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SAILPLANE & GLIDING

OFFICIAL ORGAN OF THE BRITISH GLIDING ASSOCIATION

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CONTENTS

Cover Photograph: Walter Neubert, world record breaker par excellence, is claiming a new world record (see p141). Here he is flying the Kestrel 604 over Marfa, 1970. *Photo S. A. Aldott*

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CHAIRMAN'S REPORT, 1971

IN last year's report I was in the position of commenting on the first year of operation of the new BGA Organization, under my Chairmanship. I am glad to be able to report this year that the early promise has been sustained and it is clear that we have a very appropriate organizational framework within which to administer the Association's affairs. As always, the success of the system depends on willing and capable assistance from members to take on the many demanding and important jobs on the various Committees and special events which determine our progress as a movement. I should like to open by thanking all those who have helped in these various roles and our dedicated staff in the office, for making the whole system work so well. It has made my part both pleasant and manageable—which it easily could not have been.

A year ago we were all wondering what Roskill was going to recommend and whether we or the Brent geese were going to cop it. As things turned out, what Roskill said seems to have been paid scant attention. Instead we have a political decision in favour of the environmentalists, and it so happens that it suits the gliding movement very well. It is quite likely, however, that the last word has not been said on this matter and it may be found necessary by the Government to moderate its present decision in some respects. The closure of Stansted and Luton I would regard as doubtful when the dust has finally settled on the initial furore and a bit more arithmetic and thinking has been done. So we may not as a movement get all the benefit that at present seems in prospect.

David Ince took over Chairmanship of the vital Airspace Committee, but had only been in the job a few months when he most unfortunately had to relinquish it for personal reasons of a very compelling kind. I was very worried about a gap in air representation at Civil Aviation Control Advisory Committee and Private and Club Flying and Gliding Joint Committee on this matter, but fortunately John Ellis stepped into the breach and has been sustaining our cause on this front with energy and a deep knowledge of what it means from the point of view of the professional user of controlled airspace. As I remarked last year, and it is still the case, our most serious current threat is from proposed military special rules zones—that including Brize Norton and Lyneham being the most imminent and threatening. By the time this report is presented we will almost certainly have seen a further and perhaps the final move in this case. We are at present hopeful that our arguments have prevented the worst from happening (see p119).

Another World Championship is upon us, and I should like to take this opportunity of wishing the team and the fund raising, *bon chance*. And may I link this wish with one for Sigma, which after much trial and tribulation and a vast amount of hard work, looks as though it may be ready to take part in the proceedings. As one who has been involved in the project, I have been able to see at close quarters the extraordinary effort that has gone into Sigma. A very difficult step forward in design has been attempted which has taxed to the maximum our ability to organize and sustain through the various tribulations that beset us. One hopes the outcome will prove that the objective was sound and efforts effective.

1971 has seen significant development in the less exotic regions of sailplane production. Torva has flown and performed well in competition (a very bold stroke by Chris Riddell to enter it whilst still halfway through the test programme —but, as he says—what better test?). Kestrels are coming off the line and seem to be delighting their owners—Torvas in number will be available in 1972.

The year has also seen some solid experience for motor glider training in the hands of clubs, which has fully borne out the promise of Bill Scull's first season of experience which I commented on last year. I am glad to report also that we have made substantial progress with the Department of Trade and In-

dustry on the outstanding questions of licensing and operation which have worried us all for the past year. We now have nominated sites exempted from the requirements of the Air Navigation Order and the endorsements for instructing approved for a further period, with the prospect of a permanent system of BGA instructor categories for self-launching motor gliders. The Air Registration Board will fall into line as soon as the Department of Trade and Industry has finalized its own policy and meantime the Air Registration Board is being as helpful as it can.

There is no doubt that this development of the self-launching motor glider will have the most important consequences for the future of the movement. Not only will it revolutionize training and instruction, but, judging by Ian Strachan's demonstration at Husbands Bosworth this year, it may well in due course revolutionize our competitions as well.

In terms of membership and flying activity, the past year has shown a steady increase. Launches are up 7% and hours 8% and civilian clubs for the first time have topped a quarter million launches. The year has also glistened with Diamonds. All this points to problems to come with the saturation of present gliding sites and the difficulty in developing more. This topic is dealt with in Joan Cloke's report and you will be glad to see that, in spite of the change in the organization of Government Departments dealing with the matter, it appears that we have managed to ensure continued financial support and negotiated the administrative hurdle of the proposed restriction to grants for other than central and national purposes. We all owe Joan our thanks for her continuing very effective attention to this important aspect of our affairs.

Finally, in concluding my last report to you as Chairman of the Executive Committee, may I say how easy everybody has made my task for the past two years. Philip Wills at the time of my election made some sympathetic noises about willing horses not being flogged too hard, but in fact the cheerful and willing way in which everyone has done the bit that they are good at and interested in has made the job a sinecure. This advertising will, I hope, have the desired effect of interesting others in coming forward to do their stint, thus bringing new minds and experience to the many tasks faced by the Executive Committee. I am happy to hand on to my successor a proven and smooth running organization which must I think have achieved everything its builders hoped for. For my part, although I shall not continue as an Executive Committee member, I hope to be able to give a hand from time to time with particular problems of the Association—and I do not expect to do any less flying than before.

Good luck to you all.

K. G. WILKINSON, *Chairman.*

Wave clouds over Disforth on April 17, 1971
photo by Malcolm Blackburn

REPORTS ON BRITISH WAVE FLYING, 1971

By T. A. M. BRADBURY

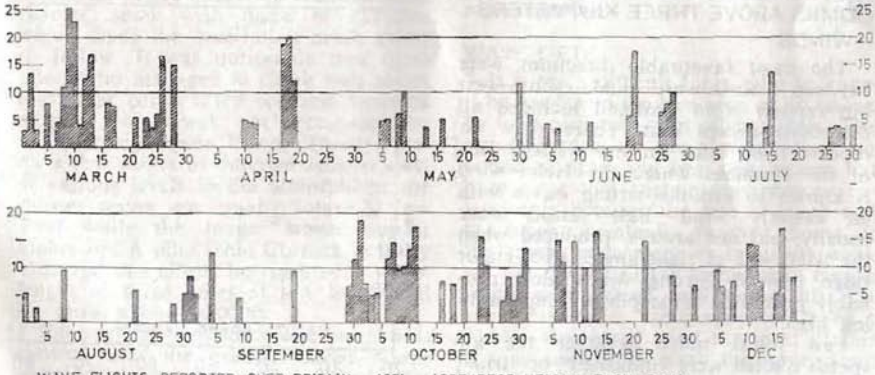
THIS is a preliminary summary of the data sent to the British Gliding Association during the period March 1 to December 18, 1971.

CALENDAR DISTRIBUTION OF WAVES

Waves were reported on 101 out of the 295 days of the survey, and probably occurred even more often. As was expected the frequency of wave days decreased during the summer months, but climbs to three kilometres or above were reported in every month except August. In March and October waves were reported on two days out of three and many of the highest climbs were made in these months, but April, November and December also produced good conditions for wave flights.

A calendar of the highest climbs on each day is given in figure 1. It shows that 20,000ft was reached or exceeded on three days, 15,000ft on 14 days, 10,000ft on 35 days and 5,000ft on 76

Figure 1



WAVE FLIGHTS REPORTED OVER BRITAIN 1971 (GREATEST HEIGHT EACH DAY)

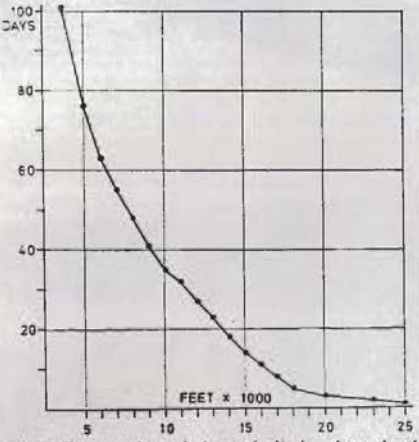


Fig 2: The number of days of climbs above level shown on the base line

days. The graph in figure 2 shows the chances of experiencing wave flow up to various heights, based on these reports. However, this is probably an underestimate of what is really possible. A number of pilots were obliged to break off their climbs for lack of oxygen, thickening of cloud, approach of night or just because of the extreme cold. Instructors were also restricted from climbing high and had to cut short flights to enable other pupils to be taken up.

SOME GENERAL FEATURES OF WAVE CLIMBS ABOVE THREE KILOMETERS

—WINDS

The most favourable directions were between north-west and south-west but reports from Scotland included all directions except east. There were no reports from sites on the western side of the Pennines where the Helm wind is known to produce strong waves with an easterly wind. Best results were usually, but not always, produced when the wind was at right angles to a major ridge upwind. Strong winds aloft probably prevented some pilots from climbing high.

Few pilots noted whether the air speeds quoted were "indicated" or "true" values. The winds reported by radiosonde stations upwind of the area were therefore used to estimate the speeds at various levels before the air was disturbed by wave flow. The actual wind speed may vary considerably as the air passes through the wave system. Almost all the winds at the top of the climbs were less than 60kts and the majority were found to lie between 40 and 50kts. However a speed as low as 23kts at 11,000ft was reported to give a good climb. Figure 3 shows the envelope of wind speeds at the top of a number of climbs.

Figure 4 may help pilots appreciate the difference between indicated and true airspeed at the heights reached in wave flying. It shows the approximate percentage to be added to the indicated value to find the true airspeed at different heights.

VARIATIONS OF WIND WITH HEIGHT

Theory indicates that when conditions are favourable for lee waves the wind speed should increase with height. In most cases this was observed but we also have an example of a day when the true wind speed actually decreased above 6,500ft and did not increase to the original value until a height of 20,000ft. There was, however, a well defined stable layer near the 6,000ft level.

VARIATIONS OF STABILITY

The presence of an inversion or stable layer, with layers of less stability above

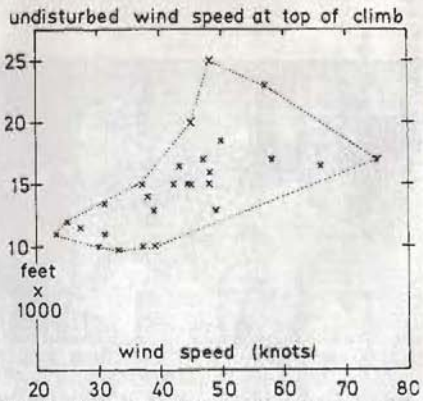


Fig 3: Wind strength at the top of a number of wave climbs

and below, is usually considered an essential feature for the development of wave flow. On most days for which reports were received, and on all the days when pilots reported that wave flying was particularly easy, there was a well-marked stable layer at some level between 2,000 and 10,000ft. In Scotland, however, this stable layer was absent or barely discernible on several good wave days, but there was then an increase of wind with height. In every case there was a stable layer or an increase of wind with height (or both together). When both were lacking there were no wave reports.

For many years pilots have been making the transition from thermal to wave soaring but it was generally assumed that if the air was unstable enough for showers there would be little chance of soarable lee waves. Just how high a cumulus cloud must extend before wave flow becomes impossible is not yet clear. However, wave soaring is certainly possible when the cumulus top is about four times the height of the mountains. Pilots flying at low levels reported that wave flow was rapidly re-established after the passage of a heavy shower. Pilots at high level were able to continue soaring above large cumulus.

WAVELENGTH

On many occasions no clear or sustained pattern was seen, and since the present form does not ask for such details few pilots included wavelengths. However, there were several valuable reports, some with maps or sketches which made the description much easier to follow. It was noticeable that those pilots who managed to climb well above the cloud could often see and report a pattern which was not recognised by pilots flying lower down. Theory predicts that waves of different lengths exist at various levels in the atmosphere; the shorter waves are usually found at low level while the longer waves appear higher up. A pilot from Currock actually observed this effect; he reported a wavelength of three miles at low levels and six miles above 10,000ft.

Pilot reports and some satellite photos showed that the evenly spaced waves were more common over relatively flat terrain while over the mountains the wave pattern was apt to be irregular. An excellent report, complete with map, showed a regular spacing of three miles between waves over the Vale of York (one pilot said it looked like a Zebra crossing) but over the Pennines the pattern was not so clear and the wavelength appeared longer. Comparisons between reported wavelengths and wavelengths calculated by Casswell's simplified method (Reference 1) did not always agree. The observed wavelength on these occasions was shorter than the calculated value, particularly below 10,000ft. The difference may be because the nearest upstream radio sounding was not truly representative.

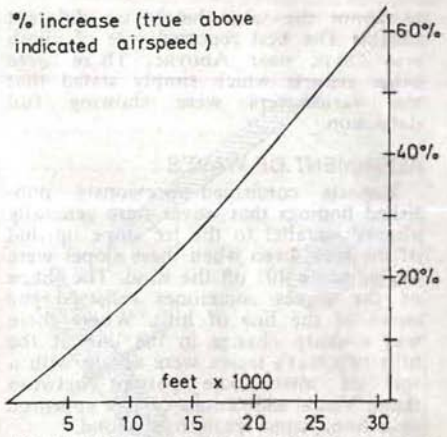


Fig 4: Difference between indicated and true airspeed shown as a percentage to be added to IAS to get TAS

WAVE LIFT

It is often difficult for a pilot to know if he has found the best area of lift unless he is in company with other gliders. The reported rates of climb were often too varied to draw any firm conclusions but it is clear that there is no obvious relationship between the rate of climb and the height eventually reached. Some of the climbs were made in relatively weak lift but continued far higher than climbs which encountered very strong lift. On some days when there appeared to be a sudden change of wind the level of this change seemed to mark the upper limit of wave flow. Lift which was strong up to this level was found to cease abruptly

at about the same height on different climbs. The best reported rate of climb was 18kts, near Aboyne. There were other reports which simply stated that the variometers were showing full deflection.

