions that by sundry skilful manipulations of our machines, we fly like unto the birds, yea, and some of our number

soar on high like unto the eagle."

But the wise men laughed and rebuked them, saying: "Thou art like unto the thistledown, blown hither by the east wind and thither by the west wind." But they graciously relented in small portion, granting licence for the birdmen to fly, but only like the locusts, over the deserts and saundry places far from the habitations of men, reasoning that the firmament elsewhere might have some more profitable use: but this firmament, like all other, remained empty and void for the most part, but so terrible was the power of the Ae-Tee-Cee that none dared venture therein.

And the birdmen persisted, saying: "Can we not venture into the empty firmament, for lo, our wives, our children, cattle and all manner of possessions need be carried with us into the desert each seventh day, which surely should be a day of rest? Is it not true that other birdmen, though Gentiles, do partake of the firmament elsewhere in amity with you who reign so powerfully?"

But the elders and the priests did not hear, and returned to worship at their magic altar, where ever more commandments were being scriben on tablets. And lo, there was much wailing and gnashing of teeth in the camps of the birdmen. They sought council amongst themselves to no purpose. Many there were who continued like locusts to fly in the desert air, but many others, yea even those of stout heart and strong courage, were to be seen beating their heads in vain against the mighty citadel of the Ae-Tee-Cee. But all the wise elders inside, bedecked in ribands of scarlet hue, were muttering incantations in the name of Airsafetee, and could not hear the noise without, being also deafened by the chink of the moneylenders, and the sound of tablets being scriben.

And so the firmament was delivered from the ungodly birdmen who would wish to use it to no profitable purpose, and instead the firmament was rent asunder by high and fearful aerial chariots that passed with a noise like thunder, shaking the tents of the peopie who trembled inside. But these people quieted their fears and accepted all with resignation, for hath it not been said that all was accomplished under the guidance of the elders, in the name of Profit, Progress and the Holy Airsafetee? And the noise of the birdmen was like unto the bleating of distant sheep, for they had not the means to counter so great a mystic incantation, no, neither by force of logic, pitiful supplication, indignant wrath or any such thing that they could devise, such being the power of words over an ignorant people.

OSTIV CONGRESS

THE 11th OSTIV Congress will be held in Leszno, Poland, on the site of the World Gliding Championships from Wednesday, 12th June, to Saturday, 22nd June, 1968, inclusive.

Provisional programme:

Wed., 12th—Official Opening.
Thurs., 13th-Sun., 16th—Technical Sessions.
Mon., 17th—Excursions.
Tues., 18th — Excursions or Free Day.
Wed., 19th-Fri., 21st — Meteorological Sessions.
Sat., 22nd—General Conference and Closing Dinner.

For a group of about 40 participants there will be a two-days excursion to Bielsko on June 17th and 18th. Others can take part on a one-day excursion to Wroclaw on June 17th.

All subjects of papers read—technical as well as meteorological—must be related to soaring flight.

The chairman of the Technical Section: Lt.-Col. (Rtd.) Floyd J. Sweet—1910, Massachusetts Avenue, McLean, Virginia, USA, and the chairman of the Scientific Section (for meteorological papers), Dr. Joachim P. Kuettner, 8721 Waterford Road, Alexandria, Virginia, USA, will be pleased to receive as soon as possible the names and addresses of those who wish to read a paper at the Congress, stating the title of the paper.

The fifth competition for the Standard Class prize will be held during the training week previous to the World Gliding Championships (mainly flight tests) and during the two weeks of these Championships. Chairman of the Jury will be Dipl.-Ing. B. Puzej, Poland.

ANNUAL STATISTICS FOR

Gliding Club	Aircraft Club owned or op. 2S	Sec	HP	PO	TUG	Launches On Club site	By Club gliders	Hours Total	Club gliders
ALBATROSS	1	—	—	—	—	494	494	39	39
AVRO	3	—	1	1	—	2,404	2,394	259	258
BATH & WILTS	1	1	1	8	—	4,041	2,913	1,031	460
BLACKPOOL & FYLDE	1	1	1	—	—	1,915	1,915	272	272
BRISTOL	2	2	3	16	2	5,839	4,638	1,996	948
BURTON & DERBYSHIRE	1	—	1	1	—	1,581	1,470	218	177
CAMBRIDGE	2	1	2	7	1	2,766	2,587	879	613
COLLEGE OF AERONAUTICS	2	1	1	4	—	3,150	2,933	626	458
CORNISH	3	4	1	2	1	6,467	6,336	865	777
COTSWOLD	1	—	1	3	—	2,172	1,700	442	363
COVENTRY	2	1	3	8	3	5,402	4,717	1,339	916
CUMBERNAULD	2	2	1	—	—	1,000	1,000	51	51
DERBYSHIRE & LANCASHIRE	3	4	2	16	—	4,360	3,652	1,737	1,169
DEVON & SOMERSET	1	2	—	5	1	3,392	2,137	624	271
DONCASTER & DISTRICT	3	4	1	8	1	4,524	3,937	831	465
DORSET	3	2	—	7	1	3,991	3,217	856	361
DUMFRIES & DISTRICT	2	—	—	1	—	666	658	51	45
ESSEX	2	1	1	3	—	3,911	3,744	597	500
ESSEX & SUFFOLK	1	—	1	—	1	453	453	224	224
HALIFAX	2	1	—	—	—	535	535	29	29
HANDLEY PAGE	1	1	1	—	—	2,261	2,203	363	353
KENT	4	2	1	10	—	8,152	7,490	1,414	976
LAKES	1	2	1	3	1	1,741	1,604	261	191
LASHAM GLIDING SOCIETY	5	1	—	1	3	24,146	12,782	1,958	1,663
IMPERIAL COLLEGE	1	—	1	1	—	550	550	230	230
POLISH AIR FORCE ASSOC.	1	—	4	1	—	704	539	547	417
SURREY & HANTS.	—	—	9	40	—	2,620	2,620	2,081	2,081
LEICESTERSHIRE	1	—	2	8	—	1,614	1,039	1,005	439
LINCOLNSHIRE	4	1	—	4	—	3,636	3,223	428	292
LONDON	5	4	4	35	3	16,369	14,835	4,127	2,605
MIDLAND	1	2	2	9	—	6,893	5,657	3,108	1,371
NEWCASTLE & TEES-SIDE	1	1	1	6	—	1,574	1,345	374	198
NORFOLK	1	2	2	—	—	2,327	2,169	327	214
NORTHUMBRIA	1	1	1	5	—	2,074	1,580	265	168
*NORTH WEST OF IRELAND	2	1	—	—	—	730	750	50	50
OUSE	2	2	1	2	—	4,253	4,020	472	424
OXFORD	2	—	3	4	1	2,470	2,263	603	433
PERKINS SPORTS ASSOCIATION	1	1	2	—	1	2,064	2,044	333	327
PORTHCAWL	1	2	—	—	—	1,210	1,210	61	61
R.A.E. (CISAVIA)	1	—	3	—	—	3,068	3,063	502	501
R.P.E. (CISAVIA)	1	—	—	—	—	1,309	1,259	112	106
SCOTTISH GLIDING UNION	4	2	2	7	1	5,301	4,672	2,282	1,330
SOLENT	1	—	—	—	—	—	—	—	—
SOUTHDOWN	1	2	1	2	1	4,855	4,583	625	497
SOUTH WALES	2	1	—	3	—	1,640	1,600	180	155
STAFFORDSHIRE	1	2	1	2	1	3,479	3,353	478	412
SWINDON	1	1	1	3	—	3,594	3,202	760	475
TRENT VALLEY	1	—	1	—	—	2,177	2,177	130	130
ULSTER & SHORTS	2	—	2	—	—	2,060	2,060	269	269
UNIVERSITIES OF GLASGOW	1	—	1	—	—	408	408	28	28
UPWARD BOUND	5	—	—	—	—	2,061	2,050	143	143
WEST WALES	2	—	1	—	1	3,918	3,855	481	462
WORCESTERSHIRE	4	2		6	2	4,928	4,638	723	590
WYCOMBE AIR PARK	5	2	—	6	2	5,952	5,158	2,548	1,574
AIRWAYS	—	—	2	—	—	536	536	388	388
POST OFFICE (CISAVIA)	—	—	1	—	—	235	235	129	129
THAMES VALLEY	1	—	3	2	—	515	515	345	345
YORKSHIRE	3	2	1	11	—	5,123	3,984	2,751	1,444
CIVILIAN TOTAL	109	64	77	244	28	195,610	166,701	43,847	29,867

1967 (1st Jan.—30th Sept.)

Flying days		Cross-country		Courses		Certificates					Membership		
Total	soaring	Total miles	By club gliders	No.	Pupils	AB	C	BC	S c—l	G c—l	Flying	Non-flying	Potential
31	5			—	—	2	4	—	—	—	30	20	150
76	20	—	—	—	—	6	4	3	1—3	—	89	12	
83	50	505	30	1	8	7	8	6	4—10	—	80	10	200
68	36	—	—	2	—	3	4	8	—	—	68	80	
173	97	6,000	500	20	160	16	4	8	8—24	2—5	258	54	350
58	21	62	62	1	—	6	10	5	1—8	—	37	5	100
141	94	2,493	705	10	53	12	11	11	5—29	1—3	199	6	210
126	53	170	—	—	—	12	14	7	4—19	—	141	—	140
219	82	1108	232	27	158	13	6	6	2—6	—	89	15	120
58	23	48	48	—	—	12	9	14	1—5	—	54	—	150
135	75	5,350	1,920	15	92	10	11	1	1—16	1—1	191	37	250
35	10	—	—	1	12	8	—	—	—	—	50	4	100
126				12	96	16	12	10	2—13	0—3	206	160	350
144	78			6	48	6	6	2	4—12	—			200
108	66	613	154	—	—	7	4	4	0—6	—	131	56	150
90	47	—	—	1	6	19			2—5	—	126	51	200
33	7	11	—	—	—	—	—	2	—	—	40	18	70
86	39	602	283	—	—	11	12	12	0—11	—	183	90	200
46	26			—	—						28	—	
44	10	—	—	—	—	1	1	1	—	—	32	8	
77	41	177	177	—	—	3	7	4	4—6	—	37	9	45
199	122	1,480	131	25	264	25	17	9	4—22	0—1	155	53	200
71	30	90	40	4	25				1—9	—	50	16	100
250		—	—	52	235	—	30				297	100	
				3	21	3	—	6	0—8	0—1	75	5	
58	49	2,520	2,337	—	—	1	1	1	1—3	2—5	30	35	1,000
		9,000	9,000	—	—				7—	2—2	295	—	
90	85	2,890				2	3	3	12	0—6	103	4	120
90	33	551	—	1	8	7	14	6	2—7	0—1	80	5	100
252	194	9,000	1,000	28	280	25	20	12	6—	1—2	483	100	600
192	80	2,888	1,230	2	8	11	12		10—37	2—10	182	50	
85	50	100	—	4	23	5	4	3	0—3	—	70	—	200
82	40	991	191	1	8	9	11	9	3—5	—	75	4	120
68	31	230	10	2	15	6	—	10	2—5	—	67	2	100
48		—	—	continuous					1—		40	10	100
99	21	291	134	—	—	5	2	2	0—5	—	159	5	
77	42	623	207	—	—	4	2	—	2—6	—	80	1	100
70	51	197	197	2	12	5	3	3	1—4	—	35	—	35
40	—	—	—	—	—	5	—	—	—	—	42	—	50
125	67	406	391	—	—	11	10	3	4—6	—	95	5	150
41	9	—	—	—	—	11	1	1	1—0	—	51	—	80
201	128	2,240	525	20	160	17	2	6	3—21	2—11	178	50	700
—	—	—	—	—	—	—	—	—	—	—	65	5	150
87	36	262	168	3		13	7	4	0—4	—	107	20	150
58	33	219	16	2	10	1	—	3	0—2	—	57	10	100
103	22			2	20	15	3	5	4—10	—	115		250
103	41	3,550	520	—	—	16	9	7	2—4	0—3	99	2	120
67	24	—	—	1	12	7	5	1	—	—	52	1	60
69	15	120	120	—	—	8	5	5	1—2	—	55	—	80
24	8	—	—	2	10	1	—	2	—	—	25	—	40
47	14	—	—	11	57	20	4	2	0—4	—			
146	87	100	100	22	124					0—1	100	400	150
150	60	200	—	13	104	17	4	6	3—6	—	181	32	250
214	132			—	—	44	27	—	17	2—4	412	12	500
As for	Wyco	mbe Air	Park ab	ove									
180	135	1,004	—	40	—	—	15	27	20—46	1—5	216	129	500
5,343	2,519	56,091	20,429	336	2,029	464	338	240	134—404	16—64	6,195	1,691	

ANNUAL STATISTICS FOR

Gliding Club	Aircraft Club owned or op. 2-S	Sec	HP	PO	TUG	Launches On Club site	By Club gliders	Hours Total	Club gliders
A.G.A.									
Aldershot & District ..	1	1	2	—	—	1,772	1,770	300	300
*Army Soaring Club	—	—	2	—	—	90	90	146	146
*Southern Command	2	2	3	—	—	4,212	4,251	647	647
R.A.F.G.S.A.									
Bannerdown	1	1	2	—	—	3,396	3,318	682	651
Bicester	4	1	7	—	3	16,548	16,548	5,278	5,278
Chilterns	2	1	2	1	—	3,116	3,099	427	407
Clevelands	2	3	2	1	—	8,273	8,109	1,374	1,278
East Midlands	3	—	4	—	—	4,410	4,388	868	844
Fenland	3	1	2	—	—	5,855	5,852	772	771
Four Counties	1	1	3	—	—	4,754	4,754	727	727
Humber	1	2	—	—	—	1,924	1,924	156	156
Mendips	1	2	2	—	—	2,515	2,515	333	333
Moonrakers	2	1	3	4	—	3,342	3,342	1,140	1,050
Wrekin						7,377	7,377	842	842
R.N.G.S.A.									
Condor	2	1	—	—	—	1,615	1,615	140	140
Fulmar	2	2	2	—	—	2,918	2,918	396	396
Heron	1	—	4	—	1	1,173	1,059	307	235
Portsmouth	1	1	2	1	1	2,269	2,257	292	276
Service Total	29	20	42	7	5	75,759	75,185	14,827	14,477
Service and Civilian Total ..	138	84	119	251	33	271,369	241,887	58,674	44,344
Eagle (Army, Germany)	2	1	2	—	—	3,418	3,418	608	608
Phoenix (RAF, Germany) ..	2	2	2	—	—	2,655	2,596	606	606
Two Rivers (RAF, Germany) ..						3,650		524	
Crusaders (RAF, Cyprus) ..	2	1	1	—	—	4,278	4,278	573	573
Overseas Total	6	4	5	—	—	14,001	10,292	2,311	1,787
Air Training Corps	150	15				162,082	162,082		

Note: The Culdrose Gliding Club has been omitted because no returns have been received for two years. Asterisks indicate that the figures given have been estimated on last year's return. Blank spaces indicate that no figures have been received.

