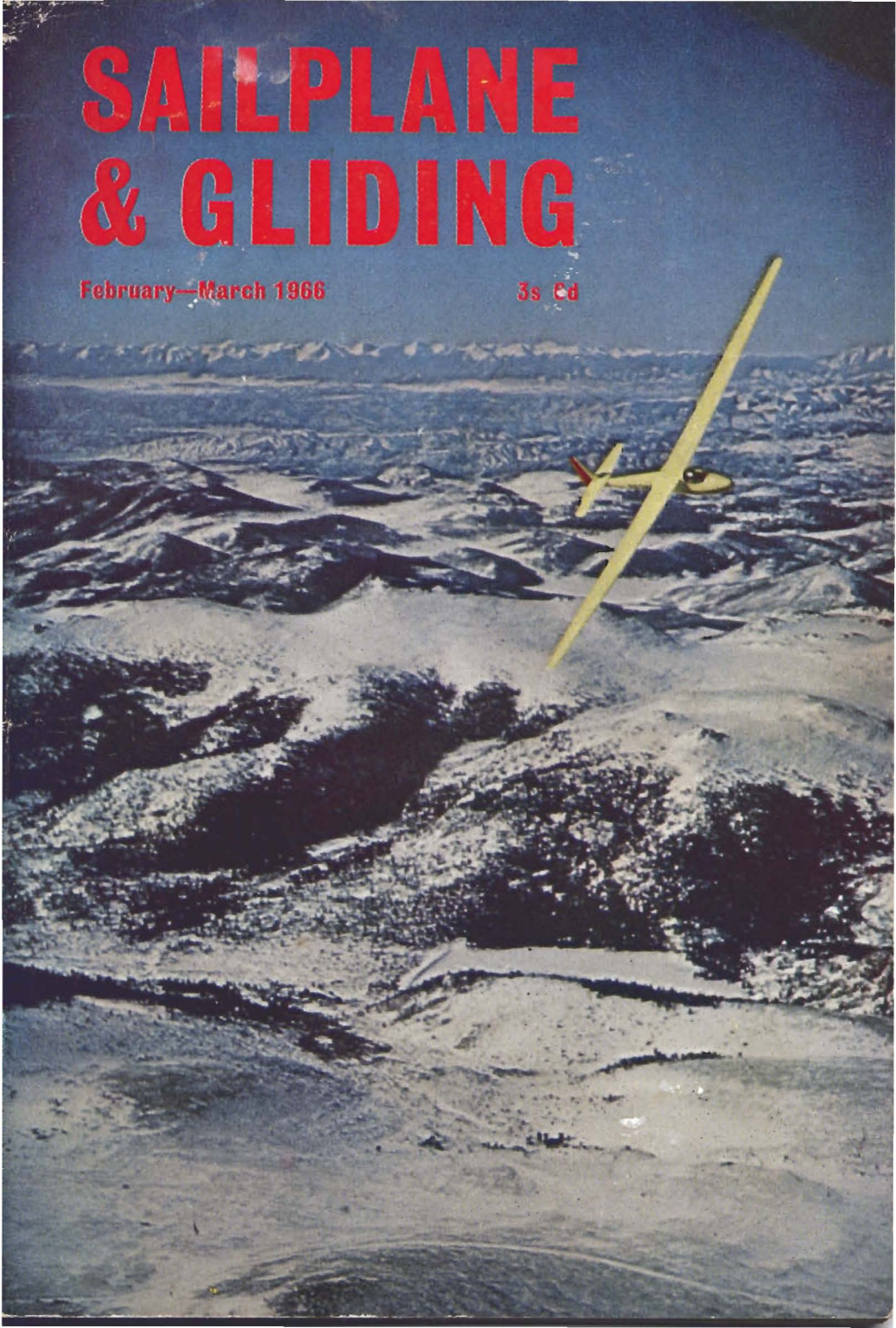
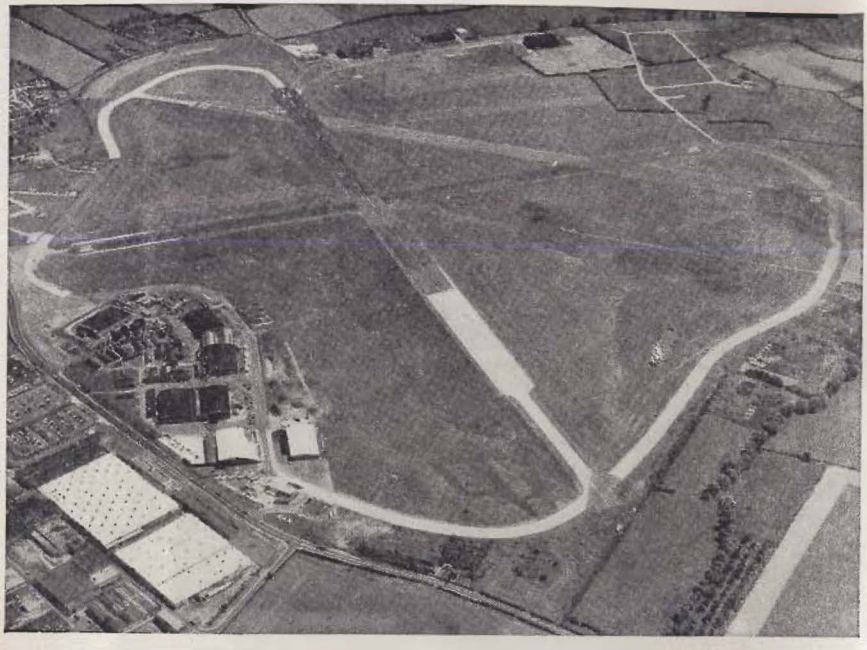
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MOUNTAIN WAVE FLOW

By BRUCE B. BISHOP

THE study of airflow over mountains has been the subject of many recent papers, both from the practical and theoretical points of view. Many of these papers, however, concentrate to a great extent on the mathematical aspects of the flow pattern, assuming a certain amount of understanding of advanced mathematics and theory of wave flow. The primary purpose of these notes is to present a general picture of the principles involved in such a flow, with the hope that they will be of some interest to those persons who do not require the amount of formulae which are frequently associated with the subject.

Airflow across a ridge

When a stable airstream meets an obstruction to the flow, it is forced to flow partly over and partly around the sides of the obstruction. In the case of ridge, lying approximately normal to the wind direction, then a very large proportion of the air will be forced to ascend (orographic ascent) and flow over the ridge. With a stable airstream, the air, having crossed the ridge, will descend the lee slope in an attempt to regain its former level. Due to various factors, such as the velocity and stability of the airstream, the steepness of the lee slope, and turbulence factors, the airflow will describe various patterns downwind of the ridge, the most important of these, from the gliding point of view, being wave and rotor flow.

Basic types of flow across ridges

When an airstream of a stable nature is brought up against a ridge, and forced to rise over it, the path followed by the air is to a great extent dependent upon the velocity of the flow across the ridge.

If the wind is light through the streaming layer, the airflow tends to follow the shape of the ridge, this type of flow being known as "laminar streaming". This normally occurs with winds of less than 15 knots, and gentle slopes (Fig. 1).

If the winds are stronger, between 15 and 20 knots, and with a steeper lee slope, the flow becomes more disturbed, with standing eddies forming on the

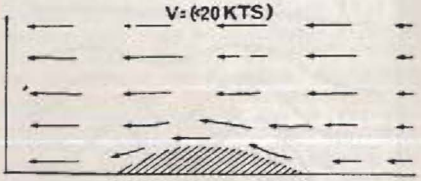


Fig. 1.—Laminar Streaming.

slopes of the hill, especially on the lee slope. This "standing eddy streaming" occurs mainly when the stable layer is shallow, not much greater in depth than the height of the hill.

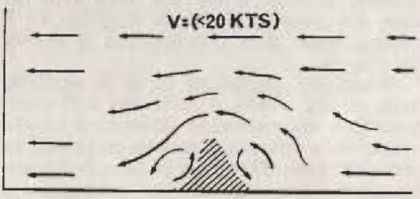


Fig. 2.—Standing Eddy Streaming.

With a deeper streaming layer, and stronger winds, which are constant in direction through the streaming layer, and increasing with height, wave streaming takes place. The air, having been forced to ascend the windward slope, descends the leeslope attempting to regain its former level. The velocity of the flow increases on the descent, due to the adiabatic heating and expansion, and due to the increased momentum the air tends to overshoot its former level, and to oscillate about this level for a distance downwind of the ridge. A wind at ridge

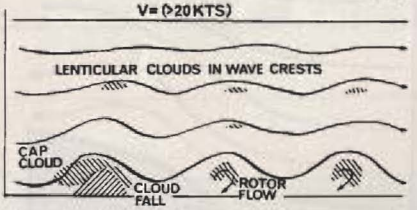


Fig. 3.—Basic features of wave streaming.



Fig 4(a).—Effect of a steep lee slope on the wavelength and amplitude of a system.

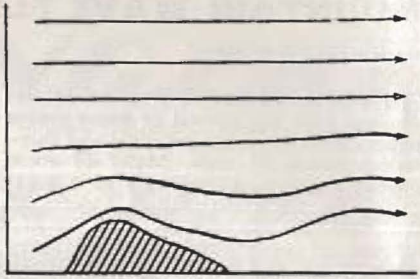


Fig. 4(b).—Effect of a gentle lee slope on the wavelength and amplitude of a system.

height of at least 15 knots, and generally considerably stronger, is a common feature associated with such flow, this, of course, usually being the best type of flow for soaring flight. A diagram of a typical wave flow cross-section is shown in Fig. 3.

When the streaming layer is shallow, with strong winds, a turbulent and complex flow may develop downwind of the ridge, with rotors at various positions in the airstream. This flow pattern is known as rotor streaming, and can take a great number of different forms, depending on the vertical distribution of wind velocity and stability through the streaming layer. Two typical forms of rotor flow are shown in Figs. 6 (d) and 6 (e).

Effects of the shape of the obstruction

The shape of the ridge also has a minor part to play in the shaping of the flow pattern which it initiates. If the lee slope is steep, under normal wave streaming conditions, the wavelength will be shorter or the amplitude greater than for a system originated under similar conditions by a ridge having a gentle lee slope. The precise values of wavelength and amplitude are very dependent upon the wind velocity and the stability, but the general effects of the hill shape can be seen from Fig. 4. The formation of standing eddies on the hill slopes will, of course, tend to modify the lee slope of the hill, and may, in practice, make a steep slope effectively similar to a gentle one.

Hill Lift

For wave systems to occur, a stable layer is necessary through the streaming layer. If the air is unstable, or tending towards instability, then the air rising

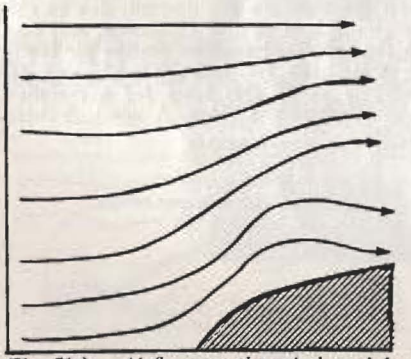


Fig. 5(a).—Airflow on the windward face of a ridge in stable conditions.

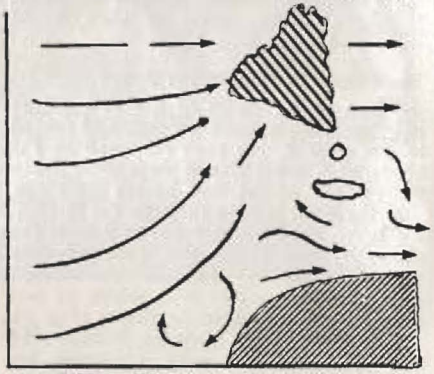


Fig. 5(b).—Airflow on the windward face of a ridge in unstable conditions.

over the ridge will not have the same tendency to return to its original level, but may rise convectively, triggered off by the ridge, to, under certain conditions, form a line of thermal lift along the ridge. Amongst the majority of glider pilots a nominal value for the height to which hill lift extends is three times the height of the ridge, a value which seems to work reasonably well in stable or neutral airstreams, although in unstable conditions thermals triggered off by the ridge may rise to greater heights.

Diagrams of hill lift in unstable and stable airstreams are shown in Fig. 5 (a) and (b).

The work of Förchtgott

Förchtgott published a paper in 1949 (Ref. 1) giving the results of an investigation into mountain waves which he carried out using a fleet of sailplanes and light aircraft. One of the most important aspects of this paper from the gliding point of view is a series of diagrams which relate the type of flow pattern to the vertical distribution of wind velocity in the streaming layer. The wind velocities are indicated by the profiles on the left-hand side of the diagrams. These diagrams are reproduced in Fig. 6.

Meteorological Conditions for wave flow

WIND.—As will be seen from Förchtgott's diagrams, an increase of wind velocity with height through the streaming layer is a necessary feature of an airflow in which lee waves form. That the pattern may vary with different types of flow is apparent from the wind profiles on the left of the diagrams. At various stages between the different types of vertical distribution shown in the diagrams, a mixing of the different flow patterns may occur. As the wind speed decreases with height above the main part of the streaming layer, the waves become less pronounced, although waves from even small ridges may extend to quite considerable heights.

When the wind speed across the ridge is greater than about 20 to 25 kts., the flow will normally, especially over a steep ridge, begin to become turbulent, and although this may be no more than a discomfort whilst soaring, the hazards during landing at a hill-top site may become an important consideration.

STABILITY.—It has been said that a stable layer is necessary for the formation of waves. This is generally the case, but there are a few occasions on record

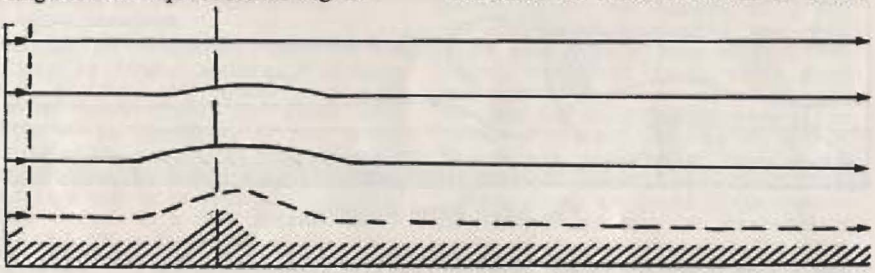


Fig. 6(a).—Laminar streaming.

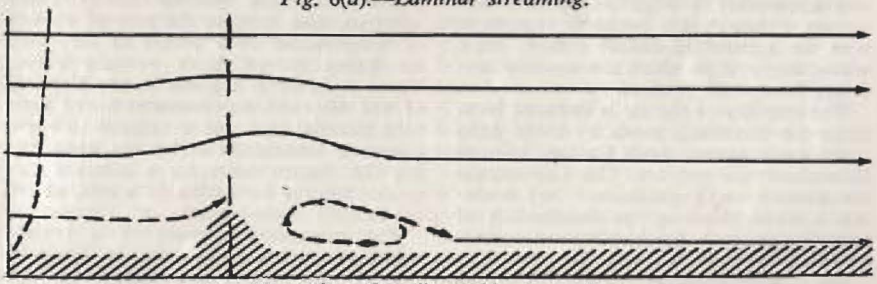


Fig. 6(b).—Standing eddy streaming.

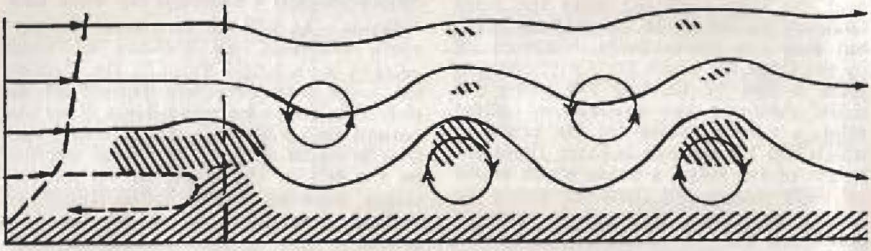


Fig. 6(c).—Wave streaming.

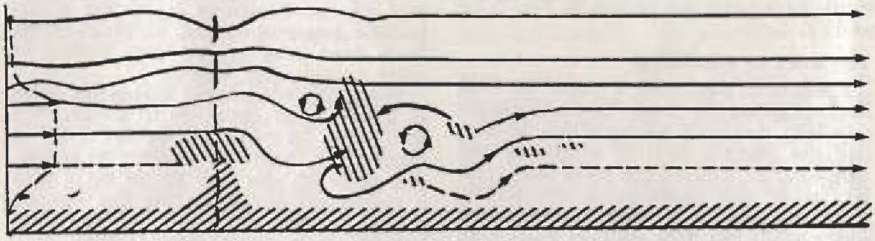


Fig. 6(d).—Rotor streaming.

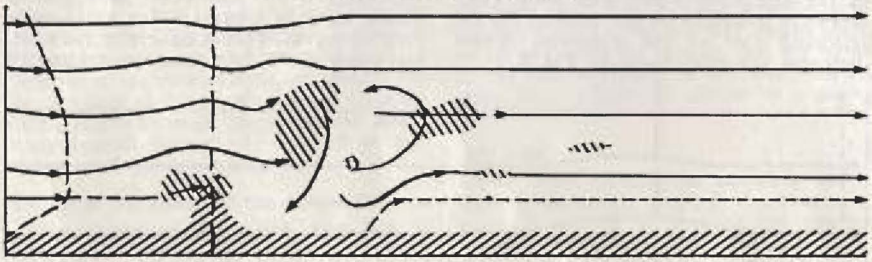


Fig. 6(e).—Rotor streaming.

where a wave system has formed in what was apparently a slightly unstable air-stream, although it is probable that, even with an apparently unstable flow, there was some level at which the stability was either neutral or positive.

The stability of the air is deduced from upper air soundings made by twice daily radio-sonde ascents from various stations throughout the country. These soundings are plotted on Tephigrams—very basically a chart showing the distribution of temperature with height above a certain place.

On the Tephigram it will be noted that there are a series of lines curving upwards from bottom right to top left. These lines are known as saturated adiabats, and indicate the rate of change of temperature of a parcel of saturated air being moved in a vertical plane. These lines form a guide to the stability of the air; any environment curve running parallel to or at a tangent to these curves is technically stable air, thus filling the requirements for a suitable air-stream for the formation of waves, as far as stability is concerned.

The temperature curve of a typical ascent through a stable layer is shown in Fig. 7. The winds are shown on the right-hand side. As will be seen, there is

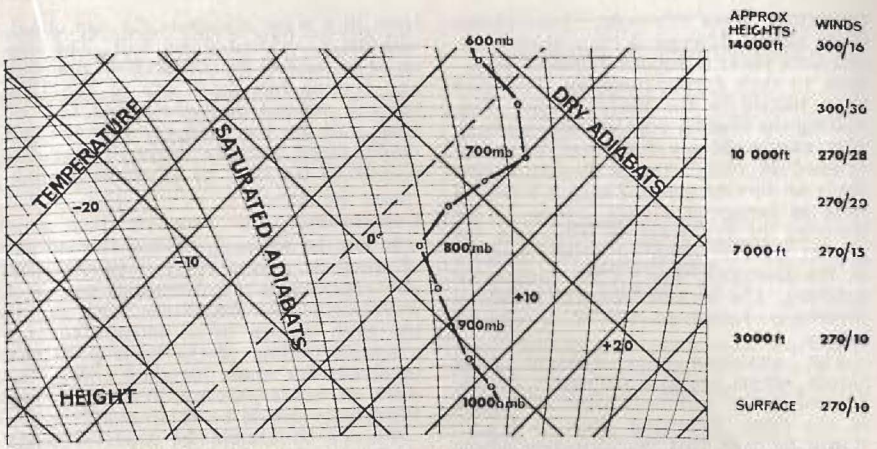


Fig. 7.—A typical Tephigram of an ascent through a wave streaming airflow: winds are shown on the right-hand side.

a stable layer between 800 and 700 millibars—7,000 and 10,000 feet. Through this layer there is a steady increase in wind velocity, and the wind direction is constant—this being an ideal ascent for a wave streaming airflow.

Association of Waves and varying Synoptic Situations

Waves are frequently found in the vicinity of frontal systems. Wallington (Ref. 2) found that, ahead of a well-marked warm front, lee waves were likely to be significant in two zones. Ahead of the warm front featured in his investigation, lee waves were calculated, and observed to be particularly marked at low levels in a zone between about 150 and 250 miles ahead of the front. Pronounced wave flow was also possible at both low and high levels between about 400 and 600 miles in advance of the front. Between these two areas of waves there is a possibility of short lee waves of insignificant amplitude.

Due to the normal stable nature of warm air masses, waves may also form in the warm sector, but may be obscured from the surface by the cloud layers characteristic of warm-sector weather.

It should be remembered that the weather in advance of a warm front is usually characterised by increasing cloud layers, and with the increased water content and the lowered freezing level in the wave system, there is the added hazard of possibly severe icing.

Cloud Conditions in Wave Flow

Wave systems are normally indicated to a surface observer by the lenticular clouds which are a feature of these systems. There are actually three predominant cloud types which can occur in lee wave systems: true wave, or lenticular clouds; roll clouds, which occur in the rotor flow; and cap clouds and the cloud fall which are a feature of the summit of the hill initiating the system. The relative positions of these clouds are shown in Fig. 3.

Wave clouds are found in the crest of the system, and may be laminated in various layers, depending upon the saturation of the air at various levels through the streaming layer. With a very dry airstream, of course, these clouds may not be present, although for the air to be dry in wave crests, after its forced ascent, is not a common feature. These clouds, of course, are the best guide to finding lift in the wave system, the main area of rising air being upwind of the leading edge of the cloud, with sink downwind of the cloud. The clouds are generally stationary with respect to the ground, the air moving through them, and the cloud forming at its leading edge and dissolving on the downwind edge. Sometimes, however, and possibly more

frequently than thought, the clouds move slowly downwind for a short time, and then make a sudden "upwind jump" back to their former position. This may be a hazard to the inexperienced pilot, soaring the leading edge of such a cloud, who may suddenly find that he is enveloped in cloud, the lenticular having made an upwind jump. There is a risk of icing in lenticular clouds, owing to the lowering of the freezing level and the greater concentration of water droplets in the airstream, due to the orographic uplifting. The airflow in these clouds is invariably found to be of a smooth nature.

The airstream may contain rotor clouds, which are also stationary clouds, formed in the turbulent areas downwind of the ridge. Referring again to Fig. 3, it will be seen that the airstream effects a circulation in the vertical plane, causing marked turbulence, and a ragged roll of cloud. These clouds form below the wave crests, and are generally found at about the level of maximum amplitude of the system. The main danger to glider pilots in these clouds is the severe turbulence and strong descending currents, especially if terrain clearance is marginal. Due to the severe turbulence there is also the risk of structural failure when flying in roll- or rotor cloud.

The third type of cloud which may form in a wave system is the cap cloud, with its associated cloud fall. The cap cloud is caused by orographic uplifting and cooling forming a cap of cloud on the hill summit, and the cloud fall, or föhn wall, by the wind carrying the cap cloud down the lee slope during the process of dispersal by adiabatic heating.

Conclusion

It will be appreciated that the subject of waves is a very complex one, especially regarding any calculations of actual wavelengths and amplitudes. This article has been written in an attempt to give a simple outline of the basic principles involved; for more detailed study, the work of Scorer, Corby, Wallington and Förchtgott should be referred to.

Finally, it should be said, although some of the hazards of wave flight have been mentioned, it is still probably the smoothest and most pleasant form of soaring.

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1. Förchtgott, J. Wave currents on the leeward sides of mountain crests. *Bull. Met. Tchecosl.*, Prague, 1949, p. 49.
2. Wallington, C. E. Lee waves ahead of a warm front. *Quart. J.R. Met. Soc.*, Vol. 81, p. 251, London, 1955.

HOW FAR TO THE NEXT THERMAL?

By MIKE GARROD

With acknowledgments to the London Gliding Club Gazette

HAVE you ever thought just how many thermals there are at a given moment during an average day in summer? How far you have to fly before the next one turns up?

Well, there's no simple answer to these questions, as thermal distribution will rarely be in a regular pattern. The presence of any surface irregularities that will cause marked variations in the air temperature near the ground, such as towns, rivers, forests, etc., will upset any such possibility.

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is even feasible. Every thermal has its own sphere of influence, the size of its area of influence depending primarily on the diameter and strength of the upcurrent, and also the height to which it extends. The associated downdraught, which must be present to compensate the upcurrent, is going to suppress any other thermal which tries to come up from the ground, but may encourage a thermal to break away in proximity to its edges. So we have a thermal unit, so to speak, consisting of the updraught and downdraught, on the edge of which there are other potential thermals. In practice thermals are found in a somewhat random distribution, but on occasions they may form into well-spaced streets, or into a pattern which shows some semblance of regularity. In general conditions, then, we can only talk about average distribution.