ALIGNMENT OF WAVES

Reports confirmed previously published findings that waves were generally aligned parallel to the lee slope upwind of the area, even when these slopes were angled some 40° off the wind. The shape of the waves sometimes reflected the curve of the line of hills. Where there was a sharp change in the line of the hills two wave trains were set up with a sort of interference pattern between them. Visual indications of this appeared as a honeycomb pattern of cloud.

There were, however, two days on which the wave pattern developed at right angles to the wind flow, apparently regardless of the hills below. The first was shown on a satellite photo (May 10) when waves in a southwesterly flow developed at right angles to the ridges near Bantry Bay in Eire, and maintained this alignment for hundreds of miles. The second occasion was also with a southwesterly flow on October 1, when numerous pilots were soaring from Portmoak. It then appeared that the wave train began just upwind of Stirling with an alignment roughly northwest to southeast. The waves retained this alignment for many wavelengths as the air passed over the Ochil range which lay parallel to the wind.

Fig 5: Wave pattern over Scotland on November 15 last taken from satellite picture

Two pilots who reached about 18,000ft were able to observe this wave pattern at right angles to the Ochils.

BRANCHED WAVE CLOUDS

A few pilots found some waves which were very much out of alignment with the general pattern in the area. By tracking along these odd waves it was possible to progress upwind without the usual loss of height. It has not been possible to match these reports with simultaneous satellite photos and even if such pictures were available it is unlikely that the position of individual waves could be identified with sufficient accuracy. However some photos over Scotland show wave clouds which appear to branch into two.

The effect is almost certainly due to topography since it seems to be confined to mountainous areas. Wave trains over the sea look much more regular. Figure 5 shows a greatly enlarged pattern sketched from a satellite picture rectified to correct for distortion due to the curvature of the earth and the angle of viewing. The positions of the waves may be slightly in error but the general pattern should be correct. The wave alignment alters from nearly north-to-south near Jura and the Kintyre peninsula to northeast-to-southwest near Perth. There are three places where the wave cloud appears to branch.

Figure 6 shows two possible schemes for the formation of such branches. When the air is unstable, with semi-permanent cumulus over the hill tops acting as an upward extension of the ground, the branch looks like part of the bow wave of a ship. With a more stable airmass the wave conforms more closely to the shape of the lee slope. At this stage we know too little to be confident of either scheme however.

SHALLOW EASTERLY WAVES

During the summer months there was a surprisingly large number of reports of

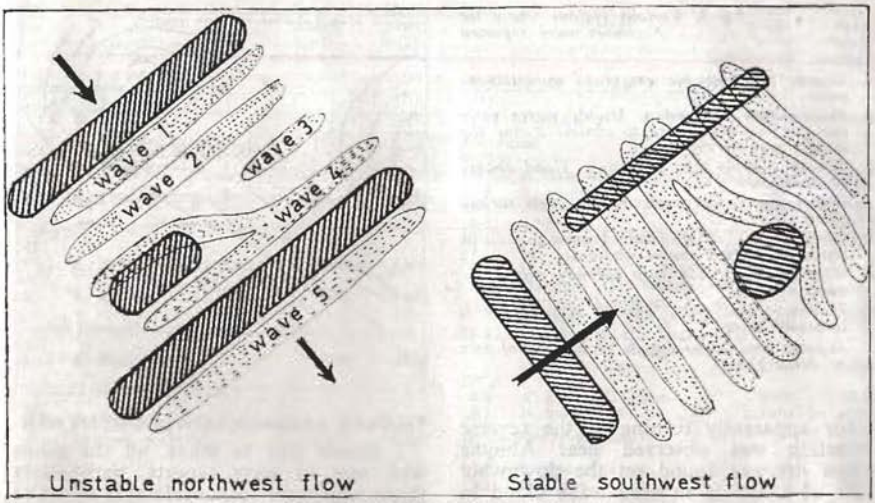


Fig 6: Formation of branched wave clouds in two airstreams

shallow waves developing in easterly winds. Many of these occasions were when relatively cold air, flowing inland from the North Sea, lay under a layer of warmer air where the winds were much lighter. (In some cases the wind direction was reversed in the warm air aloft.) There was always a marked inversion on these days.

East wind waves were reported from places as widely separated as Portmoak and Maidstone. Quite strong lift was found in the lowest few thousand feet but the lift decreased rapidly above the inversion level. Few pilots climbed much above 5,000ft and many found that the upper limit was only 3,000ft. The wavelength was always short, ranging from about three miles to an estimated 2,000 yards.

At Portmoak these easterly waves developed with remarkably light winds. Since the winds over the Bishop hill were stronger than those measured near the coast at Leuchars earlier there may have been a sea breeze effect. Lee waves in sea breeze air have been observed in America. At Portmoak one striking feature of these east wind waves was a forward tilt to the wave front which enabled pilots to soar directly over the hill top on the lee side of the Bishop hill. The probable airflow has been sketched in figure 7.

On some occasions the air seems to rise almost vertically in front of the main rotor and pilots could circle in wave lift. With stronger winds there is evidence for a secondary rotor turning in the opposite direction to the main rotor upwind of it. Secondary rotors were reported by French pilots many years ago but little has been heard of them in Britain. Forward-curving wisps of cloud on the upwind side of a wave may be a sign of such a secondary rotor. Secondary rotors may exist both in front of and downstream from the main rotor. A

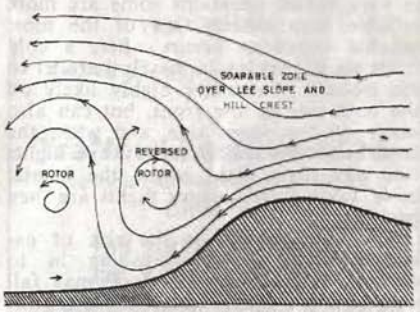


Fig 7: Possible airflow when soaring was possible over the lee side of a hill

Fig 8: Various regions where lee waves were reported

KEY:

A. Usually too unstable except in mountainous areas

B. Rather deep convection. Usable waves early and late but often hard to contact during the middle part of the day

C. Usually reliable area for waves. Good chance of lenticulars

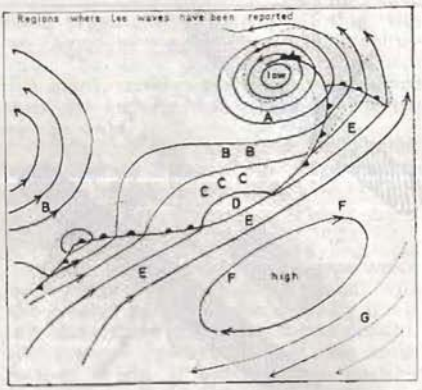
D. Waves apt to be weak due to high surface winds

E. Good waves likely but ground may be obscured by low stratus

F. Winds probably too light for any except the weakest waves

G. Shallow waves only, possibly capped by a turbulent layer.

Stippled areas denote high probability of rain or dense cloud



rotor apparently turning in the reverse direction was observed near Aboyne when lift was found on the downwind side of a slowly moving wave cloud in an area where sinking air is normal.

DAYS OF WIDESPREAD WAVE ACTIVITY

There were a number of days when waves occurred simultaneously at many gliding sites. One day this area extended from Aboyne in the north to Bicester in the south. Figure 8 is a composite weather map showing where waves were found last year in relation to various flow patterns. Only the details shown on weather maps printed in daily papers, or shown fleetingly on television, have been included. The various letters indicate the kind of wave activity possible.

Although lee waves have been found in very varied situations some are more reliable than others. One of the most reliable situations occurs where a cold front trails back to lie nearly parallel to the isobars. Waves are highly likely on the cold side of the front, but can also occur on the warm side, and when the front is temporarily inactive wave flights can take place right across the frontal zone. Long cross-country flights are then possible.

The chief hazard is the risk of extensive cloud cover spreading in to obscure landmarks. This cloud may fall very low near windward coasts and hills but the Welsh mountains and Pennines often act as a barrier to the lower cloud.

THANKS AND ACKNOWLEDGEMENTS

I should like to thank all the pilots who sent in wave reports, particularly those who went to considerable effort to amplify the reports with longer descriptions and added maps or sketches.

REFERENCE

Casswell, S. A., 1966. "A simplified calculation of maximum velocities in mountain lee waves". *Met. Mag.* 95, pages 68-80.

WAVE FLIGHTS

THE period under survey ended on February 29. We will be publishing a final list of wave flights carried out in the survey period in the June issue, and would be grateful if all pilots would send us the completed wave forms by April 9.

Date	*Name of pilot(s)*	*Lowest height wave contacted (ft)*	*Maximum height reached (ft)*
Aboyne (Deeside)			
1971			
2-10	P. Guest	1300	6800
6-10	P. Guest	2000	14000
7-10	P. Guest	3000	5000
9-10	M. Audritt	2500	7200
5-12	R. Kerr	3500	9100
1972			
20-1	R. Lee	2500	6700
22-1	A. Middleton	2400	6600
27-2	R. Kerr: D. Lee	2400	6800
12-2	A. Middleton	1500	4000
13-2	A. Middleton; D. Lee; I. Lovie	2000	10500
14-2	P. Candy; E. Summers; D. Neilson; I. Murdoch	2100	7000

Date	Name of pilot(s)	Lowest height wave contacted (ft)	Maximum height reached (ft)
Bickmarsh (Worcestershire)			
1971			
28-10	D. Neilson	1100	3600
11-12	A. Coffee	1800	3500
18 12	D. Neilson; B. Dexter	2000	3300
24-12	D. Neilson	2500	4500
1972			
16-1	B. Dexter	2500	4500
Camphill			
1971			
11-12	A. Beer; A. Blackburn	2300	8300
1972			
13-2	B. Morgan	500	7500
Church Broughton (Burton & Derby)			
1971			
11-12	K. Brett	1800	4270
Cranwell (RAF College GC)			
1971			
11-12	P. Medhurst; I. MacFadyen; A. Price	2000	6500
Dishforth			
1971			
30-10	B. Nowell	3000	6500
5-12	T. Drake	3660	5700
10-12	A. St Pierre	2560	7560
11-12	W. Wintrip; R. Beck; P. Shanahan; A. St Pierre	2000	18500
18-12	A. Letts; P. G. King; B. Barry; P. Shanahan	2100	5900
24-12	M. Greaves; M. Orrey; W. Wintrip; B. Nowell	1500	10600
Doncaster			
1971			
16-12	B. Pell	4000	9500
Hedley (Northumbria)			
1971			
23-10	A. Townsend	2200	6800
14-11	D. Pattison	1900	2000
5-12	D. Ingle	1900	6300
7-12	A. Brown; J. Head	2200	6300
18-12	D. Driver	1700	3800
1972			
13-2	D. Osborne	4800	7300
Kingussie (Cairngorms)			
1972			
9-1	W. Longstaff	1650	2050
6-2	W. Longstaff; A. Lindsay; D. Tipping; R. Mackintosh	1850	6050
Long Mynd			
1972			
12-2	A. Sykes	2000	12500
Milltown (Fulmar)			
1972			
16-1	H. Dyce	1000	4500
6-2	R. Kerr	3500	4600
12-2	H. Dyce	3200	10000
27-2	E. R. Smith	3000	8000
Nympsfield			
1971			
11-12	C. Hughes	2200	6500
1972			
12-2	C. Hughes	2700	9200
Newtownards (Ulster & Shorts)			
1971			
11-12	T. Sogn	1800	7400
Portmoak			
1971			
14-7	A. Sambale	1100	12400
31-8	A. Sambale	900	4600
1-10	A. Sambale	2000	8900
6-11	A. Milne	1500	21250
22-12	J. Fraser; J. Hutchings	1800	11650
27-12	M. Alexander; A. Dick; H. Torode; F. Irving; J. Dandie; D. Walker; E. Vann; D. West; J. O'Donnell; G. Smith	1500	7350
28-12	M. Short; E. Vann; H. Torode; J. Hempseed; F. Irving; V. Carr	1500	8600
1972			
4-1	A. Dick; G. Green	1900	3900
5-1	N. Stevenson	1900	4200
Strathallan (Perthshire)			
1972			
8-1	R. Pears	1000	4000
15-1	R. Pears	1000	2600
Sutton Bank			
1971			
5-12	M. Carter	3400	5100
Usk			
1971			
11-12	P. Gould	3750	7250
12-12	E. Duffin	1600	6300

A LATIN CHECK

Traveller's Tales II

By the Armchair Pilot

WE drove into the airfield in the heat of the day, the sun and the valley haze combining to make the whole scene liquid; even the snows of the mountain tops seemed to shimmer. On the runway stood a Blanik, its attendant tug languorously ticking over.

"So you are English," said the instructor, a man called Luca whom we found in the hangar. "We have just had two English visitors, but we would not let them fly. One had a new C Certificate, and the other not even that. They were very rude to us. We are sorry, but they should not have behaved as they did. What experience have you?"

My heart sank; so I was to be an ambassador, charged with restoring the honour of my country after two unwelcome Englishmen had passed through. I produced a fat log-book: "Ah," said Luca, waving his arms with delight, "that is different. You will only need a little check. We will take the Blanik immediately."

Not five minutes after having arrived, unannounced, I was putting on the parachute from the Blanik's front seat, while peering anxiously into the cockpit at an incredible forest of levers and knobs.

Now I am a simple man, and levers and knobs confuse me. I have only twice been through the bottom of gliders, once on trying to perch on a Lake District mountain, when I mistook the sense in which the brake lever operated, and once on trying to learn to land a T-21 left-handed, when I confused the levers I held in my two hands. Nor, indeed, do I like more than the minimum of instruments, for the same reason.