BGA NEWS

Restructure of the Association

At the forthcoming AGM, Council are going to propose the following:

1. Council to be enlarged, particularly by increasing representation of what are now the Associated Members.
2. Council will elect an Executive Committee to meet monthly with considerable powers to conduct the affairs of the Association and to make decisions on all matters except those of main policy. Minutes of its meetings would be circu-

1967 (1st Jan.—30th Sept.)—contd.

Flying days		Cross-Country				Certificates					Membership		
Total	Soaring	Total miles	By club gliders	Courses No.	Pupils	AB	C	BC	S c—l	G c—l	Flying	Non-flying	Potential
50	32	1,710	1,710	1	6	6	8	3	1–1	—	96	—	100
		2,083	2,083								50 189	—	250
		940	940	—	—	6	12	5	3–4	2–2	53	—	100
210		22,712	22,712	12	180	50	20	51	0–37	0–1	243	—	300
68	25	868	430	cont	inuous	19	7	7	3–10	0–1	82	1	100
171	71	1,305	1,305	2	14	24	18	9	5–27	0–7	108	—	120
106	49	3,100	2,200	2	20	26	14	16	8–25	0–1	97	—	120
100	37	1,244	1,244	—	—	22	13	7	5–13	0–2	173	—	200
120	63	1,150	1,150	—	—	9	5	2	4–10	1–8	75	4	
				—	—	8	1	1	—	—	46	—	100
120		688	688	—	—	11	2	5	0–3	—	77	—	120
90	65	6,976	4,276	cont	inuous	10	7	10	5–20	1–0	116	—	200
176		1,452	1,452										
65		—	—	—	—	7	—	—	—	—	90	—	150
83	42	110	110	2	20	12	1	2	2–3	0–1	60	—	100
72	43	1,740	1,150	—	—	5	2	2	1–6	—	29	—	100
79	19	335	—	—	—	3	5	5	1–6	—	90	1	100
1,511	446	46,414	41,450	19	240	218	115	125	38–165	4–23	1,674	6	
6,854	2,965	102,505	61,879	357	2,269	682	453	365	172–569	20–87	7,869	1,697	
111	67	2,200	2,200	2	20	15	6	7	5–14	1–2	40	—	60
56	34	2,481	2,481	—	—	13	11	9	3–12	1–3	48	—	100
89													
158	85	—	—	cont	inuous	15	10	3	1–4	0–3	70		
414	186	4,681	4,681	2	20	43	27	19	9–30	2–8	158		
				cont	inuous	2,036	61		5	1			

Key to aircraft categories: 2S=two-seater; Sec.=Secondary; HP=high-performance; PO=privately owned; S=1st column completed Silver C's, 2nd column Silver C legs. G=1st column completed Gold C's, 2nd column Gold C legs. BC=Bronze C.

larised to Council Members.

3. The Council would meet twice yearly to ratify the work of the Executive Committee and to discuss and decide matters of major policy falling outside the terms of reference of the Executive Committee.

A committee is now sitting to prepare proposals in more detail which will be circularised to all members prior to the AGM on 9th March.

PHILIP WILLS

In Parliament

Mr. Robin Turton (Conservative) asked the President of the Board of Trade, in the Commons on 18th December, 1967, how many applications for remission of duty on imported gliders have been granted under paragraph 3 of the Fourth Schedule to the Import Duties Act, 1958, during the last 12 months.

Mrs. Gwyneth Dunwoody, Parliamentary Secretary, Board of Trade, replied: "Directions to remit import duty on gliders under paragraph 3 of the Fourth Schedule of the Import Duties Act, 1958, have been made in respect of 36 applications received in the 12 months up to 30th November, 1967. These applications covered the import of 45 gliders in all."

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	Price per hour
Schempp-Hirth SHK	£3 15 0
Elliotts Olympia 465	£1 15 0
Elliotts Olympia 403	£1 10 0
Elliotts Olympia 463	£1 10 0
Schleicher Ka6	£1 10 0
Olympia 2B	£1 7 6
Bolkow Junior	£6 15 0
Auster J.I.N.	£6 10 0
Thruxton Jackaroo	£6 10 0
Aero-tows by Super Cub	£1 7 6

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No more pushing or pulling.
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Shaftesbury, Dorset
Ring J. Thorne, Fontmell Magna 328

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FLYING TALK

Part 2—Notes on CALIBRATION

THE height attained by an aircraft as measured by the atmospheric pressure reached is a purely arbitrary figure because the change of pressure with height is not a function which remains constant with time. It is necessary, therefore, to specify some arbitrary way in which this pressure varies and then to say that if the aircraft had been ascending through an atmosphere which followed this law, then it would have attained the corresponding height. This has been specified by the International Civil Aviation Organisation (ICAO) and they publish tables showing Heights against Pressure measured in millibars.

There is no instrument which will absolutely measure pressure. The best device, however, is the Mercury Manometer. Even with this instrument some corrections are necessary. For the purpose of claims in the United Kingdom, it is sufficient to consider the gravity effect as being at latitude 52° North for the whole of the United Kingdom. A further correction must be made for the temperature which effects the density of mercury, and the atmospheric pressure at the time of calibration.

To calibrate a barograph you need the following equipment:

1. A vacuum chamber readily demountable to contain the barograph.
2. A Mercury Manometer fitted with a scale without parallax to within 20/1,000ths inch. There must be a means of adjusting the attitude of the column.
3. A vacuum pump.
4. Needle valves for controlling the air flow from the chamber to the pump.
5. A thermometer.
6. A means to increase the pressure in the chamber above atmospheric when necessary.

Procedure

1. Smoke or prepare barograph with chart taking care to avoid spiral wind. Wind barograph clock mechanism and set at fastest speed and extend the base line.
2. Calculate corrections necessary for

barometric pressure and temperature in preparation for the ascent.

3. Enclose barograph in vacuum chamber and ensure satisfactory sealing.
4. Mount and connect Mercury Manometer making the necessary adjustments for plumb.
5. If the atmospheric pressure at the time of calibration is low, it will be necessary to increase the pressure in the chamber so that it is in excess of 1.013 millibars. This is to ensure that the calibration covers the important lower altitudes.
6. Exhaust the chamber from the chosen pressure altitude in 1,000 ft. steps for the first 6,000 ft. and 2,000 ft. thereafter. Take care to avoid a "spiky" calibration by approaching each pressure altitude slowly.
7. Use identical steps when raising the pressure.
8. If any corrections are to be made to the chart, these should be entered upon it with the following information:

   Calibration Officer,
   Place of calibration,
   Date of calibration,
   Barograph type and number.

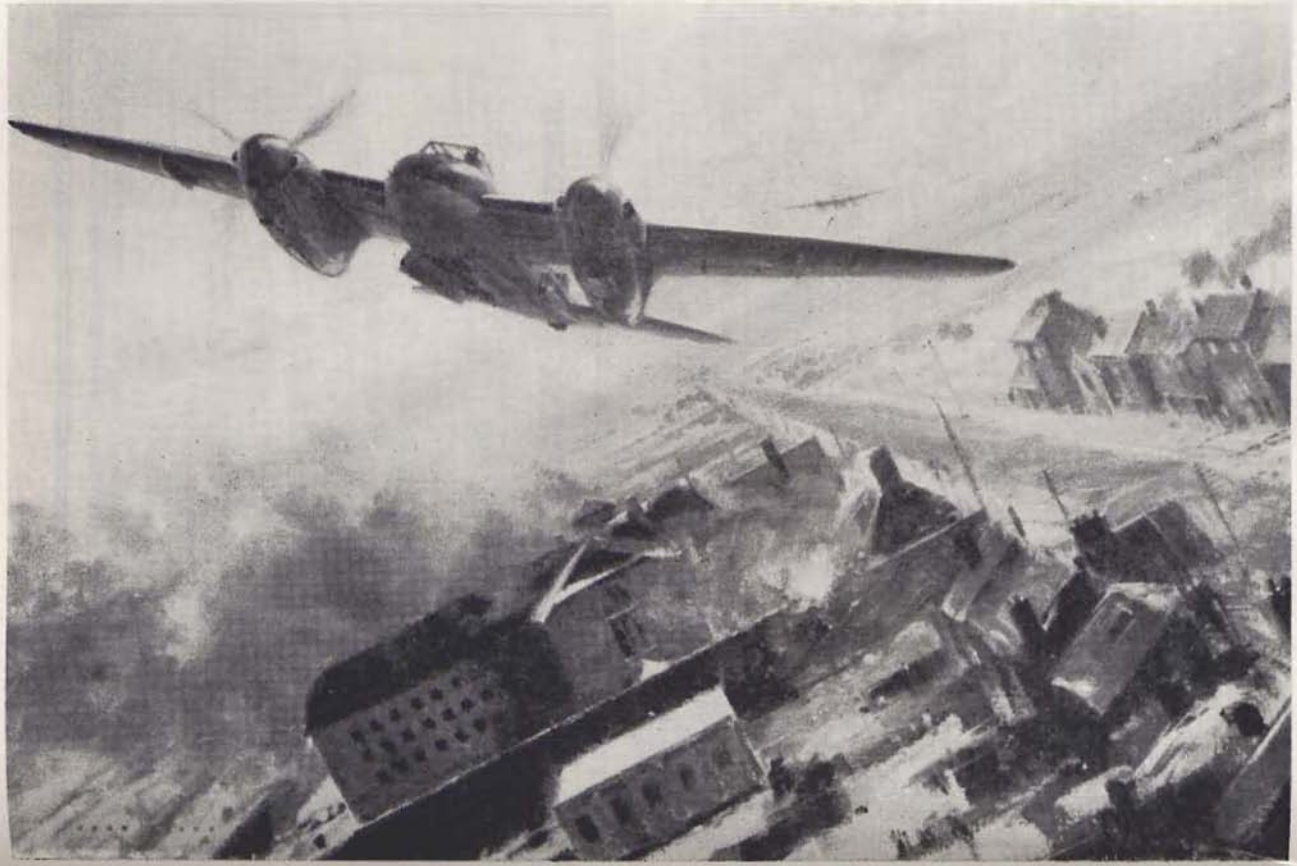
In an endeavour to improve and speed up the procedure for height claims, it will only be necessary to obtain a certificate of height when the height claim is for:

1. A Diamond qualification.
2. For any national or local records recognised by the BGA and/or the FAI, and on Gold C heights where the margin in excess of the height required is less than 250 ft.

In all other cases it will be sufficient for the person substantiating the claim to make a straightforward comparison with the barograph calibration which is dated the 12 months prior to the claim or eight weeks subsequent to the flight claim.

A certificate of height can be issued by any competent person having the facilities outlined above. The certificate should state the name of the person undertaking the calibration, date and place of calibration, the maximum height reached and the minimum height prior to the climb, having taken into account the necessary corrections.

V. C. CARR,
Member, BGA Flying Committee



AVIATION ART EXHIBITION

DURING the exhibition from the 25th October to 11th November, 112 exhibits were on view. Within the classification of Professional and Non-Professional was a special section to commemorate the 50th Anniversary of the RAF in 1968. This section is being enlarged and will tour various RAF flying displays during the anniversary year.

Frank Wootton, who was also one of the judges last year, and well known as a professional aviation artist the world over, again led the panel of judges: Michael Ramsden, Editor of *Flight* and an amateur landscape painter, and Robert Blackburn, aviation consultant.

Michael Ramsden presented a report at the first dinner of the society held at the Eccleston Hotel following the preview. A summary of his report follows.

The winners were announced in our last issue, page 469.

* * *

After browsing around and making notes for about an hour we finally sat down together, and the moment to compare notes had arrived. We had each mentally selected the same numbers, although not quite in the same order and after the difficult business of finally agreeing the relative merits of A, B, C or D we made the decisions that you are aware of.

In the Professional Class John Young came first with "Mosquitoes Bomb Amiens Prison". It's a splendid portrayal of a moment, an instant of action—you can feel the *g* as the pilot pulls away from the target. A prison in the snow

Continued on page 42

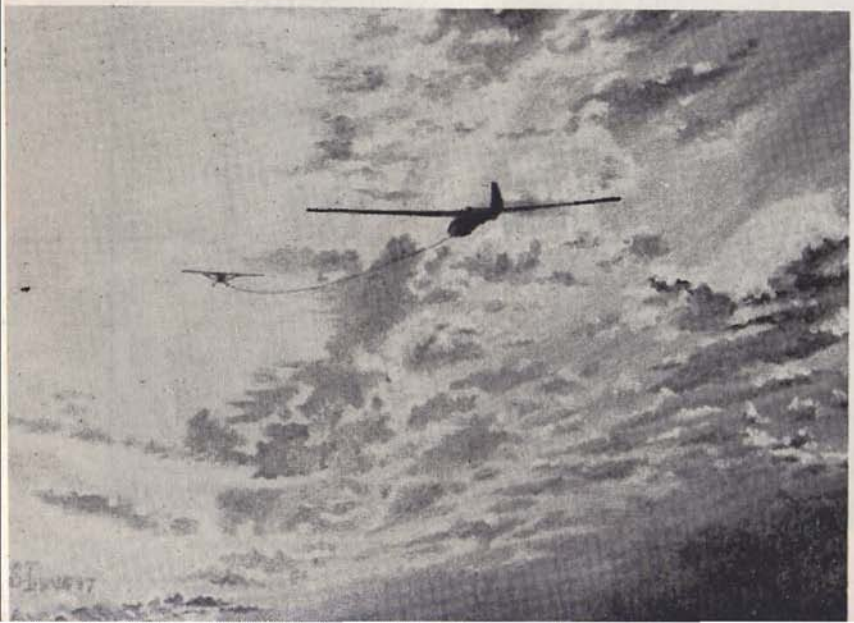
Photo opposite: "Mosquitoes bomb Amiens Prison" *by John Young.*

▲ Buccaneer RN 1967 *John Nash*

Overdue *Gerald C*

▼ Werner Voss's last flight *Brian Withams*

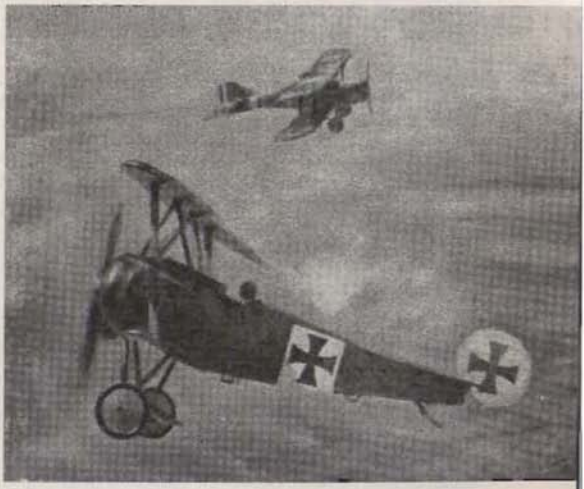
▼ Night Ride *Mrs. Sheila Innes*



oulson ▶

Sedan 14-5-40 ▶
Norman Hoad

Three of a kind *A. Harold* ▼



Blocks by Courtesy of
Flight International

Continued from page 39

isn't one which would inspire many painters, but the bold and vigorous treatment of the buildings in the foreground help to achieve speed. Also the clever way in which the artist has painted the road and the horizon, and the triangle on the right of the painting all help to take the eye to the Mosquito; even the propeller blades help in this important illusion of taking the eye to that triumphant aeroplane. I suppose the artist was tempted to paint figures in —without them the effect of complete surprise, which the story tells, is complete.