From years of dashing about the sky some points have become quite plain. When the depth of convection is great, then the thermal spacing is wide, and the thermals themselves large. When convection is restricted to a shallow layer, say 2,000 ft., then the spacing is small, and the thermals small. Now I cannot answer why large thermals don't occur when convection depth is very limited, but it appears that thermal spacing and depth of convection have a fixed ratio.

With this question in mind, I examined a number of barograph records of my own, picking out those where thermals were marked by cumulus clouds, and also those during National competitions when large numbers of gliders marked the thermals (when there are 30 or 40 gliders spread over a few miles you can be almost certain that every thermal gets found!). I worked out the spacing between the thermals, in miles, and compared these with the depth of convection. The results are tabulated below:

Depth of Convection	*Thermal spacing*
2,000 ft.	2 miles
4,000 ft.	3½ miles
6,000 ft.	5 miles
8,000 ft.	7 miles
10,000 ft.	9 miles

Now I don't pretend that these figures are anything like truly representative of the facts, as the data available were rather limited and inaccurate. But they do give some indication, and you can be sure that the actual spacing is less than quoted.

There are some interesting facts which arise from these figures. If one could detect every thermal, it would be quite easy to do a cross-country flight in a Dagling! It's also rather plain that with a high-performance glider there is little excuse for landing during the active part of the day, as no less than six thermals would have been missed to achieve the result (groan from pundits)! Sometimes, in practice, there are large holes in the sky full of downdraughts, so I suppose there's always an excuse handy, and thermals just won't be neatly spaced. So you may have good reason for throwing my findings straight into the nearest W.P.B. and cursing all Met. men! However, the "armchair pilot" may find a use for them, and carry out the perfect high-speed cross-country flight, on paper, flying the latest Slingsby Dart Mach 2. And he'll break every record there is!

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A SOARING SAFARI

By J. C. "RED" WRIGHT

LET no one misconstrue at the outset that this rambling narrative lodges any claims to be technically accurate, intelligently critical or especially enlightening. Indeed, if it has any point to it at all, it is simply to recount how I had the good fortune to meet a host of charming people from all points of the compass, see and take part in an Internationl, and enjoy the damp and beautiful English countryside around South Cerney.

To begin at the beginning, which seems to be a logical sequence, Wally Scott, Wally Scott II and I set sail to the North-east United States for the port of embarkation in his station wagon on 14th May, 1965, from Odessa, Texas, to McQuire Air Force Base. The first leg of this safari was an uneventful three days of usual tourist travel and three days of listening to a monotonous but not too subtle account of what a superb driver Wally Scott was. After a brief stopover at the National Capitol to take a few photos, we journeyed on to McGuire Air Force Base. Arriving one day early on our schedule, we proceeded to enjoy the relaxing atmosphere of the Officers' Club and Bar, mostly the bar, which was the first of an infinite series of bars we toured and inspected during the next few weeks.

Midnight — 18th May — boarded TWA 707 flight to Mildenhall, England. A midnight lunch, a cat nap and presto! England! A far cry from the old ferry pilot days in World War II, the usual chaos and utter confusion to clear customs, a short briefing by Harold Drew, who met us and escorted us to Lasham. The two Wally Scotts — Sr. and Jr., Ben Greene and I boarded Denis Burns' Ford Zodiac which Wally had contracted for a crew car to use in the coming contest. Denis took us for a wild, hair-raising, careering drive to Lasham. I do believe Denis is a frustrated Grand Prix driver. I commented to Denis: "How in the name of H . . . do you keep from getting lost?" He politely retorted: "Really quite simple, you know, one becomes accustomed to driving in this countryside." And then he got lost forthwith. A good night's rest at a pleasant inn near Lasham and we reported to the aerodrome for practice. The first teams we met were the South Africans, and what a fine group they are. Mutual esteem and rapport were established at once with them and continued throughout the coming weeks. No language barrier here.

Next we noticed the U.S.S.R. team. They seemed to be quite disconsolate. Ben Greene suggested we introduce ourselves to them and have a conference. The language barrier did prove to be somewhat of a stumbling block in this instance, but they were extremely interesting and friendly. I remember the pilots Veretennikov, Chuvikov, Suslov and Jarushevichus particularly for their good humour, friendliness and superb athletic condition. On the coldest days when we were shivering from the cold and all bundled up in extra clothing, they were wearing open sandals, short-sleeved shirts and Veretennikov would be sporting his ever-present *hairnet*,

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A new Air Cadet week-end Gliding School will shortly form at R.A.F. Gaydon to provide gliding training to A.T.C./C.C.F. cadets. Vacancies exist for instructing staff. Posts are part-time honorary (but certain out of pocket and travelling expenses are paid) and should appeal to ex-Service pilots with or without gliding experience and to civilian gliding enthusiasts. Further details may be obtained from Sq. Ldr. P. W. Kingwill, Headquarters Air Cadets (SAA8), R.A.F. White Waltham, Maidenhead, Berks.

which simply proves my theory that a good jolt of vodka is a prime training stimulus for whatever. With them was a lady whose name escapes me, but I was told she was the Russian counterpart of our Jackie Cochran. At any rate she inquired of Miss Cochran and shook hands with us exuberantly. After Dr. Sam Huddleston, our team physician, had examined my hand and assured me I had no crushed bones, we resumed our chit-chat. Boy! Did she ever have a strong grip! Seriously, she was a very nice lady, and through an interpreter conveyed to us the information their sailplanes had not arrived and they had no word of them, which accounted for their worried looks.

Surprisingly, the weather was beautiful for the next three days — for England, that is. Roughly comparable to a weak day in West Texas. Our pilots got in some very good practice flights, especially Dick Schreder. Dick's HP-12 and the Darmstadt D-36 (dubbed the "Gummiflügel" or rubber wing by some wag) created a lot of interest. Had some long and interesting bull sessions with "Boet" Dommisse, Pat Beatty, "Bomber" Jackson, Bobby Clifford, Tim Biggs and Ted Rudnick (Capt.), of the Republic of South Africa team. Great bunch of guys.

SATURDAY, 22ND MAY.—Pilots launched to fly from Lasham to South Cerney. They made the flight in good order. Can't say as much for our ground team. Ben Greene was driving and I was making a valiant effort to navigate for him. Ben was not very complimentary about my navigation, but what the heck, a wrong turning here and there just adds variety to the trip. Finally made port at South Cerney and checked into the barracks. Not exactly like the Hilton, but quite comfortable. Our barracks mates were part of the South African team, which we were quite pleased about. The mess hall was quite conveniently located next door — not exactly like Delmonico's either, but what they lacked in quality they made up for in quantity. Must have been very wholesome — young Wally Scott gained about ten pounds.

Next few days devoted to getting acquainted, practice flying, etc. You can imagine the interest involved when a group of soaring pilots this large is exposed to as many varied and exotic type sailplanes as congregated there. During this pre-contest period Wally Scott got involved in a chug-a-lug contest with the Russian pilots, with the Russian pilots furnishing the vodka. Between the lure of free drinks and the ability of the Russians to handle vodka neat, Wally was overmatched but somewhat, out like a light before Taps. Several of us visited the wonderful old English taverns and inns in the countryside. Most of them were marvellous places to eat and all had a charming atmosphere in the Tap Room.

The South African team gave a party and served delicious South African brandy. The Swiss and Finns gave a very successful "Beer Bust". We did not have a party scheduled on our rather lean budget but we could not let the honour of the Americans suffer this embarrassment. We chipped in a few

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pounds sterling each and elected Capt. Wally Leland to visit a near-by U.S.A.F. base and con the Commanding Officer out of a couple of cases of Bourbon. He did — so we reserved the club for the party. Major Butts, our esteemed team manager, elected "Big John" Brittingham and myself to act as ex-officio hosts — in other words, bartenders. Luckily, the club loaned us a couple of their bartenders.

It was a real study in human behaviour to see how extremely polite, courteous and reserved everyone was at the start and how quickly their reserve melted and good fellowship abounded after a few hefty belts of "Bourbon and branch water". One of the fellows on the Dutch team was intrigued by Big John's "chawin" tobacco and wanted to try a chew. Big John thought he only wanted to smell of it, but he bit off a sizeable chunk and began to chew vigorously and swallow the juice. We tried to warn him he was flirting with disaster, but we didn't speak very good Dutch. Anyway, he caught on pretty quickly and began to turn green around the gills and the last we saw of him he was headed for the open air. I always thought the Australians were a rugged people. My point was proven at this party. This young gentleman from Down Under chided me for putting too much water in his Bourbon. Deeply hurt at this affront on my bartending ability, I substituted gin for water in his Bourbon thereafter. He duly recognized this as an improvement and continued to empty his glass with astounding regularity. I thought we wouldn't be bothered with him long, but lo and behold, he drank about six of these "specials" and didn't even stagger. Last time I noticed him, he was about three sheets in the wind and going strong. Hats off to you — "Cobber".

This little Soiree was supposed to end by 10 p.m. but at 2 a.m. was still going strong. So Big John and I decided we had better catch up with the rest of the crowd. Fortunately, we had stashed a bottle of old Jack Daniels under the bar for just such an emergency. From that point on, I do not choose to answer questions pertaining thereto, for fear that it might tend to incriminate me.

Since all the statistics of this contest have long since been many times told, I will not repeat them. Just a few observations regarding the actual contest. All our pilots flew a good contest. Wally Scott was really outstanding considering his relatively short experience in contest flying. Dick Schreder is just simply great in all categories — pilot, designer and gentleman. Dick Johnson and A. J. Smith are both true professionals in this great game of soaring.

As for the rest of the team, the two lady members, Alice Johnson and Angie Schreder, were a real credit to the team. Alice's charming graciousness and Angie's unfailing smiling good humour and personality will long be remembered by all of us. Sam "Doc" Huddleston, the team's physician, is a great gentleman by any country's standards — a really outstanding guy. Kudos for the greatest wit go to Moon Mullins. He tells the one about travelling north on highway A429 through "Bourton-on-the-Water", "Stow-on-the-Wold" and "Moreton-in-the-Marsh" and coming to another sign that read "Mud on the Road". *He said he thought he was com-*

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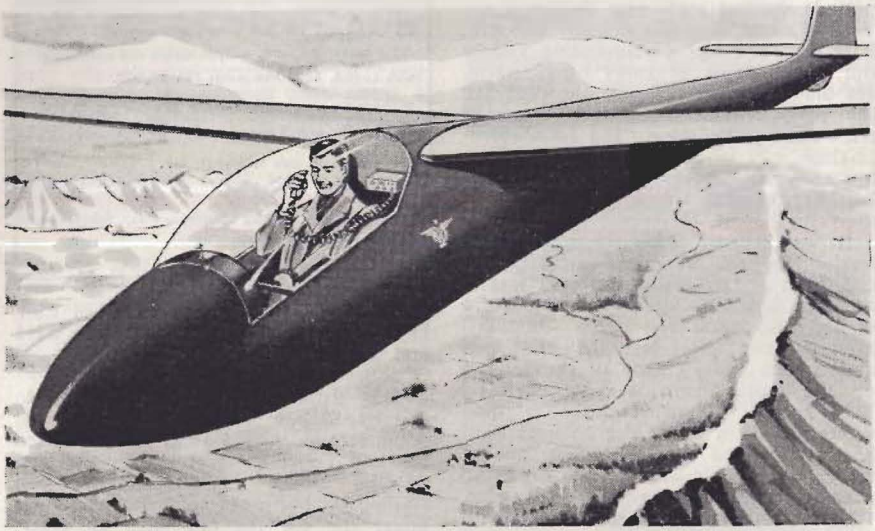
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ing to another town! On Ben Greene I will not elucidate. It is a matter of principle with me never to say anything good about him. I am feuding with this so-called Southern Gentleman and I dare not let my guard down or he will nick me.

Up to this point, I have said very little about our English hosts. This is intentional because they deserve far more than casual mention. I have saved them for last so I can pay proper tribute to them, their outstanding performance and hospitality. Their efficiency in conducting this meet was truly remarkable. I doubt it will be equalled for many a year, and how the gliding types from all reaches of the United Kingdom pitched in and really ran this show was quite fantastic. To begin with, Ann Welch did a magnificent job as Director, and such a grand lady. Wally Wallington, a fine job with the Met. Poor fellow didn't get much co-operation from the weather either. It threw him every curve in the book. The exciting visit of Prince Philip and his warm and cordial visit with all personnel — even the rain didn't dampen his enthusiasm. Philip Wills is simply the greatest when it comes to soaring and charm and is esteemed by all of us from all parts of the world. Group Captain Peter Ottewill, the Station Commander, is every inch the British Officer and gentleman that typifies the staunch courage of the Empire throughout the world, and R.A.F. officers Simmons and Phillips are great guys, and hundreds of others who contributed to the unfailing hospitality and efficiency of this meet. The beautiful countryside in the Cotswolds, the courteous people and, oh, yes — I must not forget "good old Frank", the bartender in the canteen — great guy. Take them all together and it adds up to why there will always be an England. Congratulations to all for a job well done.

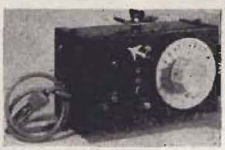
Another short return flight via TWA and a bright quip on the cabin speaker by the pilot announcing that they (the crew) "had confounded the experts again" and that we were over our shores approaching our destination. A cursory examination by customs and everyone scattered to the four winds.

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THE HISTORIC NINETEENTH RHOEN

By CHRISTOPHER WILLS

IN winter it is pleasant to dream of good weather, and especially good weather in competitions. There was once a competition that had good weather on every day for a fortnight. At the time, it was hailed as the greatest competition of all time, but for various reasons it was never fully recorded in English.

Such was the Rhön Competition of 1938, the 19th of the series. Stories of gliders breaking up have been recorded here and there, but little else. An attempt has been made here to reconstruct what happened from German documents in the Editor's possession; but as they do not always agree about dates and distances, I am quite prepared to be corrected.

Owing to the political situation, pilots were forbidden to cross frontiers, except



the Dutch one. As Oskar Ursinus wrote: "When considering long-distance flights, it seems that we can now only go upwards, as horizontal room is somewhat limited." The competitions were run by the N.S.F.K. (National Socialist Flying Corps), which had taken on most of the top German glider pilots as instructors. So most of the entries were from the N.S.F.K., some from D.V.L. (German Aviation Union), others from the Luftwaffe, and one from Lufthansa. However, Heini Dittmar, the World Champion, and Hanna Reitsch were not competing.

This year there were more new machines on the Wasserkuppe than ever before. Two Weihes (with less dihedral and other differences from the more recent ones), two Condor 3's, the FVA-10B (Rheinland, with gull wings and retracting undercarriage), AFH-4 (Hannover, with very thin gull wings and flaps), FS-18 (Stuttgart, high-wing, gulled at the root), C-11 (Chemnitz, steel-tube fuselage, high wings and flaps), B-6 (Berliner, steel tube fuselage, part of which was covered with stiff paper ½-mm. thick, flaps and retracting undercarriage), two Horten 3 (tailless), a new Reiher, two Mu-13D, Kolibri (small mass-produced gull-wing sailplane), Schwalbe. Older machines were 12 Rhönadlers, 15 Minimoas and a Rhönsperber. A Two-seater Class included Kranichs, an Esslinger, and an MG-9A from Ostmark (Austria).

Each crew consisted of five glider pilots, who helped each other to launch the gliders by bungy. The gliders launched from the top, if there was no hill lift, were expected to find a thermal before they got to the valley below. As the Wasserkuppe in places slopes very gradually, pilots had often to catch thermals from a very low altitude, or land in a field at the bottom called Tränkhof or Märchenwiese, from which they could be aero-towed or retrieved by road. Some aero-towed launching was done, as well as aero-towed retrieving from distance flights. However, the main method of launching was by bungy. The crews were very hard-worked, as they were continually going up and down the Wasserkuppe, rigging and de-rigging, and were on the road day and night until the end of the competitions.

The competitions were opened by the Korpsführer General-Leutnant Christiansen, and then all the crews marched off and immediately started flinging the machines one after the other into the slope lift.

Right from the beginning the weather was good.

On the first day, 24TH JULY, there were 51 cross-countries, the furthest being that of Bräutigam (Weihe), 272 km. to Fassberg and Beck (Minimoa 38), 228 km. to Glane. Pomper, flying a Kranich solo, got highest with 2,455 metres (8,055 ft.). Direction of flights was between N.E. and N.W. There was one casualty on this day: the much-talked-of Darmstadt sailplane D-30 (Cirrus) was damaged during its first take-off. This fantastic sailplane had just broken the world's out-and-return record (205 miles), flown by the Darmstadt student Bernhard Flinsch. Now, having damaged it, he took the earlier Darmstadt design, the remarkable light-weight D-28 (Windspiel), and flew it very well.

On the second contest day, 25TH JULY, the possibility of getting away was

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Otto Bräutigam (front), Heini Dittmar (in helmet), and behind them, in caps, Ludwig Hofmann (L.) and Wolfgang Späte (R.), at the 1937 Internationals.

doubtful. One Minimoa landed twice in the same place in the Poppenhausen valley. Its crew thought they would be going up and down until dark, rigging and derigging. However, the next time the Minimoa got away and went 165 km. The best distance was by E. G. Haase, 274 km. to Jüterbog-Damm. Schmidt (Mu-13B) went 241 km., Boy (Rhönadler) 235 km. Heights were increasing on this day: Romeis (Kranich) 3,120 m., Blech (Horten 3) 3,650 m., Treute (Minimoa) 3,085 m., Peters (Condor 3) 4,200 m. (13,780 ft.). Späte, the eventual winner, only went 57 km. on the first day, 34 km. on the second. The longest flights were to the N.E.

On 26TH JULY the Contest Direction set goal flights (to anywhere) as tasks. The furthest goal was reached by Opitz in the Condor 3, with 183 km. He also got highest with 2,845 m. Flight direction was north.

On 27TH JULY goal flights had again been set as a task. There were 26 of them. E. G. Haase (Minimoa), van Husen (Rhönadler), Beck (Minimoa), Bräutigam (Weihe), Kuhnold (Minimoa) and Schmidt all made goal flights of around 200 km. Flights between E.N.E. and S.E.

The 28TH JULY was the first big day: for the first time, flights were made to Berlin and beyond. Eighteen machines landed on the two Berlin airfields, Rangsdorf (315 km.) and Tempelhof (328 km.), and 11 went beyond. Two landing reports came in from the Baltic coast: Bräutigam, 429 km. to near Warnemünde, and Späte, 445 km. to near Stettin. Flinsch in the Windspiel went 365 km. and Schmidt 401 km. to Bellinchen (or Bellingen).

Here are some extracts from an account of one of the Berlin flights by the pilot, Heidrich, in a Rheinland:—

GRAND ASSAULT ON BERLIN

Strong cumulus build-ups; 30-40 km./hr. S.W. wind. Donnerwetter! That means Berlin!

Because of damage I was last to start from the Kuppe at 13 hr. Sixty machines have already been hours on the way. How shall I overhaul them? I calculate that I shall need a ground speed of 60 km./h. to cover the distance in 5 hours. I could not be sure that I would have 5 hours in this high-pressure weather system.

I had a good start, found 3 metres lift, and was soon at 2,000 m. Before me ranged cloud after cloud. In down-currents between the clouds I pressed on at 120 km./h. It is a joy to fly today. Only faster — still faster!

I overhauled one machine after another. After a bad moment at Laucha the flight began to gather tempo again. Under a cloud street I flew almost without interruption 60 km. in 40 minutes to Wittenburg. The lower Elbe seems to be almost without clouds and an almighty crabbery begins. Ahead are thunderstorms, overclouding and rain. Taking every advantage, I crept on and arrived at Rangsdorf with 600 m. I thought it too risky to go on to Tempelhof, and so I joined seven other machines on Rangsdorf below. Berlin is ours!

HEIDRICH (*Düsseldorf*)

And here are extracts from an account by KURT SCHMIDT, who overflew Berlin. He is being towed home during the morning from the previous day's cross-country:—

"If only the little Klemm towing me could be a Dornier 17! There are already good cumulus clouds and my glider is dancing in a frenzy behind the aeroplane. At last we are over the Wasserkuppe and I can see that most

of the other gliders have already left on distance flights. A quick landing before the Martens School. 'You, Hans, go and organize the barograph. Here, the landing report, and don't forget the starting board.' And now — in the canteen — 'Waiter, quick, a Shinkenbrot and Apfelsaft.' Then I am back in the machine. Look and see if Hans has remembered the peppermint. Prima! Then the Mu-13 is airborne again. Left the Kuppe with a slight tailwind, and have already lost 200 metres. Has the 'Sonnenbenzin' of the Rhön gone out?"

Now follows an appalling scrape, mostly below the Wasserkuppe, at times 80 metres above the ground. At last he manages to get up to cloud base. The flight gathers tempo. He "twittered awhile" over some wooded heights. "Behind Brandenburg I managed to get to 4,200 m. in a cloud, and eventually through holes I saw the capital, 2,800 metres below, and saw five gliders in a neat row on Tempelhof." He escaped from some dying thunderclouds and continued to the north-east. "Suddenly I had only 300 metres height. I caught an evening thermal over a wood and managed to fly 6 km. further to the Oder. I was flying over the river at 20 metres, overtaking a sailing cutter, when I spied a dry meadow downstream. With a tailwind I made it to this meadow and discovered from the fishermen and bathers that I was at Bellinchen on the Oder, 410 km. from the Kuppe."

The flights on this day were between N.N.E. and E.N.E.

On 29TH JULY Schmidt and three others made goal flights to Bayreuth, 133 km. Späte (Reiher) made 153 km. and the greatest height, 2,380 m., and Opitz (Condor 3) made 153 km. Flights were between N.E. and S.E.

On 30TH JULY the Contest Direction set an optional 160-km. out-and-return to Eschwege and back. This was a very hard task, made more difficult by cirrus. Only six pilots completed the task, taking between 5 and 7 hours. Späte was fastest, taking 5 hours 4 mins. Schmidt took 2 minutes longer with his Mu-13, beating the Minimoa, Reiher and Weihes of Treute, Kraft, Hofmann and Bräutigam.

The 31ST JULY was a good day for goal flights. The two Weihes of Hofmann and Bräutigam made goal flights to Regensburg, 224 km. A Kranich flown by Vergens and Trippke went furthest with 229 km. Judging by the number of failures to get away, launches must have been by bungy. Flight directions were from N. via W. to S.E.

On 1ST AUGUST there were many fine goal flights to the west. The two Weihes of Hofmann and Bräutigam and many others made goal flights to Trier, 255 kms. Schmidt, Treuter, Flinsch and Flakowski of the Luftwaffe made goal flights to Saarbrücken, 257 km. Späte made his goal at Karlsruhe, 198 km. Thus Schmidt maintained his lead over Späte.

On 2ND AUGUST Späte made the longest goal flight of the meeting by flying to Freiburg/Breisgau, 320 km., and Schmidt and several others were again at Saarbrücken. There were very many other good goal flights. Directions were between W.S.W. and S.S.W.

On 3RD AUGUST huge cumulus clouds and thunderstorms started to build up over the Rhön mountains. Lemm (Minimoa) climbed to almost 6,000 m., which

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was 4,980 m. (16,339 ft.) above the Wasserkuppe, thus breaking Dittmar's 1934 world height record. However, this record was of short duration. The 34-year-old Fick produced barograph evidence to a flight to 6,500 m. a.s.l., 5,550 gain. He used three cumulus clouds. This time Bräutigam (Weihe) and Ruthardt (FS-18) landed at Saarbrücken. Beck (Minimoa), Boy (Rhönadler) and Müller reported from Trier. The Bavarian Kranich, flown by Romeis and Schillinger, set up a two-seater height record of 4,510 m. (14,796 ft.).

German official documents state merely that the flight by Knopfle described in the following article ended at Fulda. The account is condensed from that published in THE SAILPLANE & GLIDER for May, 1948.

IN BITS AT 16,400 FEET

After having made three miserable attempts to get away on 3rd August, I took off for the fourth time on aerotow. I flew into a large cloud over the Wasserkuppe and was carried up at 30 ft./sec. On coming out of the top of the cloud, I was then confronted by another far bigger cloud which I waded into. I then found that my Minimoa was going much too fast. Suddenly I heard a whistling note. I attempted to pull out. The noise got louder and the glider began to scream. Quick as lightning, I realized that, because of the apparent reversal of controls, the glider must be inverted. Carefully I tried to bring it round. There was a terrific jolt and a crash. I was being tossed through the canopy with tremendous force. Then there was uncomfortable silence. I was able to verify that my parachute had opened, but that I was only held by the two leg straps. My face was badly cut so that I left a trail of blood upwards. I had the sensation that I was rising.

Things got lighter, but then I fell into the centre of a cyclone. I knew this because I looked down through a gigantic tube and could see a bit of the earth below. I then drifted sideways into the cloud again and, to my astonishment, found myself at the top of the cyclone again. This happened four times until I finally began to descend. I came out

of cloud and saw bits of my machine floating around me. After being blown sometimes horizontally by a strong wind, I finally landed near Fulda. Peasants gave me first aid and then Opitz's team arrived. They said that they had seen pieces of wing falling out of the cluods and then a parachute.