. . . a Lake District mountain

Peter Scott and I once landed together after a race from Dunstable, and he helped me de-rig. "I didn't know it was possible to fly with so few instruments," he said, on seeing the blackboard which passes for Cockleshell's instrument panel. That day he had had to take a relight because on the first launch none of his three electric variometers was working. As a matter of fact the only reason I made such good speed was because I forgot to pull out the telescopic aerial to my radio, and as the voices of my competitors faded I was spurred on by the thought that I was leaving them all behind . . .

"Get in," said Luca, "the tug is starting to move." Indeed it was. I flopped into the middle of the forest, making sure that at least one knob fell easily to hand between my knees. I was about to ask a hundred-and-one questions about what all the other knobs and levers operated when Luca slammed the lid shut and the tug opened up.

. . . slammed the lid shut

I am about six feet three inches tall, and the Blanik canopy caught me bang! on the top of the head, forcing my head back into a position more appropriate to Luca washing my hair than giving me a check flight. Looking down my nose I could see, past the bottom rim of my

glasses, the thick cross-member of the Blanik canopy, and beyond that the merest hint of a tug setting off down the runway. Instruments were just a short-sighted blur below my glasses, and the knobs and levers were all out of sight.

"Very good take-off," said Luca as the Blanik lifted its wingtip from the scorched runway and followed the tug of its own accord. My neck ached, the sun beat down on my forehead, and a torrent of broken English came from the

. . . a torrent of broken English

rear seat. Luca was determined that the English ambassador should not fail, that the memory of the other two pilots should be expunged.

My left hand started feeling its way round the invisible cockpit. I was appalled by what it found. Brakes, flaps, trimmer, seat adjustments, release, oh help! does a Blanik have a retractable wheel? (I still can't remember).

The mountain tops were all that I could see around me. Panic struck—where was I? Navigating by the sun, I judged we had completed a circuit of the airfield, and, pulling the roundest knob I could lay hands on, I was immensely relieved to see the tug climb on and to be able to get the nose down. Yes! That quivering blur ahead must be the runway!

"What ever did you do that for?" shouted the exasperated Luca.

"My neck . . . I can't see . . . my head is jammed . . . no, I cannot translate 'jammed'." I lined up on the runway.

A flood of instructions started to flow from the back seat. "More speed . . . more flap . . . trim . . . trim!" shouted Luca.

I played with the knobs and levers like a biscuit packer packing biscuits. In my trade of statistician there is a theorem known as the Central Limit Theorem which states that if you operate enough such knobs and levers rapidly enough, everything will average out.

"Less speed . . . more flap . . . undercarriage . . . brakes . . . you must *trim* when you use the brakes."

Did I use the brakes? Bang! In Luca's native language the distinction between "we have arrived" and "we are arrived" is the same as in English. We were arrived.

"Very, very good," said Luca. "You managed very well. You are a very good pilot. You will have no trouble with the single-seater." And without further ado I was placed gently in the single-seater, and Luca himself towed me over the steel-works, over the town, and just over the pylons on the hillside, passing instructions the while over the radio. "Release", he shouted as soon as it was quite obvious that return unaided was impossible because of the electricity wires.

Anything to be my own master. I released, and tucked my wing into the great hillside. Slowly we rose above the pylons, above the haze, above the troubled world. As the sun lost its power I savoured the still air of that splendid valley for an hour before inching my way back across the town to the shadowed airstrip.

The following day was magnificent, with towering cumuli above the brilliant mountain tops. I could have explored the high mountains as so many others have done on such days. But, alas, I was ill; the nervous exhaustion of the day before took its toll, and I dared not fly. Will I get another chance, or will it mean another check?

THE "FEETLE" PEOPLE

By ANN WELCH

RESPONSE to my "Low and Slow" article (S&G, Feb, p19) showed that there is much more interest in hang gliders than I thought, at least three having been built here recently. In Switzerland, Hans Spengeler has built a sophisticated (Swiss watch) hang glider, taking off and landing on his skis. The Swiss Federal Air Office have put a top limit of 150m above ground on hang gliders, but with mountains up to over 13,000ft flying possibilities could still be interesting.

What we don't yet have here is much knowledge of what really goes on at the Californian focus point of Capistrano Beach. Since I cannot write at first-hand —not having been there—I have dug into "Low and Slow" magazine and extracted from the writings what I hope will give a descriptive picture. I would like to thank Joe Faust (Editor), Richard Miller, Dr Bruce Carmichael, Dave Kilbourne, Jack Lambie and others for taking their words in vain. This is what they say:

ON FLYING

• This foot-launch low altitude stuff is one of the better training schools for flight. One feels the wind and very quickly realises its powers and tricks; respect comes quickly.

• Why it's hard for man to fly? There are really two basic problems—People are fat and brittle and air is thin and lumpy.

• The lumpiness of air is well known although not much solid data is available. Some authorities say that a mean sharp edged gust of about one tenth wind speed can be expected with a scale length of about 30ft. This means one might expect a change in angle due to a relative up gust of about 1½ degrees.

We find this produces a rolling moment of about 150ft/lb. Assuming the agile pilot can extend both his legs to the full side position to counteract this, he might produce a barefoot restoring moment of about 30ft/lb, or 40ft/lb in army clod-hoppers. When one considers the various time lags, including the rather slow-moving *cortex cerebelli* of the type of person who of his own free will projects himself into space, one sees that controlling the lumpiness of air, at least in the lateral modes, it a pretty forlorn situation. What to do? What we really need is an aeroisoclinic wing (one that bends without twisting) . . .

• The success of the Rogallo is due to the aeroisoclinic effect of the flexible lifting surface coupled with the lower span of this type. But in the Rogallo one pays for lateral docility by the problems of a large chord, meaning you have to scurry backwards and forwards along the hang-bars to exert sufficient longitudinal control.

• When you get tired of hanging by your armpits (and it doesn't take long) slide into a small swing seat suspended by four lines; but watch that C of G shift.

• Running forward and then settling into his seat put Taras Kiceniuk into his first successful sit-down self-launched fuel-less flight. He had sat in a garage-hung swing seat for 10 minutes as practice for flights on this October afternoon.

• In dives the hanging or swinging pilot tends to permit his weight to shift forward which maintains or increases his dive. The steeper the dive the more muscle power it takes to put the weight where one might want it to be.

• A great deal of research needs to be done on controls. At the very slow speeds of hang gliders ailerons don't seem to work too well. A down aileron will cause the plane to pivot in that direction due to the drag. Perhaps spoilers would be better. I still like weight shifting.

• Within three seconds after self-launching, "Icarus" was banked by operation of the left tip dragger. Taras crabbed south with a very low ground speed. Staying in the best regions of the slope he carefully drifted in and out according to the contour. Once he was given company by a soaring gull. This was in a mildly fresh breeze, not a gale or even a strong wind. At the end of 1¼ minutes Taras properly entered a turn, and his ground speed picked up as he began a fast return to a point about 40ft above his take-off spot. Waving down at us with a wide smile midway around his second turn Taras expertly maintained vigilance over his airspeed and position relative to the slope winds. This was Taras' first solid taste of self-launch hang-soaring, and he had never ridge-soared his own Olympia.

Heading back south into the wind on his second run Taras and Icarus were again warmed by the face of the sun and a near zero ground speed. His gain on this leg was about 70ft above take-off.

• Tom kept too close to the hill and lost more airspeed than he desired. His feet touched and relaunched not unlike a bounding mountain goat. His landing at the next knoll was not as graceful as his animal cousin's, but all was fine.

• I netted over two hours in three flights—the longest 1:04 (on a Rogallo). The only bad experience was in landing after the longest flight. I had been skimming with feet 2-3ft off the crest of the ridge and was lured into trying to touch down there. It felt deceptively like a very low energy approach due to the fact that I could almost hover there over one spot; however, it was not at all low energy because the wind was moving almost at flying speed. The instant my feet touched I found myself thrust backward and upward in the nearest thing to a deep stall I've ever experienced. It was at that instant a gust caught one wing and lifted it causing a quick slip straight to the ground. I was unhurt but a wing tube got bent. However, I was able to straighten it in the crook of the only tree on the ridge.

• The soaring potential will only be realised as the end result of a great deal of careful thought and by endless fussing with details. But it leads inevitably to that magic moment when you take a few steps down the hill into the quickening wind and step off into the air for one of life's truly unforgettable experiences.

• But I still say don't go higher than you're willing to fall.

ON DESIGN

• The law of survival is still enforced by the implacable order of natural events. The men who crossed the Pole and walked on the moon did so only by using every advantage available. Thus, if one must take a long running gliding jump down a grassy slope, let it be in something thoughtfully considered, so that survival is less than accidental.

• Our systems do wear out by ground handling; they do indeed. This problem is solvable in many ways—one is often quite ready to build his next "new design" by the time the ship is in need of its first major maintenance.

• The primary factor governing all considerations of size, weight and wing loading is the necessity to take-off and land while running. This is further qualified by the range of wind speeds in which it is pleasant and safe to fly such light machines. We might assume that practical running speeds are of the order of 10-15mph and practical wind speeds for flying between 5-20mph.

• Assuming the usual Californian zephyrs of about 5mph, and that we can handle (or feetle) a ground speed of 15mph, we have an airspeed of about 20mph to fool around with. Dr Bernouilli tells us that this gives us a dynamic pressure of about 1lb/ft², not the most sustaining calculation. Now aerofoils is aerofoils, boundary layers behave in their inimitable, intractable and generally cussed way, and one thing leads to another. In short, at Reynolds numbers less than a million cannot achieve a lift coefficient of more than 1.2, and this

Volmer Jensen flying his VJ-23. The aerofoil is 16in at the roof! *Photo by W. A. Allen*

usually at the price of a vicious stall. Eg: the N60R, so lovingly described by Dr Schmidt in *Aerodynamik des Flugmodels* goes from a lift coefficient of 1.1 at 13° to 0.55 at 15°. That's rough sledding, matey.

• Aspect ratio. Let us take the example of a wing with 36ft² area, just about the size necessary to accommodate a 130lb man, and slice it in two ways, first as a high aspect ratio (9) form with a chord of 2ft and a span of 18ft; then as a low aspect ratio (4) form with a chord of 3ft and a span of 12ft.

If we now assume a flying speed of 35mph or 50ft/sec, we find that by using the larger chord we move from a Reynolds No range of somewhat over half a million (0.6) to almost a million (0.9). This is a particularly productive increase and the consequent gains will in some degree off-set the loss in span efficiency.

What is interesting in the design of Low and Slow aircraft are the two limitations. They are speed (because ordinary human legs can deal only with a small range in this respect) and span (because a large span is not controllable on human shoulders). If hang glider enthusiasts only want to soar, then design will probably move in the direction of the conventional glider, even towards the extreme aspect ratio and sophisticated structure of present man-powered aircraft, or the Fafnir and Austria of the late '20's. If, however, the physical challenge of genuine hang soaring is what people want, then development will be concentrated on low aspect ratio and very light structures. My hope is that both things will happen—there will be good genuine hang gliders, and good, but simple, lightweight sailplanes. If sophistication is avoided costs can remain low, and flying will be possible for more people.

ON CONSTRUCTION

• There is a greater variety of types available than might be at first supposed. The *Rogallo Wing* (L/D 4:1) is ideally suitable in many respects. It is easy and inexpensive to build and can be trans-

ported and assembled with ease. Making it turn is the problem. Being essentially a flat plate, it needs about twice the area of a ship with an aerofoil to do as well. It is loads of fun and a good step up. The *Chanute Biplane* (8-9) is one of the world's perfect aeroplanes and a perennial favourite. It probably offers the lowest airframe weight/area.

The *Flying Wing* (10-15) swept type like Icarus (not a plank) has advantages of simplicity, low airframe weight and low drag. Solution to lateral control problems may be complicated.

• For covering, use ordinary polyethylene sheeting about 4 mils thick. Stretch it on tightly during a hot day. Mylar is much better but costs more. Dacron glued on and tightened by passing a medium hot iron lightly over it, and a couple of coats of clear dope, is about the same price but is a lot of work.

• The covering—4 mils polyethylene sheet—showed up just in time. Bruce discovered a mass of it on the scrap heap where he works and took it home. It was a little on the tired side but the price was right. Two sizeable sections were cut out for the left and right wingsails and attached to the frame with duct tape. An Indian cow bell, by way of a stall warning device, was hung in the superstructure, and we were ready to go. I'd spent $50 and had 50lb of airplane to show for it—$50, 50lb and 50:1 I thought in my dreams. Well, you live and learn.

SPEED CONTROL — SYMPHONY IN THE SKY

• The pilots of conventional gliders can afford the instruments (ASI) they use. They've got money and plenty of time between turn points at 12,000ft to look at clouds or talk to their crew on the radio. The hang-glider pilot, however, is much too preoccupied with the very immediate business of staying up to have even a second or so to spare for anything as wasteful as reading an instrument dial. He requires a more direct system.

Consider, then, the synchrotone pitch pipe. Mine is S-6, used for tuning a cello, costs 30p and weighs a half-ounce, give or take a gramme or two. The pipes sound by means of reeds within the tubes which are activated by air passing over them . . . Everything suggested that S-6 would make an ideal audio airspeed indicator provided its range of operation coincided with hang-glider speeds.

Some simple tests in the open air settled the matter. The low note (CG) side of the pipe sounded at about 16mph and increased to its maximum volume, with no change in pitch, by about 25mph. Beyond this there appeared to be no change in either pitch or volume up to freeway speeds (70mph). The two higher notes began sounding at a slightly higher speed and took relatively longer to reach maximum volume. At a distance of 3-4ft from the ear the pipes can be heard distinctly through the range. The two higher notes (D and A) seemed preferable to the lower, sounding with greater clarity and it being easier to distinguish changes in volume.

The pipes were not critical as regards intake direction up to 20-25° of yaw. If you intend to skid or slip at greater angles than that, you can mount your ASI on a small weather vane, then at least some part of the glider will be lined up with the airflow during flight.