Gerald Coulson came second with his painting "Overdue". The simplicity of it appealed to us, and the poignancy of a Lancaster in trouble, limping home after a raid as dawn breaks over a cruel-looking sea. The artist has remembered that aeroplanes are living things which are used, perhaps a bit dented—this one is stained with exhaust—small points, but aeroplanes to me aren't very appealing if they are in brochure or showroom finish. We are not quite sure whether he's going to make it, and the greatest piece of artistry in this painting is the glimpse of the sea through the cloud.

Third we placed a very lovely painting of a Sunderland over the North Atlantic by Roy Nockolds If you're going to paint flying boats you've got to be a master of not only wings but of water, and the ships which are silhouetted against the sea are a great delight to the eye.

Among the paintings which received a commendation were several watercolours. Watercolours of aeroplanes are incredibly difficult and I'm glad that some of them stood out. Among them were J. A. Davies with "Bristol Fighters", a pastel of a Lightning in a hangar by T. Halliday and K. McDonough's picture of Bert Hinkler, the intrepid aviator of the 'thirties, flying an Avro Baby. I think, however, we felt this one was a little too much like an illustration—a little too precise. Another watercolour which deserved mention was also by Halliday of a Viscount at London Airport.

The Non-Professional Class was discussed at some length before the judges came to their conclusion. Brian Withams was placed first by all the judges but not at first for the same picture. Eventually we chose the Fairey IIIF on a training flight over Arabia. The foreshortening of the upper wing was particularly well executed — the lighting on it was perfect. I felt, though, that the lighting on the building could have been equally strongly handled.

Peter Mason was placed second with "Storm Flight" (Skylark 4), a beautiful portrayal of a glider. I'm not a glider pilot but I can really imagine that this conveys the feeling of gliding; it's a very dramatic and powerful sky, the glider well placed and conveying the loneliness and grace of gliding.

Third was "Those Magnificent Men" by Fred Slingsby, a portrait of Derek Piggott. It is a painting of a man rather than an aeroplane—the beautiful pyramidal composition rather carried us away, also the interesting intersection of the wires and struts of the Boxkite.

Finally, the best "first-timer" award was unanimously given to Peter Mason for "Storm Flight". We also named the best painting in the RAF section as John Young's "Mosquitoes Bomb Amiens Prison".

THE K12 MOTOR GLIDER

By ANDY GOUGH

The K12 has now gone into production as the AS-K14 in order to avoid confusion with the well-known AS-12.

THE K12 can be ground-handled by one person. The low wing with its turned-down tips keeps the bank to a minimum when on the ground, but allows sufficient clearance for an unassisted take-off under normal operating conditions.

The K12 motor glider is a development of the K11 prototype, which provided valuable information on such problems as engine position and mounting, vibration and restarting in the air. As a result, the makers have been able to proceed with this high-performance production version.

The Engine

The engine is a Hirth F10A 1a, rated at 26-29 h.p. at 5,000 r.p.m. It does not retract into the fuselage, but a single lever feathers the propeller and also closes louvres covering the air intake vent when the engine is not in operation.

The lack of engine torque is very noticeable. This is achieved by off-setting the engine, a common practice employed by aeromodel designers.

The Airframe

A low-drag high-lift wing and a light, low-drag fuselage fitted with a Ka-6E type pendulum elevator, together with a retractable undercarriage, helps to achieve a significant advance in performance over the K11.

The undercarriage operation was simple and effortless, but the trimmer was not very effective. Rudolf Kaiser, the designer, agreed on this point, and said production models would be fitted with a more effective trimming device.

An L/D of at least 28:1 and a minimum sink better than 2 ft. 8 in. per second gives the K12 an "engine off" performance that the makers claim is somewhat better than the Ka-6CR.

Flying the Aircraft

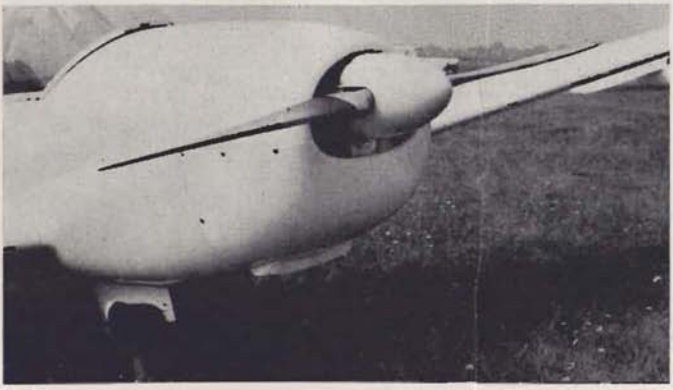
I flew the K12 at the Wasserkuppe during October, 1967, and found the aircraft handled very much like the Ka-6E, light and responsive.

On take-off the engine achieved 5,200 r.p.m. at the recommended climb speed of 46 kt. The rate of climb on both flights I made exceeded the makers'

Note spoilers on top surface only. (Photos by H. Schwing)

Rudolf Kaiser (sitting on wing) briefs H. Schwing from Holland

Easy to load on trailer



Propeller feathered

claim of 500 ft./min., but I suspect a weak ridge wind and numerous weak thermals boosted the ascent.

Feathering the propeller reduces the rate of sink immensely and I had no difficulty soaring the machine in the weak thermal conditions.

Restarting the engine in the air was successful on both attempts, but not easy. The starting handle is mounted under the instrument panel and connected by means of a Bowden cable to the crank.

The spoilers (on the upper surface only) were very effective and necessary if spot landings were to be achieved. The operating lever was well positioned on the port side of the roomy cockpit, and was operated with ease.

The canopy afforded good visibility with ample headroom and added pleasing lines to the sleek sporty-looking fuselage. As on all Schleicher aircraft the finish was superb.

Conclusion

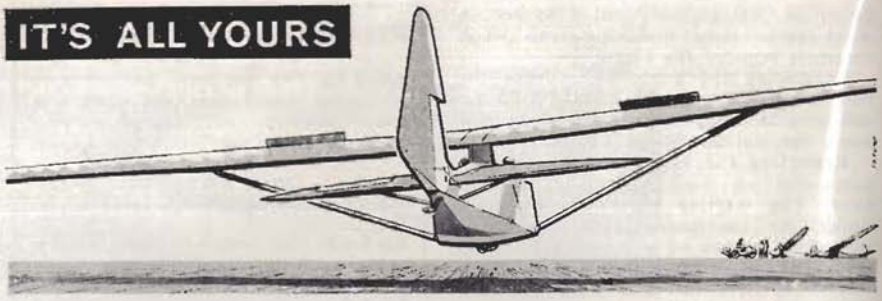
It is evident that there is no simple formula for the designer of the powered sailplane to work on. Careful compromise is essential to achieve the balance between the high-performance sailplane on the one hand, and the independence and advantages of powered flight on the other.

Rudolf Kaiser and the Schleicher Company have, in my opinion, achieved this balance with the K12 motor glider, the price of which is comparable with the RF-4.

Technical Data

Span (metres) — 14.3.
Wing area (sq. metres) — 12.63.
Aspect ratio — 16.2.
Equipped weight (kg) — 230.
Max. flying weight (kg) — 360.
Wing loading (kg./sq. m) — 26.2.
— — at flying weight (kg) — 330.
Best L/D — 28.
Stalling speed (kts) — 32.
Min. sink (ft./sec.) — 2.3.
Rate of climb with engine (ft./min.) — 400-500.
Max speed (kts)— calm, 108; rough, 76.
Engine — Solo Hirth F10A 1a, 26 h.p.
Propeller — Hoffman feathering.
Fuel Capacity — 4½ gallons or 2 hrs. under power.

IT'S ALL YOURS



AS from 1st January, 1968, instruction in two-seater gliders will be subject to a BGA operational regulation requiring it to be carried out only by qualified instructors.

The change-over to this new standard will take place during the year 1968.

The CFI endorsement

This is mandatory for all CFI's and continues as at present. It may be held by an Instructor holding a Full or Restricted Rating, but not by an Instructor holding an Assistant Rating. On the recommendation of the Chairman of his club and approval of the BGA, an instructor holding a Full or Restricted Rating will be given a CFI endorsement provided that he holds the following additional qualifications:

150 hours as P.1 on at least 6 different types of glider. Two years' experience of instructing. (In future this will mean holding a Full, Restricted or Assistant Instructor Rating for two years provided that the Assistant Rating has

Class of Rating	*Holder entitled to*	*Requirements*
Assistant Instructor	Instruct pupils only as authorised by the CFI	Completion of an Approved Instructors' course, 35 hours P.1, Bronze C. Acceptance test by CFI who will issue Rating certificate
Full Instructor	Instruct pupils at all stages, subject to the authority of the CFI	Similar to the present BGA Category, which it replaces (see Note 1)
Restricted Instructor	Instruct pupils in all flying exercises, except cross-country flying (see Note 2). Subject to the authority of the CFI	This is a Full Rating without the Silver C. New Restricted Ratings will not be issued except to Instructors needed to become CFI of their clubs.

NOTE 1. Present holders of a current Category will automatically be issued with a full Rating when renewing their Category for 1968.

NOTE 2. If the CFI of a club has only a Restricted Rating, the only pilots in the club who may do cross-country flying are those already holding a Silver C, and those who possess a Restricted or an Assistant Rating, for the purpose of obtaining their Silver C.

On informing the BGA that the Silver C has been completed, the Restricted Rating will be upgraded to a Full Rating.

Holders of the present Category, issued provisionally, will receive a Restricted Rating on renewing this Category for 1968.

The Restricted Rating is not intended to remain permanently. The goal is to have all clubs in the charge of a Full Rating CFI.

been upgraded to a Full or Restricted Rating prior to applying for a CFI endorsement. There is normally no test.)

How to get an Instructor Rating

Instructors who do not hold a present Category, and who wish to become a Rated Instructor, should apply to the BGA for an Instructor Record. Their letter of application should be countersigned by their CFI and they should enclose £2. This covers the subsequent Rating examination fees and a candidate will not be required to send further such fees to the BGA as long as he holds his rating currently.

The Record includes:

Information on how to become qualified for a Rating.

Syllabus for the Approved Instructors' Course.

The certificates required to obtain an Assistant Rating.

A blank authorisation card for the CFI to complete for the Assistant Rating.

Requirements for the Full and Restricted Rating.

Full Rating certificate of experience and examination schedule.

Certificates of completion of the Full or Restricted Rating.

The Instructor keeps his "Record" himself, getting it signed up as required, until the BGA Instructors' Panel Examiner tests him for a Full Rating. The examiner is then responsible for sending the Record to the BGA who will issue the Full or Restricted Rating certificate.

Requesting a Rating Test

A pilot wanting to be tested for his Assistant Instructor Rating goes straight to his CFI, who will test him and, if satisfied, will issue it on his own authority.

An Instructor wanting to be tested for his Full Rating should apply direct to one of the Test Centre Examiners listed in the Instructors Record. The application must be countersigned by the Instructor's own CFI. In case of difficulty, application may be made to the BGA direct.

An Instructor wanting to be tested for a Restricted Rating and obtain a CFI endorsement *must* apply direct to the BGA office. The letter of application must be countersigned by the Chairman of the Instructor's club.

An Examiner may not test a candidate who is an Instructor in his own club.

Renewals of Full, Restricted and Assistant Ratings

Renewal requirements for all Ratings will be the same as for the present BGA Category, as follows:

Recommendation for renewal from the CFI.

10 hours' glider flying as P.1 — 5 hours of this, including 25 launches, to be instructional flying.

Declaration of fitness, endorsed by doctor, still valid (see BGA Operational Regulations).

All renewals fall due on 1st January, each year.

During December, the CFI of each club will receive a blank renewal form from the BGA on which he should list all the Instructors whose Rating renewal he recommends, together with the amount of flying that they have done

Air Brakes

(very very very important)

Effective air brakes are not only important, they are imperative. Be rid of landing worries. Buy a new DIAMANT 16,5 or 18 with extra-large air brakes. They permit you to approach at a 45° angle (and can be regulated continuously).

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during the year. The form must be returned to the BGA by 31st January.

It is the responsibility of the Instructor who wishes to renew his Rating to provide his CFI with evidence that he has completed the amount of flying necessary for renewal.

Any Rating not renewed by the 31st March automatically lapses.

The position of Instructors who fail to renew their Rating

Assistant Instructor Rating holders will have to pass a further acceptance test with their CFI before having the Rating revalidated.

Full or Restricted Rating holders will have to apply to the BGA Instructors' Panel who will require a further test, or an interview, or other evidence that the Instructor is still up to standard.

Alternatively, the Instructor can apply to his CFI for an Assistant Rating.

Value of Power Flying towards Rating and Passenger Approvals

P.1 flying experience on aeroplanes will count towards Instructor Ratings, or the Passenger Flying Approval, as follows:

5 P.1 hours on aeroplanes equals 1 P.1 hour on gliders, provided that at least 35 hours, which must include 100 launches, has been carried out as P.1 on gliders. A maximum of 5 of these 35 hours may be done on motor-gliders without depreciation of the hourly value.

Further motorglider time will be valued as power time.

Position of Restricted Rating holders who cease to be CFIs

The only purpose of the Restricted Rating is to assist small or new clubs whose CFI has not yet got his Silver C; it is not intended that it shall be regarded as a separate Rating in its own right. On ceasing to be CFI, a Restricted Rating holder will be permitted to renew his Rating once only. At the second renewal it will revert to an Assistant Rating unless the Silver C has been completed. In this case the Restricted Rating will automatically be upgraded to a Full Rating.

Standing of the Restricted Rating CFI in the Club

The CFI is the senior Instructor in the club even if another Instructor holds the higher Full Rating.

Club operations are subject to the limitations of the CFI's Rating (e.g., non-Silver C pilots may not be sent on cross-country flights even if there is an Instructor in the club with a Full Rating).