Hours later, while my head was being sewn and bandaged in Fulda, I thought: "In spite of all this, I will fly again."

HELLMUTH KNOPFLE

On 4TH AUGUST, in the late evening, landing reports of the flights over 200 km. started to come in, and it seemed that Westphalia had been the great landing area. The longest flight over German territory had been achieved by E. G. Haase: 292 kms. Späte had landed at Karlsruhe, 198 kms. In the late evening it was announced over the loudspeakers on the Wasserkuppe that for the first time four pilots had crossed the whole of West Germany and had landed in Holland: Peter (B-6), Peters (Minimoa), Späte (Reiher), and Hofmann (Weihe).

(To be concluded)

WALLY WALLINGTON

IT will be odd having a World Championships or a Nationals without Wally. I will miss particularly his incurable optimism when confronted with a weather chart on which one couldn't see the coastline for the isobars. We will all miss his humorous briefing, his unruffled calm when being barracked by pilots longing for 8 knot thermals, and not least his flashes of genius, or something, when he predicts one small cumulus over the middle of Salisbury Plain, and there it was, isolated in ant.cyclonic splendour.

Wally will arrive in Australia at the end of their winter, and I hope he won't be quite lost among cumulus at 12,000 ft. or antipodean depressions. Being a good soaring pilot as well as a mere senior met. man should give him the best of both worlds. I hope it does, because we have always had the best from Wally.

Apart from the professional side of his met. office work, Wally has made two valuable contributions to gliding. For years he has worked on, and succeeded in persuading the Met. Office not only that gliding is excellent field work for any met. man, but that gliding competitions should be supported by really good forecasting and met. facilities. Our



'Wally' talking to Nick Goodhart before a flight.

Nationals and Regionals are as good as they are largely because in a country of quite impossible weather, we are able to make the best use of it through good forecasting by someone who understands the problems of soaring. Wally, unlike many Prime Ministers, has not kept championships forecasting in his own hands, but produced a whole platoon of competent met men experienced in gliding forecasting. And the odd thing is, that they are all, like Wally, easy to work with.

Wally's other contribution is his book "Meteorology for Glider Pilots". This is a classic, comprehensive, and readable volume, and ought to be read by every pilot coming up to Silver C, and remain by his side thereafter.

I know everyone will hope that Wally and his family will enjoy Australia. His membership of successive British Teams has already made him familiar with other peoples gliding. I just hope those Aussies don't make their country so attractive to him and his family, that they stay there for always.

ANN WELCH

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B.G.A. NEWS

Annual General Meeting

THE A.G.M. will be held this year at Harrogate, Yorks., at the Crown Hotel, on Saturday, 12th March 1966 at 10.30 a.m. Associate Club and Private Owner Group meetings will be held at 10 a.m. The A.G.M. will be followed by Instructor's, Inspectors' and Administration Meetings until lunch time.

The afternoon will be devoted to informal discussion on many subjects including Regionalisation, future structure of the B.G.A., National Championships and Grant Aid. A note of other subjects for discussion should be sent to the Secretary no later than Monday, 7th March 1966.

Hotel accommodation can be booked with the Crown Hotel, Harrogate, direct at a special rate. Please book early as the hotel is holding a number of rooms provisionally, mentioning that you are attending the B.G.A. Conference.

The Annual Buffet Dance will be held on Saturday evening at the hotel; further information will be sent to Clubs and Private Owner Groups direct.

THE BRONZE C

THE British Gliding Association announces that this new badge has been introduced by the Council as a stepping-stone from the ordinary C to the Silver C, although for those who want to move quickly, or avoid extra paperwork, it is possible to go direct from the B to the Bronze C. The main intention of the Bronze C is to raise the standard of flying before pilots can go cross-country.

This is particularly important now that it is fairly easy for inexperienced people to buy themselves fast high-performance gliders. There is not only the risk of such pilots raising insurance premiums for everyone else, but causing damage to crops and annoyance to farmers. As cross-country flying increases in Britain, the novelty of having a visitation from the skies in the barley is rapidly wearing off. If we are to keep the goodwill of farmers, the inevitable field landings, which are an integral part of gliding, must attract as little attention as possible. They must be made accurately on land where neither stock nor crops will be harmed. This means that the pilot must be competent.

The Bronze C came into existence on 1st January, 1966. Application forms are being sent to clubs. A badge is being made, which has a half wreath in bronze-coloured enamel; cost has yet to be determined but will probably be 5s.

It will be seen from the qualifications given below that if a pilot has a C, and has registered any one leg of the Silver C with the B.G.A. by 31st December, 1965, he *does not have to obtain* the Bronze C at all. He can, however, do so if he wishes. Pilots holding a B certificate on 31st December can bypass the C if they wish, and qualify only for the Bronze C.

For those whose schools never taught them history, the Silver C, Gold C and Diamonds are international and can only be altered internationally. Qualifications below the Silver C are a national responsibility and are alterable by the national authority.

Regulations

1. From 1st January, 1966, Operational Regulation No. Q.4 will read: "A pilot in charge of a glider may not fly out of gliding range of his base field unless he either holds a Bronze C, Silver C or higher qualification *or* on that date holds a C certificate and has registered with the B.G.A. at least one Silver C leg. He must carry with him on all cross-country attempts maps marked clearly with airways and control zones."

2. The C certificate will continue. After obtaining the B, a pilot may qualify for the C and then the Bronze C, or for the Bronze C direct. In this case the C is automatically included.

3. The qualifications for the Bronze C are:—

A. At least 50 solo flights in a glider, except that a power pilot of 50 or more P1 hours need do only 20 flights.

B. Two soaring flights, each of which is at least 30 minutes when launched by car, winch or bungy or 60 minutes following an aero-tow to a height not exceeding 2,000 ft. Landings must be normal and within the boundary of the landing field specified by the instructor in charge. Barographs are not required.

C. Two or more Test Flights in a two-seater glider with the C.F.I. or Categorised Instructor nominated by him, in which the pilot demonstrates the following without any help:—

(i) Well co-ordinated and accurate general flying, including the keeping of a good look-out.

(ii) Understanding and recognition of the symptoms of the approach of the stall, and correct recovery

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from, at least, an incipient spin.

(iii) Two simulated field landings into a marked space not more than 200 yards long, making on each a safe and accurate approach, with proper use of the airbrakes, and good landing.

(iv) Satisfactory completion of both Air Law and General written papers. (Papers to be corrected by C.F.I. or Categorised Instructor nominated by him and forwarded to the B.G.A.)

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THE AIRWORTHINESS OF WOODEN AIRCRAFT

THE British Gliding Association has studied the problem of the airworthiness of wooden aircraft, and has published a detailed report on glue, after exhaustively collecting and analysing all relevant data. It was concluded that "with satisfactory assembly techniques and storage conditions as should be normally applicable, glued joints on gliders in U.K. operation have not been responsible for any reduction in airworthiness beyond the point for which current inspection requirements and methods are adequate".

The B.G.A. has had a unique opportunity of continuously observing the condition of sailplanes from pre-war to current vintage, from United Kingdom and foreign sources of design and production.

SPEEDWELL SAILPLANES

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The B.G.A. are familiar with the contents of Air Registration Board Notice No. 67 and with the subsequent Cranfield Test Report Aero No. 58.

The B.G.A. has only ever condemned to be scrapped, sailplanes found to be unairworthy by physical examination.

The Cranfield Report on the testing of Gemini and Proctor aircraft states that "with one exception, the failures were not initiated by weakness in glued joints, and . . . even in the case of the one test terminated by glue failure, this occurred at a very satisfactory figure of 115% fully factored load". The report also states "Glued joints frequently have a large margin in hand".

The A.R.B. letter dated 1st March, 1965, issued with the Cranfield Report concludes that "the Board sees no evidence for the imposition of more severe restrictions" (Ref. A.R.B. Notice No. 67). In fact, no ultimate life has been placed on wooden aircraft operated in United Kingdom (temperate) conditions.

It is not intended to imply that the B.G.A. considers that unairworthiness due to glue failure can be ignored. Apart from those totally unairworthy aircraft mentioned in the 4th paragraph above, there have been minor failures in British-built gliders due to poor glueing techniques and in foreign-built gliders using "Kaurit" and apparently similar glues.

The B.G.A., having examined all the relevant information, and from its abundant experience, concludes that, in the United Kingdom:

(a) So far as structural integrity is concerned, no aircraft should be condemned unless there is physical evidence that the structure is no longer airworthy;

(b) It is possible satisfactorily to inspect aircraft for condition;

(c) Casein glued structures are still to be found in good condition, and foreign aircraft are still being manufactured with similar glues;

(d) Pre-war gliders (e.g. Kite 1) have been inspected and found to be sound, and their C's. of A. have been renewed;

(e) Up to now, sailplanes found to be unairworthy by virtue of age alone, have almost certainly been manufactured to inferior standards.

Poor glue is merely one of a number of possible sources of unairworthiness in wooden aircraft. Others which come to mind are: unsuitable timber, poor detail design leading to stress concentrations, and difficulty in detecting compression failures. Likewise, other materials (metal, glass fibre) each entail their own specific problems which are different from those of wood, perhaps no less severe, but seemingly amenable to suitably designed inspection procedures. There seems to be little case for regarding glue as a more insidious or intractable source of unairworthiness than the other possibilities mentioned above.

Bearing in mind the above remarks, the B.G.A. Technical Committee does not regard glue deterioration as a major problem in gliders constructed by reputable British or foreign manufacturers when the gliders have been kept reasonably well in temperate conditions and regularly inspected and maintained.

The possibility of glue deterioration or failure becomes more significant when:

(i) A glider has been manufactured by an organisation known to use poor techniques, or

(ii) The manufacturer and the previous history of the glider are both unknown (e.g. some wartime-built gliders), or

(iii) The manufacturer is reputable but the glider has suffered from poor treatment.

In the interests of potential buyers, the B.G.A. Technical Committee made the ruling published in SAILPLANE AND GLIDING for April, 1963 (page 102).

In accordance with this ruling, and paragraph (a) above, the B.G.A. Technical Committee will, in exceptional circumstances and after a thorough inspection, consider the certificate of old foreign gliders newly imported into the United Kingdom. But the inspection must be very extensive, so that the inspector is satisfied that all parts of the structure are sound, including those which may normally be inaccessible. Such an inspection may well be more costly than is warranted by the value of the machine, even if it is found to be in airworthy condition.

F. G. IRVING,
Chairman, Technical Committee,
British Gliding Association.

December, 1965

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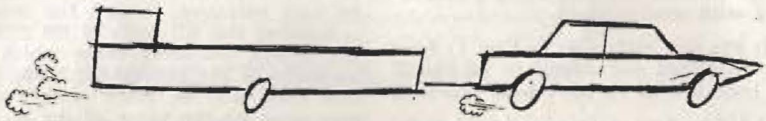
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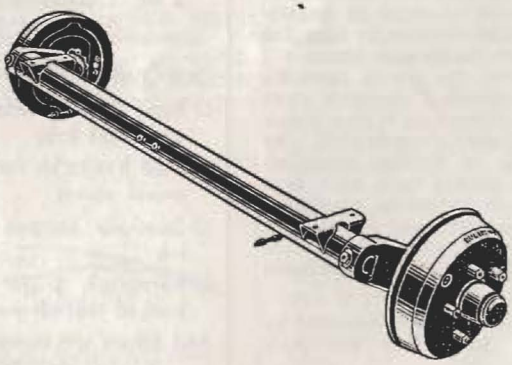
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DRAG REDUCTION IN SAILPLANES

BY DR. F. X. WORTMANN

The original paper was presented at the 1965 OSTIV Congress at South Cerney, Britain, and was published in German in the "Ostiv Section" of the November and December 1965 issues of the **Swiss Aero Revue.** *This translation has been approved by Dr. Wortmann prior to publication here.*

MORE than any other aircraft the sailplane relies on a low resistance to airflow.

To reduce drag is nearly as difficult as saving money, and often involves, especially in sailplanes, work requiring great effort, because, unlike in all other kinds of aircraft, the drag must remain small at both high and low speeds.

Furthermore, an effective reduction of drag cannot be achieved by just one single measure, such as the use of suitable laminar profiles alone. It is, rather, the total sum of many small improvements and troublesome detail work, if the result is to show any clear improvement over and above the levels currently being achieved. It may therefore be useful to set out the simpler possibilities of drag reduction which may, especially in the second half of this article, be of interest to sailplane pilots.

General Review

Before one discusses drag reduction it is as well to have an idea of the magnitude of the individual contributions to the overall drag, in order to establish the influence of a particular improvement on the overall performance. Figures 1 and 2 give such an example for a sailplane such as the Ka–6, Figure 1 as a speed polar, and Figure 2 in the form of a lift-drag polar. Both Figures give information as to the effect of drag change in a given lift or speed range. Unfortunately they are only valid for straight flight, not for circling flight.

The influence of these two flight conditions in combination shows up primarily in the cross-country speed, which therefore is the proper criterion for the optimum design of a sailplane. Another useful criterion may be the longest distance which can be achieved over the whole day in prescribed weather conditions.

But we are not considering the problems of design here; and drag reduction will only be taken in the restricted sense of designing for low drag in each separate detail.

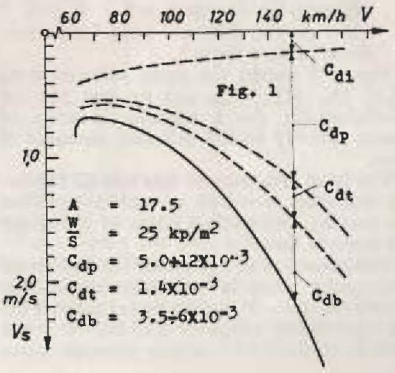
However, a pointer here will not be out of place.

In the case of a drag reduction of $\Delta C_d = 1 \times 10^{-3}$ in the high-speed range, for example with a C_L value of 0·2–0·5, the cross-country speed increases by around 4‰ and this practically regardless of thermal conditions. An equal drag saving in the low-speed range, for example with a C_L value of 1·1–1·3, reduces the rate of sink by around 2·5 cm/s.

The effect on the cross-country speed is strongly dependent on the rate of climb: with an average climb of $V_{cb} \approx 0{\cdot}5$ m/s the percentage gain is about 4% on the cross-county speed, with $V_{cb} \approx 1$ it is reduced to 2·2%, and with $V_{cb} \approx 2$ m/s to 0·5%. This means that a saving of drag in the high-speed range (this refers to cross-country speed in better thermal conditions) is 2–8 times as valuable as in slow flight.

Wing Planform and Twist

In Figures 1 and 2 the induced drag is shown for a wing with aspect ratio A=17



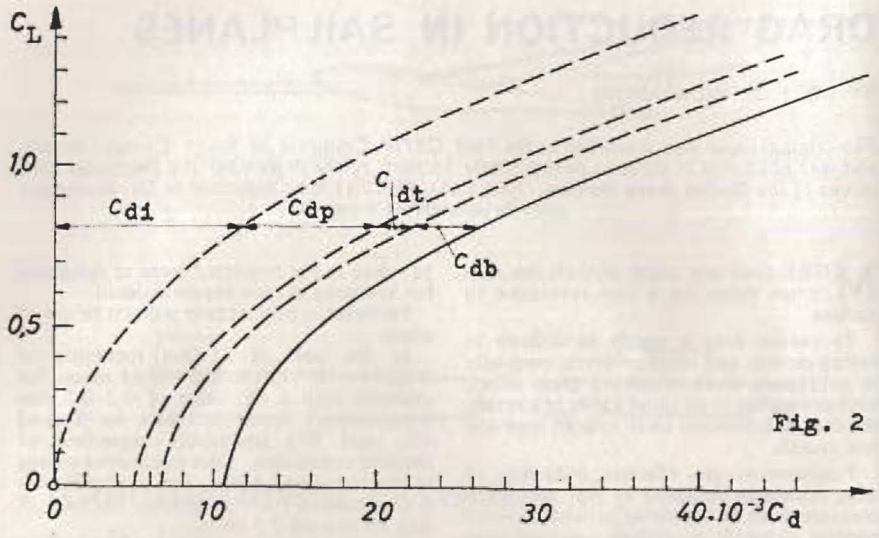


Fig. 2

with elliptical lift distribution, which as is known, will be obtained at all angles of attack only with elliptical planforms.

For practical reasons however, one avoids the elliptical planform and chooses instead tapered, double-tapered or rectangular-tapered (rectangular inner wing with tapered tip) planforms.

The aerodynamic advantages and disadvantages of such planforms will be mentioned briefly in this article, but two questions come to the fore:—

By how much does the induced drag increase as against the ideal case of an elliptical lift distribution?

How do the different wing forms perform in slow flight?

Figure 3 shows the extra induced drag ΔC_{di}, i.e., (C_{di}—$C_{di,\,ell.}$) against the lift coefficient C_L for a rectangular wing of aspect ratio 15 with 3 different amounts of twist.

The twist sequence, in this and all following examples is shown in such a way that the leading and trailing edges of the wings are straight lines.

One observes at once that the untwisted rectangular wing is especially unsuitable. A twist of $\varepsilon = -3°$ would be favourable for the high-speed range of C_L 0·2—0·3 but already at $C_L = 1{\cdot}17$ would give an extra drag of $\Delta C_d = 2 \times 10^{-3}$. [Negative values of ε represent wash-out.] [Ed.]

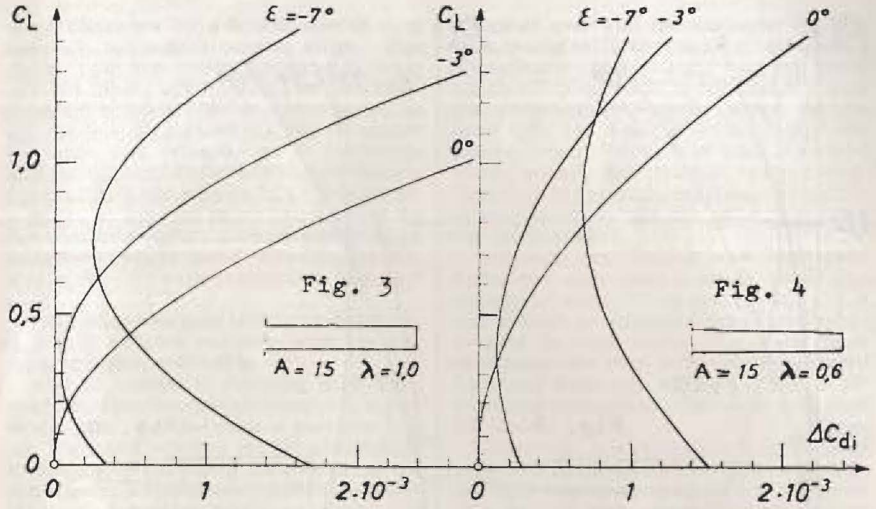
The larger twist of $\varepsilon = -7°$ must be rejected as it produces at high speed a $\Delta C_{di} = 1 \times 10^{-3}$, which increases the sinking speed in Figure 1 at 160 km/h by about 23 cm/s or reduces the effective aspect ratio of 17 to about 7.

A really practicable compromise is therefore hardly to be found with a rectangular planform.

Figures 4 and 5 show the extra induced drag for simple tapered wings with the same angles of twist.

With increasing taper ratio λ i.e., $\left(\frac{\text{tip chord}}{\text{root chord}}\right)$ the ΔC_{di} curves become correspondingly flatter though their minimal values become increasingly large. Comparison of these curves with each other will show that the rectangular wing with $\varepsilon = -3°$ twist, and the tapered wing with $\lambda = 0{\cdot}4$ and $\varepsilon = 0°$ twist, obviously give the least extra drag in the high-speed range; on the other hand, above $C_L = 0{\cdot}45$ the tapered wing with $\lambda = 0{\cdot}6$ and $\varepsilon = -3°$ twist will be superior.

Following on this, one should still consider whether other planforms could give even better results.



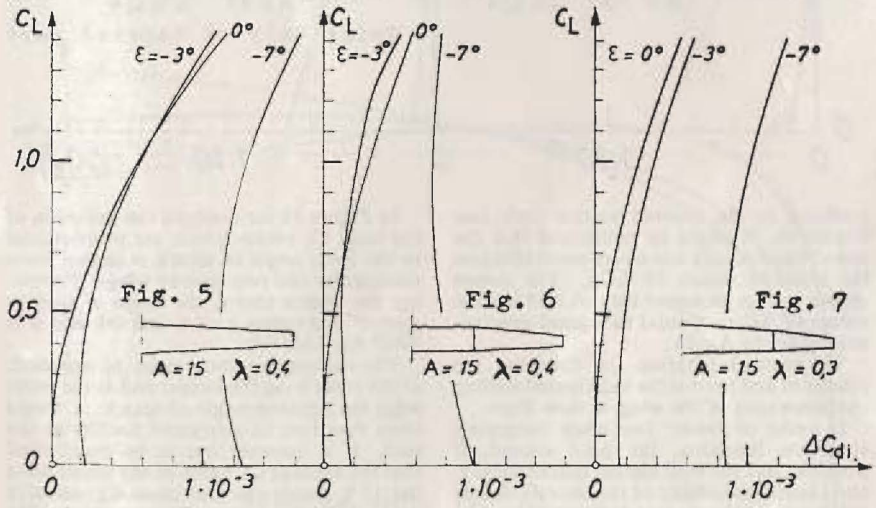
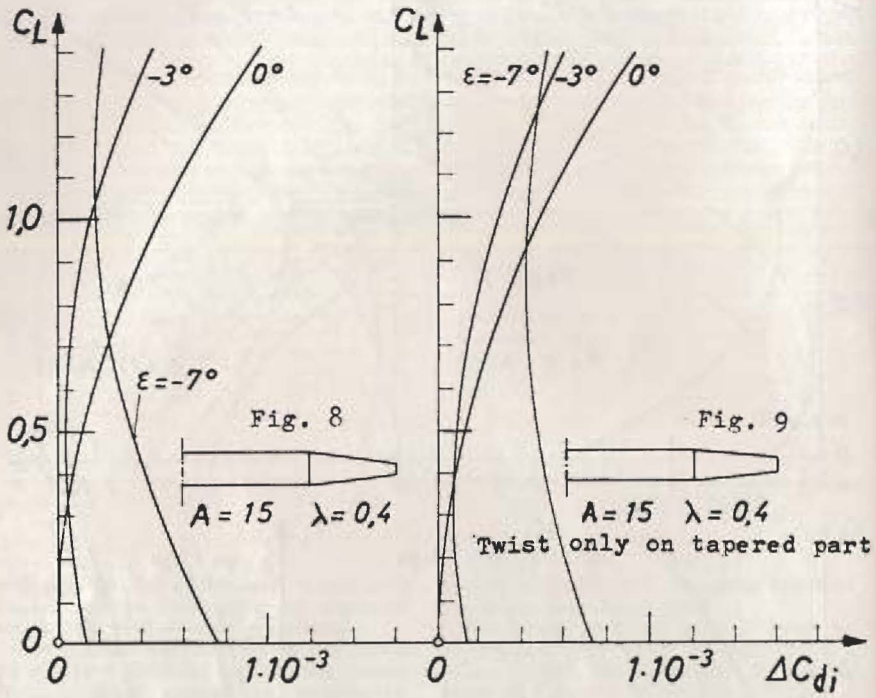


Figure 7 shows, as an example, ΔC_{di} for a double-tapered wing and in Figure 6 and 8 a rectangular-tapered wing is shown.

Without twist the C_{di} values for double-tapered and rectangular-tapered wings are always substantially lower than for simple tapered wings. With $\varepsilon = -3°$ twist the double-tapered wing is worse than the rectangular-tapered wing in Figure 6 and in the high-speed range the tapered wing with $\lambda = 0{\cdot}4$ and $\varepsilon = -3°$, and the rectangular wing with $\varepsilon = -3°$, will be superior to it.

Undoubtedly the best solution, both for high as well as low speed is the rectangular-tapered wing shown in Figure -8.

Surprisingly enough the rectangular-tapered wing keeps its favourable drag characteristics even when the twist of —3° is



confined to the tapered section only (see Figure 9). It might be mentioned that the aspect ratio A only has a very small effect on the absolute values of ΔC_{di}. The curves shown are for an aspect ratio A=15 but the values of ΔC_{di} are valid to a good approximation up to A=25.

The second criterion for choosing the planform and twist is the anticipated stalling characteristics of the wing in slow flight.

In order to render this often dangerous condition harmless, the pilot should, if possible, feel the stall almost automatically, and the controllability of the aircraft should still be maintained, even if flown below the normal stalling speed.

One should therefore ensure that the airflow at the outer wing (within the aileron region) separates later than that of the inner wing. One possibility is to choose suitable profiles for the inner and outer wing. In addition to this, a second consideration must be the effective angle of attack of a wing portion which is affected by planform and twist.