You can become more sophisticated . . . For example, find a reed that begins to vibrate at your basic safe speed, say 22mph, the "tonic" note of the glider. Next find a reed turned to say 28mph. On the run down the hill the pilot maintains take-off angle of attack and continues to gain speed until he hears the sound of the tonic note. Only then does he rotate into a normal flying attitude, and thereafter maintains the note to maintain the speed. Should airspeed build up the volume of the tonic will increase and be joined by the new note — the dominant.

This note can be used as a kind of turn (permission) indicator, for holding adequate airspeed in turns is going to continue to be perhaps the most serious problem the hang glider faces for a long time to come.

One could even go to the extreme of cutting reeds to indicate a safe speed for the inner wing tip. It is not difficult, it just takes a peculiar kind of person to do it.

• I plan to keep my Std Cirrus and build a hang glider also.

• Dick Eipper built in seven hours a fine glider that has given over 100 people some fine flights and over 300 flights for himself. In four months he is on his 10th personal glider ("I saw Dan's kite Friday night; Saturday morning I bought the bamboo and plastic and flew off the hill Saturday evening").

• Dave Kilbourne's sailwing is 16ft on the keel, 40° on the wing angle with 44° on the sailcloth which is 4oz Dacron. The harness is a plastic toy swing seat with auto seat belt to hold it in place while running. All control is with weight movement which is *very* sensitive. Slow flight is about 10mph with a stall coming on very gently, fast flight approximately 35mph. Glide ratio is 5:1; sink rate 500ft/min. I've made about 1,000 safe flights, the longest 25 minutes' ridge soaring.

AND SO BACK TO FLYING

• Of the two ways to err, trying to take-off with too high an angle of attack is the least punishing alternative. The method presents so much of the underside of the sail to the relative wind that you can't get enough airspeed to leave the ground. About the best you do is to wallow around and perhaps end in a ground loop. You've got to get the nose down to a point that will permit you to gain more speed. You lower it bit by bit until finally—inevitably—you go too far and pitch forward into the ground. This tends to happen very quickly and be quite painful.

• Those who have had experience with the Rogallo know about luffing. At low angles of attack the forward part of the sail tends to luff and lose lift. The portion of the sail behind the C of G, meanwhile, goes on about its business as usual. The result is a sort of see-saw game. Once things go beyond a certain point there is no turning back. In the sailwing it could be disastrous following a stall. It was to prevent this that I installed a set of false ribs on which the sail could fall back for support *in extremis*.

• He had had his share of nose-ins that day, and took off down the slope, still smarting, and determined not to repeat his mistakes. As a consequence, when he was tippy-toe height above the ground he threw himself abruptly back in the hang bars. To the onlookers the result was dramatic and so funny we could hardly run to his rescue for laughing. He shot a good 6ft in the air, stopped, dangled a bit, then settled to the ground with one wing in the bushes. Bruce was all right. Zooming was something new.

• Do not neglect to thoroughly familiarise yourself with all flight characteristics of Icarus. Discover problems in yourself and in your entire flight experience before the time when you might wish you had done just that.

ON THE LILIENTHAL BIRTHDAY MEET

• It was certainly a fantastic happening from the hour the landowner said "have fun" until well after birthday cheers were sung for Otto L.

• Lateral control on ships were missing and spectators soon became participants by acting as a cushioned landing field.

• (The meet) was everything we could have asked for; some special grace must have been operating in our favour.

AND LASTLY

• We are not only distilling the goodness of the last seven decades, but we are determined to make happen what flying man has always wanted to do.

Superficial consideration could easily pigeon-hole hang gliding into a "dangerous" category, because it is a now unfamiliar form of flight, and because it perhaps looks hairy in a sort of "fringe element" sense. There are, however, only three ways to kill yourself: hitting something, falling out, and structural failure. If hang gliders stay light and slow the

effects of hitting something are not likely to be any greater than the various forms of skiing or rugby football. In fact, probably less, although there are no proper accident records from which to obtain figures.

Falling out is avoidable immediately the possibility is perceived; attach yourself. Structural failure is the most likely risk, but the factors working towards hazard are incomprehension and carelessness, not absence of knowledge; designs can easily be checked and structures inspected by competent people. At the present state of the art the hang glider enthusiast spends a great deal of time considering his equipment, its environment, and developing techniques to overcome problems of use. He is not just an operator depending on a formal training, as many pilots now are. For people prepared to visualise the scene, and think, *I do not believe hang gliding need be hazardous in any serious sense.*

A GLIDING CLUB'S NECESSITY

By ELIZABETH RITCHIE

NO ONE would ever admit it, but a gliding club's necessity can be summed up in one word—women.

From my experience, in the average gliding club, the helpless female is outnumbered by about 20 to one.

Who's complaining about that? It is considered a man's sport, even though women have shown themselves to be on a level with or even better than men. (Hearty disagreement from all males.)

Any girl with a sense of adventure wants to do something a little different. What better choice is there than gliding? It has an aura of excitement around it. Dreams rush through one's head, write-ups in the local paper:

STOP PRESS

World Glider Record Broken

"A woman has broken the world record. She stepped out of her glider dressed in the latest fashion in flying suits. A car was waiting to collect her to take her to the clubhouse where she held a short press conference—details and pictures on page three."

However, dreams are soon shattered. The great day has arrived—mid-November, cold and windy, but the newcomer does not realise that this spells "no flying today".

On entering the clubhouse, yells come from the stronger sex, who are lounging in the only easy chairs. "Put the kettle on". "Can you sew? Something has gone wrong with the zip of my flying suit". "Do you feel like washing the dishes, sweeping the floor, etc . . ." and so it goes on. Eagerly she obeys (fool). After the chores are done, she sits down with her now cold cup of coffee, ears flapping to pick up any flying tips. Alas, she has no idea of what they are talking about. The flying jargon is like a different language. So ends the first exciting day at the gliding club.

The next weekend the weather conditions have improved. She has her first flight—the thrill of the launch, the few moments when she was allowed to handle the controls, the perfect landing. The perfect sport.

Between flights, she drags gliders up and down the runway, drives the tow-car, which looks as if it might blow up at any moment, also many other manual tasks. In fact, on the airfield, woman's strength equals man's.

What would they do without us? There would be no cups of coffee waiting for them when they come in from the bitter winds in winter. The clubhouse would turn into a slum, through no one cleaning it up. There would be no unpaid secretaries and organisers of social functions. On the airfield the man power would be greatly reduced. Who would help them to idle away the long hours of waiting between flights during the soaring season?

Treat us like women once in a while, or you will find that the establishment will collapse.

I am not trying to put the female off gliding. It is a never-a-dull-moment sport. I cannot see the male glider pilot changing his ways, so you cannot say that you have not been warned.

THE BRITISH TEAM—the old hands

ON being asked to write a "potted history" of our two senior pilots in this year's British Team, I made the "mistake" of looking through old copies of the magazine. Soon I lost myself in all sorts of interesting material published over the last 25 years and found it difficult to put the copies down and start the job in hand.

As most readers know Nick Goodhart and George Burton by name or reputation and their exploits over recent years are fairly well known, I felt that some notes about the early period of their competitive gliders careers might be of more interest.

In 1947, the first postwar British Nationals took place at the Naval Station at Bramcote. Nick grabbed the chance to fly as P2 to John Sproule in a Kranich 1 and thus experienced his first cross-country flying. They finished 14th out of 26 and the only time Nick's name was mentioned was in the *Entry* list. He made up his mind, however, that this was not the last time he would compete.

In 1950, the Navy entered its Mü-13A with Nick and his more experienced brother Tony as its team pilots. On one of the two days Nick flew he came second in a 73-mile goal race from Camphill to Boston—his first solo cross-country and his Silver distance.

Before entering the 1951 contest Nick went to France where on May 11 he did his second cross-country in an Olympia 2—a 315km Gold C and Diamond goal flight! His first article (about this flight) was published in *Gliding*, July 1951. In those days such flights were (in fact they still are) very newsworthy.

Nick Goodhart

Our 1951 contest had been changed to the Open and Team Championships and the Goodhart brothers were again entered by the Navy—this time as two teams! The Navy wrote in *Gliding*, July, 1951:

"Owing to the dearth of pilots coming up to the minimum qualifications required by the organisers, it was necessary to enter the same two pilots (the Lt Cmdrs Goodhart) for each team, flying each sailplane alternately. A Meise and Mü-13A were used and they finished 1st and 2nd in the Team Championships. Suffice it to say that subsequently no such entries were allowed.

"For ground crew the teams were able to obtain the services of four volunteer Wrens, who, although none of them had ever seen a sailplane at close quarters before, carried out their duties of rigging and retrieving with efficiency and undoubtedly helped considerably towards the success of their teams."

Since then Nick has flown in all (except four) British Nationals, in two USA Nationals and six World Championships. (He and the late Frank Foster became the two-seater World Champions in France, 1956—the first time Nick flew in a World Championship).

He has thus amassed a tremendous amount of experience, experience which he gladly passes on and shares as is shown by his many contributions to *Sailplane & Gliding*.

On asking him if he remembered any particular highlight in his gliding career he felt that there were so many different incidents that it would be difficult to single out any one of them, but as we were talking they came flooding out. Unfortunately this is not the place to relate them!

One must say, however, that as far as the gliding movement as a whole is concerned one of Nick's exceptional characteristics is without doubt his un-

tiring and devoted work over many years to the problem of our airspace. Like that of so many of our top people, Nick's philosophy is that one should try to put back into gliding what one takes out, and this was his way of doing it.

His current project, Sigma, is followed with great interest everywhere. It is too soon to crystal-gaze on what Sigma may have in store—but the combination of the two should be, to say the least, interesting to watch.

* * *

GEORGE BURTON started gliding as an ATC cadet at his school in Lichfield in 1948. He qualified for his A by the ground slide, low hop training method in a Cadet. He did not glide again until his last year at college in 1952 when he joined the Imperial College club.

I can well remember his early days at Lasham. He was forever tinkering with his ancient car to keep himself mobile while getting very frustrated because of being limited to flying club gliders only.

By 1957, George had scraped together enough money to buy a quarter-share in the beautiful Petrel, in time for the forthcoming championships. He flew on two days, being highly placed on one of them. His fellow syndicate members were Jim Torode and David Martlew and in 1958 they bought a badly damaged Olympia 2 called Mambo.

All through the winter George and David worked hard under the eye of Jim Torode who conveniently was a BGA inspector. David brewed beer in a plastic bucket in the workshop and after a hard evening's work they would have a pint before they went back to their digs. By early summer Mambo was flying again and after an expedition to Clwyd Gate, George entered it in the National Gliding week at Nympsfield. The glider now looked like new and was beautifully finished and instrumented (instruments being another of George's hobbies).

His efforts were well rewarded as he finished second despite zero scores on the first and fourth days. Incidentally, on the third day, only George and John Williamson (Skylark 3) completed the task, a goal race to Yarmouth. This gave George his Gold C distance and Diamond goal.

George Burton

George was now truly bitten by the competition bug and has flown in every National, several International as well as three World Championships (see Index 1971 for placings).

I don't think George will mind the mention now, after all these years, that in 1957 as an inexperienced pilot, he landed within a control zone on his Silver C distance and was grounded for three months. He found this difficult to accept, and it was CFI Derek Piggott who wrote to George some months after he had done his penance to be sensible and to come back. It is fortunate for both George and British gliding that Derek appreciated in those early days George's potential as a pilot.

With an Honours degree in Physics George left his student days behind and next gained experience in research establishments and in industry. He had by now arrived at a stage when he could afford to buy better gliders and fly different types.

His expertise with instruments has become well-known over the years, and many is the time that he has helped a

keen opponent out of instrument trouble during a contest.

Since December 1969, when George became managing director of Slingsby Sailplanes he has worked steadily and hard to get the firm on its feet again. One of the projects George has developed is the Kestrel 19, and it is hoped that several of them will be competing in Yugoslavia. George himself will be flying the only carbon-fibre spar Kestrel 19 and like Nick's Sigma, this should be an equally interesting combination. R.H.

the young stagers

BERNARD FITCHETT, at 25, is the youngest member of the British Team. He is quiet, friendly, unassuming and perhaps a little shy. But underneath lies a skill and determination which in a very few years has taken him to the top—to National Open Class champion, 1971.

He started gliding with the Coventry Club (then at Coventry airfield) in 1962, going through the early stages in the T-21, Prefect and K-2. He obtained his C in thermal in early 1963, just missing Silver height before a hailstorm forced him to make an away landing in the Prefect. His father Fred obtained his Silver height on the same day with the next Prefect flight.

The mid-sixties saw the Fitchetts moving quickly up the performance scale of private ownership. They obtained in turn a Swallow (end of 1963), K-6CR (winter 1964/5), K-6E (end of 1966) and a Cirrus (1968).

During this period, Bernard developed steadily as a cross-country and competition pilot. The year 1966 saw him finishing third in the Camphill and fourth in the Dunstable regionals, and in 1967 he was able to fly the K-6E in League 1 in his first Nationals. He placed a respectable 13th.

As early as 1966, it was clear that Bernard was a pilot of exceptional promise. I first met him at the Dunstable regionals—a competition with more than 40 entries. Bernard came fourth, and won one day outright—the single day of that wind and storm-stricken competition which didn't depend in a large measure on luck.

The final Sunday had a "forbidding" weather forecast, so no task was set. But conditions did improve a bit and a few pilots used up what aerotow tickets hadn't been swallowed up by relights during the week. A little gentle local soaring was carried out. Bernard, however, declared Newcastle for his Gold C distance, and landed at Sutton Bank after a tremendous flight in generally poor conditions.

1966 also saw Bernard obtaining his first Diamond—for height at Portmoak. He added a second Diamond (completing his Gold) in 1967, with a 300km out-and-return from Rearsby.