Position of existing Instructors who have not obtained a present Category

Instructors listed on the BGA Instructors' Register for 1967 as Senior or General Instructors may obtain an Assistant Rating without the need to do an Approved Instructors' Course. Alternatively, they may apply for a Full Rating for which they must have completed an Approved Instructors' Course. If they have not achieved either Rating by 31st December, 1968, they must stop instructing. Instructors listed as U/T Instructors on the 1967 Register, or who started instructing in 1967, must complete the full requirements for the Assistant Rating before 31st December, 1968, or stop instructing. Alternatively, they can go straight for the Full Rating, which must

be completed by the same date. After 1st January, 1969, Full Ratings will be granted only to Instructors who have held an Assistant Rating for 12 months.

Instructors who are not covered by the above must obtain an Assistant Rating before starting to instruct. If they are qualified aeroplane instructors, they may not be required to do the Instructors' Course.

NOTE: Instructors who have completed Approved Instructors' Courses will be charged £1 only for the Record if they enclose their completed Instructors' Course report.

BGA APPROVED INSTRUCTOR COURSES

Before starting to instruct in a BGA club, a pilot must complete a BGA Approved Instructor Course.

An Approved Instructor Course consists of not less than nine full days' training, which must be completed over a period not exceeding two months. Approximately four hours' flying, or 25 launches, will be needed to cover the syllabus, which is given below.

An Approved Instructor Course may be run by the National Coach, an Examiner of the BGA Instructors' Panel, or a CFI or full-time professional Instructor approved by the Panel. It must be run in accordance with the BGA syllabus, and in line with the current policy of the BGA.

Unless authorised by the BGA the ratio of instructional staff to U/T Instructors shall not exceed the following:

1 staff Instructor: 4 students
2 staff Instructors: 9 students
3 staff Instructors: 14 students

There is no objection to additional people attending lectures.

Equipment necessary for an Approved Instructors' Course includes:

A minimum of a two-seater fitted with airbrakes for every staff flying Instructor.

Launch facilities to enable full spin training without soaring.

Classroom with chalk, boards, desks or tables, and lighting and heating.

Running an Approved Instructors' Course in your club

Before running an Instructors' course open to pilots from outside, a club must first run an Approved Course for its own members.

Subsequently it is hoped that places will be made available by clubs running Approved Instructors' Courses to members of other clubs in their area.

CFI's wishing to obtain recognition for their first Approved Instructors' Course should apply to the BGA giving the name of the instructor(s) who will run the course, intended dates and numbers on course. The CFI will then be put in touch with an Examiner of the Instructors' Panel who will vet the arrangements for the course and its operation, and advise and help the CFI. If the Examiner is satisfied that the course has been run efficiently, it will be approved.

Subsequent Courses

Approval will be given in advance to clubs whose Course arrangements are assessed as satisfactory by the BGA, provided that the Course is in the charge of the same person.

The Instructor in charge of the Course is responsible for its efficient operation and for certifying the "Record" of each trainee instructor as appropriate at the end of the Course.

Annual Conference

The Instructors' Panel intend to run annual weekend Instructors' Course Policy Conferences, regionally if possible. Instructors intending to run Approved Courses must attend the conference in their area, or send a deputy who will be teaching full-time on the Course.

BGA Approved Instructor Course Syllabus

Part 1 — Air

The U/T Instructor must learn how to teach the following exercises to an ab-initio pupil.

1. Preparation for flight; cockpit check; hooking on the cable; signals.
2. Effect of controls; flying at right speed; co-ordination of controls.
3. Further effect of the controls; use of the trimmer.
4. Gentle, medium and steep turns; continuous circling.
5. Take-off; launch procedure (winch or aerotow or both).
6. Approach and landing; airbrakes; under and overshoot procedure.
7. Circuit planning; making best use of time in air.
8. Symptoms of approaching stall; stalls and recovery from turns.
9. Incipient and full spin entry and recovery, e.g., considerations.
10. Airmanship; look-out; assessment of weather and flight conditions.
11. Emergencies; failed launch procedure; brakes coming open; ASI failure.
12. Soaring technique, if possible.
13. Normal category aerobatics, optional.

Part 2 — Ground

Lectures on:

1. Instructing technique and briefing relating to the air exercise.
2. Instructor/pupil relations; care and briefing of the solo pilot.
3. Safety in operations on the field; organisation of the launch point.
4. Airmanship; Laws and Rules; flying discipline; accident prevention.
5. Glider construction; Daily Inspections; maintenance; reporting of faults.

Instruction in the teaching of:

6. Principles of flight; typical glider performance; aircraft limitations.
7. Field landings; basic technique of cross-country soaring.
8. Soaring meteorology; synoptic chart interpretation; principles of convection.
9. Navigation; maps and map reading; the compass; vector triangles.

Time should also be allowed for practice by the U/T Instructor in giving short briefing talks and little lectures.

ANN WELCH.

THE REACTIONS OF TOTAL ENERGY SYSTEM

By E. DOMMISSE

The Variometer

A VARIOMETER is actually a rate-of-flow-of-air meter. A fixed flow of air gives a fixed rate of UP or DOWN reading. But air expands per unit change of altitude at different rates at different altitudes. At about 40,000 ft. air expands only half as much as it does at sea level for the same change of altitude. This means that our variometer, especially the capacity flask type so commonly used, has an altitude error and can be calibrated to read exactly for only one altitude. Below this it will over-read and above this it will progressively under-read.

If the instrument is mechanically sound but the calibration incorrect for the altitude at which it is calibrated the fault can be corrected by changing the volume of the capacity flask. We must therefore remember that the volume of our total energy compensator will increase this capacity. When running a bench test it is also important to connect the tube by which we bleed air into or out of the system to the static side of the variometer case. If we connect it the

other way around, the volume of the case will be added to capacity, giving large calibration errors.

The Diaphragm-Type Compensator

All aircraft instruments that work off forces obtained from the outside air suffer from altitude errors. The particular instruments would be the compensator, variometer, airspeed and altimeter. At lower than calibration altitude the compensator will over-compensate, and at higher levels it will under-compensate. Fortunately this is required by the variometer with which it is integrated, and as far as the unit is concerned we will have no altitude compensation-error.

The reaction of the compensator diaphragm must be a function of V^2 if it is to work correctly. This function is obtained from pitot pressure. Unfortunately the expansion of the diaphragm is a function of the square of its elastic resistance, and on test it is found that the diaphragm reaction to pitot pressure is linear and not according to a function of V^2. In this respect we have all slipped up badly, and all systems, including various metal or spring-loaded diaphragms and capsules which I have had the opportunity to test, show the same fault. The only system which does not have this particular fault is the venturi tube or nose-blister venturis.

A further fault, which has been found during bench tests on most diaphragm compensators, is that not enough space is provided for the proper full expansion of the diaphragm on the capacity side. In most systems a test will reveal that the diaphragm bottoms on the case at speeds as low as 80 m.p.h. If this speed is often exceeded on the glide the case must be deepened. By shaping the inside of the case in the form of a truncated cone, the volume of air displaced by the diaphragm will be more closely related to V^2.

There is one instrument on the market which is very clever in that the pressure and capacity sides are not on two sides of the same diaphragm. In this instrument a beam or lever connects the metal pressure capsules with the metal capacity capsules. Adjustment is easily obtained by shifting the pivot point on the lever. On test it was found that this system bottoms at 120 m.p.h., which again is far too low a speed to suit the modern machines that are advertised as having a limiting speed of 160 to 180 m.p.h.

A great deal more could be written on various other very good ideas and test methods, with a description of the various inadequacies and snags connected with such tests but, because I consider the basic fault of the system to lie elsewhere, I will not waste space by too much elaboration on these matters.

Reaction of the System in Flight

What we are reading on the T.E. vario is rate of change of height (Potential

Energy) after the effect of change of speed (Kinetic Energy) has been eliminated.

The system follows one unalterable law for all conditions of flight and speed change both on the dive and during a pull-up. When correctly made and installed it will, in still air, give a rate of sink against speed exactly as per the L/D curve for the sailplane.

For example: if, from our L/D curve, the sailplane descends at 600 ft./min. at 120 m.p.h. and we are diving to attain that speed, we will find that the T.E. vario will move steadily DOWN to read 600 ft./min. DOWN as we reach 120 m.p.h. If we now decrease speed slightly by a slight pull-up, the speed will decrease slowly back to, say, 100 m.p.h. and the vario will creep slowly back to, say, 500 ft./min. DOWN. So far the T.E. vario is behaving in a perfectly understandable manner and is following the L/D curve exactly. If we now pull up from 120 m.p.h. into perfectly level flight, the speed will drop off slowly and the vario will read DOWN, starting from 600 ft./min. and ending at, say, 150 ft./min. DOWN as the speed falls off to the minimum of 40 m.p.h. As far as the instrument is concerned, this is perfectly correct; the instrument must, and will, show 600 ft./min. DOWN at 120 m.p.h. and 150 ft./min. DOWN at 40 m.p.h., but in actual fact the sailplane has been at constant height during all this time and, for the instrument to be correct in relation to the sailplane, it should have been reading zero. I will say more about this later.

If we pull up steeply from 120 m.p.h. the vario will again read DOWN from 600 ft./min. to 150 ft./min. as we level off at minimum speed of 40 m.p.h. In actual fact it does not. Due to some obscure mechanical fault in the system which I have not fully investigated, *all* T.E. systems tend to over-read on a pronounced pull-up, and instead of reading 150 ft./min. DOWN at the end of the manoeuvre they all read 200 to 400 ft./min. UP, depending on various circumstances and variables. For the moment this is not important and we can leave the matter there.

Reaction of the Pilot

We now come to the most important part of the equipment, namely the pilot, and investigate his reactions to the information which he receives from the T.E. vario.

It is generally stated that the T.E. vario shows what the air, through which the sailplane flies, is doing. This is not correct. The vario reads Potential Energy after the effect of Kinetic Energy has been excluded. Thus, if we accelerate to 120 m.p.h. and the vario reads 400 ft./min. DOWN instead of 600 ft./min., it is the *pilot* who does a little sum and says to himself that the outside air is rising at 200 ft./min. and not *the instrument.*

We come now to the vital pull-up. In a low-speed sailplane with a light wing-loading the pilot thinks to a large measure with the seat of his pants. His combination of observation, thinking and feeling, plus the behaviour of the vario makes it very easy for him to use his T.E. vario correctly. It is a very different matter for the pilot flying at really high speed with a heavy sailplane. Here things are happening very fast and the vital "feel" of the pilot is virtually non-existent. He has to rely on an exact interpretation of the vario only.

Now, if he decreases speed slightly because he observes that he is about to enter a thermal, which is also beginning to show on the vario which is reading 400 ft./min. DOWN instead of 600 ft./min. DOWN, he can do a quick calculation which tells him that the air is rising at 200 ft./min. He must carry this calculation further and realise that if he were to pull up at once he will gain height at 50 ft./min. if he circles at minimum speed.

This basic interpretation holds good for all conditions of flight and for any manner or degree of dive or pull-up. The trouble is that on a pull-up from high speed the calculation is constantly variable as speed falls off; the vital thermal is perhaps very small and quickly traversed while the distance covered by the sailplane during all this is very large. The pilot cannot possibly do mental and other gymnastics such as winding flaps, etc., quickly enough.

The answer, of course, is to compensate the vario in such a way that it will always read zero at any speed. Then, if the vario departs from a zero reading this will be a direct reading of what the air is doing. One possible way to do this is electrically: current from a speed sensor would increase during a speed change to give compensation to the electric vario in the normal T.E. manner, and at the same time this current must increase and be ever present with increased speed. Providing Potential and Kinetic Energy is changing in one fixed and regular manner as it does on a dive, the system could possibly work. Unfortunately there is and can be an infinite variation between these forces on a pull-up, and the problem goes beyond solution.

One possible help would be to do the pull-up in perfectly level flight with the aid of an artificial horizon and using an uncompensated vario which will read zero under this condition. Any departure from zero on this vario will be a true and direct indication of what the air is doing. The only other alternative seems to be a violent pull-up at each indication of lift. When once constant minimum speed is held, the compensated vario will also make sense.

BOOK REVIEW

Without Visible Means of Support, by RICHARD MILLER. Published by Soaring International. See advert page 4.

THIS is a most entertaining collection of stories, articles and historical information about almost every conceivable form of motorless aviation—not even excluding anti-gravity proposals—but with a special emphasis on soaring flight, since the author was, until a few months ago, Editor of *Soaring*. Many will remember meeting him at South Cerney in 1965.

Many of the gliding stories are historical, starting with 1490 and including 15 pages on J. J. Montgomery, with also a few about the troop-carriers, one of which Chester Decker soared 50 miles to its destination after the cable parted, to the astonishment of the ten soldiers inside. There is no room here to mention all the 29 articles in the book, but all make enjoyable reading.

Its opening paragraph is worth quoting: "The contrasts between soaring flight and powered flight are both numerous and noteworthy. Soaring, for example, is not done despite the weather and the time of day, but because of them; not by schedule, but by impulse. Nor is the soaring pilot at odds with the atmosphere; his progress is *in* it, not *through* it. He makes an aerial excursion, not an incursion. His passage leaves a whisper, not a shriek."

A.E.S.

Jane's All the World's Aircraft, 1967-68. Edited and compiled by J. W. R. TAYLOR. Published by Sampson Low, Marston & Co., Great Missenden, Bucks. Price £8 8s.

NO less than 80 sailplane types have been described in the current issue which is corrected up to 1st October, 1967.

Since the last OSTIV publication *World Sailplanes Vol.* 2 was published in 1963, no up-to-date details of sailplanes have been available for easy reference except in Jane's All the World's Aircraft. It is interesting to note that in this latest edition one sees the Wortmann wing section used more often than hitherto.

For those who wish to keep abreast of current sailplane trends this book should be a valuable asset.

R.H.

CORRESPONDENCE

AS IF BY MAGIC

Dear Sir,

I must congratulate Chris Riddell on his magic figures (Oct., '67, page 294). If I didn't know he was a respectable Yorkshireman who drives a dustcart, I'd have assumed him to be an accountant. But in case your readers become too spellbound by the magic of "fixed and variable" costing, I feel I should mention there is a sequel to his story.

After many years the "intelligent businessman", now very wealthy, retired from his job at the head office of the large combine (whose profits were on the decline) and, thinking to recapture old delights, he returned to his former haunts. He revisited his old gliding club expecting to find it luxuriating in great wealth, thanks to his efforts in showing them the way with his marginal costing techniques. Alas, he found that although the club had indeed grown in every way, it was still as impecunious as when he first knew it.

On enquiry, he was informed by a worried treasurer that the "fixed costs" just hadn't stayed fixed. In their enthusiasm for still more launches, the committee had

decided to employ a professional instructor, arguing that the profit on the extra launches he'd produce would more than pay his salary. Then they'd build a clubhouse to try to placate the wives who were threatening to move their husbands from the duty instructor lists. They only later discovered that for a clubhouse the "first cost" is not the last cost, and that, apart from financing charges, heating, lighting, cleaning and maintenance all make their annual toll on the club exchequer.

So they had a drive for more members to help absorb the "fixed costs" of the professional and the clubhouse. But they soon found that further professional instructors had to be taken on, in order to train the new members, because the volunteer instructors were forever idling in the clubhouse.