In Figure 10 for example the variation of the local C_L values which are proportional to the local angle of attack is shown for a rectangular and two tapered wings. Following the choice above, the angle of twist is $\varepsilon=-3°$ for tapers $\lambda=1{\cdot}0$ and $0{\cdot}6$ and it is $\varepsilon=0°$ for $\lambda=0{\cdot}4$.

The rectangular wing gives, as expected, at the inner wing the largest and at the outer wing the smallest angle of attack; it would seem therefore to guarantee docility at the stall. It is however not to be overlooked that the average C_L value of the whole wing lies 15% below the maximum C_L value in the middle of the wing. This means that the docility of the wing involves an overal loss of lift, in other words, a slight increase of the minimum speed is necessary.

A better compromise would result presumably with a tapered wing with $\lambda=0{\cdot}6$, while a tapered wing with $\lambda=0{\cdot}4$ and 0° twist clearly shows too large an angle of attack of the wing at about the point where the ailerons begin.

Figure 11 shows the spanwise distribution

of lift coefficient for a double-tapered wing and two rectangular-tapered wings. This shows that the rectangular-tapered wing with the taper beginning at $\frac{2}{3}$ of the semi-span will be better than any other shape, in sofar as the stall characteristics are influenced by wing plan, since it has in the whole aileron region a lift coefficient value which is lower at the inner wing by $\Delta C_L = 0{\cdot}06 - 0{\cdot}10$.

So far we have not taken into account the fact that the wing has elasticity and develops extra twist at high speed. Allowing for this, a ΔC_{di} for $-7°$ twist is shown in Figures 3 to 9.

With a knowledge of the elastic distortion it is easy to work out how large the real ΔC_{di} at high speed will be.

Also of interest is the wing with flaps, where the flaps are extended over only a part of the span. For the present purposes it is not important whether the lift distribution is changed by increasing the camber, or the chord or by a combination of both possibilities. If, for example, the wing chord is increased over $\frac{2}{3}$ of the semi-span by 20% then, owing to the uneven lift distribution, a considerable extra induced drag will result which will be about 30% in excess of that of the untwisted rectangular wing. At the same time the angle of attack within the aileron region (compared with untwisted wings) will be greater than in the inner wing. Therefore in sailplanes the change of camber or wing chord should, if possible, run along the whole span.

Although for circling and high-speed flight one only need consider small flap changes of about 15° up and 10° down, it is still difficult to safeguard the aileron effectiveness in slow flight. We know from experience that even with simple cambered flaps and Reynolds numbers $0{\cdot}5 - 0{\cdot}7 \times 10^6$ increased separations occur even with flaps 15° down.

To sum up, it is shown that a rectangular wing with a tapered tip with little twist, with the taper beginning at about $\frac{2}{3}$ of the semi-span, would give aerodynamically a very

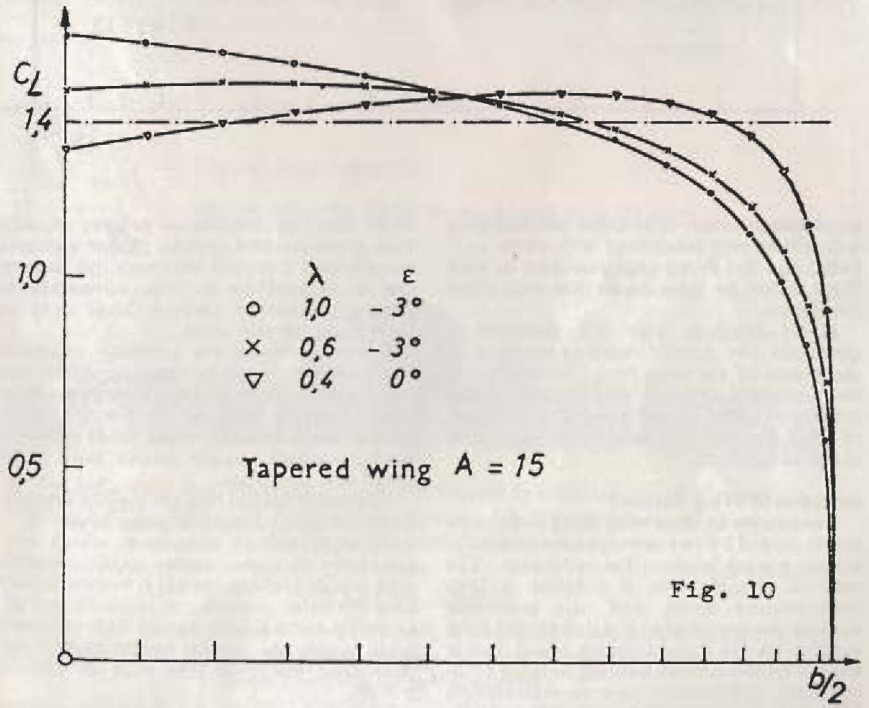


Fig. 10

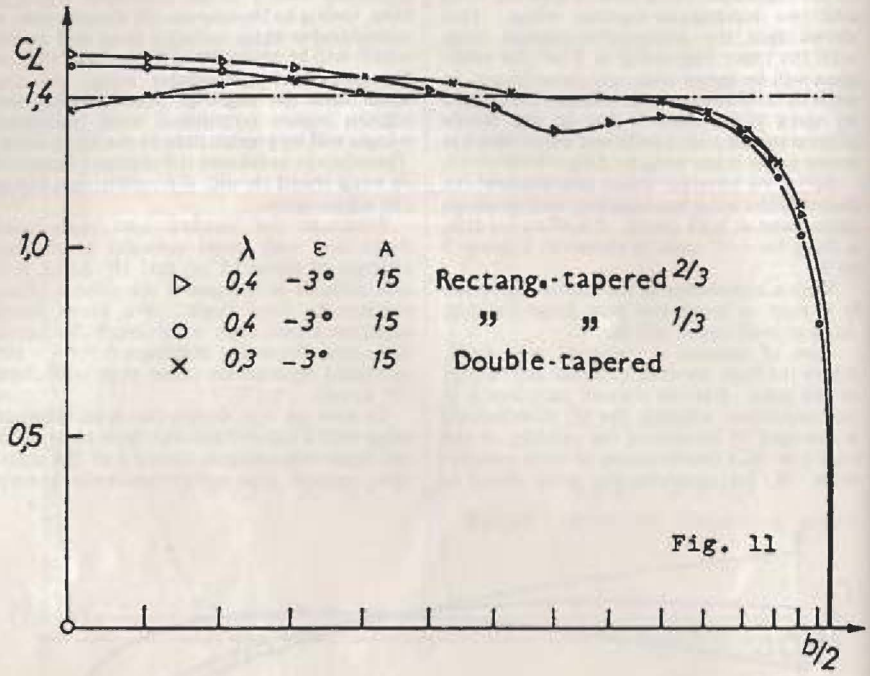


Fig. 11

good compromise. The extra induced drag will still be very small even with about —3° twist, and the flying characteristics in slow flight should be more docile than with other planforms.

A disadvantage with this planform is obviously the greater bending-moment in the region of the wing root. However it is not necessary to keep very strictly to the planforms under review here. The influence of small changes will be clear enough from the data supplied.

Selection of Wing Sections

Even more so than with wing planforms one is guided by two aerodynamic factors in selecting wing sections for sailplanes. The sections should have, if possible, a high cross-country speed, and also guarantee docility in slow flight. The influence of the section on the cross-country speed is not easy to percieve when bearing in mind circling flight, and requires separate examination (See Ref. 1). Even with very different sections one can sometimes achieve equally high cross-country speeds. If for example one chooses a section with very low drag at the high-speed range, this advantage is generally removed through large drag in slow flight, or vice versa.

If one examines the currently available section polars, it will be seen that neither one nor the other gives extreme optimum cross-country speeds. It looks to be much better to use sections with extra wide laminar buckets, which equally favour both high-speed and slow flight.

A detailed reason (not taking into account meteorological details) is given in Ref. 2.

Apart from such arguments, which consider only the cross-country speed, a section with a wide laminar bucket is recommended also for other reasons: in weak lift conditions it is easier to stay up and if lift increases with height, the critical height before one must land, lies lower than with the narrow bucket.

Obviously, one can put forward a case for

sections which favour high-speed; if one assumes weather conditions with strong but widely spaced thermals. It seems however, that such conditions are rather the exception than the rule.

To use the same section throughout the span is from the aerodynamic point of view not the optimum, as apart from a high cross-country speed the section should fulfil further requirements at the outer wing.

*To obtain a docile performance in slow flight the spanwise distribution of angle of attack for all lift coefficients between zero and the maximum should, if possible, be greater over the inner wing than over the outer wing, and above the maximum the lift coefficient should fall off as gradually as possible. Finally, the outer wing section should not have a sharply defined laminar bucket.

At high speed, owing to the elasticity of the wing, it could be that the outer wing could reach such a low C_L value that it falls out of the laminar bucket and becomes a very active brake. When circling tightly the same sort of danger threatens the outer portion of the inner wing, this time however by reaching too high a lift coefficient. Above all however, the aileron efficiency should not be lost through an unlucky choice of sections.

Such extra and opposing desires are not easily obtained without some penalty to the cross-country speed, especially as the Reynolds numbers of $0{\cdot}5–1{\cdot}0\times10^6$ in the outer wing are already rather small. A comparison of a few wing sections, whose measured polars give high cross-country speeds, and which seem to satisfy a few of the above requirements, has been given in Ref. 2.

*Note:—In the German text, "inner wing" and "outer wing" are transposed in this sentence.

References:—Ref. 1. Summary of the influence of the airfoil polar on the performance of sailplanes by Dr. F. X. Wortmann and K. Schwoerer. Ref. 2. Some laminar profiles for sailplanes by Dr. F. X. Wortmann. English translations of both articles appeared in *Soaring*, January, 1964 pages 6 and 14. (See also OSTIV Publ. VII.)

(To be continued.)



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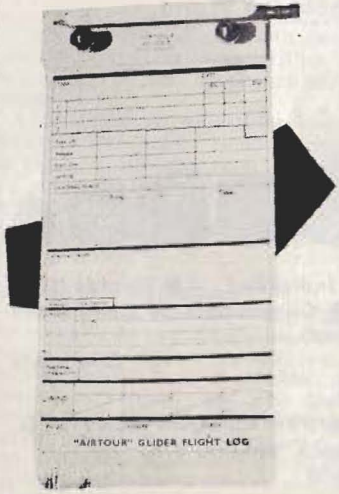
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NOT SO MUCH A SKYLARK, MORE A WAY OF LIFE— OR THAT WAS THE WRECK, THAT WAS!

By MARTIN SIMONS

With acknowledgements to the London Club Gazette

SOME time in 1964 a pilot at another club, flying a syndicate-owned Skylark 2, had his air brakes come open when he was just crossing the boundary of the airfield on aero-tow. Presumably he had not checked them before take-off. He mistook the sudden loss of urge for a failure of the tug's motor, and promptly released himself. The glider, with brakes still open, descended rapidly and cartwheeled along the road which ran close to the field. A couple of cyclists reached the ditch in time, and were available to help the pilot take his first few shaky steps, after they had brushed him down and got the little bits of plywood out of his hair. The tailplane and rudder of the Skylark were undamaged, but the ground crew broke the rudder when they put the wreckage into the trailer.

There remained a good, if rather solidly constructed trailer, some instruments, including artificial horizon with transistorised invertor, Crossfell electric and P.Z.L. variometers, A.S.I., turn and slip, a damaged altimeter, an elderly parachute, and a perfectly good tailplane. I answered the advertisement in SAILPLANE AND GLIDING and viewed the wreckage in early March last year. It didn't look very promising, but having had advice and offers of professional help from Vic Ginn, I bought the lot.

The port wing-tip simply did not exist. There wasn't a single serviceable rib, the main spar was broken across in two places, the aileron was in two entirely separate pieces, and the rear wing spar was still attached to the two bits of aileron. The other wing tip didn't look too bad from outside, but it, too, had damage to the main spar at both ends, and there was a nasty five-foot long crack in the leading edge ply. The centre section had the main spar broken near the fuselage attachment fittings, and untidy-looking pieces of rib and ply at the tip attachment points. A good deal of the fuselage was stuffed into a tea chest. The rest of it, from the trailing edge of the wing to the fin, was in reasonable shape. One thing you don't very often get an opportunity to inspect is the inside of a rear fuselage without cutting off chunks of plywood.

The glider's logbook proved that it had had quite an adventurous life. Derek Piggott once took it up to 23,000 ft. in cloud, without oxygen. He was struck by lightning several times (see S. & G., October, 1955). At least one Gold distance had been done in it, and any number of Silver C's completed. It had also been flown less skilfully on a number of occasions, but never quite so extensively damaged as now. Most of its life it had belonged to the Surrey Club, and

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rejoiced, if that is the word, in the name Phoenix (not to be mistaken for another aircraft of the same name, of Teutonic origin). Appropriately enough, the Phoenix is a legendary bird which, after writing itself off in a blaze of glory, invariably gets a new certificate of airworthiness and flies again, with any desirable modifications incorporated.

The machine itself is ten years old, the design somewhat older. The first laminar-flow sailplane to appear in Britain was, as far as we know, the EON Olympia 415, which was a standard Olympia fuselage with a strengthened tailplane and a laminar wing. This type was eventually developed into the Olympia 419, and from the 419 came the present-day 463 series. The second laminar type was Slingsby's Skylark 1. This had a modified Prefect fuselage and a small, high aspect-ratio wing of only 45 feet span. One of these aircraft is still flying in this country, and another went to South Africa. The Skylark 2 had a larger wing, 48 feet span, and a lower aspect ratio, so the wing loading was lower and thermalling ability improved at some cost in high-speed performance. The fuselage, of course, was cleaned up. The type was the first laminar-flow glider to be produced in quantity in England, about forty examples being built. The Skylark 3 and 4 are in direct line of descent.

The idea of rebuilding a completely wrecked glider appealed to me. Apart from being a comparatively cheap way of getting into private ownership, I felt I ought to know more about the construction and repair of gliders. Also I had become rather tired of hanging around the club waiting for the weather to improve, and decided it would be a good idea to have something rewarding to do during the off season. As it happens there has been rather a lot of off season lately. The project, however, is definitely going to take a long time.

It seemed best to begin on the wing. Vic agreed to let me use his workshop, and, where my own kit proved deficient, to supply the rarer tools. He also has done the main spar of the centre section, and is ready at all times with advice and assistance. At the time of writing, the starboard wing tip panel is virtually finished. All that remains to be done to it is to mate it with the centre section when that is ready, to make sure that the two pieces join neatly. There's nothing worse than a half-inch gap at a wing joint, unless, of course, it's a half-inch overlap which would prevent them joining altogether. The centre section is now the chief preoccupation. The spar is done, and replacement ribs, where needed, should soon be going in, then comes the ply skinning. A small amount of fitting damage will be rectified. The port tip panel is going to be rebuilt completely. A new main spar has been bought from Slingsby's, and also a new set of ribs. The old rear spar and leading edge spar have been salvaged and repaired, and so has the aileron. Once the centre section is done, that will be the next job. The fuselage has hardly been started. One reason for this is that we want to modify it.

The simplest thing to do with a rebuild is, of course, to put everything back exactly as it was before. You then have no trouble with C. of A., etc., and people can sometimes recognise the machine when they see it lying about or even flying about. However, the Skylark 2 has a number of features which seem capable of improvement. In the first place, it is *not* a full fifteen-metre span machine, though it is admittedly not far short of it. There is already, at the Bristol Club, a Skylark 2 with a wing tip extended to the full fifteen metres, and modified to the "Hoerner" shape. The idea of the Hoerner wing-tip is to increase the effective wing span, and hence the effective aspect ratio, by causing the tip vortices to form as far out as possible. On the normal rounded or squarish tip, the vortices lie several inches inboard, so that a nominal fifteen

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metres span wing is, aerodynamically, probably nearer fourteen and a half. The up-sweep on the underside of the Hoerner tip (named after the man who developed it in wind tunnels), and the squarish washed-out corner at the trailing edge, is supposed to encourage the vortex to form very near the tip, so that a fifteen-metre span is, say, effectively 14.75 metres aerodynamically. Thus, by increasing the Skylark 2's span to full fifteen metres, and incorporating a Hoerner tip, we may get the equivalent of another eighteen inches or so of span. At least, that is the theory.

The fuselage modifications, which may or may not be incorporated, are a little more complicated, and some re-stressing will be necessary. Generally the idea is to improve pilot comfort and vision, and to improve streamlining. The fuselage neck, which, as on the Skylark 3, carries the wing, will be cut down so that the wing sits six inches lower. It should look rather like a "4", but the "2" fuselage is less deep aft, so there will be some careful filleting. The pilot will recline somewhat, as in the "4", and a Dart canopy will be fitted. The improvement in performance which, in theory, should result from the general cleaning-up of the nose (the standard Skylark 2 canopy is rather bulbous so it must create some extra drag), and the reduction of fuselage cross-sectional area, is probably so slight in practice that it is almost negligible. A more profitable approach would be to reduce the angle of incidence of the wing, so aligning the fuselage with the airflow at some selected speed, say 50 knots. The machine at Bristol, mentioned above, has this modification, and we are still hoping to have more information from the designers about it. The snag, of course, of such incidence changes is that take-off becomes more difficult, the tail tending to drag along the ground. However, one or the other of these modifications, or even both, will be tried.

When the glider is finished, but before the covering is put on, there will probably be some attempt to smooth the wings, to get a true profile, and to seal gaps where they occur. Smoothing wings has not, so far as can be discovered, been tried in this country before, though it is common practice in the U.S.A. The main defect of this Skylark wing (and this applies, one suspects, to most Skylarks, including "3's" and "4's") is the slight hump and hollow where the ply skin passes over the main-spar. This probably, at higher speeds, causes a certain amount of drag. The laminar boundary layer breaks down prematurely if the waviness of the wings is too great. By filling in the hollows with a fascinating substance composed of Araldite resin mixed with micro-balloons (minute plastic bubbles) it ought to be possible to improve the flow to some degree. Again, the improvement will not be very large, since the Skylark wing, with its gaboon ply skin, is remarkably free from waviness where it really does count, in front of the spar.

The sealing of gaps is probably even more important. The main gap causing both increased drag and reduction of lift is the one formed by air brakes and spoilers. Even when closed, there is a gap through which air can, and does, pass from lower surface to upper surface of the wing. To seal this is very difficult. People have tried taping the brakes shut, but then they won't open

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when they are needed. Other dodges have been suggested. The best answer would be some kind of rubber seal that is airtight when the brakes are closed, and yet could not in any way interfere with the proper action of the mechanism.

The answer probably lies in the subtle use of a liquid, room-temperature vulcanising rubber compound known as PR 1221, produced by British Paints Ltd., though to design a good seal for the particular form of gap which occurs in a Skylark spoiler box is not very easy. We shall see what can be done.

It will be much easier to seal the gap where the wing panels join, but this is probably less drag-creating anyway, and it won't make a lot of difference either way. Similarly, sealing the cockpit canopy will be very much better done with PR 1221 than with the usual strips of sponge plastic, which come off in time, and, according to one American source, are not at all airtight either.

Whether all the modifications will actually be completed, or whether someone gets very impatient and anxious to get the thing into the air sooner, remains to be seen. If we do carry out all the improvements mentioned, although each taken alone can only have a small effect, the combined results might be quite noticeable.

The one question which everyone asks is, how long before it is finished? I should like to know that too.

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1965 KRONFELD AVIATION ART EXHIBITION AND COMPETITION

BRIEF details and prize winners were given in the December issue. Sir Dermot Boyle, G.C.B., K.C.V.O., said in his opening speech it was remarkable that so many excellent paintings should have been produced so soon after the South Cerney exhibition. Only one or two of the 150 exhibits have been seen before. The number of artists painting gliders have risen from two or three to over a dozen. The judges to whom we are once again grateful, David Shepherd, Roy Nockolds and Gerry Davison Coulson, had a tough time selecting the winners in the oils section.

Roy Nockolds, whose painting of a Hawker Hart in acrylic colour won the professional section, gave a most instructional lecture to artists halfway through the exhibition on the use of this new and exciting medium. 600 people visited the exhibition and 22 exhibits were sold.

The next exhibition is scheduled for the Biggin Hill Air Fair from the 12th-15th May, 1966. Apply to Yvonne Bonham, 14 Little Brownings, London, S.E.23, for details.

* * *

The Christmas Party on the 22nd December was attended by over 70 members and friends who enjoyed a turkey buffet prepared by the Social Committee. Harold Drew has been working very hard to complete the bar extension which will be used to provide better snack-bar facilities. A new record-player and radio have also recently been purchased for the lounge and it is hoped to get together a collection of club records. Anyone having records to dispose of, is asked to contact the Social Committee. A new fan and heater have also recently been installed in the lecture room, which adds greatly to comfort in that room. The gentleman's toilet is also having a New Year long-awaited face lift.

The series of instructional lectures are now well under way. Fees are 4s. 0d. a lecture but there is still time to book for lectures in advance and so qualify for special rates. Lectures for the next few weeks are as follows:

Y. C. B.

Lectures on Mondays at 8 p.m.

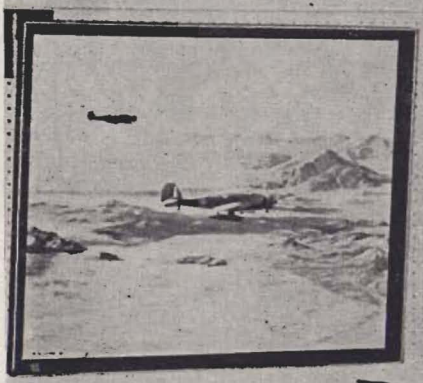
Jan. 31. Away Landings, by Lorne Welch.
Feb. 7. Navigation and Map Reading, by John Neilan.
„ 21. On Becoming a Private Owner, by David Carrow.
„ 28. Accident Avoidance, by Paul Minton.
Mar. 7. Instrumentation in Gliders.
„ 21. Competition Flying, by John Fielden.
„ 28. More Advanced Meteorology, part 1.
Apr. 18. As above, part 2.
„ 25. Trends on Glider Design, by Keith Chard.

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

Feb. 2. More Hazards of Aerospace Journalism, by Ken Owen.
„ 9. Talk and time-lapse film, 'Wave clouds at Colorado Springs', by W. E. Malpas.
„ 16. The aircraft called 'Seventy'. History of XB70.
„ 23. Weather and locust control, by David Pedgeley.
Mar. 2. Seat ejection, by Gp.-Capt. A. J. Barwood.
„ 16. British air power (slides), by N. Crosby and T. Gender.
„ 23. Battle of Britain, film.







AT KRONFELD ART EXHIBITION

▲ *Sir Dermot Boyle opening the Exhibition.*

▼ *'Alex' Orde talking to Margaret Kahn and Yvonne Bonham.*

OPPOSITE PAGE: *Norman Hoad, this year's winner of the Challenge Trophy.*

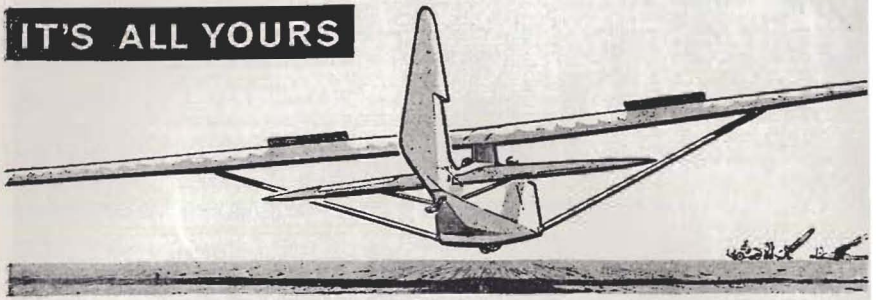
Photos by John Blake







IT'S ALL YOURS



THE first C.F.I. Conference was held at Lasham from 12th to 15th November. Ninety instructors from 47 clubs turned up, and those who could come on the flying days of Friday and Monday did some 70 flights, mainly aero-tows, in the seven gliders of five different types. In addition to the main sessions reported in the last issue, Roy Procter talked on the new Mitchell-Procter Kittiwake tug that he is building, and there were sessions on using powered aircraft to help speed training, and the training of instructors. Nick Goodhart discussed airspace problems, and Lionel Alexander was available to help clubs with site problems.

The main lectures covered wide aspects of the instructor's work, and two of them are printed in the following pages.

Finally, I would like to thank all those who came and helped to make the Conference a success, particularly those who contributed gliders, and lectures.

ANN WELCH

THE AVOIDANCE OF INADVERTENT STALLING AND SPINNING

By JOHN EVERITT

IT has been well known for many years that when the wing of an aircraft is no longer producing the required amount of lift, the aircraft will lose height. If the wing loses a large proportion of its lift suddenly, such as occurs when the wing stalls, the loss of height can be considerable and the rate of sink will depend on the proportion of the lift lost. In order to regain the lost lift when this occurs, some energy has to be provided in order to accelerate the aircraft; in the case of gliders this can only come from gravity, which means again "more loss in height".