From 1967 to date, Bernard has steadily climbed the charts in Nationals

Bernard Fitchett

flying. In 1968 he flew to 10th place in the Open Class, in what was at the time a virtually virgin aircraft; the family Cirrus had only just arrived. In 1969, he came 5th, in 1970 4th and in 1971 1st against machines with much better performance like the Kestrel 19 and ASW-12.

In the meantime, there was that elusive third Diamond to be obtained. Britain is infertile territory for growing distance Diamonds, and only a handful of pilots over 20 years had flown 500km from a British site. It was only in 1968 that a closed circuit 500km flight was made, by Brennig James. Bernard in 1969 made a flight of 450km while attempting the 500km triangle Rearsby-Tetbury-Battleden-Rearsby. In 1970, he succeeded (round the same course) to achieve only the second such flight in Britain, and beating Brennig's time. This flight made Bernard only the 8th British pilot to obtain his distance Diamond in Britain.

He will be flying a Std Cirrus in Yugoslavia, and doesn't think that changing to Standard Class flying will be a drawback. He has not flown abroad apart from a couple of flights when collecting the Cirrus, and would love to do some Alpine soaring.

Bernard has a BA from Oxford, and is at present learning the building trade. He is unmarried.

* * *

MOST glider pilots, like other mortals, carry out their soaring when work allows. John Cardiff, the other newcomer to the British Team, is, perhaps, an immortal. For a number of years John, who is a film cameraman under his father, director Jack Cardiff, has, by virtue of an ailing film industry, tended to work when soaring allows.

He is a lightly built young man of 31 with an engaging personality, and loves nothing better than to kick a football around the tarmac at Dunstable with the members' children.

He devotes a considerable amount of his time to gliding activities, often helping out as a course instructor or tug pilot or tractor driver at Dunstable. Above all else, he is a pilot born to the air, and undoubtedly gets as much pleasure from the T-21 in which he has a share as his syndicated ASW-12.

John Cardiff

His semi-resident capacity at Dunstable has led to his experiencing a number of odd byways of gliding. For example, a few years ago, Marconi's did some radar tests on the club's Skylark 3. They carefully covered the machine with short strips of foil, and John carried out a large number of mid-winter flights from Ipswich, being instructed by radio by Marconi. The pieces of foil fell off one by one, until one of the crew, Pat Holmes, was moved to speculate in print on what would happen when they all went. Would the Skylark on the screen grow fainter and fainter, like the Cheshire cat, until only Cardiff's grin remained? During the testing, John came as near to experiencing Air Traffic Control as a glider pilot is ever likely to—in poor visibility he was guided safely back to Ipswich by the radar operators.

Although he had a joyride at the age of 10, he started gliding in Germany about 1957 while he was working on the film "The Vikings". He was taught in a Doppelraab: "A two-seater with staggered seating and one long, kinky stick for the pupil in front. The instructor leant over from the second seat to take over control when he wanted to. This was okay unless he'd been eating garlic the night before."

John came to Dunstable in 1959, soloed in the Tutor about May and

gained Silver height in July in the same machine. For his Silver distance, he was instructed to fly the Prefect downwind to Dengie (on the Norfolk coast). "I got too far behind the hill in the west wind so I *had* to go. I landed at the goal simply because John Westhorpe had gauged the wind direction so carefully." He bought a share in a Weihe about 1961, and flew in his first regionals (at Dunkeswell, Devon) in 1962 in partnership with Gordon Camp. The team finished 5th, John achieving Gold distance during a goal race to Swanton Morley.

He has flown in many countries during the course of making films with his father, including France, USA, Kenya ("The Lion") and Yugoslavia ("The Long Ships"). He visited Vrsac once, driving along a long, straight road from Belgrade through very sparsely populated countryside. He remembers Vrsac as a big grass field with a small hill off one end.

He came second in the 1964 regionals at Dunstable, and was in the lead until the last day when John Firth (now a member of the Canadian team) overtook him. He flew in League 1 in the Nationals in 1966, when he finished fourth, and since then has been in the top rank almost every year. He gained his Gold height in 1967 during a competition for possible world team pilots held after the Nationals had proved to be a washout, and his Diamond height in 1968 at Portmoak.

That same year, he flew a K-8 in the first of the Sport Class nationals. He thought that the handicap (112) was so good that given a light wind he stood a real chance against the higher performance gliders. He finished third—one day when he landed a couple of miles short of the goal prevented him from winning—and completed the 300km triangle which had been set on the same day that Brennig James notched up England's first home-grown 500km triangle.

John acquired in 1969 the latest in a succession of syndicate-owned aircraft, an ASW-12, and a few days after it arrived, flew it to fourth place in the Open Class nationals. He won 1970's competition.

He has made two flights of 500km in England. One was when he won a Cat's Cradle task during the 1969 Open with a flight of 537km. The other . . .

On June 30, 1970, he declared a 508km triangle Dunstable-Shobdon-Worksop-Dunstable. "The weather was terrible at first. During the first leg to Shobdon, I didn't get above 2,000ft above Dunstable; I used streets. The wind was west, 10-15kts. Conditions were horrible in Wales, and I nearly landed at Shobdon."

It is said by some that John is never really happy unless he has a close shave, and by now he must have been in his element. He persevered, and "cloudbase shot up around Derby to 5,000ft. It was beautiful round the second turning point (16:30). Conditions were fabulous then, but the wind had backed, increased to 15-20kts and I had a headwind component to face on the third leg. I was at 3,500ft north of Cranfield, but the wind was stronger than I thought and I fell down 1¼ miles short of Dunstable."

John will be flying a Std Libelle at Vrsac. We wish him and the rest of the team the very best of luck. G.L.

APPROACH CONTROL (or in short Terminal Energy Management)

By RAY STAFFORD ALLEN

IN the beginning, gliders were slow, had fairly steep gliding angles, and could be side-slipped by the pilots (usually intentionally). Consequently, getting the thing down on to a given spot was not very difficult.

However, gliders began to get more and more efficient and the gliding angles became shallower and shallower, so that a very small error in speed or height could completely muck up an approach. In addition, as they became cleaner, they became more and more difficult to side-slip, owing to the strong directional stability which made the machine turn into the slip. Pilots began to demand some sort of control to make the last bit of the approach simpler and safer.

The first device to appear was the spoiler. (There was a story that Mungo Buxton in fact made a split rudder on one design so that when the pilot pressed hard with both feet, the rudder opened up into a sort of Vee shape. Mechanically simple, but apparently the drag produced was disappointing.)

Most pilots must be familiar with the spoiler, from their training days in T-21 or T-31 gliders. The device consists of a plate in each wing which can be raised so as to stand "normal" to the top surface of the wing. They are usually fixed so that the forward edge, where the hinge lies, is at about the thickest part of the wing. When the pilot operates the control, the plates stand up normal to the surface of the wing, and the effect is to detach the airflow from the top surface of the wing over that part of the wing which is downstream of the plate. Since the total lift of the wing must still equal the total weight, disregarding any contributions made by the other bits of the glider, the rest of the wing has to make up the difference.

In effect, therefore, you have reduced the aspect ratio of the wing, and have increased the induced drag. Since the induced drag of the wing is small at high speeds, the spoiler is not very effective at high speeds, as most of us have found out, but it is a jolly good control for steepening the glide at low speeds.

A further point in favour of spoilers is that when operated, they usually produce a "nose down" change of trim and this is a positive advantage in a training glider, because pulling out the spoilers tends to make the speed increase rather than decrease. The effectiveness of a spoiler depends to a large extent on how far forward on the wing the thing is fixed. The further forward. the more effective.

For many years, spoilers were the standard form of glide control but, shortly before the war (the Hitler fracas, not the Kaiser punch up), pilots started to go into large clouds, and climb in them to great heights. Several people had some rather hair-raising experiences in these clouds when they found the speeds getting out of hand. Pulling out the spoilers did not do much good in holding the speed down, and folk began to ask for something a bit better.

The answer was brakes. The basic idea of these devices is that they produce enough drag at high speeds as well as at low, to hold the speed of the glider down to below its Vne, whatever its attitude, even in a vertical dive. Equipped with these things, pilots felt that they could safely venture into large clouds with the knowledge that, if things got a bit hairy, they could open the brakes, sit back and watch the instruments go haywire, knowing that the speed could not exceed the Vne. This was all very nice, except that one or two people came back with stories that they found that ice had made it impossible to open the brakes just when they needed them! However, in spite of these horror stories, brakes have been with us now for many years, and most people seem to have been pretty satisfied with them.

There are three basic types of brake. The most popular type seems to be the scissor brakes as fitted on the Olympias and many other types. They are very effective, but like everything else in this

world, you do not get something for nothing. The main snag is that there is a very strong opening force on the brakes, and this requires an "over centre" lock to keep the brakes in when they are not required. The pilot finds when he unlocks the brakes there is a strong force to be opposed on the lever, tending to open the brakes. This is just the opposite from what he has been used to in his training glider fitted with spoilers. In that machine he had to hold the spoilers open; now he has to oppose the tendency of the brakes to fly open as soon as he has unlocked them.

The second type of brake is the "Sky" type where the brake paddles are hinged in the wing and swing up forward and down backward on the top and bottom surfaces of the wing respectively. By careful arrangement of the hinge points, the two surfaces can be made, more or less, to balance each other though the accent should perhaps be on the "more or less". The paddles when open stand off the wing, unlike spoilers, and they produce a great deal of drag at high speeds as well as at low. They are mechanically more complex than the scissor type of brake. It is virtually impossible to arrange the leverage so that they do not produce the same sucking out tendency as the scissor brakes, though it is true that the forces can be made rather smaller. However, this type has never become really popular, perhaps because of the complicated machinery required.

The third type of brake, which is not very often seen, is the "dragon's teeth" type of brake as fitted on the M100s. In this type the brake is formed by a series of small elements which hinge out of the top and bottom surface of the wing. In fact when opened they stand out of the wing like a row of teeth. They can of course be made as large as you like, so they can produce as much drag as you like, and the operating forces can be kept reasonably low, but the mechanical arrangement of this system is undoubtedly rather complicated and they never seem to have caught on to any degree.

However, brakes made the business of getting into a small field very simple. The problem became exactly the same as that facing the power pilot making a precautionary landing. The latter had always been trained to approach into his field, keeping the speed steady with the elevator, and to control his rate of descent by the amount of throttle. The glider pilot now had the same ability except that instead of using the throttle he used the brake lever. The problem is in fact simplified for the glider pilot because the response to changes in brake setting are more or less instantaneous while the power pilot has a definite lag to the throttle change.

It may well be argued that this same technique of "speed steady with the stick and rate of descent on the brake" can equally well be employed when using spoilers. There is some truth in this, but

". . . said if 'e could show us where t' thermals are, we could save him trouble o' flapping up"

the big difference lies in the fact that if the speed is inadvertently allowed to rise during the approach, the spoilers lose a lot of their effectiveness. Brakes do not suffer from this loss of effectiveness, and the approach is therefore much simplified.

Like spoilers, brakes are more effective the nearer they are to the leading edge of the wing. If you fit them way back on the wing, they seem to operate in the wake of the wing rather than in undisturbed air up near the leading edge. This of course leads to problems on the hotter types of gliders, since this is exactly where you do not want the wing surface to be messed about with gaps, slots and ill-fitting bits of brakery. In addition, air tries to leak through from the bottom surface to the top, and if it manages to do so, it produces a lot of drag by spoiling the laminar flow just at the very point where you do not want it to be spoilt. Brakes, therefore, are not an unmitigated blessing and much midnight oil has been burnt trying to think up better ways of doing the same thing.

One solution to this is to fit braking flaps. All the things that we have considered so far, spoilers and brakes, reduce the lift over the portion of the wing across which they act, and this means that the stalling speed increases. In fact the increase is not very large, but it can be enough to make a very heavy landing, if they are operated carelessly.

Flaps on the other hand increase the lift, and therefore they reduce the stalling speed, and this is an added bonus. Unlike powered aircraft, gliders do not need flaps to reduce the stalling speed for landing; the stalling speed is normally quite acceptably low. However, a reduction is welcome provided that there are no control difficulties. The usual type of flap that is employed is the plain flap, in which a piece of the trailing edge of the wing can be hinged downwards. The first bit of the downward travel produces a sharp increase in the lift of the wing, but beyond a certain point, probably around the 30° mark, the lift increase with further flap movement is small, but the drag increase becomes larger and larger. Many gliders have been fitted with flaps which come down to slightly more than 90° in the full down position and the drag increase at this setting is very large. The approach is very steep and pleasantly slow. However, the round out at the bottom is rather sharp and, in view of the high drag, there is virtually no float. Thus, the round out has got to be rather nicely timed or the arrival is a bit sudden. Coming in with excess speed does not really help since it makes the approach steeper still and makes the "corner" to be negotiated at the bottom even sharper. The flaps cannot be used in the same way as brakes—that is, adjusting the amount required all the way down to control the rate of descent —because they do not simply affect the drag of the glider but affect the lift as well. Putting the flaps in to stretch the glide is liable to result in a pronounced sink before the glider flattens out its glide. This may be enough to defeat the object of taking off flap. Another snag is that flaps do need a large force to operate them, particularly at high speed, and if they are to be relied upon as speed limiting devices, the designer usually has some headaches to provide a suitable means of operating them at high speed. A top surface "aerodynamic balance" can help here.

They have got some considerable advantages though. First, you do not have to cut holes in the wings to get brakes into them, and this has great advantages, both aerodynamically and structurally. The flaps are also useful not only for the approach but to enable the pilot to alter the characteristics of the wing for slow flight. This means that he can use a small amount of flap for thermal circling at low speed and then raise the flaps to give a low-drag wing for high speed flight. Many of the really hot gliders these days use flaps in any case to give them advantages of being able to set the wing to the optimum configuration for every speed.