And so it went on—with the "fixed costs" never staying fixed but getting ever larger, so that the committee set themselves ever higher targets of activity to bring in extra income; these targets, in turn, demanded extra equipment or staff, which in turn. . . .

"Keeping club accounts out of the red is like local thermal soaring on a strong wind day," said the treasurer, "you've got to work like mad just to stay in the same place."

London Gliding Club TOM ZEALLEY

CHRIS RIDDELL replies: Tom's zeal in taking me up on my remarks is very encouraging. Of course, he is quite right that fixed costs don't stay fixed indefinitely. However, this in no way invalidates my remarks, for my argument was concerned with the accounting period of one year—the usual practice.

It would be unfortunate if his remarks led people to feel that my remarks were less worthwhile. The importance of good financial management is self-evident as he well knows: for without it we shall disappear. The provision of capital through grants and low-interest loans are to be used to develop the sport and can only do this if they earn their keep.

To suggest that the provision of cash to acquire facilities is of itself little use if those facilities are a drain on the resources of the club, and impede progress elsewhere. There is no magic in that.

RABBITS FOR THE RAT RACE

Dear Sir,

So, the BGA considers that there are 157 pilots in this country who stand a better chance of becoming national champion in 1968 than the chap who was champion in 1964. I just don't believe it. Does anyone? It would be very interesting to have the views of those pilots who will compete in the next Nationals only because 5/8 of the competitors in the last Nationals were rendered *hors concours* in 1967 Regionals. With such tactics we can guarantee that our champion in 1968 will not have been subjected to the standard of opposition that faced previous champions, and will, therefore, be less worthy. Does this do credit to our sport? Do we have to have a second-rate champion?

The explanatory text accompanying the latest Rating List is a brilliant piece of Orwellian "Double-Think" giving every indication that 1984 is going to arrive ahead of time!

"The Rating List is not, and never has been, a list of pilots in order of ability," we are told. In fact, the Council went to a lot of trouble to define it as a "list of pilots in order of their contest winning ability". When was the Council last seen standing on its head?

Similarly, ". . . to ensure that any pilot who currently stands a chance of becoming national champion has the opportunity . . ." confirms what many of us have suspected for some while: that there *is* a secret list of pilots who ought to be champs., known only to the annointed. Thus the Rules are framed to bring about the Desired Event!

When the BGA first announced the Rating Rules for 1968 they seemed so extraordinary that only one explanation seemed possible:

Assuming that 80 places would be available in the events of national standing

which would be announced for 1968, 50 places were to be reserved for all those in League 1 and the first ten in League 2 of 1967. The remaining 30 places would be open to competitors between those coming lower than tenth in the Nationals (League 2) and the leading Regional pilots. Since the results would be so important to these categories, it made sense, perhaps, to prevent itinerant Top People influencing the battle. But it made sense only if the Rating List, deriving from this, was used to fill the final 30 places, and for no other purpose. Otherwise the following undesirable effects emerge:

1. The Regional pilots' ratings are inflated unjustifiably.
2. The top 50 are denied the privileges extended to the lower 30 (League 2) of bettering their rating by participation in Regionals.
3. The sort of situation typified in my opening to this letter.

I find it hard to believe that the BGA did not intend something like the above when the new rules were published nearly 12 months ago, but have since changed their minds. Who nobbled them?

Ilford, Essex CHARLES ELLIS

ROGER BARRETT replies: What splendid polemical stuff!

Knowing that the majority of readers (like the Flying Committee) would prefer to read about more interesting things than rating, I will be as brief as possible—but there are a number of misconceptions that need clearing up. First, three general points:

(1) Council decided that the previous rating scheme gave too much weight to performance put up more than two years ago.

(2) Any system of rating, however sophisticated it may appear, is, in fact, a very blunt instrument. It could be that sooner or later a placing system, based on a "heats" principle, will be introduced. It would be crude, too, but it would have the considerable merit of being simple.

(3) You can't please all the pilots all of the time. (Remember when SAILPLANE & GLIDING'S winter issues were full of irate letters from frustrated Regionals pilots? Times have changed!)

Now answering the specific points Charles makes:

(a) It is now, and always has been, quite impossible to produce, by means of a mathematical formula, a list of pilots in order of ability when not all of them have competed against one another. Is it seriously suggested that rating proves No. 94, say, on any list really is a more able pilot than No. 95?

No double-think, just logic!

(b) From (a) it follows that no one who understands the basis of rating considers there are 157 pilots who stand a better chance of becoming a 1968 champion than No. 158. All we can say is that, taking into account current performance, the only evidence we have suggests that some of the 157 certainly do stand a better chance than No. 158.

(c) Sorry, no secret list—just the decision that more emphasis will be placed on pilots' *current* performance.

(d) In the last part of his letter I imagine the writer has a rather large tongue in his cheek—or could it be that he hasn't read the Dec., 1966, SAILPLANE & GLIDING and doesn't fully appreciate that if "currently successful" Regionals pilots come into Nationals the fate of the "currently unsuccessful" is to drop out—for one year anyhow.

GREATFULL

Dear Sir,

On behalf of all us British contributors to your magazine I would like to take this oppertunity like of thanking Philip Wills for his praise of our litery standard of writing and that in his last editorial.

Me and all my friends in the gliding-writing game have always worked hard to keep our grammer proper, not like them other magaines that never seem to take no trouble at all, I shouldn't wonder.

Graunchester HARRY CARRIE

HOLDING OFF BANK

Dear Sir,

The letter in the December/January issue from Mr. G. D. Smith raises several points which merit further explanation.

When a glider (or an aeroplane, for that matter) is performing a turn, the airspeed at any point along the outer wing is greater than the average (i.e., the speed shown by an ASI connected to a fuselage-mounted pitot-static) whilst that at any point on the inner wing is correspondingly less. Due to the speed-squared effect on the lift, the outer wing produces more lift than one would expect, other things being equal, and the inner wing produces less. A rolling moment is therefore produced which tends to increase the angle of bank. This effect is quite inevitable, provided that the wing is symmetrical about its centre-line. It tends to be much more apparent in gliders than in most other aircraft because the span of a glider is large compared with the radius of the usual turn. And it will be greater in gliders with a small wing taper (e.g., Dart) compared with those having a large taper (e.g., Swallow), because in the former case a larger proportion of the wing is exposed to the greatest variations of airspeed.

This rolling moment can only be cancelled out by the pilot taking some action to apply a rolling moment in the opposite direction. Normally, he must apply aileron in the "holding-off bank" sense. In fast aeroplanes, the aileron deflection may be almost insignificant, but in gliders it may be an appreciable proportion of the total aileron travel—perhaps about one-third. In principle, any other method whereby the pilot can produce a balancing moment would work. Unsymmetrical flap extensions or outboard spoiler deflections are two possibilities: shifting the centre of gravity by pumping mercury from one wing to the other is another which would be unlikely to find favour. It usually seems simplest to use the ailerons.

Any stalling of the inner wing tip can only be due to its angle of attack becoming excessive, and will *not* be due to its airspeed being lower than elsewhere along the wing. Since a glider is always descending through the air, there is a difference in angle of attack between the wingtips in circling flight. This is because each tip is describing a helix downwards through the atmosphere. The pitch of each helix, in feet, is the same, but their radii are different. The pitch angle of the outer tip helix is therefore less than that of the inner tip helix. The difference in angle of attack between the tips is not simply the difference in the helix angles; the latter must be multiplied by the cosine of the angle of bank, since angle of attack is measured in a plane parallel to the plane of symmetry of the aircraft. For a typical glider circling at minimum sink with 30° of bank, the difference in angle of attack between the tips is about three-eighths of a degree, which is very unlikely to cause the inner tip to stall, notwithstanding the downwards aileron deflection. If the glider is flying at 40 knots, the airspeed at the outer tip would be about 44 knots and at the inner tip about 36 knots.

Mr. Smith is not very specific in suggesting a connection between accidents and the need to hold-off bank. It may seem to be an unnatural action to a pupil if presented by the instructor in terms of ". . . and when you get to 30° of bank hold the stick over to the wrong side like this. . . ." But there seems to be little problem if the instructor explains the situation properly and encourages the pupil to think in terms of maintaining the desired angle of bank rather than just moving the stick to some arbitrary position.

FRANK IRVING,
Chairman, BGA Technical Committee

PHOTOGRAPHIC EVIDENCE

Dear Sir,

I am sure this has all been said before, but I would like to say it again: I object strongly to the mandatory use of Kodak's Instamatic. After all, none of us would expect, say, the entrant of the Monte Carlo Rally to be timed, unconditionally,

by watches made in Hong Kong, efficient though they may be within their price bracket.

A lot of time, effort and money goes into competition flying, yet the results may now be utterly dependent on a 50/- mass-produced camera, which is not, repeat not, 100 per cent reliable.

First let me say that I think that Kodak have produced a very reasonable camera for the money, but it is not good enough for our purposes, for the following specific reasons:

(a) The case is very easily broken or distorted in the general rush and knock-about.
(b) The back locking catch is poor.
(c) The spring which helps engage the "winder" with the cassette sometimes doesn't.
(d) The slit in the film which cocks the shutter can tear or not engage properly.
(e) The shutter cocking lever can stick in the "fully over" position (shutter inoperative—winding stop doesn't).

I have had double exposures on two Instamatics. One, my own fault, and caused by removing the cassette overnight and replacing with the shutter cocking slit out of position. In the other case, the cassette was not removed at all, and I suspect a variation of (d) above. Further, a professional film finisher in my club tells me that he has noticed, in the course of processing a very large number of Instamatic films, a significant number of blank frames. In his opinion, too high a number is caused by unsuitable exposure or mishandling.

Why did the BGA choose the Instamatic?

1. Someone has shares in Kodak?
2. Low price?
3. Competition pilots can't operate normal cameras, therefore need a very simple one?
4. A standard exposure and film, making processing simpler and results constant?
5. The Instamatic cartridge is sealed by Kodak's and can't be tampered with?

One, two and three I hope we can discount, but considering four and five:

Standard exposure.—If we used a standard speed film (not camera), a "standard exposure", related if you like to the Instamatic "sunny" position, could be announced. Any pilot who chose to use a different setting could do so—at his own failure risk. In any case, I am sure this is not all that critical as the shutter speeds of individual Instamatics vary a fair amount anyway.

Sealed cartridge.—This must be the main, "only acceptable" reason. In theory, a sealed cartridge lessens the chance of fiddling, but if a fiddle can take place at all, there is no point in having a sealed cartridge. Admittedly, it is not so easy to fix the Instamatic, but it can be done, and there are other ways not concerned with film sealing.

I have always maintained that if anyone wins by foul means they are welcome. However, if it was really thought necessary to make photographic evidence absolutely foolproof, the required measures could just as easily be designed to cover any camera/film combination.

To summarise, let us be free to use the camera of our choice (including the Instamatic), at least for a trial year. I am sure the results would prove no worse.

Maidenhead, Berks JOHN ELLIS

ROGER BARRETT replies: The reasons for the mandatory rule are given on page 36 of the Feb., 1967, issue of SAILPLANE & GLIDING.

The Flying Committee asked contest organisers in 1967 to send in to the BGA details of any difficulties experienced with photographic evidence. We were told of two instances when the Instamatic had failed to wind on in flight. A failure rate of less than 1 per cent is, we feel, acceptable. However, we should be interested to hear from any other pilots who have bought unreliable Instamatics.

P.S. Has J.E. got shares in *LF*RD?

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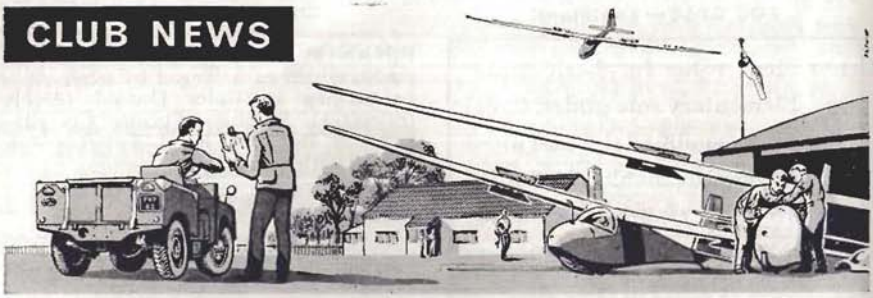
CLUB NEWS



VERY few UK clubs have sent in reports for this issue possibly due to the fact that at many flying has not been possible for the past few weeks due to the present foot-and-mouth epidemic.

By the time this issue is published we hope this will be over and we shall be looking forward to the 1968 soaring season.

Copy for inclusion in the April-May issue should reach me by the 14th February, and that for the June-July issue by 16th April. All copy should be typed double-spaced on foolscap please and sent to 14 Little Brownings, London, S.E.23.

11*th December*, 1967

YVONNE BONHAM (MRS.),
Club News Editor

BLACKPOOL AND FYLDE

WE believe that we have found a good hill soaring site near Preston, which promises to work in several wind directions. Fair Snape is the highest of the Bowland fells, and has a mile-long southerly spur with good west and east faces. A friendly farmer will allow us to make trial winch launches from a strategic position off the end of the spur. Our first flights were made in a south-westerly, which was one of the directions we were less happy about. However, launches to hilltop height contacted lift off the end of the spur, and a step back on to Fair Snape found strong lift reaching into cloud at 3,000 ft. a.s.l.

A similar step back should reach the south and south-east faces on suitable days, while the west and east faces may be joined directly, and three miles downwind there is a separate north ridge. We are very eager to explore all these possibilities as soon as foot-and-mouth subsides, but we regret that we will not be able to entertain visitors for some time. This will have to await a more permanent arrangement with the farmer, and some essential drainage and clearing, but eventually this could become an outstanding site.

Meanwhile, back at the airfield, our scale of operations has increased steadily, and last year produced a healthy surplus which is now earning interest. New members arrive frequently, and the committee are debating what limit they should allow. We have about as many pupils as we will be able to manage next summer, although we would welcome more experienced pilots.

Finally, we have drawn up a new constitution to turn ourselves into a members' club, and our solicitor is printing the papers ready to register the new company in the very near future.

K.E.

BRISTOL

AFTER last summer's bumper soaring weather, autumn has been most disappointing, with flying restricted to quick circuits on rare fine days.

However, two new arrivals helped to relieve the monotony. A Ka-6E and an HP-14 have joined our private fleet. The unusual approach attitude of the latter has astonished many of us — I expect we'll get used to it in time. A brand-

new six-man syndicate has taken possession of a Ka-6CR and we wish them all success next summer.

One day in November we were visited by the "Hot-Air Group". We now realise how delightfully simple it is to rig and launch a glider, after watching a balloon inflation!

The first attempt looked dangerous. A massive Butane flame roared out at people struggling with acres of red-and-white envelope. Amid shouts of "Lift-and-run!", "Hold-it-down!", and "Keep-going-we're-doing-all-right!" it all collapsed entangled with the trees.