It has also been known for many years that a given wing will stall at a given angle of attack, which is the angle of the chord line of the wing relative to the air which is flowing past it, and that this angle of attack is not necessarily reached uniformly along the wing — spanwise, that is. Consequently it is quite likely that the wing on one side of an aircraft may well stall before the other.

When this happens, we have the ingredients for autorotation or the spin. When the spin occurs, the aircraft will lose height rapidly, as in the simple stall, before recovery can be effected, with the added complication caused by asymmetric drag loads causing a larger loss in height and rotation about the vertical axis.

All this is old stuff and we spend a good deal of our time teaching pupils to recognise the classic symptoms of the onset of a stall and ensure that they can recover at any stage; whenever possible we extend this exercise to full spins. When these exercises are well taught and the pupil understands the object of them, we are able to *almost* eliminate the old-fashioned type of stall and spin accident where a pilot, through

sheer ignorance, allows his glider to reach this state and through sheer ignorance is unable to recover.

However, even in the elementary stage these exercises are not always well taught, mainly because the instructors concerned are not fully aware of the "object of the exercise", which is how to avoid an inadvertent stall or spin. It is not, and must never be, an academic exercise on its own carried out to give the pupil, and sometimes the instructor, a bit of a thrill, and must be related to reality. Stalling cannot be covered by one, two or three simple exercises. All aspects should be covered with particular emphasis on flying at and near the stall; certainly steep stalls should be included, but as well as, and not instead of, the slow creeping ones, some with brakes in and some with brakes out.

Care should be taken to illustrate *all* the symptoms at and near the stall, the fact that the stall occurs at varying speeds and involves varying losses of height and rates of sink. the view, the sound, the feel, the buffeting, if any, the increase in rate of sink, the ineffectiveness of moving the stick back and the rapid loss of height, etc. This all takes time and must not be glossed over in a misguided effort to shorten the pupil's training period.

Along with the practical side of this, it must be ensured that the pupil understands the objects of the exercise, which is the fact that he does not allow his glider to stall when he is close to the ground, because it needs height to recover. This necessitates a certain amount of talking on the ground, the use of a blackboard and chalk, etc.

All this applies equally to the spin. If we treat it as of academic interest, we tend to run through the classic symptoms and the classic drill only; very often the pupil is taught that if the glider is flown too slowly in a turn a spin *will* result. It does not take an intelligent chap long to realise that this is rubbish. In fact, in most gliders, if we merely fly too slowly in a turn the result will be a loss in height from the sideslip which develops. Add this to an increased rate of sink due to the brakes being open, and an increased rate of sink due to wind gradient, and one is led to the conclusion that the rate of sink can be very high indeed long before the glider spins. If we consider for a moment a total rate of sink of about 1,500 ft./min. when the ground is met, it becomes fairly academic which way the glider is pointing and what actual manoeuvre it is performing at the time.

Our job is to make sure that the pilot is *thoroughly* familiar with the behaviour of his aircraft at and near the stall, and this means in straight flight and turns, with brakes in and with brakes out, in calm air and disturbed



The lectures were well attended.

Photo: Sally Thompson

air, with well, and with poorly co-ordinated controls. Having done this, it is our job to make sure that the pilot appreciates that, at any time when one wing stalls first, a spin *may* result, and that at any time one wing *may* stall first because this is something over which he does not have full control — it may happen through misuse of controls, through being in a turn at the time, or through some outside influence such as a gust or wind gradient.

At the elementary stage we must make sure that all this is thoroughly absorbed. It takes time — there is no short cut. We must also appreciate that it is not always easy for the pilot to relate the lesson to reality, because we can only demonstrate and practise when we are well away from the ground where the loss in height is, unfortunately, not so obvious.

Some instructors have been known to demonstrate near the ground, inadvertently of course, with convincing, if expensive, results.

Basically, then, in the elementary stage we must —

(a) ensure that the pilot is *fully* conversant with the behaviour of his aircraft at and near the stall, and that he is able to recognise and recover from the situation *at any stage* including the spin, with the minimum loss of height, and that he is fully aware of the factors which may influence this behaviour. These are misuse of controls, turning, or otherwise increasing the loads on the wing, turbulence, brake setting and rate of deceleration, etc.

These are all practical things which we should demonstrate and he should practise, and —

(b) having done all this, we must make him aware of the hazards of wind gradients and turbulence near the ground.

This is essentially a talking job and is all too often overlooked.

When all this has been done, we are still only some way through the elementary stage, and the next part of our job, one thing that is generally missed, is to relate this to reality, and to all the rest of the pilot's training. For example, we may spend a good deal of time ensuring that the pilot is aware of the consequences of misuse of controls, at or near the stall. This is fine, but it will help him not one jot if he is unaware of his misuse of controls. So a pilot who cannot fly reasonably accurately may well have trouble. A pilot who has learned to co-ordinate his controls in normal circumstances may be unaware of his misuse of them if he is confused by the wind and its effects and fails to allow for drift. In the confusion of a badly planned approach his basic handling of the glider may well go to pot unnoticed.

Again, we may spend a good deal of time on stalling in turns, generally without producing a spin, and ignore the effect of disturbed air on the glider in this state. How often do we hear some nitwit saying about a particular glider that "you cannot make it spin"? This, in my opinion, is one of the most dangerous things that can be said of any aircraft. It is a fact that most, though by no means all, of our gliders are constructed so that they are very reluctant even to start a spin. When at 2,000 feet in calm air we try to demonstrate a spin, the result is not very convincing; but the sideslipping manoeuvre which usually occurs at or near the stall even in our most docile glider, is accompanied by a rapid loss of height before control is regained, and when this happens near the ground it is a point of interest, only to an enquiring mind, as to whether a full spin *would* have developed if the ground had not got in the way. If we remember that the stall is determined by the angle of attack of the wing, and that this may not be always constant along the span, due to factors beyond our control, such as turbulence and wind gradient, we must conclude that the most docile aircraft under the sun will at least start to spin if sufficiently aggravated, and in any case will produce a rapid and uncontrolled loss of height.

The brake setting does not, of course, have a noticeable effect on the speed at which the stall occurs. The brakes, however, produce more drag, and a greater deceleration of the glider, which, if it is being flown a little slowly, will quickly reduce the speed, perhaps to that of the stall. It is necessary in this case to lower the nose to maintain speed,



Photo: Sa.ly Thompson

Paul Minton during his talk on accidents.

but in a steep wind gradient, with a large amount of brake, the speed may continue to fall off. The stall occurs when more lift is required from the wing in order to level out with a high rate of descent.

In a misguided attempt to make life easy for the pupil there once grew a dogma to the use of brakes, which is sometimes still preached, namely that one *must* not alter the brake setting on the approach. As stated above, a glider with a lot of airbrake, insufficient speed and a very high rate of descent, due to an unexpectedly steep wind gradient, requires a considerable amount of extra lift from the wing in order to level off. Extra lift can be obtained from extra speed, which can be obtained by lowering the nose, but this may be out of the question for two reasons — either the ground gets in the way or the rate of descent becomes even greater. The *only* other way of preventing a sudden loss of lift is to reduce the brake setting. Such dogma is a substitute for proper instruction.

It used to be the custom, and still is to a certain extent, that instead of teaching the pupil all this, we ran quickly through the relevant exercises, told him quickly about the bogeys of stalls, spins and wind gradients, and then overcame all the problems by making him fly very fast, increasing his speed in turns, never using more than half or quarter brake and telling him that too much speed on the approach was a good thing, and all sorts of rubbish. These are substitutes for instruction, though in bygone years they made sense. To start with, there were no two-seaters to give instruction on, and then if you made someone fly too fast in a Grunau Baby, not much harm would result; it was quite difficult to inadvertently fly that type of glider 25 knots too fast, and if you did, its performance at that speed would limit the distance travelled on an approach. We now, however, have gliders in which it is *quite* easy for the pilot to inadvertently fly 25 kts. too fast on an approach, and if we ally this to a lack of skill regarding the full and proper use of airbrakes, we get some startling results. First, we find on windy and turbulent or rough days, when the higher approach speeds are required to overcome our stalling and wind gradient troubles, many pilots are approaching at something in excess of the placarded "Rough Air Speed". Then we find that, with too much speed and not enough brake, plus the doctrine that the brake setting should not be altered, instead of landing 300 yards down the field as in the case of the Grunau pilot, our modern chap in a Skylark, Dart, or something, would in fact cover several of the upwind counties if only there were no obstructions.

If we teach the pupil properly about stalling, spinning, wind gradients, brakes, etc., we also overcome this sort of difficulty.

The next step in avoiding stalling and spinning type accidents is to ensure by adequate supervision that the solo pilot puts into practice the principles we have

taught him. We must make sure that he is familiar with the behaviour of every glider that he flies when it is at and near the stall. We should frequently check to make sure that he remains aware of all the associated factors. Practice should be carried out solo, even for fairly early solos at least up to the incipient spin stage, provided that we are sure our early lessons have been absorbed, and providing they are carried out at a suitable height.

I believe that it would be a good thing if ultimately all pilots carried out full spinning exercises in every solo glider that they fly, but I do not consider this to be essential. I do believe, however, that practice should be carried out, through the range of stalls and incipient spins. It is up to C.F.I.'s to ensure that the instruction is carried out properly; it might literally prove fatal to encourage pupils to practise incipient spins if their basic training were inadequate, and it should be borne in mind that on any glider the stalling characteristics can be altered by the weight of the pilot involved.

To sum up, the pilot must be able to recognise the onset of, and be able to recover from, any stage of the stall or spin. He must be able to fly the glider well enough to avoid having the symptoms disguised for him and he must have a reasonable standard of airmanship, competence regarding approach planning, and acquaintance with the wind and its problems to ensure that the symptoms are not hidden from him.

Even when flying solo he should be frequently reminded of all these things.

* * *

We will now have a look towards some of our recent stalling and spinning accidents. First a few generalisations. Some of the worst of these accidents have happened to experienced people who have already demonstrated their competence to recover from a stall or spin at any stage, including instructors. Some of these have been accidents where the glider has literally spun into the ground; some where the glider has been in the very early stages of a spin and has smitten the ground or obstruction whilst side-slipping in a partially stalled condition. Some have been the sort where the glider has not spun into the ground but has spun into the soup, i.e., recovery has been effected but the unplanned and uncontrolled loss of height has made it impossible to avert disaster.

The large number of accidents, some trivial and some serious, which involve stall and incipient spin, and their near cousins — the heavy landings due to too much brake — steep wind gradients and the like, we can reduce to the minimum by thorough basic training, and this is fairly obvious. The very serious ones which I have just been talking about would bear a closer look. Why should a competent pilot, or an apparently competent pilot, have this sort of accident? In all cases the pilot has failed to recognise the symptoms leading to the event. This is probably because he learned that a stall or a spin is a positive thing that you do, and not something that can happen to you; worse, if he has learned how to make a glider stall or spin in a positive way, he may well believe that a particular glider will *not* spin. Consequently he is unable to relate the exercise to reality, and when a stall, partial stall or spin is initiated by some outside influence, he will be taken by surprise. The moral is thorough basic training, complete familiarity with the aircraft at and near the



Photo: Sally Thompson

John Fielden on Contest flying.

stall, *and* a thorough appreciation of *all* factors involved. When taken by surprise with a spin near the ground, the loss of height may well render the ability to recover from a spin completely valueless. There is no cure at this stage — only prevention.

When the instructor is not 100% familiar with the aircraft, it is little wonder that the pupil or pilot lacks basic training. Something like 90% of instructors who have attended B.G.A. courses have *never* stalled a glider with the brakes open. Some long time ago I met an instructor who asked me who was the fool teaching pupils to recover from the stall with the minimum loss of height. I pointed out that I was probably the fool concerned and then flew with three of his pupils. On being asked to fly as slowly as possible without producing a stall, one after another, with one eye glued on the a.s.i., they each proceeded to fly 5 kts. faster than hitherto. On being asked to stall the glider at this stage, they each started by lowering the nose, building up speed and producing a semi-aerobatic type manoeuvre. What chance they would have had of recognising an inadvertent stall, I do not know.

Any pilot is liable to be taken by surprise and fail to recognise the symptoms if he is confused, and he may well be confused, due to unexpectedly severe turbulence or downdraught, inability to plan a sensible approach, inability to fly reasonably accurately, or lack of familiarity with his aircraft. All of these factors will be exaggerated if the pilot is in strange circumstances, such as a cross-country landing, poor visibility, heavy rain, or he is tired after a long flight. It will be seen, I hope, that even very thorough instruction on stalling and spinning will not help if the exercise is not related to all the other basic training, which should be equally thorough and geared to avoid having the pilot taken by surprise.

Since most of these accidents happen during the approach stage, we have so far been discussing stalling and spinning in relation to this part of a flight. We must, however, relate all this to other parts of the flight where a hazard is presented. For example, most of the stalling problems connected with an approach are to be encountered whilst hill-soaring, and we have a fine crop of accidents whilst pilots (otherwise competent) are flying on a hill. Unwarned, the average pilot will not relate his previous training to these circumstances. Only briefing and discussion will prevent these accidents.

Again, going back to the start of each flight we have had a series of serious accidents when spins have occurred during a faulty winch or car launch. In this case, not only does the pilot fail to relate the possibility of stalling and spinning to this stage of flight, but the situation is aggravated by the almost standard and quite wrong doctrine preached that "when the launch is too slow you rock your wings". To do so, of course, is courting disaster, and it should be made quite plain that if a launch is so slow that you cannot climb, the first thing to do is to lower the nose to maintain adequate speed, before attempting to give a signal.

To finish off, I should like to quote a pilot's report after a spinning accident; he was injured and the glider was written off; the report sums up our problem pretty well. It says:—

"Having suffered a cable break at the 'awkward' height, I carried out the normal procedure, i.e., turned across wind and appraised the situation. As I was at about 150 ft., there appeared to be time to do a short circuit, so I started a fairly steep turn to the right. I estimated speed at about 40-45 knots, but when I was about half way round my turn my lower (starboard) wing suddenly flicked round with no warning whatsoever and I found myself diving straight at the ground with no time for recovery. It took me very much by surprise, since the aircraft had never shown any tendency to spin off a turn and I had often completed slowish steep turns at safe altitudes with no ill effects. I suppose I must have let my speed fall off, but I was unaware of it and eye witnesses have said that it was not apparent from the ground, neither was the attitude unusual before the spin started. In my own mind I am certain that the major factor was the wind gradient, which I believe can be very considerable near the hill with the wind prevailing on that day."

TEACHING THERMAL SOARING

By JOHN WILLIAMSON

A great deal of thought is put into training glider pilots to solo standard, and a lot of supervision is needed to see them safely through to the cross-country stage, but it often seems that training in thermal soaring techniques is too often neglected. This neglect is often the result of a shortage of two-seaters which are usually sorely needed for the basic training. While it is agreed that basic training provides the very life blood of any club, the advantages of formal training in thermal techniques are such that diversion of the two-seaters for this task for part of each soarable day is well worth while. Nearly all pilots will eventually teach themselves to soar in thermals. The object here is to examine ways by which to ensure that club pilots are taught to soar accurately and with some certainty, at the earliest possible stage of their training.

WHY SHOULD WE TEACH THIS?—It is quite illogical to stop a pupil's training just as he is about to take the biggest and most exciting step of all — breaking loose from the circuit. To neglect this step may be to frustrate the pupil, unless he is fortunate enough to get gobbled up by a thermal in his early solo days. Many pilots, particularly at small sites without hill lift or aero-tows to help, can wait for months for their first real soaring trip.

Examples that my own experience include are a young chap, flying quite well, who just couldn't get the hang of soaring. After two hours in a T-21 he was off like a shot, and had Silver C within a month. He was just unable to appreciate the *feeling* of a thermal. On another occasion, at a site where the sea breeze all too often blows, the wind one day stayed wonderfully off shore. Three different pupil pilots were taken up, rather luckily into decent thermals each time, given an hour each, and each of them got his C that day. The loss of the two-seater from the basic training rôle was well compensated by the raised morale of the three in particular and the club as a whole, as well as by the chance of increased soaring revenue in the future. Clearly, the greater the proportion of pilots in a club who can soar, the higher will be the *sailplane* utilisation, and the revenue.

WHEN SHOULD WE TEACH SOARING?—A pupil cannot assimilate a new technique of any sort before he is ready for it. Just as he cannot reasonably cope with an approach and landing until he has got a good grasp of control co-ordination, so he cannot give his mind to the quite difficult art of interpreting variometer readings and sensations of vertical movement until he can fly his glider confidently and smoothly in accurate turns, and can make changes of direction cleanly without conscious effort. It follows, then, that thermal soaring training, as such, should not normally be given before a pupil is solo. Thermals may always be used, of course, to lengthen a basic training flight, but it is doubtful whether the pupil has much idea of what is going on. The average pupil is ready for soaring training after about 50 solo flights or, say, 10 hours' total experience. In addition to handling the glider competently, he should also have been taught to fly at the correct soaring speed for the type, i.e. about 7-10 knots above stalling speed, and must be absolutely confident in his own ability to cope with inadvertent stalls or incipient spins, should these occur in the often quite turbulent air of the thermal.

WHAT SHOULD BE TAUGHT?—The three basic elements of soaring training are:

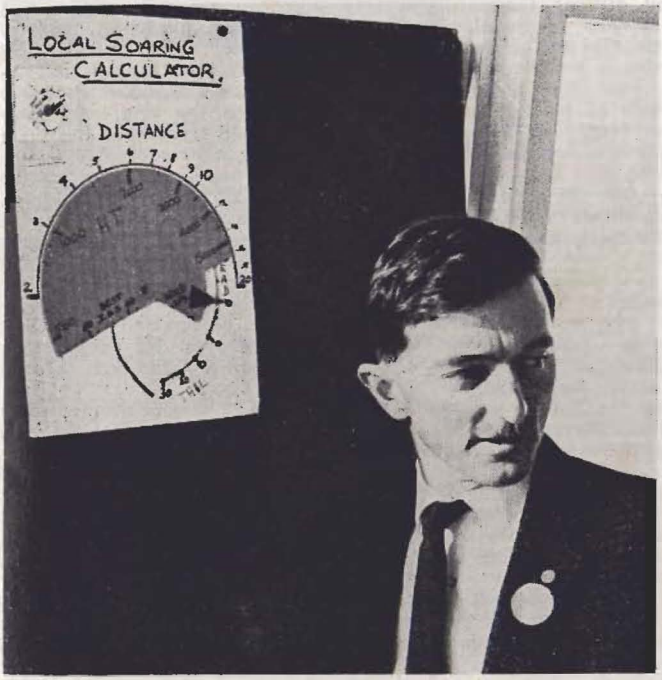
(i) location of thermals;
(ii) centring into the best lift;
(iii) best use of height gained.

The first is a matter of imparting local knowledge of thermal sources, and of acquainting the pupil with the less obvious signs of near-by thermal activity. These include:

(a) smoke trails (and windsocks) at variance with the general surface breeze;

(b) soaring birds, especially seagulls in autumn and winter, because they can be seen so well from above;

(c) birds chasing insects — swifts and swallows in the main, although they cannot be seen from very far away;



John 'Willy' explaining the use of calculators for beginners.
Photo: Sally Thompson

(d) dust rising from dry fields and other areas; this is usually only visible for a very short time but indicates that a vigorous thermal is forming.

The next important function of soaring training is to teach the pupil to centre into the lift. Several methods are advocated and will be briefly discussed.

(a) Best heading method. This method is described in detail in "Soaring Pilot". It is probably the simplest method to use, and has the virtue that the pupil is encouraged to look outside more than in. After an exploratory circle in the vicinity of the thermal, the pupil notes when he is rising most quickly. He then notes a landmark or cloud just behind the line of the outer wing of the turn at that moment, and next time round straightens up to head towards it. He resumes his original direction of turn after 1 or 2 seconds. This manoeuvre should have put him about a hundred yards nearer the centre of the thermal.

(b) "Surge" method. This method is likely to be quicker than the best heading method in that the exploratory circle can be dispensed with. The pilot now relies on feeling the upward surge of the thermal, and the opposite sensation of sink, without waiting for variometer confirmation. As the surge is felt, he straightens up, or widens the turn, and as the sink is felt he tightens the turn. The overall effect is to bias the flight towards the centre of the thermal and, incidentally, to tighten the turn up, which is usually a good thing. This technique improves with experience, and with the development of a more sensitive seat!

Whichever method is used, the pupil must always keep his circles accurate, regular and steady. Failure to do so will almost always mean the loss of the thermal, because with an irregular "circle" it is very difficult to interpret the feeling of the thermal, and to deduce its position in relation to the glider.

Training should finally give the pupil the sense of freedom to fly from the

circuit in search of further thermals. Modern secondary gliders of Swallow and Olympia performance can go quite a long way from base in perfect safety — much further, in fact, than a pupil will appreciate or dare to try for himself. He should be taught to always search upwind of the site for his thermals. He will then be able to spend a little time trying to find the centre of it and still be in easy reach of the field. If he finds nothing, he can quickly return to base.

A valuable guide to the range available to him is a calculator of the simpler kind, which requires only the appropriate wind strength to be dialled in order that range/height information may be read off. So long as an ample margin of safety is built into the device, it can be trusted in normal thermal conditions to get the pilot home. As this trust is developed, the opportunities for thermal soaring open up tremendously with the increased range of operation available. Map reading may also be practised even if no more than five or six miles from base.

HOW TO TEACH THERMAL SOARING.— Teaching of thermal soaring relies on the same basic technique which is used in any flying lesson:

Demonstrations, Imitation, Practice.

These lessons are, however, more subject to chance than the basic lessons of flying. Ideally the first demonstration should be from an aero-tow so that there is the best chance of finding a thermal. Since the demonstration has got to be convincing, the instructor should himself be one of the better soaring pilots in the club. When the centring technique has been clearly demonstrated, the pupil should take the glider up in the thermal and be left to make his own mistakes. Probably he will soon lose the centre by poor circling. He should try to put this right by himself and not be prompted by the instructor unless the fumbling is putting them too far downwind. The pupil should be encouraged to say what he is thinking and how he intends to regain his thermal. When seeking the second thermal the pupil should be told the signs to look for in an upwind direction, and should be directed to the best choice of search area. He should then be capable of utilising the next thermal if one is found.

When a climb of several thousand feet is achieved, the next thermal should be sought in a favourable area some miles from the airfield. A 250,000:1 map should be used and the pupil allowed to work out just how far he can in fact go before having to turn back. This will show him what can be done, even in, say, a T-21. In something a little sharper the lesson is even more valuable. It is always a surprise to the pupil to see how much ground he can cover. This aspect must, of course, not be *over*-played, otherwise inadvertent field landings will result later on.

The whole subject can be adequately put over to a responsive pupil in a flight of one-and-a-half hours in favourable conditions, and he will have been advanced in one go to the state of competence it would normally take 8-10 hours of solo fumbling to achieve.



Philip Wills (centre) after handing over the cheques for the 'Wills Scholarships'.

CORRESPONDENCE

THE SISU (1)

Dear Sir,

As a subscriber of your fine magazine (for some years now), I must write you re a statement in your October-November issue. The statement said that the spin characteristics of the Sisu are sufficiently bad that it is not spun deliberately.

I'm the proud, pleased owner of Sisu 1A-9 and must take a polite exception to your misinformed author. I'm from the old school (started flying in 1939) and deliberately spin most "new" (to me) airplanes and sailplanes as I deem this necessary for my own safety knowledge. I'm a flight (and ground) instructor with every possible rating except jet and "ATR". My new "S" model Beechcraft Bonanza is placarded "NO SPINS" but she's been spun — she has the "V" tail like the Sisu 1A.

Because of the temporary "experimental" category licence of the Sisu 1A, she's also not be spun. However, she's been spun deliberately and accidentally with and without flaps extended. A *vivid* memory stays in my mind. On a long, tedious out-and-return in the last U.S. Nationals (I *just* made it back!), I accidentally spun (full) out of a ragged thermal at 1,200 feet — I was half asleep. Within a half turn (approximately) — after correction — I was "out", and if I recall correctly I lost very little altitude and made it home — at that point I still had 30 miles to go.

Also — with full flaps — the Sisu 1A thermals (if necessary) as low as 40-43 m.p.h. (indicated), which is the same speed for a Fauvette 905, although I do thermal at 45-48 m.p.h., and contrary to what I even thought in the beginning, I can get the Sisu into any spot that the 905 could land in.

As a favour to Jack Baugh (owner of Arlington Aircraft) and Len Niemi (designer and builder), I think it would be nice for a "retraction"! I have no financial interest in "A.A." nor will Jack build any more Sisus! It's a matter of our pride!

608 *South Can Dota, Mt. Prospect, Illinois.* DALE S. MAY

THE SISU (2)

Dear Sir,

Following Mr. Baugh's letter, I would like to enlarge on my comments on the Sisu's spinning characteristics.