The latest device to appear for controlling the glider approach is the tail parachute. This normally stowed in the bottom of the rudder or in the bottom of the fuselage below the rudder and can be deployed by a control from the cockpit. There is a second control which jettisons the parachute. Of course the arrangement does mean that you can have a clean wing with no holes for brakes, and you do not even need to fit hinges for flaps, so the wing can be as clean as you like. However, the system is not without its snags. Parachutes in the tail are not yet 100% reliable, though they are pretty good and are getting better. If they get wet, and particularly get wet and then frozen, they are not to be relied on at all.

If they are to be used as a speed limiting device in the event of loss of control in cloud then they clearly have severe limitations. If the thing is deployed in cloud to hold the speed down, then either it has to be jettisoned after emergence from cloud in which case there are obvious landing difficulties, or else, if the parachute is not jettisoned, the pilot will have to land at once. In any case there is no means of controlling the amount of drag that the thing produces; it is all or nothing, and this does mean that it demands a rather higher standard of pilotage than usual. It is this "all or nothing" aspect that has caused the Technical Committee to have reservations about giving a cloud flying category to gliders which rely upon one tail parachute, though it has said that it would review this attitude if the glider were equipped with two separate parachutes, and that it could be sure that if one parachute were used and jettisoned, there would still be a perfectly good parachute for the approach and landing.

To recap—what have we got? Brakes are excellent, but have certain performance snags on very hot ships. Spoilers do not limit the speed so are not good enough for today's gliders. Braking flaps have many advantages, but they demand a higher standard of piloting and there are difficulties in getting them down at high speeds. Parachutes in the tail have a lot to recommend them, but they must be made 100% reliable and, preferably, there should be at least two separate parachutes.

BEYOND THE PALE

IT goes without saying that advertisements for any magazine are carefully scrutinised before being accepted, and occasionally one comes in which is beyond the well-known pale.

A famous gliding magazine recently had an enquiry from a firm seeking space to advertise the Durex range of beyond the pale products. The inquiry was considered by its Magazine Committee, which happened to be sitting conveniently when the letter came in.

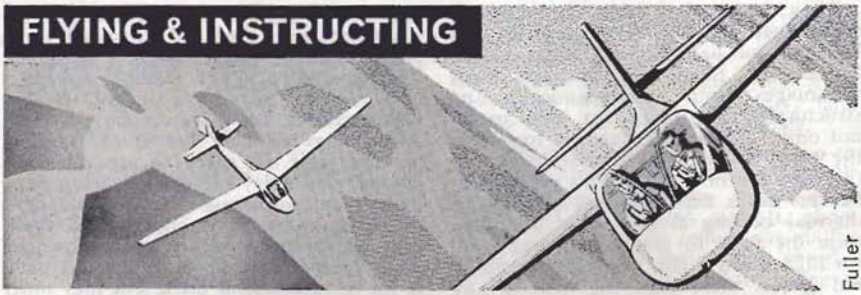
The Committee cogitated deeply, and decided that it would be quite inappropriate for the gliding magazine.

Then one member pointed out that this beyond the pale product had been used on occasions to provide a membrane diaphragm for a total energy capsule for a variometer. Amid joyous chortlings, the Committee decided that an advertisement for the product would be acceptable if its application to glider instrumentation be emphasised.

A suggested wording was duly made to the advertiser, beginning: "Diaphragms suitable for total energy capsules . . ."

A letter came back saying that the advertiser could not use the suggested wording, as he did not sell diaphragms and that it thus would contravene the Trade Descriptions Act. Besides which, the advertiser did not understand what the first sentence meant.

He had, naturally, assumed that the word "diaphragm" referred to another type of beyond the pale product.



Fuller

LANDING MODERN (GLASS-FIBRE) GLIDERS IN SMALL FIELDS

By DOUG BRIDSON

TO generalise, modern gliders have, compared with their predecessors, higher stalling and flying speeds and very smoothly finished and contoured wings. The airflow characteristics of these are susceptible to even quite small surface discontinuities.

The higher flying speeds and the ease with which speed is gained coupled with, in some cases, lower available rates of deceleration make landing in a small field a rather critical operation. The ease with which speed is gained and the difficulty in losing it quickly can lead to involvement with the far boundary.

Modern gliders are also just as capable as the older variety of hitting the near boundary but tend to do this at a higher speed. In effect, the usable speed margin for landing a modern glider in a confined space is very limited and the main problem is to keep the speed down during the final approach. Speed is reduced for the approach rather than increased and maintaining the correct speed becomes vital. Airbrakes should be used early to assist in obtaining and maintaining the correct speed. A reasonably straight final approach is desirable and permits greater concentration on speed control.

Water droplets on the wings increases the stalling speed and produces buffeting which can effectively mask the warning normally given by pre-stall buffet. This feature of the so-called laminar flow wing is particularly noticeable with glass-fibre gliders. It is stressed that even very small water droplets on the wings affect the airflow, raising the stalling speed in normal flight and in accelerated flight such as a steep turn. Steep turns on finals with water droplets on the wings can lead to a high speed stall occuring completely without warning, with the glider rolling suddenly and rapidly to the inverted position. Few glass-fibre gliders are cleared for inverted flight but more practically, a sudden inversion of the aircraft on finals can play havoc with approach planning.

To summarise:

(a) Determine the boundary-crossing speed. As a guide use the stalling speed + 10 knots but the glider's characteristics, the wind strength and possible wind gradient effects must be taken into account.

(b) Position to obtain a reasonably straight final approach.

(c) Obtain and maintain the determined speed before reaching the downwind boundary. The approach should be planned to allow moderate use of the airbrakes. From this kind of approach a modern glider will accelerate quite rapidly and "float" a considerable distance if the airbrakes are fully closed.

(d) Once into the field put the aircraft onto the ground and use the wheel brake. Do not hold-off unnecessarily.

Aerodynamic braking devices lose their effectiveness very rapidly as speed is reduced.

(e) If an impact with an obstruction appears inevitable endeavour to impact with some part of the glider other than the cockpit. Ground looping, if resorted to, should be carried out positively with a wing-tip placed hard on the ground and full rudder applied towards it. On slippery ground a glider may swing through a large number of degrees but continue more or less in the same direction to impact the adjacent scenery backwards. This gives the pilot the equivalent of a backwards facing seat, considered an advantage by some flight safety authorities. This behaviour is not predictable but gliders with the wheel located ahead of the centre of gravity appear to be the most susceptible.

It is sometimes advantageous to land out of wind to make use of a longer landing run or to land uphill. The use of braking parachutes under crosswind conditions has been questioned. As a generalisation, these devices should be used normally. Once a glider is on the ground and decelerating the retarding effect of a parachute decreases rapidly and it should be jettisoned if weather-cocking becomes a problem. It is obviously important that the wheelbrake should be efficient.

Finally, it is stressed once again that water droplets on the wings, even very small droplets, affect the stalling speed and that under these conditions steep turns on finals can produce a most unnerving result. It is possible that Lucifer's downfall can be partly attributed to violent manoeuvring in rain. While this is not absolutely satan the message is clear.

INSTRUCTING IN MOTOR GLIDERS

By JOHN MORRIS

UNDER the present system, the only persons legally entitled to instruct in Self-Launching Motor Gliders (SLMG) are (1) holders of Full Instructors' Ratings (Aeroplanes), (2) holders of Assistant Instructors' Ratings (Aeroplanes) and (3) PPL holders with specific written authority from the Department of Trade and Industry to instruct glider pilots only.

This system worked well in the interim period while the legislation concerning the SLMG was finalised. However, a new system of instructors' ratings valid for motor glider instruction is to come into being.

Before the new system can come into operation fully, a certain amount of standardisation work has to be done.

It is important to bear in mind from the outset that although in the majority of cases instruction will be given to glider pilots, there is nothing to prevent a person who wants a Motor Glider PPL from arriving at a gliding club that operates a SLMG, and receiving the instruction necessary to gain this licence.

John Morris is a member of the BGA Instructors' Committee.

The examining of instructors for the issue of the MG Instructors' Ratings will be carried out by members of the BGA Examiners Panel. To ensure standardisation from the start, Panel Examiners will be standardised at a meeting to be held at Husbands Bosworth in the near future. Following this, a second standardisation meeting will be held for the CFI's of clubs operating or hoping to operate SLMG's.

Before any instructor or examiner can be issued with an instructors' rating for motor gliders, he must have a current MGPPL or PPL or higher licence.

Initially, DoTI is going to issue 25 MG Instructors' Ratings without test, and these will be issued to members of the Panel and to certain CFI's and professional instructors of clubs operating motor gliders.

Further issues of the MG Instructors' Ratings will be made to instructors on completion of a satisfactory test with an examiner. The rating will be valid for two years and will be renewable by test only.

Eventually it is hoped that all CFI's of clubs operating motor gliders will be approved as MGPPL Examiners (ie, authorised by DoTI to conduct tests for the issue of the MGPPL), but in the meantime, only authorised members of the Examiners Panel will conduct licence issue tests.

Approval to conduct the tests will be issued to the CFI when he has submitted three candidates successfully for tests with an examiner.

A pilot having a Full Rating (Gliders) wishing to instruct on motor gliders will be required to hold a MGPPL or higher licence, undergo the conversion course to MG Instructors' Rating standard with an approved person, and then undergo the rating test.

A pilot having an Assistant Rating (Gliders) and on obtaining a MGPPL or higher licence who wishes to instruct on motor gliders, will also have to do the MG Instructors' course, and take the motor glider rating test.

It must be emphasised at this point that the Examiners Panel will not be able to consider applications from assistant instructors for tests for some time yet. The date when applications can be accepted will be circularised in due course.

Persons completing an Approved BGA Instructors' Course that is completed on a motor glider (ie, Bill Scull's courses) will not be initially eligible for a motor glider rating test. It is proposed that a minimum flying experience of 50 hours will be required for the MG rating—it is considered that the nine-day course is sufficient to learn how to teach the gliding exercises, but that a further period will be necessary to learn how to teach the motor glider exercises.

These persons, on completion of the conversion course, will apply to the Panel for a MG rating test in the normal manner.

Motor Glider Assistant Instructor ratings will be renewable annually by test, with a designated examiner.

MGPPL REQUIREMENTS

The requirements for the issue of a MGPPL are:

(1) BGA Bronze C certificate, eight hours' flying in SLMG's, at least four hours dual in SLMG (at least one hour of which must have been completed after going solo), a minimum of three hours P1, including at least 10 take-offs and landings, and three engine stops and re-starts in flight and a solo triangular cross-country of at least 100km in a glider or 150km in a SLMG.

Alternatively,

(2) FAI Silver badge, three hours P1 on SLMG (within six months prior to application), three engine stops/starts in the air.

Alternatively,

(3) The flying experience required for the issue of a PPL (Aeroplanes) (ie, a full 40-hour course).

In addition to the flying experience the applicant will be required to pass the normal PPL (Aeroplanes) examination on Meteorology and Navigation, Aviation Law, and Airframes & Engines (Technical).

Note that if the applicant has not completed a total of 40 hours flying in aeroplanes and gliders, his licence will be restricted to flights within the UK, Channel Isles, and Isle of Man. This restriction will be removed on producing log book evidence of a total of more than 40 hours flying.

KEEPING THE LICENCE VALID

The holder of a MGPPL will be required to produce evidence of having completed five hours minimum as P1 in each 13-month period. Of these five hours, two hours may be flown on a glider. "Certificates of Experience" must be signed by approved CFI's/Examiners.

CONVERTING THE MGPPL TO A PPL (AEROPLANES)

Details of the necessary conversions to a full aeroplane PPL will be published in due course.

FLYING LOG BOOKS

Motor Glider flying is to be recorded in a log book. It is recommended that a gliding log book be used, with extra columns ruled on the remarks column for "engine-on time". Ferry or positioning flights may be recorded in the standard aeroplane log book.

Gliding and aeroplane log books are obtainable from the BGA and BLAC respectively.

BRONZE C — AND THE REST!

By RICHARD BLACKMORE

WEEKEND during a business trip to America in January. Prospect of two days in a Boston suburban motel unthinkable. Gliding? Ring Soaring Society of America who give me a list of four gliding sites within 200 miles, and suggest that probably no-one flies in North-East America during the winter. I therefore select the site that has skiing nearby as an alternative and set off in a hired car, northwards to Vermont on the Interstate highway.

The scenery gets increasingly hilly, with the hills turning to small mountains. Sky blue and sunny with 1/8th winter cumulus. The excellent morning TV weather forecast (proper isobaric and isothermal charts; no daft pictures of smiling suns, etc, as in England) says two days clear cold weather, daytime temperature in Vermont —13°C. Might be lucky and get a flight. Press on!

The mountains get taller with tops above the treeline. The road winds around alongside rocky streams. A bit like Switzerland except the mountains are less jagged. I am driving in the company of cars with skis on roofracks.

Sugarbush airfield, Warren, Vermont is a strip about 800 yards long and 200 yards wide, bounded by pine trees. It has a black and white shoebox control tower. Assorted gliders are picketed in the snow, with icicles dripping off their trailing edges. Others, also covered in snow, are stored derigged in their open trailers. Four men are taking the wing off a bent Super Cub; it had blown over. I park the car and go over.

"Hi, you the Englishman phoned this morning? I'm John Macone. Wait'l I finish this and I'll show you over the field."

John shows me round and explains that this is not a gliding club (they don't have many in America) but a commercial operation called Sugarbush Soaring owned by himself and another man. In the summer they run gliding and flying courses, and have frequent airshows. He shows me a picture of their ace aerobatic instructor, a dishy bird with blonde hair.

Just now things are quiet and weather has prevented flying for two months. Today is better. I help John scrape the ice and snow off a Super Cub and hack the ice from around the skis with an axe. John flies off to look at some interesting lenticular clouds that have formed in the lee of Mount Ellen that towers 3,000ft above the site. Mount Ellen is part of the Green Mountains, at the north end of the Appalachians.