After a short pause to mend the holes, the second attempt succeeded with remarkably little drama. The balloon sailed off to land on Michinhampton Common, then Aston Down, and finally near Cirencester, giving a splendid show to a numerous and ever-increasing mob of "followers" on the road.

The Western Regionals will be held at Nympsfield on 15th-23rd June inclusive. The idea is that by sticking to last year's date, we should avoid last year's bad weather. I can't give you the name of the probability expert who worked this one out, but let's hope he's right! Those interested should write to Miss Jane Mills at Bristol Gliding Club. Entrance fee is £26, including areo-tows and BGA competition tax.

E.M.S.

COVENTRY

AS we were just about to turn round and say 1967 must have been one of the best years ever, with glorious weather, singularly successful Regionals, etc., we were blighted in November by having to close the site due to foot-and-mouth disease in the locality.

However, gliding types are, of necessity, stoics, and we learn to take these set-backs in our stride. We have consoled ourselves with the thought that flying ceased anyway in the worst two months of the year, and had it happened in the summer we would have had something to cry about.

This also meant the cancellation of the children's party and consequently some long small faces, although the dinner-dance at Leamington went off very successfully albeit, with far fewer numbers than previous years, due, we suspect, to our friend the breathalyser.

The master-schemers are working in front of their winter fires at home, laying plans for this season's courses and the proposed National Open-Class Championships to be held at Husbands Bosworth in conjunction with the Leicestershire club.

Finally, Ron Gardner and Nick Manley have received their Categories and are keener than ever to get into the "hot seat"!

B.F.

CUMBERNAULD

NINETEEN-SIXTY-SEVEN has been the best flying year in the club's history. Since moving to Cumbernauld, our members have been able to obtain a lot of concentrated flying, with the end result of eight new solos and well over a thousand launches.

The acquisition of the Prefect has paid dividends, as has the purchase of new equipment.

A number of members have had difficulty in getting to the site because of lack of transport but find it a practical proposition to hire a car for the day, provided there are at least four people to share the cost. We wonder if other clubs' members have resorted to car hire to come flying.

We are looking forward to the New Year, with the main projects being a hangar and new winch, so our hands will certainly be full for quite a time.

T. J. G.

DERBY AND LANCASHIRE

AT the Extraordinary General Meeting in October, the decision was made to go ahead with the new extensions to the premises in order to provide better toilets and other facilities.

2nd December was the date of the annual dinner-dance at the Palace Hotel, Buxton. About 140 people came, including our honoured guest speaker, Philip Wills. A feature of the evening was the paper dart contest, preceded by an impromptu toy balloon ascent competition.

With our gliders and winches in good fettle, and with reasonable weather even, we are grounded on Camphill itself by foot-and-mouth disease. Animals have

been destroyed within a mile of the site, and in sympathy with the local farmers, no one is going near Camphill.

The Doncaster and District Gliding Club has generously come to our assistance with the loan of a T-21 and a Swallow on their site. With these two aircraft, and the K13, which was off site when the order came into force, we are endeavouring to carry on flying, and are getting in aero-tow practice whilst it is available.

Before the foot-and-mouth order came in, we welcomed two parties from the Wycombe Air Park with their Ka-7.

Don Gunn reached 7,000 ft. in wave in the Skylark 2 a few weeks ago, when several people reached around 4,000 ft.

By the time this is in print we hope to be back on Damp, Clamp, Camphill!

R.H.

DEVON AND SOMERSET

NOVEMBER is never expected to produce anything spectacular in the way of thermals and we had to be content with exploiting the west ridge when this was possible, and circuit bashing when it was not. "It's an ill wind which blows no good" and the site developers could proceed with their worthy tasks without looking longingly over their shoulders at beautiful streets of cu.

Recent articles in SAILPLANE & GLIDING have had a marked effect on the "cost consciousness" of members and this was evident at the Annual General Meeting held at Hemyock on 4th December. This was attended by some 56 members, 36 of whom went on to a repast of duck and venison at the Carlton in Honiton. The meeting produced some cogent argument regarding summer courses, tug maintenance costs, purchase of new aircraft and the statistics which would make our decisions produce schemes which were viable. Our hard-worked Treasurer, Eric Shore, proved by his answers that he is as capable in performing financial aerobatics as those of the more conventional kind.

Changes in officers and committee consisted of Mike Dixon, who took over during the year from Owen Corsbie as CFI, and the recognition of Brian Weare as an ex-officio member of the com-

mittee in his capacity as Technical Officer. The President's Shield for best progress during the year was awarded to Chris Slade, and Terry Brown was awarded the Kelsey Plate for best cross-country during the year.

After a great deal of delay owing to negotiations, digging machinery gremlins and weather, it really looks as though concreting will start on the site for hangar and workshop. Of the many stalwarts who have plodded on manfully with this task it would not be out of place to mention John Hancock, Dave Bindon and Bill Nill.

A.E.R.H.

KENT

HERE at Challock, the thermal season came to an abrupt halt on Sunday, 22nd October, at 4 p.m.! This then signalled a run of dull, wet weekends, especially Saturdays, with precious little sunshine and not even a good westerly to provide ridge soaring. However, at every opportunity the new Swallow from Lasham has been airborne, enabling its pilots to catch up on lost time.

Because of the mud, and availability of only one cable, whilst the two-drum winch is withdrawn for various modifications, aero-tows have taken prominence with our faithful steed, the Tiger Club's Tiger Moth "The Canon". We are also trying their Super Cub in an effort to reduce the noise problem for the benefit of the local residents. Of course, if the third or fourth London Airport ever appears at 'Sheppey, heaven forbid, no doubt those who have complained would welcome back one solitary Tiger Moth with open arms, in preference to Jumbo Jets, Concordes, etc.

The annual dinner-dance, held at the Star Hotel, Maidstone, on 27th October, where we were honoured with the presence of Basil Meads, was well supported and enjoyed. This year's cups were taken away by Dick de Las Casas (Ab-Initio); Tony Powsey (best Silver Distance—100 miles); Cyril Whitbread (Instructor's Cup) and Ron Cousins, who won three: the Task Cup (Club Ladder winner), the longest flight (156 miles, Challock-Chilbolton-Redhill) and the Eric Gook Trophy (fastest time to Firle — 63 minutes).

We have a new phenomenon—mice in aircraft. The syndicate blue Olympia discovered a nest under the cockpit floor, at the expense of one D.I. book, an airmap, plus part of a bulkhead, all of which proved good nesting material. It has been suggested that one way of their getting rid of these creatures is to deposit lumps of cheese in rival syndicate cockpits!

Congratulations to our permanent ground engineer, Peter Kingsford, in obtaining his inspector's ticket after a recent visit by Ray Stafford Allen—we are now in the happy position of having three approved inspectors within the club.

M.H.

LAKES

OUR monthly club nights have got off to a good start. On 11th October we held a film show and pea-and-pie supper in the clubhouse. This followed an eventful day's flying. The tug was grounded as strong winds swept in off the Irish Sea. The "pundits" in the club decided to try the Ireleth ridge from a winch launch. The Skylarks found this quite easy, and after a winch launch to 1,600 ft. lost some 300 ft. on the six-mile trip to the ridge. Soaring conditions were good and despite strong headwinds they managed the return flight to the airfield. The syndicate Olympia 392 was less fortunate, having to land out near Barrow on his return from the ridge.

The northerly wind on 5th November produced some wave off Black Combe, which the T-21 managed to contact off a winch launch. Being bonfire night the day rounded off with a huge fire on the airfield. By this time the wind was gale force, so the hot dogs and soup sold quickly before members retired to the clubhouse to watch our home-made thermal from a distance.

The annual dinner-dance took place at the Lakeside Hotel, on Lake Windermere, on 1st December. The Earl of Lonsdale Trophy went to Peter Redshaw for his cross-country flight. The Leighton Hall Trophy was awarded to Gill Scurrah, who gained two legs of his Silver C ridge soaring on Black Combe. Ron Hawkes, who has recently been made an assistant instructor, received the Dodd Trophy.

P.E.G.

LASHAM

NEITHER the National Sport Class or Open Class Championships will be held at Lasham in 1968. As most readers will know, the whole competitions structure is being changed in 1968 and the Nationals, as we know it, have been split into Sport and Open Class, and will be flown on different dates from different sites.

When Lasham was asked to give up the Sport Class to "another" club which was in some difficulty, Lasham did not hesitate. The Chairman of the BGA said, "This is one of the finest examples of club co-operation which I have come across during my 33 years in the BGA, and will set an example to the movement which will have far-reaching effects . . ."

To replace the Sport Class championships, Lasham will be holding the first-ever *One Design* (Dart) contest for high-performance gliders in Britain.

This should be a most interesting meeting, especially as the British Team have been invited to come and fly *hors concours* before their departure to Poland. Ann Welch has agreed to do the task setting. Slingsby Sailplanes have donated a Dart Trophy. (Dates—18th to 26th May.)

Decompression Chamber

A very interesting and stimulating talk by Dr. Mike Hawkins, of the A & AEE Boscombe Down, was recently given on the subject of high-altitude flying. Some 70 members attended this lecture and Mike has arranged for us to use the decompression chamber at Boscombe Down for the sum of £2 10s. per person If you want to undergo this test, which is strongly recommended if you intend to clamber into the upper atmosphere, please let Bill Scull know, and ask him for further details. It is well worth while and an interesting place to visit if you have not been to Boscombe Down before.

Farmers' Party

What a splendid party this was! Some 20 farmers turned up with their wives and friends. A friendly and matey occasion, thoroughly enjoyed by all, as is evidenced by numerous letters of appreciation and thanks.

Other items of interest for the coming season include: Advanced Courses—instructors, tug pilot training, instrument flying, pre-cross-country, navigational and full post-solo general courses will be held.

Two beginners' courses each week will be held during the summer, one by motor-tow, the other by aero-tow. You can also book gliders . . ! Lasham office will gladly supply full details on the above.

We do not intend to let the grass grow under our feet and we shall continue to keep in the forefront of world gliding in 1968.

J.A.

MIDLAND

ON 11th November the outbreak of foot-and-mouth disease brought about the suspension of our operations. The indications at the time of writing are that the suspension could extend into the New Year. Whilst anything which prevents our gliding is unwelcome we should, perhaps, take some comfort from the fact that had the outbreak occurred in early summer our deprivation would have been far greater. The farmers have no such consolation.

The outbreak has also caused the cancellation of various non-flying activities, including the Christmas dinner. It is intended that the resumption of our activities should be marked with some form of festivity.

Just before our operations had to be suspended Mollie Hamer and Ric Swancott were injured in a T-49 accident. Fortunately both seem to be making good progress and should by now be out of hospital and well on their way to what we hope will be a complete recovery.

We extend our best wishes to Mike Randle and Jane Warter, who were married recently. Greetings to Nicholas, newly-born son of Alan and Elizabeth Parkinson.

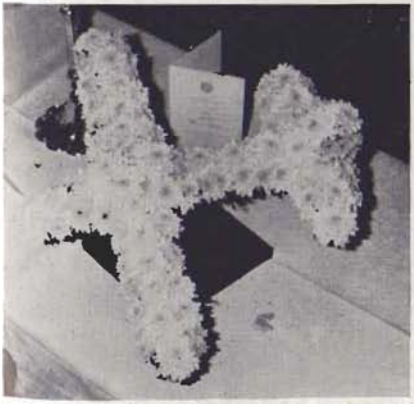
The club's first AS-K13 arrived early in December and a second should be delivered during February. Rhoda Partridge has a Ka-6E which is to be operated jointly with the club. Louis Rotter has an AS-K13 on order. Thus the coming season should see several new gliders in the Shropshire sky.

K.R.M.

OUSE

WE have had a wonderful year. Despite poor weekend weather in the last three months we achieved over 5,000 launches. In October and November we seemed to have the lot—rain, fog, frost and gusty winds. Yet we can all look back on some glorious flying days when the sun was hot, the sky blue and the thermals active. Our quarterly Newsletter, issued in December, contained articles by several pilots with nostalgic (and retentive!) memories. Keith Massey told of his flight to Hornsea . . . "I flew out to sea, and came in over the coast; it looked almost tropical . . . and the girls were sunbathing," he recorded. John Taylor, John Rogers and Peter Oglesby (who did so well in the "Swallow" competition) spent a week at Lasham—John Taylor came out of cloud at 7,400 ft.

Our annual dinner was a tremendous success, a real prestige occasion. Superbly organised by Brett Atkinson, well aided by his gliding family, and supported so strongly by members that tickets were sold out well in advance, the event will long be remembered. Speeches were witty, entertaining and brief, and the dance which followed was delightful. Guests included Group Captain G. J. South, DSO, DFC, and Mr. Michael Byrne (Publicity Officer, Hawker Siddeley Aviation Ltd).



This floral glider graced the top table at the Dinner, and later was auctioned and bought for £5.

Peter Oglesby was enthusiastically cheered when Wilf Coulsey, our genial, conscientious CFI, presented him with the trophy for the finest all-round performance among the younger pilots. A fine boy, Peter; he can put his hand to any gliding job, and is modest withal.

A busy social programme is planned for this year (we had a children's Christmas party and a New Year supper-dance), we have been allotted a new clubhouse, and we plan to reach 6,000 launches. As Ron Taylor, our Hon. Secretary, says, "The club is in a very sound state, we have used all the money coming in on the principle that one cannot launch a bank balance." Certainly our fleet of gliders will be very active again this year. Our sights are set high! We are not resting on our laurels. We aim, figuratively, to reach the moon!

A.H.S.

OXFORD

A DEVALUATION depression, centred over Weston-on-the-Green just prior to collecting our new AS-K13, quickly dispersed during the first week of December when Peter Pratelli, John

Adams and Tony Taylor returned with the precious load from the Wasserkuppe, having negotiated hundreds of miles of thick fog and obstructive Belgian Customs only to be welcomed at Dover with a cheerful "Oh, not another one"!

Sadly we record John Ellis' resignation as CFI following many years of devotion and enthusiasm—we offer him very hearty thanks. He will continue instructing and flying his Gull 3, the small syndicate to which your scribe was thrilled to join this autumn.

John Adams has kindly stepped into the CFI's harness and with the vital cooperation of all members we wish him success in this responsible position.

Present membership stands at the limit of 85 following a sudden influx at the start of the winter, obviously news spread quickly about the new canopied two-seater. To ease the situation it is hoped to retain the Booker T-21 until such time as the AS-K13 has integrated into club operations. This could be prolonged, as untold excuses are anticipated from pilots unable to ignore thermals when circuit flying in this superb sailplane.

C.J.T.

PERKINS

THIS gliding club ought to adopt a circus-type nomenclature and call themselves "The Famous Flying Nomads", as once again we have to "derig" and move camp! Maybe it's because it's Leap Year, as it previously happened in 1964. Whatever it is it's rather disconcerting, and the thoughts of 1972 bring pangs of apprehension.