I was of course referring to *full* spinning. British Civil Airworthiness Requirements state quite clearly that, for all gliders that can be made to spin, it shall be possible to recover from the spin, by the standard method, after five complete turns, and furthermore that the recovery shall take no more than one complete turn, and that the loss of height from initiation of recovery to the regaining of level flight shall not exceed three hundred feet. These are the standards which apply to all gliders with British Certificates of Airworthiness. Mr. Baugh states that "recovery may be effected *immediately after the spin is initiated*" (my italics), i.e., he states that recovery may be made from "incipient" spins. In Britain this alone is not an acceptable standard of safety.

I hope that my article has not been misleading concerning the *incipient* spinning of the Sisu and that Mr. Baugh will be content that the Sisu is one of the five aircraft considered most progressive in 1965, seven years after first flight and thirteen years after the design was conceived.

Lasham. KEITH CHARD.

SHALL STANDARD CLASS AND FREE DISTANCE GO?

Dear Sir,

There are some pretty horrid things facing the future gliding world if some of the ideas expressed by pundits in the last issue of SAILPLANE & GLIDING come to fruition.

Boris Cijan has the idea of deleting the Standard Class, and in future World Championships having a 15-metre Class within a single-class Championships. This would involve a perpetuation of the practice of the last few Champs., of everyone flying the same task.

More than 45-50 gliders flying the same task is, in my view, an abomination. Too many tugs are required, involving too much expense. Too much gaggling, too great a collision risk. Gliding in this context bears little relation to the sport we most of us have in our hearts. If ants glided, this is the way they would do it.

If, to avoid this, future Championships are to be restricted to, say, 50 aircraft, the cost must go up, and State financial assistance will be needed again, with all that that implies. And all this in order to get an entirely meaningless and unnecessary comparison between the performance of gliders of a different span.

With all the force I can muster, may I plead that C.V.S.M. now lays down that in future World Championships the two Classes are recommended to fly *different* tasks each contest day.

Next, I come to the ideas expressed in Tony Deane-Drummond's letter. Designated starts and down with Free Distance.

These two proposals come down to what I might call the computerisation of gliding. I wrote a description of a flight in "Where No Birds Fly", which started off as a speed record attempt, and suddenly switched to a distance record attempt, and tried to show in the prose how the atmosphere and the technique changed between the two.

May I assure Tony, and many others of equal calibre who think like him, that there are, and always will be, a large number of people, of value to the gliding movement, to whom the attraction of Free Distance will always be the ultimate adventure of gliding.

The fact is that it requires a different outlook and technique to speed-flying, and surely the whole pilot must be able to excel in both. In these days of radio, it is hardly ever necessary to sacrifice the next day: it certainly was not at South Cerney.

The 1984 version of gliding we are facing is of a competition exclusively consisting of up to 100 sailplanes flogging off daily, on the word of command, on speed triangles. On landing, each ant will get out, stoop down, pick up his egg in his powerful mandibles, and hurry off back to his queen in a dark cavern in the midst of his heap. Please include me out.

PHILIP WILLS

DESIGNATED START AND THE LEAD SLED THEORY

Dear Sir,

At the risk of being branded as a Reactionary Heretic and a Stalin Revisionary Deviationist, I must reply to Tony Deane-Drummond's letter in the last issue of SAILPLANE AND GLIDING. He appears as the latest protagonist of the Lead Sled Theory, and wishes for the element of chance (viewed as luck or skill dependent upon one's standpoint) to be eliminated so far as humanly possible from influencing the outcome of a competition flying day, and for the results to be increasingly determined by "Organisation" consisting of Met. Forecaster, Chief Marshal, Task Setter, rather than by the competing pilots and aircraft.

I question whether (a) this is possible, (b) this is desirable.

Firstly the Designated Start system is dependent upon one or two pilots (not competing) doing the thermal snifting at competitors' expense, and one is surely justified in the case of Nationals to enquire why a pilot employed in so critical a task is not competing. Perhaps he is not good enough?

Secondly, the met. forecast may be wrong (*pace* Wally!) and all pilots will have lined up their aircraft, only to wait impotently for cancellation whilst only unable to leave the site for any reason whatever. With a Pilot-selected take-off this does not apply, and a pilot may fly off one of his contest launches for, e g. an instrument test.

Thirdly, the launching of all competing aircraft by designated start in marginal soaring conditions must inevitably saturate local airspace, with consequent un-

acceptable collision risk. One's mind boggles at the thought of a designated launch into the two available local thermals on the first two days of the 1964 Nationals. At least a Pilot-selected Take-off (although partially streamed) allowed some of the aircraft to leave the site before all were airborne!

Fourthly, the Designated Start tug utilisation on good days must inevitably be more inefficient and therefore more expensive, as Dick Johnson stated in his excellent article.

As regards my second query, the implications are much more serious. Do we want results determined by Organisation or by pilots and their aircraft?

The Lead Sled theory would have us believe that the fastest aircraft is always the best, as it will go fastest, furthest, and on the mostest. Inconveniently, this theory has not been borne out by fact (U.S. Nationals '63 and '64, U.K. Nationals '64), and the theorists would thus have the results for the future modified by changing the rules! Tony states that this is not his position and that "the specialist record-breaker designed for Texas or South Africa will never win", but I can assure him that nothing else will win if the rules are modified in the appropriate manner. It only requires a ruling that no competition day shall count unless the lift exceeds 6 knots and that all flying before 12.00 hrs. and after 17.00 hrs. shall earn disqualification!

Agreed, this is *reductio ad absurdum*, but indicates that a degree of caution should be exercised before accepting the principles involved by the application of a universal Designated Start System. That such a system has its place on race days, I would be the last to deny, but it is inappropriate to Distance days.

Distance flying in marginal conditions has a most honoured place in my book, and perhaps it is not surprising that at South Cerney on "Paddy's Day" the three aircraft which did best were not Lead Sleds (nor just "lucky", as they left base at intervals), but were deserving of more reward.

Finally and personally, I should be loath to lose one Free Distance task per Competition, as this task is the only one which provides all competing pilots with equal facilities, to fly as far and as fast as they legally can, in which direction their individual decision directs them, and is thus, as has been said, perhaps the most sporting of all tasks.

London. D. M. R. RIDDELL

NOISE MEASUREMENTS IN TRAINING AIRCRAFT

Dear Sir,

There are rumours afoot that a new training sailplane may one day be created from a U.K. source, and there is so much foreign competition in this field that great attention will have to be paid to configuration, weight-saving, low maintenance, ease of aero-towing, and the provision of sprung undercarriage and brakes on the wheels.

However, the most important aspect of modern training aircraft, powered or otherwise, is that of comfort and "communicatability", in order that the instructional task can be performed with the greatest efficiency. Have you ever seen a reputable driving school use an open sports car for instruction? And have you noticed the trend from Tiger Moths to saloon, heated and even radio equipped, training aircraft for the Flying Schools and Clubs?

So it must inevitably be with instructional sailplanes, and if you think that the absence of a motor is all that is necessary to produce a low level of noise, try instruction in a T-31! Whether or not we use powered sailplanes in the future for basic instruction, we already have a problem of *too much noise*, for ease of communication between crew, in present-day sailplanes. The following quantitative measurements were made with a Dawe sound meter, at 40 knots I.A.S., all windows and vents closed, from the instructor's seat at head level:

T-21 (canopied)	76 db	Goevier	75 db
Bocian	76 db	Blanik	72 db

Only in the Blanik is it possible to hold a low-powered conversation, both ways, between the crew, and in the Bocian it is almost too much of a strain.

because the pupil is further away than in the canopied T-21! The last thing we want to do is to revert to Gosport bug-tubes, or to introduce transistors! Good engineering, and the introduction of sound-absorbing "furniture", should make it possible to achieve a target sound level of 70 db!

A good quality car will generate 86 db at 40 knots!

Kidlington Airport, Oxford. DICK STRATTON

SILVER C ON CLUB GLIDERS

Dear Sir,

Recent correspondence in SAILPLANE AND GLIDING has pointed to a certain naiveté in those who assume that the difficulty in obtaining a Silver C lies in the flying. This must be confined to private owners and members of well-endowed Service Clubs.

Let it be known that there are those with limited spare time who must queue for club aircraft, on which there is considerable pressure, and therefore usually attempt to complete the tasks by over-riding the claims of their families in order to spend summer holidays at gliding sites. This means that the opportunity is limited to one or two weeks out of the 52, when the weather either (a) rains continuously, (b) blows very strongly (in the wrong direction if one is at a ridge site), or (c) provides a low-level inversion.

In the event of the weather not turning sour, one can rely on non-availability of aircraft through damage the previous week-end, or a foul-up in launching or retrieving facilities.

Even if inanimate objects co-operate, the helpful fellow-member has still to be defeated. I once found that the barograph had been taken out for re-smoking while I was strapped in waiting for a launch!

I would suggest that for Silver C claims forms endorsed "Private Owner", the B.G.A. should require an excess of 50% on all tasks. This would even things up a little, but only a little.

Bournemouth, Hants. GRAEME M. MORRIS

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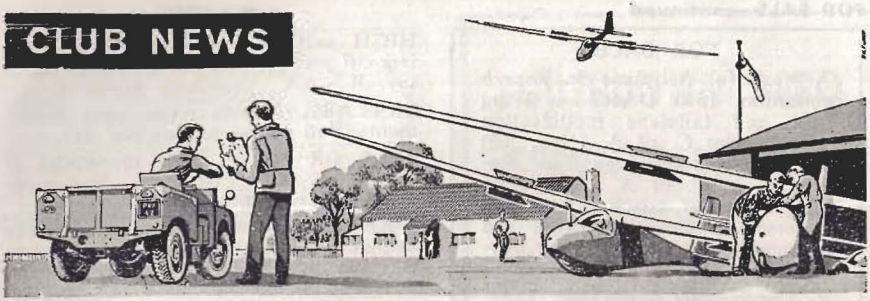
PUBLICATIONS

"AUSTRALIAN GLIDING"—monthly journal of the Gliding Federation of Australia. Editor, Gary Sunderland. Subscription 30 shillings Australian, 24 shillings Sterling or 4.25 dollars U.S. and Canada. Write for free sample copy, "Australian Gliding", Box 1650M, G.P.O., Adelaide.

"SOARING" — Official organ of the Soaring Society of America. Edited by Richard Miller. Address: Box 66071, Los Angeles, California 90066, U.S.A. Subscription, $5.00 outside U.S.A.; apply to your Post Office for a form.

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CLUB NEWS



MANY of you will have read Anthony Edwards' criticisms on the Club News section in the December/January issue of SAILPLANE AND GLIDING. The magazine committee would like to have comments from other readers and Club secretaries as to what form they would like to see this section take. My personal view is that Club News items very often contain purely local news which should properly be included in the Club's own Newsletter, as they are of very limited interest to readers in other parts of the country and abroad. But please do let me have your views.

Copy for inclusion in the April/May issue should reach me, typed on foolscap and double-spaced, by 16th February. Owing to the Nationals, the June/July issue will be published early and copy should reach me by the 30th March at 14 Little Brownings, London, S.E.23.

13*th December*, 1965.

YVONNE BONHAM (MRS.)
Club News Editor.

BATH

AT this time of the year, the majority of our activity seems to be confined to "fettling" with the old flying day squeezed in whenever weather permits.

At the time of writing, recent torrential rain has put patches of our normally accepted flat airfield under water, so that the aircraft resemble flying boats sending up a shower of spray on touching down on a particularly damp patch.

From the air the surrounding countryside presents a pretty unattractive appearance with much of it inundated — roll on Spring!

C's. of A. overhauls are very much the order of the day. The Skylark 4 has been completed and the 463 is almost finished.

The T-21 has had a lot of work done, including a re-spray. She should be more easily visible in the air now in her new red and yellow finish. Perhaps not a "happy" combination, in fact, one wag has already nicknamed her "plums and custard", but at least the object has been achieved.

It has been encouraging to see some of our newer members taking part in the work on the T-21 under the guidance of the usual stalwarts.

We have added another glider to our inventory by purchasing a Swallow. Some of the more experienced Grunau pilots have already converted and are thankful for a canopy for their winter flying. We shall continue to use the Grunau for early solos, and the "fly for fun" characters will no doubt still enjoy the pleasures of the open cockpit.

K. N. S.

BRISTOL

BY the time this appears C.F.I. Peter Etheridge and José will have taken the plunge and we know that their many friends will like to join us in wishing them good luck and good health.

The Christmas Party went off with a bang, literally, and a few hours ago yours truly was sent packing from the club to put pen to paper. Flying-wise our biggest problem in the future could be one of overcrowding. With 20 aircraft operating from the site we could reach

saturation point within a year or two.

Two more syndicates are planned. Another Ka-6 and a Dart 17. Barry Walker is the instigator of the latter and this therefore leads to conjecture as to what will happen to his Blanik, which, incidentally, is still at Portmoak. Barry came home with a glowing report about the Scottish club and his Silver duration, but his second trip north in arctic conditions was ironically over the week-end when the Nympsfield wave appeared! Peter Philpot achieved 11,000 ft. a.s.l.

Finally, talking about Peter Philpot, we hear that the hundreds of hours he has put in on the Scud will bear fruition when it flies again next year. This aircraft was on display at the World Championships last May. R. G.

CAMBRIDGE UNIVERSITY

THE tail of last year's soaring season gave us a chance to catch up on cross-country miles, though not on flying hours. On 20th August, Richard Fortescue achieved his Gold C distance by taking his Olympia 463 on a 190-mile dog-leg via Kidlington to the East Coast. On the same day Sigfrid Neumann stayed airborne for 8¼ hours, passing the time by rounding a 130-mile triangle. The 22nd August was our day of great climbs, and both Archie Erskine and Richard Fortescue gained more than 10,000 ft. and completed their Gold badges. Our fastest triangles were flown in September. On the 5th, David Wigglesworth bagged the Slazengers' Trophy for the fastest 100-km. triangle in a club aircraft, and on 20th September Simon Redman leapt round the Slazenger Triangle at 52 km./h.

Most members must have sensed that the Long Mynd would be soarable on only three days during the fortnight's September Camp; for the Camp had poor support. It has now been decided to drop the September Camp this year and to go to the Mynd in June only.

Last year we held four aero-towing and two winch courses. Further restrictions in our winching runs have now forced us to forget about winch courses altogether. Ray Haddon, our Course Secretary, is now organising 12 aero-towing courses.

At the beginning of October we had an unusually strong influx of new members. At the same time the weather at last improved and gave us the best Michaelmas term the club has so far seen. In October and November there was flying almost every day. The most successful trainee was Rowan Bradley, who went solo within seven weeks.

After almost 10 years' service, the Skylark 2 has been sold, so that the fleet of club-operated aircraft now consists of a T-21 ("Bluebell"), a Ka-7, a Swallow and an Olympia 2.

G. S. N.

CISAVIA

AT the A.G.M. held on 30th November a vote of thanks was passed to three members retiring from the Council of Management for all they had done to foster progress. They were Lionel Alexander, Don Green and George Hole. The last-named who has been Chairman of the Council was elected an Honorary Life Member. He is succeeded by George Haynes, Under Secretary Contracts Division, Ministry of Aviation.

Steps are being taken to form a London and District Civil Service Aero Club which will be part of the consortium of clubs at Wycombe Gliding Centre, Booker. It will be open to all civil servants wherever stationed and is intended to cater for those who are not eligible for membership of the Post Office Flying Club. J. E. G. H.

CORNISH

OUR Annual Dinner and Dance on 4th December was a tremendous success. Thanks are due to our ladies and those who helped them to organise it. Godfrey and Rika Harwood did us the honour of being our guests, arriving by train this time, instead of by Motor Tutor and Skylark respectively.

In spite of the weather we have managed to beat last year's figures for September-November, with 1,058 launches as against 844 in 1964. December has so far been too much for us: as somebody said as he was propelled through the clubhouse door by an 80 knot gust, "It is highly soarable but not flyable." The stream which normally flows over

the cliff edge was being lifted fifty feet into the air and blown back across the airfield like smoke.

Our thanks are due to Doc Slater for the photo of our clubhouse, which appeared in the last issue of S. & G. The building used to be part of the old Nobel Explosives Works at Perranporth and must be well over 100 years old. It is still as solid as ever. G. E. T.

COTSWOLD

ON the flying side we have nothing much to report. Week-end weather has not been very kind over the past few months and has restricted flying somewhat. Nevertheless our C pilots can be seen practising turns, sideslipping, spot landing and other exercises and the hard core of "ab initios" are working hard to go solo before the crowds return with the warmer weather.

On the ground we have several projects in hand which will increase our facilities both flying and in the clubhouse.

We have purchased a two-drum winch which is having its engine replaced, paying-on-gear added and other refinements so next Spring we will have three cables in use.

Under the energetic guidance of our new Chairman, Roger Bunker, a Tutor is receiving a "face lift" and spoiler mod. and this will be flying in the near future.

The clubhouse is to have running water and a water heating system. At last we can do away with paper plates.

I am sorry to shatter Lincolnshire Club's illusions but they are definitely not the only club with club minded syndicates. We have two syndicates, one with an exotic Cadet and the other with an Olympia which are to be club operated. As we are a new club and finances are strained at present we are very glad of this and all eagerly anticipating the day which is not far off when we will have three cables and four machines on the field and lots of lovely money coming in. D. G. M. L.

COVENTRY

WE start on a sad note as we write this issue, having just learned of the death in hospital, after a relapse, of our Instructor, Phil Winkley, whose progress we were only reporting in our last Newsletter. Our sympathy is extended to his wife and two children.

Our recent annual Dinner Dance was once again a tremendous success, and thanks must go to Jack Allen and his helpers who were responsible for all the behind-the-scenes work.

The President's Trophy for the longest flight of the year in a club aircraft was won by Peter Partridge for his flight to Newcastle, the Boomerang Trophy for the longest out-and-return was won by Mike Smith and awarded in his absence to his parents, guests of the club. The Gimmick Trophy for the most outstanding flight of the year was awarded to Lou Franks for his Gold C climb over the site, and the Coventry Evening Telegraph Trophy, for the most progress by a Club member, was awarded to Phil Banks.

A week later we followed up with a party for nine under-privileged children from Market Harborough, who had the time of their lives sitting in the T-21 having their picture taken, also

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enjoying a big "nosh" and watching a film of Donald Duck. At this point many supposedly staid and "seen it all" senior members were seen to creep quietly into the clubhouse! Praise is due to Doug Sadler and Jackie Bradshaw for laying on this event.

Recent solos include Tony Covington, Tom Phillipson, Sid Gilmore and Lester Goodman, who now avidly take turns in the Prefect queue every weekend.

We cannot in truthfulness say that this has been a happy year for several reasons, not the least important being the weather, but with the arrival of our new Tiger Moth, the completion of a so far successful new pulley on the winch, the arranging of a few courses for the first time next year, and a list of people waiting to join us, we look forward with confidence and hope to the unknown year ahead.

DONCASTER

THE Club Swallow has been taken to Sutton Bank for a period to give Silver C aspirants a chance at a five-hour leg. The move seems to have triggered off gales, blizzards and, of course, plenty of East winds. The gales which demolished the Ferrybridge cooling towers, made a determined assault on our trailers but thanks to quick action by local members, damage was confined to the massive T-21 trailer. This was on its side when help arrived and apparently could fall no further. In fact, a gust took it bodily up a road embankment, over two hedges and it made a very poor round out on to a sports-field. Repairs are almost completed.

Two new gliders arrived in October, a Ka-6 for the Bower-Tarr syndicate and a Bocian owned by Arthur Snipe.

Arrangements have been made to fit a canopy to one T-21, this should give encouragement to the more delicate of our members in this cold weather.

Congratulations to Sid Hayes on the award of his Instructor's Category. Also to Allan Charlton who soloed on his 16th birthday and made his C flight 10 days later; to Barry Noble — solo on the 9th October, C on the 10th.

Les Welburn is due to leave for Singapore in the New Year, by kind permission of the R.A.F. He has been a keen and hardworking member and we wish him many happy landings.

ANON.

KENT

IN spite of general complaints about the weather, the year has turned out to be fairly successful for the club. The number of certificates gained and the total of cross-country miles flown must have beaten all previous records. The club fleet has been increased by the purchase of a T-49, and also the Dunkeswell T-21, so that we are getting through the flying list more quickly.

As winter moves in, thoughts turn more to the social side. Already, a highly successful Dinner and Dance has been held. Over 100 members were present, and the Mickey Gilbert Cups were presented to Ron Cousins (fastest out-and-return to Redhill), Don Connolly (longest cross-country — Dunkeswell to Redhill), Peter Beechey (longest first cross-country), Tug Burne (Instructor's Cup) and Alf Coley (best ab-initio).

Every week the clubhouse becomes a little more comfortable, and as we write plans are well advanced for the children's Christmas party, to be followed a week later by the grown-up "do".

Meanwhile, our M.T. boffins are going ahead with the development of a new diesel winch, and C's. of A. have been started ready for a busy season next year, when we shall be operating seven days a week as from Easter.

R. W.

LAKES

THE tragic circumstances recorded in our last report will have explained the necessity for important changes in leadership at the Lakes. We are happy to report that Mr. Len Redshaw has been prevailed upon to accept the office of Chairman. He needs no introduction to the gliding movement, but readers may like to be reminded of the many instances recorded previously in these notes of the happy relationship, understanding and co-operation which has always existed between him and his unique predecessor, Ernie Dodd. Continuity of policy and drive is thus assured.

He will be assisted in matters of day-to-day administration by Frank Roynon, your humble scribe for the past three years. The rest of the family tree remains as before and no other important changes are in prospect.

Next year it is proposed to run ten courses spread over alternate weeks during the summer months. David Millet will be in charge of organisation and flying instruction. We congratulate him on gaining his Silver C. His ability as an instructor is already well known to us and to many who flew with him in South Wales last year. Further announcements of the programme will be made in due course. In the meantime we look forward to a successful year.

We are sorry to learn that Matthew Hall is having to relinquish his duties as an instructor. F. G. R.

LAND'S END

THE social side of club activities forms the mainstay of the current progress report. The passenger building has been decorated and one of the offices converted into a very attractive snug bar. The vast majority of this work was done by Pat and Tom Blevins, and we are all delighted with results as well as grateful for the efforts.

After the licence was granted, several successful, and convivial, events have been arranged, and the social side is developing nicely.

On the operational side, most of the bugs have been chased out of equipment, and the usual winter programme of fettling is well under way. In addition every possible opportunity to fly is seized although we have again been severely limited by even fouler weather than before. If it is not gales, it is mist.

At last we have been able to experiment with a retrieve winch. The first three launches each contained a different fumble, but thereafter an impressive degree of success was apparent, the cable being back and ready invariably

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The Club fleet and clubhouse of the Land's End Gliding Club.

before the next glider was on the launch point. More of this when we have more experience — but to date we are pleased.

The list of jobs to be done is as long as ever, but at least it is constantly changing as more and more members buckle to to give a hand. Enthusiasm is breeding enthusiasm at an exponential rate and we look forward with eagerness to the New Year.

W. D. T.

LEICESTERSHIRE

HAVING all made our New Year resolutions — to get more gliding money somehow — we look forward to lots more soaring in 1966.

Our brand new Beagle Terrier tug is flying very well indeed although its warm, cosy cabin tends to discourage tug-pilots from making a quick return to base in readiness for the next tow. Especially in winter. There was never the chance of a crafty kip in the old Tiger.

Keith Moseley accepted the post of very-active, deputy C.F.I. last December and is doing a grand job. He muttered something about reluctance as we went to press but all these reluctant heroes are the same!

Loughborough University now fly with us as full members of the Leicestershire club. The Capstan list tends to get rather long — the Loughborough section having increased our flying membership by 30% — but we have great hopes for the club Olympia in the months ahead.

Finally, news of an addition to the Rearsby flying fleet. Any time now we should be able to inspect one of the Dart 17R's at close quarters. The members of the late Skylark 4 syndicate will be able to fly much much farther round the airfield, in search of thermals, before coming in to try again.

D. H. A.

LINCOLNSHIRE

THE adverse weather has continued from summer into winter and one can but say that it has presented us with too many opportunities to talk gliding. On some of these pouring wet days we can be thankful only for a well drained site. Airborne news is a rare commodity.

Jack Nicoll, C.F.I., and John Cheeseman attended the National C.F.I.'s Conference. They returned fired with enthusiasm for the Capstan and with threats of firing the T-31. Subsequently we were honoured by a visit from John Everitt and his Capstan for 4th/5th December. The weather allowed one launch only. John gave some very interesting lectures which helped markedly to offset our disappointment with such unco-operative weather.

On the bright side, we are pleased to extend a hearty welcome to Roger Alton's recently purchased Skylark 4. Good luck to her and all who soar in her.

B. N.

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LONDON

IN our last notes, we observed that the Tull Brothers' home-built Skylark 3x was nearly ready to fly. We are pleased to report that not only has it since flown — it has been skilfully steered by Vic Tull to fourth place in our Regionals last August.