It is too late for gliding today, but if the weather holds I might get an interesting flight tomorrow. During the evening I read everything I can find in "New Soaring Pilot" about wave flights, tolerance to anoxia, cold, etc. If John will let me fly one of his Schweizer 1-26 gliders I might have a chance at Silver height, or at least one of the hour flights I need for Bronze C. Warmth is going to be a problem as I have little more than the clothes needed for a short business trip.

Up early and the day is promising. Clear crisp sky and the thermometer at -15°C. Dress in two string vests, three shirts, two pullovers, three pairs of socks, two pairs of trousers. What did that article in the Yorkshire Gliding Club magazine say? Newspapers? Off with the top pair of trousers and wrap liberal helpings of *Boston Herald Tribune* round legs, held on with elastic bands and BGA tie. Trousers back on. Feel a right twit rustling down to breakfast bulging like a fat gorilla.

Buy some gloves that look like miniature sleeping bags and off to the airfield. I am there first so start chipping ice and frozen snow off the Schweizer

2-33 two-seater. It is all-metal so I don't feel too bad banging at it to break the ice off.

John arrives. "Feel like waves today?"

I try not to look too eager and carry on chipping.

John lends me some American Navy arctic boots, and I am away on a check ride in the 2-33 with Pete, a local pilot. Learn two essential bits of local information:

(1) Don't check rudder movement during pre-flight checks—rudder waggling is the signal for the tug to take-off.

(2) When you release at the end of the tow do a climbing turn to the right. (They drive on the wrong side of the road as well!)

"Yeah, he's OK. Get the 1-26 de-iced."

This is exciting. The wave is strong. "Can I have a barograph?" For hire, three dollars.

I snuggle down into the cockpit of the 1-26 and tie a scarf over my ears like I have tooth-ache. The controls are handy except that the airbrake is operated by a funny handle on a chord like a lavatory pull. Waggle the rudder and we are off. The Cessna climbs steeply at the front of the rope and then disappears underneath the glider's nose as we fly into the rotor turbulence of the primary wave. I chase it fearfully around the sky, having to use full control movement at times. The Cessna is getting knocked over too, so it isn't only my inexperienced flying.

Smooth again. 3,000ft above the site. 4,300ft above sea level. Pull off and climb, losing speed. Fly level for a while then a stall to see what the Schweizer feels like. Very nice. Dive 200ft at 85mph to mark the barograph trace. Steady up and look for lift. Damn! 250ft/min down. Move forward. That's better. Going up!

The lift is smooth, just like the books say. Ahead is Mount Ellen. I can see skiers on the slopes above me. Over my shoulder and much higher is the lenticular cloud of the primary wave. The variometer shows 500ft/min up, and is still moving. Then, more than 1,000ft/min. This is terriffic.

Hell! What's the ASI up to? 90mph? Never! Pull back to a gentle stall, and it reads over 100mph. That's wrong.

Must have frozen. Altimeter and vario still OK. Must be a plug of ice in the pitot tube. Would the expansion of the water as it freezes compress the trapped air and cause the high ASI reading? Have to be very careful not to exceed Vne. Do occasional stalls for a speed reference.

The skiers are below now. 5,000ft. The wave cloud is nearer and I can see its leading edge over my shoulder. It is jumping forward and dropping back about once every two minutes. Forward a bit to miss that.

7,000ft. 8,000ft. Silver height! Hope the barograph's working. Can hear it ticking. Above the wave cloud now. I can see it stretching for 20 miles, parallel to the range of mountains that are causing the wave system. There are at least five waves in sight behind me. The wavelength seems to vary according to the height of the ridge, so the system becomes muddled further back. What flying! Brilliant sunlight above the clouds, and still rising at this terrific rate. Both primary and secondary gaps between clouds are wide open. Keep an eye on that. Over the mountain range I can see about 50 miles to Lake Champlain. Upwind there is about 4/8th cloud cover in a shallow layer just lower than the tops of the mountains. As the clouds drift over the mountain tops they disappear in the primary gap.

10,000ft. The lift is easing up. Only a measly 500ft/min now.

12,000ft, and the lift has stopped. Search around. Forward first. No. Back a bit. Lift again, but only just. Don't fall back too far or you will lose height penetrating forward. Not too fast. 12,000ft? Me? What's Gold height? Never dreamed of getting this high so never checked. 3,000 metres? What's that in feet? A bit over 9,000?

Remember cold and anoxia at this height. Don't feel cold, except nose and kneecaps. Wrap scarf over nose and mouth. Can't help kneecaps. There is a gap between pages there! Damned good stuff newspaper is! Cockpit thermometer says -50°C. Anoxia. Symptoms headache and inability to think straight. No headache yet.

That calculation. 3,000 metres to feet. One inch equals 25.4 millimetres. Scribble in the frost on the canopy. About 9,850ft.

Launch 4,500ft. Present height 12,500ft. About 1,800ft to go. Worth a try. Have been over 12,000ft for 20 minutes. Will give myself another 20 above 12,000 and a maximum of 10 above 13,000. Must be strict.

Rising air is hard to come by up here. Try left a little over the highest part of the mountain. That's it! A bit of up! Don't drop back. The wind seems strong up here. Wish the ASI was working. Don't forget what is happening downstairs. Clouds upwind of the range have been thickening during the last 20 minutes. Slot between waveclouds a little narrower. 13,000ft. 250ft/min up. Another six minutes in this lift will do. Damn! Cloud is pouring over the mountain and the gap is narrowing. 13,300ft. The second gap is still as wide as ever.

13,500ft. No. Must get down. How tempting to carry on for the last 800ft. Mustn't. Brakes open. Down. 800ft off Gold height. Never mind, never even expected to get Silver. Penetrate forward to get out of the lift. Left arm aches from pulling the lavatory chain airbrake control. 8,000ft. Primary slot very hazy.

Can still see the ski slopes. Ears popping. Swallow. Pinch nose and blow. Better. Hazy primary slot or clear secondary? No gyro instruments so can't risk getting caught. 6,500. Decision point. Primary slot. Slow down and stall to get used to speed without ASI. Down past cloud. Hazy but can see ski slopes. Can't see much else.

Down into clear air. Phew! Pick up landmarks. Mad River Glen ski-centre then leave the mountain at right angles to the range over Route 100. There it is —the control tower at last!

A few stalls to get exactly the right wind noise for landing sorted out, and down. Shhhh into the snow. Stop. Earth feels strange. John Macone comes over and takes the barograph out. "Gold height? No—not quite. Hard lines! You were lucky though. No-one else got over 8,000 today."

Tether the glider, arrange with John to apply to the Soaring Society of America for ratification of the Silver height, and back to Boston and England.

AIRSPACE AND RESPONSIBILITY

By JOHN ELLIS

THE current UK airspace situation is fairly complicated. Why is this? Would it not be better to have only one or two sets of rules, with nice, simple, easy to remember, shapes on the map? Then we would all know exactly where and when we could, or could not, glide.

Airspace simplification would seem to lead to segregation. Segregation of the military and commercial user from all the other users, with perhaps entry into the "elite" areas allowed, at certain times, to the "right sort"—who certainly isn't the cross-country glider pilot.

This is exactly the situation facing our gliding friends, and indeed many sporting power pilots, in some countries overseas. They will know that they may not fly above 1,000ft or thereabouts; they will know over which parts of the country they cannot fly—almost all of it. Nice and simple!

We are far better off with our system, which at least offers a reasonably fair compromise most of the time. There is room for clarification in many areas, but overall, a complicated system does seem to give most aviation interests a look in.

There are continual pressures towards simplification (segregation). The reason that is always given is "safety". Very loosely translated, this means that "there will be less risk of a mid-air collision, in this particular area, if we take away responsibility for collision avoidance from the pilot, delegate this responsibility to ground controllers, and exclude those pilots unable to communicate and/or follow ground instructions."

While it must be completely accepted that there are areas where exclusion is indeed the safe answer, it is also true that the word "safety" is often used emotively, without regard to the fact that excluded aircraft, outside the area, might have a greater risk of collision. Other points that are often not taken into account are that the known facts may show that there is little or no risk, that controllers themselves (like pilots or any other humans) sometimes make mistakes and that radar, while generally satisfactory in a controlling function, is still not nearly 100% effective in detecting potential conflicts.

Because the word "safety" *is* emotive and all embracing, the argument that gliders must be excluded is often difficult to combat. However, I think that most readers would agree that, with one or two exceptions, the situation at the moment is not an unhappy one. There are many reasons for this. Perhaps partly historical, perhaps the BGA's unique independence from State control, perhaps because of the British talent for compromise, perhaps because the rules, though complicated, are basically sensible, perhaps because of the very good relationship that has existed, for many years, between the BGA and many

John Ellis is Chairman of the Airspace Committee.

individuals in the various Government departments. All these things have played their part, but there is no doubt that if glider pilots had disregarded the airspace regulations, all would have been to no avail, much less attention would be paid to our viewpoint, and the UK air would be much more hostile to us.

Remember that the basic and main reason for any controlled airspace is to help protect public transport operations from collisions between themselves and all others. When discussing any new proposals, my starting point is that our collision avoidance system is built into the pilot—LOOKOUT via EYEBALLS. Eyeballs are particularly effective in a glider due to its design and mode of operation. Even if it were possible to "control" gliders (and I doubt very much if this can be done, even with transponders, radar reflectors, multi-channel radio, or whatever, there is no need, since we control (avoid collisions) ourselves. There is no doubt that although we may be thought to be off our heads for wanting to glide at all, we are considered to be responsible airspace users. The facts prove this. Airmisses between gliders and power aircraft are minimal, as are inadvertent airspace infringements. This condition must be maintained.

The real problem is that one cannot be completely "responsible" without knowledge, even though, as always, ignorance is no excuse. Here I will freely admit that, although I am a professional pilot and therefore should know all the answers, it has taken at least the first six months as Airspace Committee Chairman to learn and relearn the system and even now I wouldn't guarantee to answer all the questions. Luckily, it isn't necessary to know all the ramifications when actually in the air in a glider.

Since the legislation is vast, it is not possible to cover it in a few pages, but there are some basic essentials.

MAPS AND OTHER INFORMATION

Obviously of prime importance are up to date maps, which means that one either has to buy new ones up to two or three times a year, or make conscientious hand amendments (see p121). This, in my view, also applies to those soaring pilots who, although they may not yet have reached the cross-country stage, operate from clubs near controlled airspace.

Clubs and gliding groups should be absolutely sure that they obtain and display information on changes of airspace. *The Air Pilot*, backed up by supplements and Notams, is available, but probably extracting what is required from Information Circulars is sufficient. Since these are almost the only things that are free in aviation, there is no real reason why every soaring pilot shouldn't get his own copies. There is a lot of irrelevant stuff, but among this is the vital airspace change information, plus a lot of other useful material. Information Circulars are free, on application to: Aeronautical Information Service (AIS 1), Tolcarne Drive, Pinner, Middx. Royal Flight Notifications are normally sent by post to all users; it goes without saying that these will be available to all pilots.

BASIC KNOWLEDGE

By basic knowledge I mean such things as the rules of the air, how to actually interpret a map and navigate, what is meant by a Flight Level or what is the significance of 1013.2 millibars to a glider pilot, etc, etc. I don't propose to spend any time on this, since I know that every soaring pilot in the country will be fully aware of all these things, together with all the other basic items which it is necessary to know. If anybody thinks that he is a little rusty, I must strongly recommend a chat with the CFI before next soaring.

Assuming that we have the Maps, the Information, the Basic Knowledge, and the ability to apply the above to our gliding, we must then continue to apply "responsibility". I do not mean by this that we should not fully use all the air available to us, but it is not necessary to beat along the boundaries, and in certain circumstances, thought must be applied.

It is not possible or even desirable to point out all these circumstances, but perhaps the following few examples will suffice:

(1) If you are two or three miles upwind of controlled airspace, it may not be wise to enter cloud, since there is a good chance of ending up inside it.

(2) Although one is entitled to fly all around, just outside the edge of an aerodrome traffic zone, it may be unwise to thermal on the extended centre line of an active runway. Incidentally, this might also be called plain bad manners.
(3) If one has been uncertain of one's position (a technical term, frequently used by experts, which means Lost), for say 30 minutes, and there is even a remote possibility of an infringement for this reason, it may be more responsible to either land, or fly a reasonable compass course directly away from the general area of possible conflict.

Many other similar instances will occur to thinking pilots. Indeed, quite a few Clubs have local Rules which cater for such cases. Local Rules, plus of course, "Laws and Rules for Glider Pilots", where more restrictive, must override anything written here.

IFR, IMC, VFR, VMC

Since an understanding of these terms is essential, it is worth re-explaining them now.

IFR—Instrument Flight Rules These are rules which apply to aircraft which file Flight Plans in order to fly. Within controlled airspace they must generally comply with Air Traffic Control instructions. Outside controlled airspace, while in *IMC—Instrument Meteorological Conditions*—they must fly in accordance with the quadrantal rules. Since glider pilots cannot comply either with ATC instructions or the quadrantal rules, it follows that they may not fly IFR. However, they can fly in IMC outside controlled airspace.

VFR—Visual Flight Rules An aircraft is deemed to be flying VFR if it is flown in *VMC—Visual Meteorological Conditions*. These are at least one nautical mile horizontally and one thousand feet vertically from cloud, with a flight visibility of at least five nautical miles. Exception: outside controlled airspace and below 3,000ft above sea level, these criteria may be reduced to clear of cloud and in sight of the surface. An aircraft flown in anything less than these conditions is in IMC.

THE PRESENT SITUATION

The remainder of this article is an attempt to portray the UK situation at the time of writing (mid February). It must be emphasised that it concerns gliders only, since under the current Legislation, for Airspace purposes, motor gliders are considered to be powered aircraft. Since the legislation is vast, there may well be some errors and omissions. Correspondence on specifics will be well received. There will certainly be changes in the near future; I will endeavour to keep clubs informed.