As the early morning mist cleared on 26th November, getting ready to launch the aircraft around to the far end of our other runway, we perceived ominous-looking equipment halfway down our 1¼-mile-long and most-used E.W. runway. On closer inspection we found that our strip was coming under the hammer in more ways than one . . . the "hard-core boys" had struck yet again. However, things are not always as black as they look; we have a "prospect" and are hoping that we will be fixed up in the near future elsewhere.

Perkins September holiday was a sad disappointment weather-wise: crews were standing by their phones ready to scramble all week, but only one day proved operational.

Your scribe is still being ribbed about an incident that occurred that day. After flying the Olympia round to the long runway I decided to save time between launches by retaining the 'chute whilst getting out of the aircraft, to assist with ground handling; the back flap caught the back of the seat and the press studs came undone—the cotton broke . . . and hey presto, instant silk! I am still trying to find out if the 2 ft. 6 in. jump to the ground qualifies for membership of the Caterpillar Club.

A highly successful social evening was held on the 30th November. John Baker took this opportunity to show some films of the Nationals and Regionals, and also one starring club members operating at Spanhoe.

Congratulations to Harry Benton and Daphne Shotter on their recent engagement, and to Hayden and Joan Haresihn on the birth of their daughter.

J.V.L.

SCOTTISH

WE appreciate the return of John Campbell's Auster as a second tug for the winter season. During previous weeks the SHK has been proving its capabilities with the odd 150-km. triangle and wave flights to 20,000 ft. Gold C heights continued to be recorded and on Sunday, 3rd December, flights in nine club aircraft were above 9,000 ft. However, the regulations enforced as a result of foot-and-mouth disease are not only affecting our own members' cross-country sorties, but also understandably curtailing the movements of visiting groups from South of the Border.

At this point we would take the opportunity to advise or remind prospective visitors in 1968 that an Application and Booking Form covering "number in party" plus "details of flying experience", etc., must be completed and received by us prior to any such expedition.

Since Charlie Ross has newly acquired the most fab "Hi-Fi" suit he has become our Gliding Cowboy. Being the latest in cold-weather gear it is quite an outfit. By the way, our recent mini-skirt and kilt party made one interesting fact that not only a Scot can wear the kilt

well. There were Irish, English and Welsh suitably attired to prove it!

With regret we learned of the deaths of Donald and Nan Campbell in the Caravelle accident during November. "Doc" Campbell and his lady were always welcome here.

M.B.R.

STAFFORDSHIRE

WE have been fortunate that the recent foot-and-mouth epidemic has not made it necessary to curtail our activities, but the weather has been nearly as effective, and with the Stoke-on-Trent town council casting pensive eyes at the large expanse of ground inside the city boundaries that we use, we feel that in the not too distant future we may have to fold up our gliders and disappear to pastures new. However, this is not preventing us continuing to train our extremely numerous band of ab-initios, all 64 of them, the latest two to go solo being Mike Johnson and Dave Freeman.

To make up for the lack of flying activity during the winter months we are running a set of evening lectures. Subjects covered so far have been "The function of a Duty Pilot" and an explanation by the CFI of the progress system that we are now using for trainee pilots. The latest was a talk on aircraft structures and their repair by our ground engineer, Eric Clutton. This talk was extremely erudite, at least that part of it which was audible above the laughter. Mr. Clutton, with his disparaging remarks about gaboon ply and what has happened when he only just touched the structure of an Olympia, has given us all food for thought, but somehow it won't stop us flying.

A club raffle is being organised to siphon away some of the spare cash that everyone seems to have at Christmas, with five pounds of free flying for the member who sells the most tickets—just think, this means that some lucky person will be able to do his five hours for practically nothing.

Membership will have to be restricted in the New Year, since we are getting to the stage where we really have too many ab-initios for the number of aircraft.

R.B.L.

YORKSHIRE

Bird's-eye view at Sutton Bank. Photo by Michael Wilson.

SERVICE NEWS

FULMAR

THE death of Flt. Lt. Hugh Blake in a flying accident while stationed at Singapore with 205 Squadron meant a great personal loss to his many friends.

He was a native of Sunderland and was educated at Durham University. At 27, Hugh was captain of a Shackleton and served at Kinloss prior to going to the Far East.

When he joined Fulmar G.C. his sincerity, enthusiasm, ability and willingness quickly endeared him to all. He became a categorised instructor and gave up much of his free time and travelled long distances to give us aero-tows.

Born to fly, he found the ideal wife in Sue, herself a solo pilot before the birth of their son. To Sue we extend our deepest sympathy. We share, in no small measure, her great loss.

H.D.

Flt. Lt. Hugh Blake

BICESTER

TWO weeks of inclement weather towards the end of the season prevented the target of 20,000 launches being passed by the centre. Flying hours, however, well exceeded last year's figure and an all-time high of nearly 5,500 hours was achieved. This is in no small way due to the efforts of Andy Gough and his staff, one of whom, Tom Williams, has recently left for a tour abroad. We shall miss his expertise but hope to see him if he comes to the UK on leave.

When this edition of SAILPLANE & GLIDING is published, winter fettling will have been finished and the '68 programme, of course, will be under way. At the same time many pairs of eyes will be scanning the sky for signs of thermal activity, together with hopes of even a better soaring season than the previous one.

I know all members of the RAFGSA, whether past or present, will join with me in wishing Air Commodore Kearon a happy and prosperous future on leaving the RAF to take up an overseas appointment. He played a large part in forming our Association and ensuring its continued growth in past years. We at the centre hope that on his visits to the UK he will be able to find time to fly with us.

A.E.B.

STRAITS (Singapore)

SINCE our last entry we have made a club expedition to Kluang, about 60 miles upcountry in Malaysia, which has great potential as an excellent soaring site. However, we are awaiting the arrival of our promised Swallow before returning upcountry again. Also a few of our members have visited the Ipoh Club in Perak. Several of our staunch members have returned to UK "tour ex".

Much of our spare time has been spent reconditioning some of our fleet, including the aircraft recently arrived from Aden Services Club. We were delighted to receive a visit from Pete Hanneman on his way out to Australia, and also Chris Gill on a visit from Gan. Our turnover of A, B's and C's goes on at a steady rate and, needless to say, we welcome all at RNAS Sembawang.

J.A.

ADEN

OWING to the imminent withdrawal of the British Forces from Aden, we have reluctantly been forced to suspend operations and dispose of all our equipment as the opportunity arose. The Olympia 401 was despatched to our friends in Cyprus. A T-21 and T-31 are on their way to Singapore and our faithful old T-21, known as the "Yellow Peril", and the tow car have gone to Sharjah, in the Persian Gulf, where it is hoped to start a gliding club in due course.

Increased activity by Arab terrorist organisations finally forced us to leave our site at Sheik Othman, but through the generosity of the Officer Commanding we were allowed to continue operating from the airfield at RAF Khormaksar, where we received superb cooperation from the staff of Air Traffic Control. Our sincere thanks to them all.

Due to the rundown of personnel from Aden, our last day's flying was

attended by our half-dozen remaining stalwarts, all grimly determined to make it a memorable day, and indeed it was. Almost every launch proved to be a soaring flight; a weak sea breeze effect was discovered by Bill Maltby, our CFI, and subsequently exploited by Bernie Morris and our youngest member, Norman Shephard, who used it to gain his C certificate. Appropriately, the last flight was done by our longest serving member, Colonel Fred Shephard, a founder member of the club and the proud father of young Norman, who half an hour previously had gained his C.

After towing our remaining T-21 to the hangar for the last time, a somewhat dusty, dishevelled and perspiring crew repaired to "Shep's" house to drown our sorrows and allow a furtive tear to drop unnoticed into our beer.

Finally, it's goodbye to Bill Maltby, who returns to Benson and the Chiltern club, Peter Kingwill, shortly off to the Far East, Bernie Morris and George Young, who worked so hard keeping the equipment serviceable to the end, and last, but by no means least, our Chairman, Don Spottiswood, who was a tower of strength and performed wonders behind the scenes in enabling the club to go on operating in spite of the difficult security situation. Poor Don has to stay until the final evacuation. When the flag finally comes down, let's hope Don and our remaining members lead the race to the last aircraft to leave Aden. It was very nice to know you all.

H.W.M.

OVERSEAS NEWS

We would be pleased to receive news for this section from every country in the world where soaring is done.—A. E. SLATER, *Overseas News Editor.*

AUSTRALIA

QUEENSLAND CHAMPIONSHIPS 1967.—Seven clubs sent 15 sailplanes to this meeting, held at Inverell in Northern New South Wales. Max Howland and Bruce Sinclair, each flying a Ka-6, tied for first place in League 1 (7 entries), and Marjorie Pegler (Ka-6) came third; other types flown in League 1 were Arrow, Bocian, Skylark 2, K-7 and Mucha. Ron Muir in a Kingfisher won in League 2, in which other types flown were Kookaburra and Grunau Baby 4.

The highlight of the meeting is described as the visit of the Minister of Civil Aviation, Mr. R. G. Swartz, who said in his opening speech that at least 14 Queensland pilots had graduated from gliding to commercial aviation.

COST OF GLIDING.—A correspondent of *Australian Gliding* estimates the annual cost of running a privately-owned sailplane costing 5,000 dollars. Allowing for 10 per cent depreciation, a loss of 5 per cent interest on first cost, and other expenses, it works out at 1,500 dollars per year (equivalent to £600 sterling before devaluation).

NATIONAL CHAMPIONSHIPS.—These are being held at Benalla as we go to Press. League 1 is for sailplanes with best glid-

ing ratio of 26 or more, with not more than two pilots per machine, and the winner will be National Champion. In League 2, three pilots per machine are allowed. There are also Team Championships in both Leagues and a Two-seater Championship.

Australian Gliding.

AUSTRIA

THREE DIAMONDS.—Numbers 532 to 536 in the international list of Gold C pilots with three Diamonds have been awarded to Josef Walsberger, Adolf Köhler, Herbert Demmerer, Walter Szabo and Otto Tuna. With a total of 24 pilots with three Diamonds, Austria comes fifth among the nations.

INSTRUCTORS' COURSES. — The first course for instructors was held at Zell am See from 8th to 20th October, with 19 participants, of whom 16 completed blind-flying training in a Bergfalke borrowed from Salzburg. Following this experience, four more courses are planned for 1968 during April and October, at Graz, Zell am See, and two at Spitzerberg.

Austroflug.

BELGIUM

THREE DIAMONDS have been earned by Bert Zegels, Svein Thorstensen and Paul Bourgard.

CANADA

NATIONAL RECORD. — Charles M. Yeates, flying an Austria SH-1, completed a 200-km. Triangle from Pendleton via Kemptville and Lancaster at 51.8 m.p.h. on 12th August, 1967. This beat the national record of 48.6 m.p.h. set up by Wolf Mix from Regina in an Austria SH-1 in 1966.

NEW CENTRE IN WEST.—A gliding centre for Western Canada has been established at Windermere, B.C., as a result of flying trials made in 1966 and again, with 29 pilots and eight sailplanes, in July, 1967, when 139 hours were flown from 137 launches and a tow plane put in 30 hours. One pilot reached 14,500 ft. in a thermal.

Free Flight.

CUBA

SIX CUBANS have spent ten months in the East German gliding school at Schonhagen. They took an instructors' training course, learned elementary aerobatics, attended technical lectures and passed the examinations, learned about care and repair of gliders, and trained as winch drivers, one of them qualifying to instruct in winch driving. One already had a power-flying licence. Altogether they put in 2,100 launches and 623 hours' flying, including five duration legs for Silver C. Bridging the language difficulty was not found easy.

The six have now returned to Cuba and face the task of getting a gliding movement started there.

Aerosport.

DENMARK

WORLD CHAMPIONSHIPS pilots for 1968 are to be: No. 1 Niels Sejstrup; No. 2 Ole Didriksen; No. 3 P. V. Franzen; No. 4 Carsten Thomasen. Reserve, Ib Braes.

An attempt was made to buy a Zugvogel 3B from Sweden for the World Championships, but devaluation has brought difficulties.

Flyv

HUNGARY

A VISIT by an East German party to Hungary, described in *Aerosport*, is made the occasion for a summary of Hungarian aviation history. The first Hungarian to fly did so in 1909 on a Farman aeroplane. The first glider launch was in 1930 by bungy, but the pilot, Karoly Csermely, then built a winch to give him higher launches, and these are claimed to be the first winch launches in Europe.

The flight of Louis Rotter, Snr., from Berlin to Kiel (described in THE SAILPLANE & GLIDER for December, 1936) is mentioned as having been done in an Olympia-Meise, but actually the machine was the Nemere, of his own design.

The national sport-flying organisation claims about 1,900 glider pilots, 2,200 parachutists, 400 power pilots, and 10,000 model fliers. The first post-war flying groups were formed in 1948, and there are now 29 flying clubs.

NATIONAL CHAMPIONSHIPS, 1967. — These were held at Dunakeszi airfield near Budapest in July. In 11 consecutive days, tasks totalling 2,500 km. were set. Among the 19 pilots were two visitors from Poland, Henrik Muszczynski and S. Kwiatowski, each with a Foka, Jan Satny from Czechoslovakia with an Orlik, and Udo Elke and Horst Rakowski from East Germany. Of the Hungarian competitors, 12 flew the Foka type and two the A-15. They included G. Petroczy and K. Tury who flew at South Cerney in 1965.

The number of competitors who exceeded 80 per cent of the winner's points was five in 1964, eight in 1966, and 13 (including four visitors) in 1967.

On the first day the two A-15 pilots led, and kept their lead till the 6th day, when they made 66.5 and 28.5 km. along a 200-km. Triangle, the day's winner making 114.5 km.

A 520-km. Triangle, the 9th task, was won by Petroczy at 73.15 km/h., the next best speeds being 72.90 and 72.64. But only four pilots completed it, the two next best getting the Distance Diamonds with 505 km.

Final leading places

International Classification

1. Muszczynski (Poland)	-	8528
2. Szeredai (Hungary)	-	8194
3. Elke (E. Germany)	-	8152

National Classification

1. Istvan Kunsagi	- -	9625
2. Willy Simo	- - -	9012
3. Karoly Kvasz	- -	8715

Aerosport.

IRAN

FACED with the prospect of a couple of months in Teheran without the family and with work finishing at 2 p.m. each day, I naturally called at the BGA to see what information they could give about the prospects of gliding. Sure enough, they remembered a visitor who had informed them that he was from a gliding club near Teheran, but they had no other details.

On arrival I found that the club was run by the Ministry of Civil Aviation and operated for them by officers of the Imperial Iranian Air Force, and that if I presented myself at Dosham Tappeh Air Base on any weekday and asked for Major Khamee I could no doubt become a temporary member.