George has since been appointed C.F.I. Gliding at the steadily growing Centre at Booker, and we wish our erstwhile Chief Tug Pilot all the best in his new job. Ian Burgin, our tame Australian, has decided to rest his shattered nerves, and is no longer a resident instructor, but his talents as a bookkeeper, etc., have been gratefully retained in our office.

The best flight of the year was undoubtedly Peter Carr-Withall's 300 km. triangle (Downham Market—Leicester—Rearsby) in May. Mike Riddell flew a 300 km. dog-leg (Little Rissington-Great Yarmouth) during the regionals; the influx of high-performance aircraft seem to have made people more ambitious and less fond of letting themselves in for Roborough retrieves. In September Terry MacMullin completed his Gold C with a height climb to over 13,000 feet.

Dart fever is catching on here. Barrett, Hull and Bird have sold their Skylark 3 in anticipation of a Dart 17, Mike Garrod is replacing his 463 with one, and the Cardiff syndicate hopes to follow suit. The Tarnow family have taken over Colin Richardson's Skylark 3. Martin Simons managed to squeeze a Silver C out of an Olympia in between rebuilding a heap of scrap he bought for a song into its original form — a Skylark 2. Other Silver C's were completed this year by Angela West, Lennie Woods and Michael Erdman.

The anti-social November weather hasn't damped our winter social programme; our Christmas Party on 4th December was an unqualified success. The band was grand; Doc Slater's antics with a penny whistle superb, and the hangar underneath survived the enthusiastic stompings of more than a hundred people. Our Annual Ball will be held on Saturday, 5th March, at the Dunstable Civic Centre. Our Open Day on August Bank Holiday Monday was a great success — roads round Dunstable were jammed with traffic winding its way club-wards. Plans for next year's show are already well under way. It will be held in conjunction with the local branch of the Royal Aeronautical Society's Centenary celebrations, over two days next August, and promises to be the gliding show of the year!

Congratulations to Ralph Chesters and Sue Still, John Blackbourne and Jacqueline Cooper, who were recently married.

This winter will be the scene of considerable refurbishing, with paint being applied liberally to walls, ceilings and various members' clothing. The old place promises to look quite smart next year with, in addition, the possible conversion of the old members' kitchen into a ladies' dormy. G. L.

MIDLAND

THE Trogs' Party was held in November and was thoroughly enjoyed by the seventy or so members and friends who were present. Our thanks to Janet Hilton for the organisation and to Elizabeth for letting us crown Alan Parkinson as King Trog. It is hoped to hold another similar party in February. Our annual dinner-dance will be held at the Belfrey on 11th March.

In the workshop, Jack and Tony are busy with the C.'s of A. of the Club fleet. This year, all C.'s of A. will be completed by Easter thus ensuring that no time is lost during the soaring season. Also in the workshop are parts of the trailer which the "Twins" are building; this time for themselves. They will not say what type of glider is to go inside but when the trailer has progressed a little further, we shall measure it to see whether it is 7½ metres or 8½ metres long.

Our congratulations to our Resident Instructor Jack Minshall and his wife Ruth (until recently our head Fairy) on the birth of their daughter, Janet. On a rather heavier topic, Jack would like the Lasham syndicate to know that we steamrolled our car park two years ago.

During November and early December we enjoyed rather more soaring than usual. The best to date of the winter season being 10,100 ft. a.s.l. in wave by Shelley "Cairo Fred" Curtis on Sunday, 12th December. K. R. M.

NEWCASTLE

THIS year the winter has arrived early on Carlton Moor, and by the end of November our access road was blocked in several places by deep snowdrifts. So much snow has drifted across the road, around the clubhouse and hangar that, short of a very rapid thaw, it looks like being with us well into the spring!

Our financial year has now ended and 1964-5 was as expected a rather poor year. We managed 2,350 launches and about 630 hours, mostly in hill and wave lift. The thermal season was most disappointing and we can only hope that the present weather heralds a much better summer to come.

The T-21 has returned to us, immaculate and fully airworthy again after its unfortunate encounter with a hedge during a field landing. The club fleet is now ready for the new season with the exception of the Olympia which, at the time of writing, is due for C. of A. A Dart syndicate has recently been formed and this machine should be flying in time for the start of the season.

Another "first" for next season looks like being our telephone. After many months of negotiation with the G.P.O. and adjoining land-owners, agreement has been reached at last, and as proof telegraph poles and wires now reach almost to the club buildings. Only adverse weather has prevented the installation of the underground part of the cable and the actual phone itself.

A recent innovation has been the formation of Durham University Gliding Group affiliated to the club. It is hoped that this will provide an influx of keen members and lead to greater utilisation of the club aircraft. With these same objects in mind we have recently launched a publicity campaign aimed at recruiting more members from the Tees-side area. First results have proved most promising and it is hoped that by the start of the soaring season a significant increase in our membership will have been achieved. B. W. B.

NORTHAMPTONSHIRE

THE main item of news from Northamptonshire is the arrival, on the 19th November, of the new T-49 Capstan. This is now being enthusiastically flown whenever weather permits with the help of Derek Wilcox and David Luddington, the two Tiger tug pilots.

The fitting of a diesel engine in the winch has been discussed but this too has now become a reality. Most of the teething troubles have been overcome and we are looking forward to nearly trouble-free winching.

Wet weather has restricted flying to some extent but even with very wet grass fields it has continued whenever possible.

The club has decided to hold its annual dance this year at Bedford, as many of the members now live in this area. R. N. W. K.

OUSE

THIS newsletter is more like the hatch, match and despatch columns of a newspaper.

There has not been much activity at Rufforth recently, as bad weather conditions have curtailed operations. The only news to report is mainly of a domestic nature, rather than flying. Les Bellamy, one of our best instructors, left us in October to start pro-instructing

at Lasham. As well as being well-liked, Les put tremendous energy into the club, and has played no small part in its development. Our loss; Lasham's gain.

Congratulations to Pam and Alan Park on their recent fleet addition. John Taylor, another pundit, departed for Cambridge University, where he has joined their gliding club. At Rufforth he was content flying a Skylark 2, but on his recent return he mentioned things like Darts, which immediately gave our pundits inferiority complexes!

A miniature annual dinner was held at the home of the under-initialled, who made his 21st an excuse. Over 30 members "gathered" — it almost took one's mind off lack of thermals! K. M.

OXFORD

FIRSTLY your scribe must offer humble apologies to Ray Stafford Allen for the unfortunate mistake in referring to him as an ex-member of this club in the last notes and would rectify this by pointing out that Ray occupies a most honourable position as founder and life-member.

Winter activities have been drastically curtailed due, as usual, to the weather and "soft going". We rather envy our Abingdon sport parachute neighbours, who need only minimal equipment to operate and no doubt revel in the cushioned touch-downs.

Chris Simpson, of the B.G.A. Study Group, was welcomed recently, when he stimulated discussion on the future of British gliding. De-centralised administration and flying training seem a good idea and we eagerly await the result of the Group's findings.



Keith Plummer said at the last Committee Meeting that a trial run of the new winch is imminent. The eagerness to enjoy the "Ritzi" qualities has lead to organised conversion training.

As a result of trailer building in the workshop, the Dart 17R syndicate have produced conditions of ideal warmth and members have forsaken the club-room. They brought with them canteen facilities, slide shows and even television! However, with a certain amount of audience participation the trailer nears completion.

With the C. of A. inspections season with us again, the T-21B has already returned to take the local air with renewed vigour, although it took several methods of transport to bring it back.

Air around here can be quite "green" but should you be lower than you wish, even as low as four wheels, we extend a warm welcome any week-end during 1966. C. J. T.

SCOTTISH

WE cannot pretend that the weather during October and November was anything like ideal for gliding, although Portmoak, with its mild, though somewhat damp climate, seems to have fared better than many places in the "frozen south". There has, therefore, been little flying, none of it being exceptional, although wave did appear on occasion, and the usual pundits reached heights of up to 12,000 ft. Graeme Smith, flying the club 460, just failed to make his Gold height, being only about 100 ft. short.

The diesel winch has, we hope, been cured of the teething troubles which gave the Technical Committee a few headaches, and is an impressive sight as it roars up and down the field, laying out its own cables. Besides being quicker than pulling them out by tractor, this greatly reduces the wear and tear on the cable, and even gives the winch-driver a change of scenery! It is pleasant to have, at long last, a machine which can extract a "too fast" signal from a T-49.

It is planned to hold a Scottish regional competition at Portmoak next August. If the wave co-operates, the task setting could prove interesting. B. M.

STAFFORDSHIRE

WE know one aircraft manufacturer who keeps his delivery promises. Our Swallow was collected two weeks ahead of the scheduled date by Gordon Hudson and Maurice Hurst, who had to complete an epic 640-mile round trip via Cambridge (where a trailer was available). The Swallow is a most useful addition to our fleet and is already proving very popular.

This year's total launches look like coming out above the 4,000 mark and our financial position is sound. The club's future has been much discussed lately in committee and we were able to make our aims known to the B.G.A. Study Group representative Chris Simpson, who visited us recently. The weather wasn't on its best behaviour but a very useful day was spent in discussion. One immediate outcome was the decision to apply for full membership of the B.G.A., which has now been granted.

By the time this appears our A.G.M. will have come and gone. The rise in club membership to almost 100 should make it a most interesting meeting, with an element of competition for the seats of influence. A. W. H. L. W.

SWINDON

AT our recent Annual General Meeting, it was officially announced that, as planned, our C.F.I., Ken O'Reilley, had handed over his duties to Bernie Keogh. We take this opportunity of expressing our gratitude to Ken for the splendid job which he has done for the club and wish him many fat thermals in the coming season, when he will be no longer chained to the T-21.

It was with great regret that the Committee accepted the resignation of our treasurer, Ray Clark, whose skilful handling of the club finances has been vital to the smooth operation of the organisation. The officers now are: L. Colquhoun, chairman; B. Keogh, C.F.I.; Mrs. M. Davies, secretary; and M. Parkins, treasurer.

Margaret Davies, in addition to becoming our new secretary, has also distinguished herself in the air by obtaining her A and B certificates in a remarkably short time. We look forward to seeing much more of her now that she can fly unchaperoned! E. C. C.

WORCESTERSHIRE

WINTER conditions at Bickmarsh have been such that suggestions of converting an old Tutor fuselage into a canoe might well have been taken seriously. The drainage problem has caused many discussions and a lot of suggestions have been examined, the answer so far continues to elude us. We have, however, managed to get the use of the runways on an ex-R.A.F. airfield and some flying has been done there. This has given many members their first experience of auto-towing. Having two sites does have its problems and we find our resources rather spreadeagled with development work at the home site suffering. Nevertheless we feel that flying, and the income from launch fees, must come first so we try to plan our activities accordingly.

Some social events have been held, including a firework party and a film show for members' films taken during the season. These were well, and noisily, received, and although not perhaps candidates for an "Oscar" gave us the doubtful pleasure of seeing ourselves as others see us. We were also reminded that the skies over Bickmarsh were once blue.

On the whole 1965 has been a year of progress, our only major setback being due to the exceptional rainfall. Advice on the drainage problem would be welcomed from any knowledgeable person, as it would on one other small difficulty; namely, how does one prevent a roadside windsock from being "liberated"? R. C. S.

SERVICE NEWS

BANNERDOWN (Colerne)

IN the last period aerial activity has been average with 556 launches for 53 hours, but not entirely abortive because Judy Hunter and Taffy Mays have both soloed.

During the season C.F.I. Tug Willson has shown extraordinary energy in organising the club's operation, at the same time spending 185 hours in the air.

Over the last four to five months, the G.S.A. Council has given much consideration to the training policy in the context of the sporting pursuit by improved training and instructor checks, by maintenance of progress records and other means. It is expected that a revised syllabus will be issued as an appendix to the new R A.F.G.S.A. handbook which will be ratified at the next A.G.M.

P. H.

FENLAND (Feltwell)

AT their A.G.M. held on 26th November the club looked back on a most successful year. A total of 7,470 launches were made and over 900 hours flown, both figures being 50 per cent in excess of our target. Forty-one members gained their A and B certificates, 22 their C certificates and five their Silver C. Club membership now stands at 170 from 21 R.A.F. stations. The cup for the member making most progress during the year was presented to J/T Hancocks, and for the longest flight (123 miles) to our new C.F.I., Sgt. Elliot.

The club workshops are once again the scene of intense activity. Both T-21's have been fitted with canopies and recovered looking very smart in orange-flame and cream finish. Minor repairs are being effected to the Olympia and this is also being re-covered. Our trailer member is busy with new transport for the Ka-6.

R. G. J.

FULMAR (Lossiemouth)

WITH only three weeks of the year left we have had little to enthuse over in 1965.

A cold summer gave us little opportunity for thermal soaring. Wave clouds appeared from time to time to whet our appetite but with no tug available we usually had to beat it hastily back down. However, on one of its rare visits, the Aberdeen Auster got Travis Spurling into wave in the Prefect. After he landed and his teeth stopped chattering, he announced a Gold C height gain. John Stanley got his in the Portmoak wave.

Recent postings cost us two of our stalwart all-weather members, Jock Christie and Bob McGinn.

We have a replacement Skylark 3 and expect delivery of a new Swallow in January to balance the fleet. There's even talk of the migratory Tiger returning before the year is very old so the prospects are bright.

May we take this opportunity to wish all former members and gliding types everywhere a happy and successful New Year.

H. D.

HERON (Yeovilton)

AT the end of 1964 we concluded a report with the hope that 1965 would be an even better season. Our hopes look like being fulfilled since our launch totals and hours flown have both improved, despite a rather depressing summer.

1965 has not brought so many Silver C legs as 1964 but we have trained more pilots to solo standard and these trainee pilots have achieved more C certificates. Congratulations to Eric Dixon, John Smeeton and David Gibbings, who have achieved their A and B certificates and Colin Hart and Philip Fell who recently completed their C's.

The Secretary flew the club Olympia in the Junior Inter-services Competition at Bicester while Ray Foot was achieving great things with his Skylark 3F at the Dunkeswell task week. This included a Gold C distance to Newmarket. On this day great was the surprise in their respective crews when the two Yeovilton trailers passed each other at high speed on opposite courses somewhere in Huntingdonshire!

We have been very pleased to welcome members of the Junior Leaders Regiment, Royal Armoured Corps, who come from Bovington Camp, Dorset, to fly with us. They bring with them a splendid enthusiasm and willingness to work.

The season was rounded off with a very good Annual Dinner in November which drew record attendance. The coming months should see the C's. of A. complete and perhaps the arrival of a high-performance single-seater to seek the 1966 Somerset thermals. M. H. L.

R.A.F.G.S.A. CENTRE (Bicester)

THE vital statistics declared by Sq. Ldr. Ian Robertson at the A.G.M. held at Bicester on 28th November, showed that the year 1964/65 produced a large increase in miles flown per launch, and a smaller increase in hours flown per launch.

The Centre fleet consists of three T-21's, one SF-26, three Olympia 2's, one Ka-6, one Olympia 419, one Olympia 463, one Skylark 4 and a Blanik.

A syndicate Bocian and Goevier also operate by arrangement with the Centre. The Blanik has flown more than 850 hours in two years, and the first major inspection at the two-year interval, was completed in three days.

Winch developments continue at the hands of Fl. Lt. John Calnan, and the recent trials of a Wild winch fitted with Leyland Comet engine and with a narrow drum without pay-on-gear, shows that the simpler the winch the more effective and economical it is.

The programme of Instructor, Ab-initio, Soaring Courses, Expeditions and Competitions for 1966, can now be obtained from Andy Cough.

R. B. S.

CRUSADERS (Cyprus)

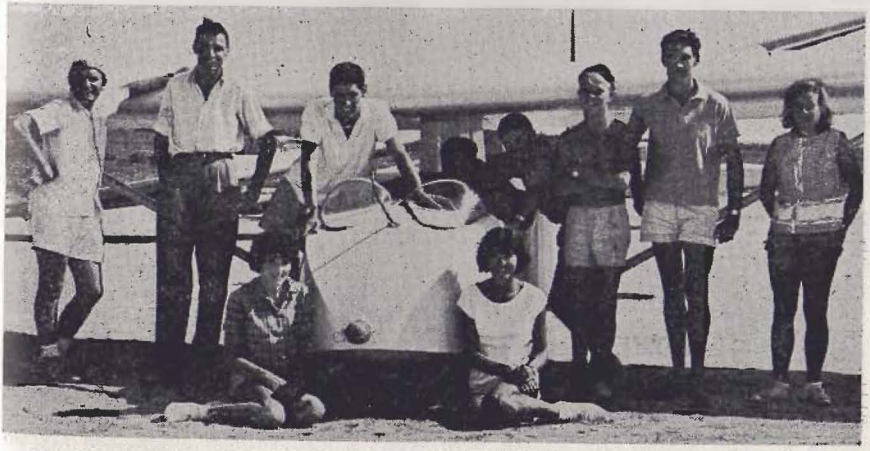
SINCE our last report, things have quietened down a little here, and less flying has been done, due mainly to other commitments for our site. It is cooler now, and the soaring season is upon us, and Harry Oxer took advantage of this to nibble at a Cu sufficiently to get his Silver C height, since ratified.

Due to problems at our present site, we are now starting a soaring branch of the club at Dhekelia, and have one aircraft, winch and tractor there each week-end. The T-21 was towed up on a trailer 'designed' (if that is a suitable word!) and largely built by the Secretary. Despite cries of "It will never fly", it was finished, and *does* work! Tony Gee is well towards completion of another home-cooked, but very professional looking trailer for our Swallow.

At Dhekelia, Viv Hoyle, one of our new Army members, and Sid Green, both got their A and B.

The Benson Club are giving us a great deal of help in getting equipment out from U.K.—currently a diesel engine for our Wild winch. We recently found out that they did much work on our behalf in getting our T-21 sent out. Many thanks, Benson—we aren't ungrateful—just didn't know what you'd done for us!

Several stalwarts are leaving us — Dennis Gould, our equipment member,



Crusaders club group with their T-21 during their Soaring Camp at Dhekelia.

and his wife Sue, have already gone, as has Mike Gilmore, our Army Representative, Penny Potts, the youngest member, leaves this month; after missing only two possible flying sessions all year, since starting in January, she has gone through 250 launches, A, B, C, and Silver Height. Our best wishes to you all, and good soaring!

H. F. O.

EAGLE (Detmold, Germany)

AT this time of the gliding year one's thoughts are divided between the good days past and those to come.

A little more recently we said goodbye to our President, Lt.-Col. Sutcliffe, without whose backing there would have been no Eagle Club. Our best wishes go with him. In his place we welcome Lt.-Col. Gow who has already demonstrated his support, and what better support have we than that of the past and present airfield Commanders? Another welcome arrival is Bob Kirkland, ex-Swinderby—he was instructing within 48 hours of arriving in Germany!

Our youngest member, Bob Jackson, got his A and B just too late for inclusion in the last notes. Congratulations, Bob!

A few weeks ago a Beer and Skittles (literally) evening was held with the German Club. Rumour has it that we won. Suitably primed, the senior German members tell fascinating tales of the revival of gliding after the war—of tailplanes amongst the tiles, cockpits in the cowsheds, of furtive pilots wheeling wings slung between two bicycles at dead of night, and so on! Really keen. Jeremy Wheeler took advantage of the jollity to celebrate the arrival of a daughter (that was his excuse anyway). Congratulations, Sue and Jeremy.

The faithful hard core (whatever would we do without them?) have fitted out the workshop in the hangar, fettled a second VW retrieve car, prepared the Grunau Baby so well for Netheravon we are almost sorry to let it go, got the Swallow back at last in very swish condition, and made a start on our new two-drum automatic transmission winch. Also our Science Reporter Chumpman Pinchup reports development behind the scenes of a revolutionary new type of cable parachute—details to be released later.



L. to R.: Taff Morley, Jef Russell, Ken Ward, C.F.I. Norman Smith, Jim Parrish and Bob Miller, in front of the Ka-4. Minden ridge in background.

By the time you read this we will have lost John Welsh. Only those who know him can possibly appreciate what this means. In the short time he has been with us he has rebuilt one trailer, produced two more, rebuilt and re-engined a winch, started the new winch, and performed hosts of smaller jobs. We will miss him indeed. Our grateful thanks and very best wishes, John!

W. C. L.

LAARBRUCH (Goch, Germany)

THE changeable weather this past soaring season has resulted in a drop of 100 hours against last year's total, though activity on the ground has kept abreast of the launches.

Things seem to have favoured the bottom of the ladder during the period June-October, with Brookfield, Hegarty, Rowe, Povey, Rowney, Flanagan, Brigg, L. Haywood, McLea all going solo. C certificates have been gained by Brookfield, Hegarty, Occomore, Parr, Phillips, Howarth, Watt, Williams. Chris Lister wandered off downwind to do five hours to complete his Silver C. Jack Collins and Graham W-Crisp have both flown Silver distance legs. To Graham W-Crisp goes the rather dubious record of being the only person to gain a Silver height leg this year.

Recent week-end expeditions to Vennebeck ridge, near Minden, has given ridge soaring experience to several pilots and five hour legs to Brookfield and Collins. The latter finishing his Silver C. Harry Orme completed his Gold C with a distance and goal flight to Brunswick.

The valuable services of Harry Orme, Al Stevens, and John Prince have been lost due to posting back to U.K. Thanks go to all of them for their hard work. To balance things out Jack Collins, Dick Parker and Dick Barrett have joined the club. As all three are assistant instructors it is a fight every week-end for the left-hand seat of the T-21, much to the amazement of the pupils.

The technical side is booming. After some setbacks a few weeks ago Ian Smith with his gang of spanner bashers have got the mechanical side running freely again. Jack Collins, who has a B.G.A. inspector's ticket, ably assisted by Dick Parker and Chris Lister, our other two aircraft experts, are looking after the "Flying Machines". By next season we hope to have the best fleet in Germany, if present ideas are fulfilled. Our congratulations go to Elly and George (our C.F.I.) on their recent engagement.

R.A.F. GERMANY GLIDING ASSOCIATION

SINCE so little seems to be known of our activities over here, it was thought that it was time that some publicity was indulged in.

British gliding in Germany began with the Occupation Forces after the war with "booty" German gliders, and there are still many people who owe their introduction to gliding to the old B.A.F.O. clubs. Today, there are five clubs comprising the R.A.F. Germany Gliding Association, which is centred on H.Q. R.A.F. Germany near München-Gladbach. Four of these clubs are west of the Rhine, Laarbruch at Goch, Phoenix at Brüggen, Nimbus at Geilenkirchen, and Crosswinds at Butzweilerhof; the fifth is up-country 200 km. further east, Eagle at Detmold. This Association is affiliated to the R.A.F.G.S.A. and is operated under the B.G.A. rules and regulations. The B.A.O.R. Gliding Association comes under the R.A.F.G.G.A. for operational purposes and control; this arrangement works very well as there are a fair number of Army glider pilots in all the clubs, and this effectively makes us an inter-Service gliding association. There are about 330 pilots on the "books" altogether.

1965 was one of the best years so far for the R.A.F.G.G.A.; in most statistics we are 30 per cent up on 1964, in some cases more. Between the five clubs, we did 17,558 launches in 2,410 hours, 86 A and B's and 46 C certificates. Here the statistics fly into "down" (we try to blame the weather): only 20 Silver legs, 9 completed Silver C's, 6 Gold legs, 2 completed Gold C's, 3 Diamonds and 5,134 km. cross-country.

All the clubs except one are on operational stations and consequently operate only at week-ends. The exception, Butzweilerhof, is a light-aircraft strip only, and was the site of 5 ab-initio courses

craft, a fair mixture of English and German types; we hope to add four more Swallows during the year. All are fairly new, with the exception of the Grunaus, a Kranich and a genuine Minimoa owned by a group at Geilenkirchen. We launch with a variety of winches, ancient and modern, and aero-tows are available at some of the clubs.

What of 1966? The R.A.F.G.G.A. 1966 Wave Expedition is returning to Issoire for two months in January and February, there will be about two dozen participants and are taking one each of Ka-6, Olympia 463, Swallow, and Ka-2 (two-seater). We hope to continue the club summer expeditions to some of the more well-known soaring sites around Europe, as well as our ab-initio courses. The R.A.F.G.G.A. 1966 Competition is hoped to be held at Butzweilerhof again, this time in June, after the U.K. Nationals.

L. S. H.

during the summer, and the annual R.A.F.G.G.A. Competition last May. This was won by Tony Phipps and "Lemmy" Tanner in Geilenkirchens' Olympia 463 after 6 competition days, using the Wallington scoring system. There were 9 expeditions at various times during the year, ranging from Zell-am-See in the Austrian Alps, Lechen-Speyerdorf in Bavaria, Venlo in Holland, and Issoire in France.