On being directed to the clubhouse I thought there must be some mistake, as no club could possibly afford this modern airy block of offices, lecture room, library, lounge, bar, verandah opposite the launch point, etc., but the notice said "Gliding Club". Then there was the hangar, new, spacious, with attached stores full of glider spares like instruments, canopies, wheels, ailerons.

In the hangar were four Blanik L-13's, spotless and fully equipped with VHF radio, horizons, etc. After a few formalities I was told to get strapped in (in the hangar—it's cooler out of the sun), and club employees trundled the glider out to the launching point directly in front of the hangar door where four winch cables were laid out.

At this point I paused to pinch myself to make sure that this was not the middle of a dream! Then hook up the dual forked cable to twin attachment points on the side of the fuselage and declare ready for take-off by radio to control. They initiate the launch by VHF command to the winch driver. The long cable gives about 1,000 ft. of height (not bad with the field at 4,000 ft. a.s.l.).

The lift is good when you find it, but there are also large areas of strong down as well, with no clouds and no birds to help find which is which. Experience showed that these areas of lift and sink were reasonably constant in position on calmer days, especially the lift at the downwind end of the field. The mountains going up to 12,000 ft. or so are only 6 or 7 miles away and are said to give good slope-soaring when the wind is right. 10,000 ft. above launch height in clear-air thermals is said to be possible; my limit was 6,500 ft. in what they called the end of the season.

The present approach to gliding is distinctly cautious with no cross-country flying permitted, although the flat desert country would make landing out fairly safe and a club trailer is available. Aerotowing by Chipmunk is planned to start shortly for the few months when the risk of not catching a thermal gets tedi-

ously above 50 per cent. Cloudy days are few and rainfall is about 6 inches a year.

Two German schoolmasters resident in Teheran are enthusiastic instructors with the club and expatriates make up a fair proportion of the membership. Everyone has keen ideas for expanding the range of activities and the material problems have already been overcome.

Club members are friendly—as usual—and there is not generally long to wait for a flight. If you find yourself in Teheran, take plenty of money; at £3 an hour (before devaluation) you are more likely to be brought down by mental arithmetic than by lack of lift!

J. A. HORLEY.

NEW ZEALAND

THE WORLD CHAMPIONSHIP TEAM are really getting down to some serious flying. They have made arrangements for aircraft to fly in Poland.

Reid and Fowke in the Standard Class will have Ka-6E's and in the Open, Cameron will have a Cirrus and Heginbotham a 17-metre Phoebus.

Auckland Provincials, 22nd-28th October

There is a tendency for these championships to be a "North Island Champs" and this year was no exception with entries from the Wellington area as well as the Auckland district. A total of 19 aircraft were entered.

Seven consecutive competition days were flown—the first time this has been possible in New Zealand. A feature was the daily radio schedules on 6745.5 kc. with the gliding bases around New Zealand—giving results to all who could hear, even over in Sydney, Australia.

Sunday, 22nd Oct.—After a beautiful thermal day on Saturday, Sunday was a weak day with high overcast creeping over from the north by 1.30 p.m. The task was a 64-km. Triangle. No one completed the task but Reid (SHK) was only a few miles from home.

Monday, 23rd Oct.—Yesterday's high cirrus brought very poor convection for the second day. However, the temperature eventually rose sufficiently to form occasional small cumulus with some bigger ones over high ground. The only possible task was free distance. The four tugs struggled manfully but launching was effectively streamed. Many relights were needed. Evenutually some got away. With very little wind it didn't seem to matter which way to go. The winner, Ross Reid, nearly gave an International Airport Controller apoplexy by getting clearance into Mangere from a junior controller. However, he turned back to Ardmore when visibility got poor.

Tuesday, 24th Oct.—Rain overnight cleared away all trace of cloud. Early in the morning the first cu's set off. The task was an out-and-return to Te Kuiti (104 miles). Peter Heginbotham, flying his new fabulous, glass fibre Phoebus, was first home in 2 hr. 50 min., but it was Ross Reid again who shot across the finish line in the fastest time, 2 hr 36 min. The fastest four were the members of the NZ World Championship team for Poland next year.

Wednesday, 26th Oct.—Another day of thermals, so a 200-km. Triangle was set. Ross Reid again was the fastest home of the 12 or so that finished. His time of 3 hr. 16 min. gave him a speed of 38.9 m.p.h.—breaking his own local record of 32.9 m.p.h. Reid's tactics were to leave late and fly fast.

Thursday, 27th Oct.—Good cu's started quite early. The task was another Triangle, this time 183 km. The turning-point at Pekeatua is just behind the 2,616 ft. mountain of Maungatautari—one of the hardest places to reach around Matamata. Several pilots lost everything there and had to land. The winner, of course, was Reid.

Friday, 28th Oct.—Task: 171-km. Triangle. The course took pilots behind the dreaded Maungatautari. Several started only to find that it was difficult to even stay up. Gordon Hookings (Skylark 4) and Dave Wright (Ka-6CR) were flying almost together—getting rather low. Dave turned right and Gordon left. Within 2 minutes Gordon had landed but Dave had found a thermal and got away. He went on to land eventually a mere 12 miles from home for 3rd place. Gordon's crew were right with him and he was back in time to relight and cover 75 miles to come 5th. Ross Reid shot around the course in 3 hr. 32 min. Peter Heginbotham now getting the hang of his

new Phoebus also got around after an epic struggle in 5 hr. exactly. They were the only two to finish.

Saturday, 29th Oct.—Beautiful cumulus everywhere. Last day, so a short task, 100-km. Out-and-Return to Te Awamutu. Doug Yarrall—now getting to know his new SHK—was first home in 1 hr. 12 min. Others finished in longer times but soon there were only 5 minutes to go before Reid's time would exceed Yarrall's. But the distinctive V tail could be seen far out over the hills. Reid's final glide took him 50 ft. above the finish line in some 2½ minutes faster than Yarrall—the winner for the 7th day in a row. His speed of 51.85 m.p.h. is the fastest 100-km. ever flown in New Zealand, but it wasn't a triangle!

ROSS MACINTYRE

Leading Final Results

R. Reid	SHK	7000
T. Timmermans	Ka-6BR	4480
G. Hookings	Skylark 4	4163
R. Carmichael	Ka-6CR	4077
A. Cameron	Ka-6CR	3976

NORWAY

EVENING THERMALS.—Mr. Birger W. Bulukin, whose account of soaring in Norway was published in our last issue (p. 530), sends us the following reply to our question whether the prolongation of daylight in summer in northern latitudes allows thermals to continue till late in the evening:—

"I'm afraid I cannot give any precise information on the development of thermals at night during summer in northern latitudes, but as far as I can remember no such report has been given from our two northernmost gliding clubs at Bodö and Bardufoss.

"Nevertheless, it is a fact that in Norway pure thermal flying may be continued until at least 20.00 hours; this I have done many times in summer in the Oslo area; it may partly be due to the heterogeneity of the geological structure, partly because the terrain offers favourable conditions for wind-shadow thermals. We also notice local phenomena giving smooth weak lift in the middle of a valley, near sunset after a good day. It doesn't feel like thermals because the area of lift is very big, sometimes covering the whole valley. Generally, we believe it to be the downrush of rapidly cooling air over the higher-lying terrain which pushes the valley air upwards.

"I believe General Aviation and Soaring will receive a boost in the near future in our country, as the Government at last has started developing a series of small airfields throughout the country. (It ought to have started long ago.)"

EDITORIAL NOTE.—The reality of the "evening thermal" phenomenon has been in some doubt for years. That encountered at Camphill at first in 1936 was proved later to be almost certainly a wave. A similar phenomenon in Poland was investigated in the late 1930's and it was established that cold air flowed down the hill, not in a continuous stream, but in discrete pulses at intervals. The difficulty is to account for its duration. At Camphill, for instance, if the air in the Bradwell valley goes up fast enough to sustain a glider, the valley would be emptied of warm air in under four minutes. But if the cold air flowing down the hillside is to be re-warmed by contact with the valley floor, the latter

would have to retain its heat in spite of the hillsides losing theirs; perhaps this could happen if the valley floor was damp, owing to the great specific heat of water. But nobody seems to have investigated this.

POLAND

WAVES at Jelenia Gora were particularly good in early November (1967). On the 1st, 6 Polish pilots gained Diamond heights, Plotkowiak reaching 6,180 m., and three East Germans also got Diamonds.

On the 5th, in a 30 m./s. wind (67 m.p.h.), climbing was easy but aerotowed launches difficult. The rotor gave lift of 10 m./sec. almost from ground level, allowing a low release at 400-600 m. so that all pilots gained 7,500 m. (24,600 ft.), and the instructor flew 170 km. out and 110 km. back along the wave. Milczer released in the third wave over Jelenia Gora, progressed upwind to the first wave and reached 7,000 m.

Over the Tatra Mountains, wave flights during 1967 earned 13 Diamond and 11 Gold C heights, the greatest height being 9,300 m. a.s.l. (30,511 ft.).

Translated by J. MIKULSKI
Skrzydlata Polska

SOUTH AFRICA

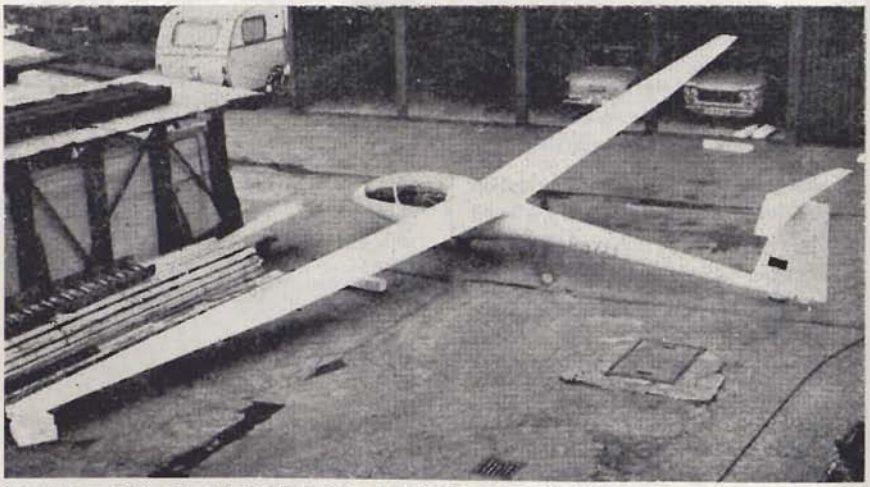
NEW WORLD RECORDS — Boet Dommisse flew his new BS-1 round the 100-km. triangle at 148 km./h. (92 m.p.h.). Previous record (137 km./h.) held by Herman Linke (USA) in Libelle on 30.7.1967.

Yvonne Leeman and Mandy Human flew the same triangle in a Kranich 3 at 91.5 km./h. (57 m.p.h.) to claim the feminine world record for two-seaters. Both records are subject to homologation by the FAI.

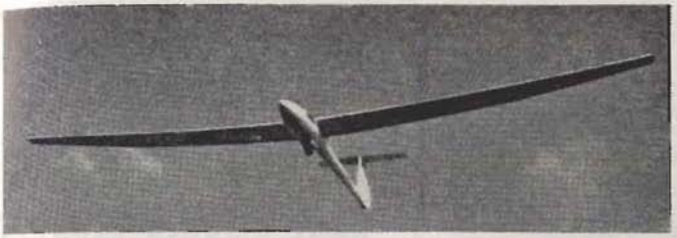
WEST GERMANY

NEW SAILPLANES.—The LS-1 is a Standard Class "super bird" designed by Wolf Lemke and built by Walter Schneider—hence its designation. With an aspect ratio of 23:1, it is to weigh 180 kg. (396 lb), and its wing loading with 90 kg. added will be 27 kg. per sq. m. Best gliding angle is expected to be 1 in 38 at 85 km./h. (53 m.p.h.). The wing section is the same as that of the Cirrus, with air brakes; it has a T-tail; the wheel is retractable. Flight trials are not yet completed, so no polar curves are available yet. Delivery is expected to begin early in 1968.

Austroflug.



The new LS-1. Its air brakes, not visible here, are at the trailing edge and are so hinged that the front border moves down while the rest moves up.



The SB-8

The SB-8 is a product of Akaflieg Braunschweig (Brunswick Academic Flying Group), who began the design in 1964. It is an Open Class machine, with a span of 18 metres, designed for soaring in weak thermals and so for light weight. (The pioneer design for this purpose was the Windspiel of 1932, produced by Akaflieg Darmstadt, but its span was only 12 metres, with the one-piece wing needing a 40 ft. trailer.—ED.)

The empty weight is 220 kg. (484 lb.); flying weight 325 kg., wing loading 23 kg. per sq. m. Minimum speed 55 km/h. (34½ m.p.h.), minimum sink 0.50 m./sec. at 67 km/h., best gliding angle 1 in 41 at 82 km/h., maximum speed (calm and gusty weather) 200 km/h. The wing has three Wortmann sections; inner wing 62-K-153, middle 62-K-151, outer 60-126. In the construction glass fibre, plastics and Balsawood are used in similar manner to the BS-6 and BS-7.

First flight was on 25th April, 1967. Subsequent test flights have shown the expected performance and flying qualities. Tests are expected to be concluded in the summer.

Aero Revue.

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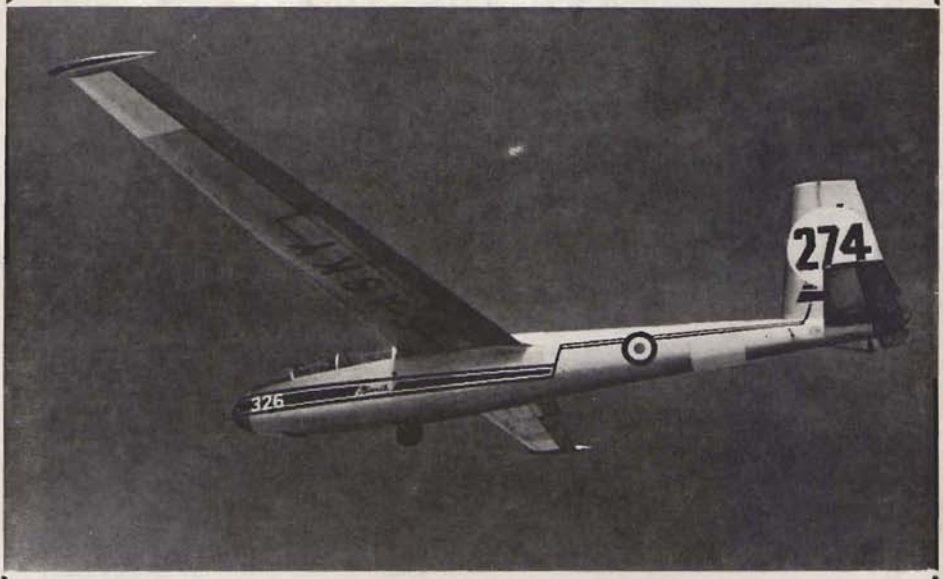

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