We have good contacts and co-operation with the local German gliding clubs around us; two of the smaller R.A.F.G.G.A. clubs have had invaluable help during some difficult periods. The Germans think our T-21's are rather splendid (they call them "Dopple-Grunaus"), the T-31's somewhat quaint, the Swallows quite fun but prefer their Ka-8's, and don't really understand how the 463 seems to go as well as the Ka-6. The Association has altogether 24 air-



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

TASMAN CHAMPIONSHIPS. — Mutual agreement has been reached on the holding of regular championships between Australia and New Zealand under this name. They will be flown concurrently with the Nationals in whichever country holds them. Not more than three pilots from each country will compete, and there will be no handicapping. Australia suggests that the two countries should alternate in holding them, whoever wins; thus the pilots of both countries would gain experience in flying overseas for their country and in preparing for World Championships.

ANNUAL GENERAL MEETING. — Each State, except Tasmania, sent two representatives to the A.G.M. of the Gliding Federation of Australia, held at Gawler during 12 hours on Saturday and 7½ hours on Sunday, 11th and 12th September. Statistics showed considerable growth: compared with the previous statistical year, membership of clubs had risen from 1,129 to 1,557, launches from 49,567 to 56,353, and flying hours from 10,076 to 13,694. There are 165

registered gliders in the country, of which 54 have been constructed by members, 34 imported, and 77 produced by the Edmund Schneider firm.

Max Howland is the first Australian to add all three Diamonds to his Gold C.

Major damage occurred in seven of the year's accidents, with one fatality due to "overloading the glider during recovery from an attempted roll." Three crashes occurred at the end of cross-countries, one of them due to hitting an electric power wire in the gap between two trees. The U.S. Air Force, it is stated, calls this "the sucker gap", as many of their aeroplanes have been caught out by it.

CLUB NEWS.—The 28th annual report of the Waikerie Club records figures for the year of 858 hours from 1,661 launches with 10,419 miles across country, compared with the previous year's 594 hrs., 1,403 launches and 5,179 miles. Four new Australian records were set up by club members in club aircraft during the year, and the club now holds all the single-seater closed-circuit records as well as the out-and-return. There were no accidents or incidents for the second year in succession.

A new club in South Australia, Keith and District G.C., started in an unusual way. In mid-June, 1964, a television technician, peering up at his 80 ft. antennae, just installed, sighted an eagle hawk circling under some fluffy cumulus, and said to his client: "Wouldn't that be just glorious up there today?" His client, a gliding man before coming to Keith, said: "Ever done any soaring?"

Australian Gliding

AUSTRIA

HARRO WODL won the Annual De-centralized Competition in the Gold C Class with 37,704 points in his three best flights. Among other members of the international team, Franz Ulbing came 9th with 22,757 and Johann Fritz 10th with 21,164, out of 34 entrants. Hugo Ebner, top of the Silver C Class, made 25,969 points in three flights.

Zell am See, the Alpine gliding and ski centre, now charges non-Austrians 72 Schillings per day for board and lodging (about £1). *Austroflug*

BELGIUM

LEADING results of the Coupe Pierre Charron competition, which closed on 15th October, were: M. Bluekens, 3,676 pts.; H. Stouffs, 3,160; H. Drory, 3,140; H. Smet, 2,266; J. Boone, 2,108; M. van Assche, 2,015; F. Lacroix, 1,940; J. Legrand, 1,908; M. Baeke, 1,849. In the Club Class, Keiheuvel won.

Conquête de l'Air

CANADA

WITH the year drawing to a close, it is time to look back on its activities. Weather has not been very good, and most clubs will have had a reduction in number of flights and hours. On the brighter side is the fine effort of our pilots in the World Contest, epecially Chas. Yeates' ninth place in his class. Considering that borrowed ships were used, it is very well done indeed. Also, the excellent weather during our own Nationals must be mentioned, and the superb task setting by Dave Parsey and his assistants.

All clubs have improved their equipment. Notable is the new towplane acquired by the glider wing of Aero Club of British Columbia, who have spent money for a new Ector, capable of launching a sailplane to 2,000 ft. descending and taxi-ing back, all inside five minutes, all with fuel consumption of some eight gallons per hour.

On the sadder side is the Southern Ontario Soaring Association's having to look for a new site, due mainly to politics. A site has been located, near Sheffield, Ont., and a runway and hangar are under construction. A clubhouse will follow.

The Montreal Soaring Council have just lost their famous clubhouse in a fire. At the time, it is not certain how it started, but the whole building is almost completely destroyed, together with 2 private L-Spatz sailplanes which were in the adjacent garage part. However, a new clubhouse will be built for the next season — there's drive for you.

Looking forward, one can see signs of a spectacular increase in soaring activity in Canada in the next one or two years. A new club is in the forming near Toronto and will affiliate with the Soaring Association of Canada for 1966,

and a substantial number of private sailplanes are on order. ONTAERO

Mr. V. A. Budachs sends the following corrections to the news about glider pilots' licenses taken from the French magazine *Aviasport*, which we published in the last issue, p. 554:

The relevant passages of the regulations regarding licencing are:

The holder of a glider licence may act as pilot in command, solo, in any glider up to 1,250 lb. gross weight or in heavier types for which his licence has been endorsed.

The holder of a licence may act as pilot in command and carry passengers in any glider for which he is licenced (see above) provided (1) he is in possession of a duly certified log book to prove he has completed a minimum of ten hours of solo flying in gliders, *or* (2) he is the holder of any type of valid Canadian pilot's licence for powered aircraft.

Other, medical examination is *not* required. An examination in theory of flight, airmanship, airframes and structure, meteorology and air law must be passed; this consists of 75 questions of the multiple choice of answer type, with 1 hour allowed. Flight test is not required; this is replaced by a mandatory recommendation by an authorized glider flying instructor.

So the situation is not as formidable as it seems.

DENMARK

COPENHAGEN'S Polytechnic Flying Group, which has turned out several original glider types in the past, has designed and is building a tug, the Polyt V. It is a low-wing monoplane with tricycle undercarriage, wing span 9.6 m. (31 ft. 6 in.), chord 1.5 m. (4 ft. 10 in.), "moderate laminar" profile 63-618, and fitted with a Lycoming engine. In the original design the elevator is in the normal position, but it will subsequently be at the top of the fin.

Flyv

EAST GERMANY

AN unusual handicap system was used at the Regional Championships for Karl-Marx-Stadt (Chemnitz), held during 12 days in the summer, owing to the variety of sailplane types: 10 Meise, 5 Standard, 2 Sohaj, 2 Orlik, 1 Jaskolka, 1 Laminar, 1 Lom-57. The handicap factor was obtained by dividing the best gliding ratio of the fastest machine on the task by the gliding ratio of the machine under consideration; this machine's actual speed on the task was then multiplied by its handicap factor before calculating the points.

For example, on the third task, a 103-km. goal flight, Fiebig in a Libelle-Laminar made the best speed of 60.147 km./h. while Albert in a Jaskolka made 46.63 km./h. But after applying the handicap factor, Albert was credited with 63.557 km./h. and was declared the day's winner with 1,000 points.

Only three tasks were flown. Leading competitors were: Burgmann (Standard), 2838.6 pts.; Neudecker (Lom-57), 2479.4; Albert (Jaskolka), 2193.4; Fiebig (Laminar), 1895.1. Two Czechoslovak pilots flew *hors concours* with Orliks: Lansky earned 2866.9 pts. and Ciskovsky 2479.4.

The latest list of East German Silver C pilots allots them Nos. 1072 to 1102; it includes three ladies. The name of No. 1084 is Karl Marx; he comes from Dresden. *Aerosport*

FRANCE

THE offer to organize the 1967 World Championships in France is subject to two conditions: One is that the Ministère des Armées should put a military airfield at the disposal of the organizers, as at South Cerney. The other is that the Direction de la Navigation Aérienne should be willing, for this occasion, to relax the rules to allow blind flying in areas corresponding to the routes of each task.

MOUNTAIN CHAMPIONSHIPS. — The Association Aéronautique "Verdon-Alpilles" is considering organizing an annual competition for mountain soaring, open to all nationalities, the first one to be held in Spring, 1966. The situation is ideal for flights over the Southern Alps. The announcement is made from the Aerodrome de Vinon-Verdon (Var) by the Association's president, M. Marcy. *Aviasport*

AGEING GLIDERS. — The Secretariat-Général of Civil Aviation has forbidden the flying of all wooden gliders constructed with glues based on urea-formol, as from 1st Jan., 1966. Technical experts consider that these glues, "largely used even recently in Germany", age rapidly and are unsafe after ten years. This order affects 23 old German glider types, as well as the more recent two-seater Ka-2B, of which there are two.

Air et Cosmos

Paris Match for 10th July, 1965 (No. 848), which has come our way, has a magnificently illustrated article by François Henry, the World Champion in the Standard Class, in which he describes his flying career, his experiences at South Cerney, and the early history of gliding. Colour photographs include immense pictures of the Edelweiss against various backgrounds, including the Alps and the vertical cliffs near St. Auban.

CORRECTION.—A line was omitted from the French news in the Dec.-Jan. issue, p. 555, col. 2, end of 1st para. M. Eyrand, of the French Aero Club, after describing his scheme for clubs grouped in "divisions" (like football), wrote that it is "nullement incompatible avec celle d'un chammpionnat de France individuel, qui reste indispensable."

IRELAND (Dublin)

THESE notes are being written on the eve of our A.G.M. when the usual revisions of the year's activities are very popular, as also are this season's versions of flu, to which your scribe has currently succumbed.

We have finally obtained a clubhouse! A large, wooden, prefabricated building, some 20 x 30 feet, was donated to the club, through the good offices of 20th Century Fox. We are now seeking official permission from the Department to erect it on the field at Baldonnell, to be used as a clubhouse-cum-workshop. However, if the red tape battle causes the usual delays, the sections might be severely damaged by the weather, since they're lying, dismantled and exposed, on the ground beside our existing hut. We've got nowhere to store them. But we live in hopes!

Flying continues spasmodically, weather permitting, but without any outstanding events since the last issue. The annual overhauls for all equipment and aircraft are slowly getting organised. (The new clubhouse should be a big help here.) It is generally agreed that the Club must now expand considerably, to get proper utilisation of all our equipment. To do this, a general re-organisation is required, with a more efficient form of direction, and lots more of the members helping with the work. The acquisition of a new soaring site becomes more urgent, too, since we don't fancy the idea of finding a VC 10 or Boeing sharing our field! Meanwhile, a prosperous new Soaring Season to all readers.

C. G.

JAPAN

ISAO WATANABE writes in *Australian Gliding*:—

"Our club consists of 55 members and one of them has Silver C. He is my upper grader. We have three gliders. They are MITA 3, H-23 and H-22. All of them were made in Japan. Mostly our flying is done with the aid of thermal currents, but I am yet training for that flying. When we get the glider up to the air, we mostly use a winch.

"Last May we had a training camp at the High Land and practised to fly with the aid of slope ascending currents. In Japan there is almost no club or association of Aviation (Gliding) except the club of the University. We can't find out good conditions for gliding, therefore it is difficult for us to fly long distance and stay in long time. I think as to Gliding, Japan is not civilized yet. But recently it is getting more and more popular, and it will be able to reach the world's level soon.

"We operate sometimes in riverside and sometimes high land slope. We cannot use a common air port, because Japan is very small as you know. Even if Air Liner, cannot always use complete air port except some big cities.

"In Japan, the way to educate the new pilots is very old fashion, that is the same way to bring up the pilots of KIMIKAZE. I think perhaps you know well."

NEW ZEALAND

AT the first Aeronautical Ball the centrepiece on the stage at Wellington Town Hall was an Olympia 463. The rigging of it on the stage was shown on TV the same night. All branches of the aviation industry were represented and a crowd of 600 attended.

SHARING AN AIRFIELD.—The Wellington and Wairapa Gliding Club operates at Paraparaumu Airport from the grass parallel to the duty runway "under a system of negative control", i.e. they do not have to get permission to take off, but the controller will give them a "red" if a powered aircraft has to taxi across their take-off run. On one particular day, Ross Macintyre writes, Wellington Airport (the busiest in the country) was closed and DC3's and Friendships were diverted to Paraparaumu. There were also six training aircraft from two flying schools doing circuits and bumps, the gliding club was operating four gliders and a tug, and there were no incidents. Gliders and aeroplanes do opposite circuits, and gliders may not cross the duty runway below 1,200 ft. *Australian Gliding*

FEMININE TROPHY. — A handsome trophy is being presented by Ena and Graham Monk, of Rotorua, for the most meritorious glider flight in any one year by a member of the N.Z. Airwomen's Association. Entries will be accepted at the annual Labour Weekend rally, and any achievement from C badge upwards will be considered. It will be known as the Airwomen's Soaring Award. There are about a dozen gliding members in the Association.

ANNUAL REPORT. — The N.Z. Gliding Association states that, in the year ended 31st March, 1965, the number of affiliated clubs increased to 24, and aircraft to 86. The year's certificates brought the total for New Zealand up to 617 C, 187 Silver C, 27 Gold, 4 Complete Diamond badges and 50 single Diamonds.

With these increases has come an increase in accidents and incidents. So, to raise the standard of instruction, Instructors' Courses have been organized for the Northern, Central and Southern districts. The ultimate goal of the Association's Council is an Annual Instructors' Course based on the Manual of Standard Procedure being submitted to the Dept. of Civil Aviation for approval. The Technical Committee complained that, although at previous A.G.M.'s the club representatives present had solemnly undertaken to report all accidents and incidents, "very few clubs have honoured this undertaking".

The Income and Expenditure Account for the same period shows an excess of Income over Expenditure of £1,282 17s. mainly due to one item of income — "Advertising — Rothmans, £1,000." Affiliation fees brought in £258 15s. 6d. Loss on producing the *Gliding Kiwi* was £99 15s. 9d. *Gliding Kiwi*

RHODESIA (Salisbury)

THE 1965 National Championships were held from 11th to 23rd October. There were six entries with nine pilots in the Open Class and three with six pilots in the Limited Class. More entries were due from Zambia, but, for various reasons, no more arrived. However, nine ships started and nine finished — which says much for the inherent skill of all the competitors.

Because of the unfavourable weather conditions, for Rhodesia that is, most of the tasks set were either 100 or 200 km. triangles, with three out-and-returns to Lion's Den, Fort Victoria and Banket for the Open Class and five out-and-returns to various points for the Limited Class.

No one in the Open Class completed the task Fort Victoria and back (500 km.). Ted Pearson flew the furthest by reaching Birdie's Farm, near Beatrice, on the way back. Thermals dissipated early in the afternoon.

Radios were installed in most aircraft and this made things a lot easier for retrieve crews.

Final results, with average daily points, were:—

OPEN CLASS

1.	Ted Pearson (Austria SH)	986
2.	John Saunders (Austria S)	746
3.	Jimmy Arnett (Vasama)	738
4.	Doug. Elliott (Ka-6)	686
5.	Alf Thompson (Ka-6)	348
6.	Mr. Pritchard (Oly 463)	329

7.	Mr. Bell (Skylark 3)	317
8.	Jimmy Harrold (Oly. 463)	294
9.	Barry Turner (Skylark 3)	259

LIMITED CLASS

1.	Bob Moore (Swallow)	991
2.	Geoff Swede (Olympia)	919
3.	Les Graham (Swallow)	662
4.	"Snowy" Snowball (Oly.)	500
5.	Charlie Mogg (S-18)	494
6.	Harvey Quaile (S-18)	404

On the evening of 23rd October, prizes and trophies were presented by Mrs. Mason, wife of Harry Mason, Awards Officer of Central African Soaring Association:—

1st Howard Knell Trophy for Open Champion, Ted Pearson. 2nd Howard Knell Trophy for Rhodesian Champion, John Saunders. Anglo-American Rose Bowl for Zambian Champion, Ted Pearson. C.A.S.A. Trophy for Limited Class Champion, Bob Moore. Salisbury G.C. Tankard for the Pilot's Award, Bob Moore.

Annual Trophies for best flights of the year:— Athenides Trophy for longest out-and-return, Riteway Trophy for fastest 300-km. triangle, and Pearson Trophy for the longest distance were all awarded to Ted Pearson. The S.G.C. Trophy went to John Saunders for the fastest 100-kilometre triangle, and the Bindura Trophy to Caroline Rowe for her gain-of-height record in the U.S.A.

Marandellas Club kindly helped out with their Tiger Moth. The only real incident was when Ted nearly lost his canopy on take-off.

GWELO AIR RALLY. — For a change, some of us thought that Gwelo would entail new horizons and an opportunity of attempting cross-countries. Arnett in the Vasama, Harrold in the 463, Hodge in the Ka-6 and Thompson and Mike McGeorge in the BF had a bash. The only successful one to reach Gwelo was Paul Hodge; the Vasama lobbed down at Que Que, the 463 near Umvuma and the BF at Gatooma Airfield. That night we were all made most welcome by the Gwelo flying types. Sunday was taken up with giving pax rides in the BF in conjunction with the Gwelo T-31. Paul Hodge was the only one to attempt the return flight to Salisbury, and what a magnificent effort it was! He arrived back at Warren Hills just on dusk, having picked up his last thermal near Lake MacIlwaine.

On 31st October the second Rhodesian 500-kilometre distance was completed by Jimmy Arnett in his Vasama. He had to battle with strong headwinds on his way back to base from Fort Victoria, and one can gauge the achievement by the fact that he was airborne for over eight hours.

Membership of Salisbury Gliding Club has had to be restricted somewhat owing to the large number of applications being received. After separating the mealies from the cobb, we will know who really are the keen types.

Congratulations to Caroline Rowe for her great effort in Colorado in gaining the Rhodesian height record of over 33,000 ft. in a standing wave.

"MIKE" (*Salisbury G.C.*)

RUMANIA

THE 12th Rumanian Gliding Championships took place at Iasi (in N.E. Rumania on the plain of the River Prut which forms the Soviet frontier) last July. Only one type of sailplane, the IS-3, was flown by competitors.

The first task, out-and-return Birland, 208 km., was won by Emil Iliescu, of Bucharest. The second, out-and-return Targul Frumos, 104 km., was won by Valentin Romascu, also of Bucharest. Next task was again Birlad and return, won by Alexander Ioja, of Targul Mures. Iliescu again won the 4th task, Tg. Frumos and return. The final task, Lasi-Vladeni-Sunesti-Iasi, was won by Vasile Cotofana.

Overall winner and National Champion was Iliescu; Cotofana came 2nd and Ioja 3rd.

Translated by Mme. Mikulska from Skrzydlata Polska

SOVIET UNION

NATIONAL DISTANCE RECORD.—During August, 1965, a cold front passed over the centre of Russia. The next day, in the region of Dnepropetrovsk, brought good conditions for distance flights. Three glider pilots took off in a Blanik, an A-11 and an A-15. The first, Sherbak with passenger, and Yerishko, started too early and had to land after

70 kms. However, Pilipchuk in the A-15 left 30 minutes after the others. He went the first 100 kms. in very weak conditions, but then the cloudbase gradually rose from 800 to 1,500 m. In the evening he landed by the small village of Staritsa in the Kalinsk Province after flying 810 kms. This flight beats the 1939 record of 749 kms. by Olga Klepikowa (a world's record at the time). Pilipchuk is the second Soviet pilot to fly more than 800 kms., the first being V. Ilchenko in a two-seater on 24th May, 1953 (also a world's record).

Translated by C. Wills from Krilya Rodiny

SWITZERLAND

TWO national competitions are held in Switzerland each year: the decentralised contest for the best flights during the soaring season, and the Swiss Gliding Championships. A reorganization is suggested by E. Dünner, who asks pilots to send their comments on it to the S.F.K. President. He proposes Regional Contests in five different regions during two or three week-ends between the end of April and end of May. Then, in June or July, the Championships would be held with 20 to 30 competitors made up of:

The first five in the previous year's Championships,

Three from the previous year's decentralized comp.,

The first 15 or 20 from the Regionals, each Region sending a number proportional to the number who flew in that Regional.

The 1965 decentralized contest ended with Rudolf Seiler leading with 87,236 points; Kurt Baumgartner had 62,539 and Rudolf Hösh 49,912. Best performances: 8,499 m. climb (27,885 ft.) by Sturzenegger, 492 km. distance by Baumgartner, 383 km. goal flight by Seiler, 365 km. out-and-return by A. Heimgartner, and 409 km. triangle by Seiler.

Aero Revue

UNITED STATES

THOUSAND-KM. AEROTOW.—Michael S. Greenwald describes in *Soaring* how he was aero-towed by a Bonanza 650 miles in 4¼ hours from Elmira to Chicago in a Schweizer 2-32. They started at 10 a.m., two hours after the cumulus had begun, and flew above the top of the convection layer. The only lift encountered was weak wave over N.W. Pennsylvania. Their average speed was 133 m.p.h., and the Bonanza used 11 gallons of petrol per hour. This is believed to be the longest aero-tow in a sailplane, though cargo gliders have had longer tows.

NEW PRUE.—Irving Prue is building a remarkable new sailplane to be called Prue 370, with an aspect ratio of 38, and a projected empty weight of 370 lb. Span is 57 feet and it will have a T-tail.

Another new design is the Bantam by Peter Bowers, intended for the "little guy". Span 38 ft., empty weight 300 lb.; estimated gliding ratio 21 or 22, and sink 3.2 ft./sec. Two men should get it off the trailer and ready to launch in five minutes. *Soaring*

YOUTH SOARING.—Holli and Richard Nelson write on behalf of the Civil Air Patrol that a "special activities program" brought together cadets from all corners of the United States to Harris Hill, Elmira, last summer. Since 1961 they have co-operated in the development of six different methods of introducing youth to soaring. They have sent out a questionnaire to organizations concerned in this activity in many countries, with the idea that they should further the cause by pooling their experiences. From England, replies have come from the Boy Scouts' Association (L. J. Bittlestone), No. 613 Gliding School R.A.F. (Flt. Lt. D. Jackson, C.O.), and Slingsby Sailplanes.

We have been sent No. 1 of a Newsletter, *Sierra Wave*, from Victor Swierkowski, whose company, Sierra Wave Inc., operates a gliding organization at Truckee-Tahoe Airport. You can get dual instruction, or aero-tows into a wave, in a hired sailplane, of which there is a choice of 1-26, TG-3 and 2-32. The schedule of charges also includes "scenic rides in a Super Cub". The address is: Sierra Soaring Inc., 213 26th Street, Sacramento, Calif., 95816.

VENEZUELA

CARACAS Gliding Centre possesses a Ka-7 but wants to buy a Bocian. Membership consists of 2 Poles, 2 Italians, 1 Frenchman, 1 German, 1 Canadian, 1 Spaniard, 1 Chilian, 2 Americans and 1 lady of Venezuelan origin. The site, at Hiquerote, is 120 miles from Caracas.

Skrzydlata Polska

WEST GERMANY

THREE DIAMONDS. — The newest Three-Diamond pilot is Dieter Memmert, No. 415 in the international list. He has Silver C no. 3,121 and Gold C No. 278 in the German list.

Aerokurier

MODEL AIRCRAFT SCHOOL. — At the Klippeneck gliding site, where the first post-war German Nationals were held in 1952, a large school has been established for the teaching of all aspects of model building and flying, including meteorological briefings on the forecasting of slope lift and thermals.

Der Adler

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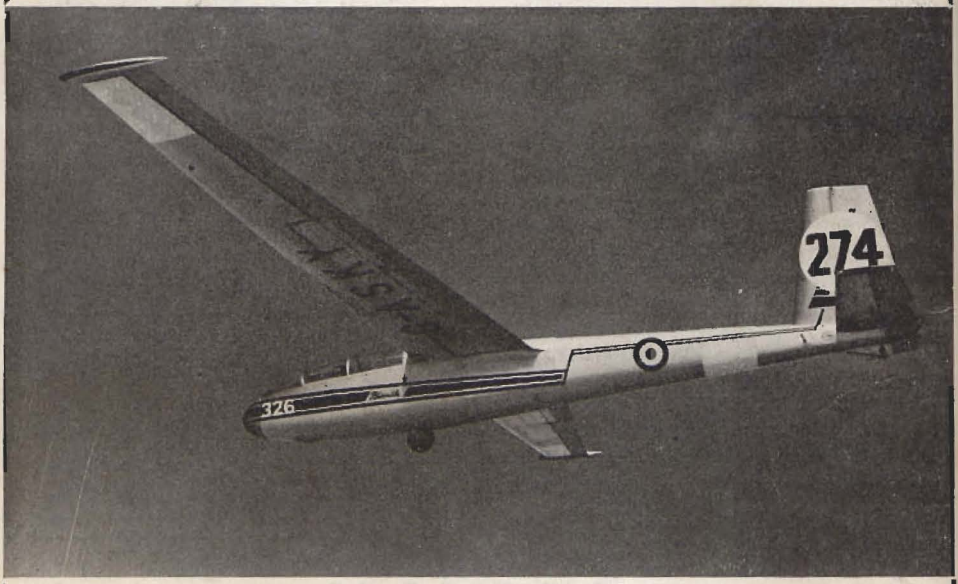
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