GLIDERS EXCLUDED

— London Control Zone
— Manchester Control Zone (all but an unimportant part).
— Gatwick Control Zone (at and above Flight Level 5.0).
— The West Scottish Control Area.
— The Following Special Rules Zones: Prestwick, Glasgow, Blackpool, Glamorgan (Roose), Liverpool, Gatwick, Birmingham.
— Luton, except in some parts, in certain circumstances. (It is best to avoid this area altogether unless thoroughly conversant with the rules).
— Lyneham, most parts unless in contact on special frequency, which seems unlikely (see page 119).
— Parts of the Cross-Channel Special Rules Area. This is particularly complicated and again, pilots wishing to fly there are advised to read the rules first.
— Any Purple Airway.
— Atomic Energy Stations: Winfrith Heath, Aldermaston, Capenhurst, Calder/Windscale, Chapelcross, Dounrey, Harwell, Springfields.
— Any temporarily Notamed Area eg. Chequers (Prime Minister's residence), Detention Camps, etc.

AREAS WHERE A GLIDER MUST REMAIN IN VMC

Note: With increasing power aircraft speed, climb and descent rates, the criteria for VMC are certainly reasonable, but do rely entirely on a pilot's individual judgment. (In any case, it's what the Law "sez").

— Birmingham Control Zone and Area, excluding SRZ, see above.
— Bournemouth CZ.
— Edinburgh CZ. This will probably become an SRZ from May 25.
— Part of Gatwick CZ—excluding SRZ, see above.
— London Control Area.
— Manchester Control Area.
— Scottish CZ and Area.
— Southend SRZ*.
— Leeds/Bradford SRZ*.

* These SRZ's are not considered to be 'Controlled Airspace', but the "below 3,000, clear of cloud in sight of ground" VMC condition does not apply.

— All airways, except Purple, may be *crossed* in VMC.

All other airspace in the country is completely free or "Advisory" only, subject only to the rules of the air. While there is no law which says that you must not fly within the "Advisory" areas, common sense and "responsibility" suggests that a certain amount of thought must be applied.

DANGER AREAS

There are a large number of these, containing every sort of weapons activity, captive balloons, etc. They are either "permanently" active or activated by Notam. The Danger Area map may be obtained free from most large airfield AIS units and the current issue is GSGS 4993, Edition 6.

The Air Pilot indicates that pilots should take every precaution to avoid infringing the boundaries of active danger areas. Club information and local knowledge helps here. Obviously some of them are really dangerous; One could get accidentally shot or homed on to, or even suffer wing damage from size 12 parachutist's boots.

AERODROME TRAFFIC ZONES

All active aerodromes, including gliding sites, have an Aerodrome Traffic Zone (ATZ). This is an area 2,000ft above airfield level out to 1½ nautical miles outside its boundaries. This area should not be penetrated unless it is the intention to land at the aerodrome. It should be noted that the limit is 1½ nautical miles from the boundary and not from the airfield centre. Therefore some of the larger airfields have quite large ATZ's. Further, a lot of airfields are only open to aircraft with radio, or are "PPO" (Prior Permission Only). (All military fields are assumed to be in this category).

INTENSE AND HIGH SPEED ACTIVITY

There are a fair number of areas where intense military activities take place, and again pilots are advised to avoid them or maintain a good look out —which, of course, glider pilots do all the time.

Intense instrument flying takes place round Shawbury up to 6,000ft. Pilots are advised either to avoid the area or maintain VMC.

Currently at Bedford, Boscombe Down, Bristol (Filton), Farnborough and Pershore. Again pilots are advised to avoid these areas.

There are, naturally, various other odds and ends of this nature. Not least, for example, High Intensity Radio transmissions. It is reputed to be physically dangerous to get too close to the aerials at Fylingdales or Malvern.

Military Air Traffic Zones (MATZ). There has recently been a large increase in the number of these—currently, 61. They are purely advisory, but obviously pilots should exercise caution.

One other, the final, is the Upper Heyford Advisory Zone, recently instituted. While this again is advisory, there is a strong advice to glider pilots to telephone before penetrating. This seems a little difficult to me, but I think that competition organisers wishing to set tasks through it could certainly telephone with that information on the relevant day.

So, we have some places where we cannot fly at all, some where the VFR state is mandatory and some where there may or may not be certain hazards, upon which we are given advice. It isn't really all that complicated is it?

LYNEHAM/BRIZE NORTON

THE long-expected Lyneham/Brize Norton SRZ/SRA complex is likely to be implemented very soon, John Ellis reports following a recent CACAC meeting. The complex will be divided into two parts—Lyneham and Brize Norton. The heights are: Brize Norton/Lyneham "rectangle" from ground level to 3.500ft asl; Lyneham "circle" from 3,500ft asl to FL65.

Gliders will be permitted without prior notification throughout the Lyneham area under VMC conditions for a trial period, except that "we agree not to plan cross-country tracks through the area on weekdays."

Brize Norton will probably be banned to gliders at all times, but this, and the exact shape of the complex, has not yet been finalised.

GENERAL & BGA NEWS

FATALITY WHILE WAVE SOARING

ON January 16, 1972, Colin McDougall was fatally injured when the Slingsby Swallow he was piloting crashed on Bishop Hill, near Portmoak. According to an accident report, the wind was south-easterly and several pilots had contacted wave lift over the south face of the Bishop.

The pilot was aero-towed to that area shortly before 13:00 and released in clear air at about 3,100ft above the airfield level. According to the barograph trace, after losing about 300ft, he climbed to about 3,500ft above airfield level, after which he descended rapidly. The crash occured at 13:15, and at that time cloudbase over that part of the hill, although varying, was thought to be about 200 or 300ft above ground level.

An eye witness working on the hill reported that the glider emerged from low cloud. Before it appeared, a noise "a bit like the sound of a jet going by" had made him look up.

This, the accident report continues, suggests a spiral dive, and the pattern of impact was consistent with hitting the ground in a steep, banked attitude at a considerable ground-speed.

The result of the post mortem indicates that there was no detectable medical factor.

The most likely explanation was considered to be that the deceased may have drifted back over cloud, or that cloud formed around or ahead of him. Other pilots had those problems during the day. He may well have increased speed to try to reach the front of the cloud but became disorientated and unable to regain a normal flying attitude in the limited height available to him on breaking cloud. This would account for the rapid descent, brakes open or not. A complicating factor may well have been misting of the canopy although, of course, that could not be established as fact.

Mr McDougall had a total of about 110 hours experience in gliders; he had soloed in 1964.

ANNUAL AWARDS, 1971

THE British Gliding Association has announced the following awards for 1971:

Douglas trophy (to the club putting forward three flights by three different club members aggregating the largest cross-country distance) the Surrey & Hants club for flights by A. D. Purnell (triangle Culmhead, Bramcote, Lasham on April 28, Cirrus, 508km); H. P. Hilditch (triangle Knighton, Melton Mowbray, Lasham on July 17, SHK, 519km) and C. D. Lovell (triangle Bath race course, Vyrnwy Dam, Lasham on July 17, Phoebus 17, 506km). Total distance 1,533km.

De Havilland Cup (for the greatest gain in height) A. Doughty (Airways) for a gain of 26,500ft on March 9 at Portmoak, Skylark 4.

Manio Cup (for the best speed around a 300km triangle) R. Jones (Inkpen) for a 304km triangle Staverton, Odiham, Compton Abbas on July 17, Std Cirrus.

Robert Perfect trophy (to the club with the most instructors per member) Four Counties gliding club.

Seager Cup (for the best closed circuit in two-seaters) R. C. Stafford Allen and L. Ryan (London) for a 304km triangle Staverton, Odiham, Compton Abbas on July 17, Capstan.

Volk Cup (for the longest closed circuit flight) G. Lee (Four Counties) for

a 520km goal-and-return Spitalgate, Yeovil, Spitalgate on July 18, Std Libelle.

Wakefield trophy (for the longest flight) G. Lee (Four Counties) for a 520km flight Spitalgate, Yeovil, Spitalgate on July 18, Std Libelle.

No award was made in respect of the California in England and Frank Foster trophies.

The Executive Committee was pleased to note that more pilots had submitted claims than in previous years.

NATIONAL LADDER TROPHIES

Enigma trophy (for the best performance in privately-owned gliders) S. A. White (Airways), 6,309 points.

L du Garde Peach trophy (for the best performance in club gliders) C. D. Lovell (Surrey & Hants), 6,025 points.

THE SECOND NATIONAL COACH

JOHN HEATH, who has been recently appointed a national coach to assist Bill Scull in his nation-wide activities, started gliding in January 1953 at RAF Grangemouth, in Scotland. After a lapse of 11 years out of the sport, he returned to the gliding scene in June, 1964, as adjutant of No 613 Gliding School at RAF Halton.

In September, 1968, he left Britain for Zambia on a three-year engineering contract. While there he was instrumental in the revival of gliding in that country and the acceptance of continued gliding operations by the Department of Civil Aviation, and in 1970 became deputy CFI of the Copperbelt Gliding Club at Mufulira. He holds a current Zambian aeroplane instructors' rating.

He obtained his Silver C in 1966, and possesses a PPL; his total flying experience, gliding and power, is about 1,000 hours.

Aged 35, he is married with two children—a boy aged 11 and a girl aged eight.

MAPS—WHERE OBTAINABLE

AERONAUTICAL charts for civil aviation are stocked by the following agents: Edward Stanford Ltd, 12-14 Long Acre, London, WC2, Tel 01-836 1321; International Aeradio Ltd, Hayes Road, Southall, Middlesex, Tel 01-574 2411; Air Touring Shops Ltd, Elstree Aerodrome, Herts, Tel 01-953 5219; British Light Aviation Centre, Artillery Mansions, 75 Victoria Street, London, SW1. Tel 01-799 4157.

The five ICAO Aeronautical Charts, scale 1:500,000, series GSGS 4649, price 75p each, cover: Southern England and Wales as in August 1971; Northern England, September 1971; Ireland North, June 1971; Scotland. April 1971 and Orkneys and Shetland, November 1971.

There are 18 Topographical Air Charts of the United Kingdom, scale 1:250,000, series GSGS 4941, 75p each.

CHURCHILL AWARD FOR 1972 STILL AVAILABLE

APPLICATIONS are invited from British glider pilots for the Churchill Award, 1972. The award, of about £50, will be given to assist some project organised and carried out by an individual glider pilot (not a firm).

Eligible projects, which should always include flying, would include meteorological research and explorations by glider of sea breeze fronts or mountain waves, invention or development of glider instruments including flight testing, or exploration of or investigation into some quite new aspect associated with gliding.

Applications for the 1972 Award should reach the BGA by May 31, 1972, on forms available from the BGA.

ENTRIES OPEN/STANDARD CLASS NATIONALS

Shobdon May 27 — June 4

Pilot	*Open Class*	*H'cap*	*Standard Class*
Fitchett, B.		88	Std Cirrus
Tanner, L. E. N.	Dart 17R	90	
Grenet, P.	?	or	?
White, S. A.		88	Std Cirrus
Burton, G. E.	Kestrel 19	74	
Saundby, R. P.		88	Std Cirrus
Gough, A. W.		88	Std Cirrus
Dobson, B. F.		88	Std Libelle
Garrod, M. P.		88	ASW-15
James, D. B.	Diamant 18	80	
Burton, A. J.		88	Std Libelle
Stevenson, J. N.		88	Std Libelle
Cardiff, J.		88	Std Libelle
Zotov, D. V.		88	Std Libelle
Sandford, R. A.		88	Std Cirrus
Williamson, J. S.		?	Cobra 15
Austin, D. C.		88	Std Cirrus
Piggott, A. D.	Kestrel 19	74	
Jones, R.	Nimbus 2		
Greaves, C. M.	Kestrel 19	74	
Goldsbrough, J. B.	Diamant 18	80	
Shephard, E. G.		88	Std Cirrus
Delafield, J.	Kestrel 19	74	
Glossop, J. D. J.		88	ASW-15
Watson, A. J.		88	Std Libelle
Lysakowski, E. R.		88	Std Cirrus
St. Pierre, A. H.		?	?
Withall, C. L.		88	Std Cirrus
Strachan, I. W.		96	SF-27M
Dickson, W. W.		94	K-6E
Pozerskis, P.	Cirrus	84	
Warminger, A. H.	Kestrel 19	74	
Welsh, J. H.		94	K-6E
Kahn, W. A. H.	Kestrel 17	78	
Haynes, K. W.		88	Std Libelle
Wilkinson, K. G.		88	ASW-15
Tull, V. F. G.	Diamant 18	80	
Seth-Smith, M. P.		94	K-6E
Simpson, C. R.	Kestrel 19	74	
Woods, L.	SHK	84	
Hors Concours			
Goodhart, H. C. N.	Sigma	64	

Handicap in the Open Class applies only for Nationals Entry List purposes. Entry list correct as at March 15.

FEW LADDER ENTRIES SO FAR

ENTRIES for the National Ladder for 1971/2 have been disappointingly few so far, Mike Garrod, National Ladder Steward, reports. A new set of rules, devised by A. J. Stone, is being used this year. This, Mike says, should sharpen up the competitive angle considerably and would not result in such a runaway victory for the top pilots. Leading positions as at December 1, 1971, were P. Lazenby, 700; D. Lilburn, 520; and T. Birch, 467 points; all from the Yorkshire club.

The next date for Ladder entries is Wednesday, April 5.

UPPER HEYFORD RADAR ADVISORY SERVICE ZONE

A RADAR advisory service, available to all aircraft at or below 3,000ft amsl has replaced the Upper Heyford MATZ, on a trial basis. Glider pilots intending to operate within the zone are advised when possible to telephone Upper Heyford ATC (Upper Heyford 331, extensions 2153 or 2814) before take-off. Details in Aeronautical Information Circular 18/1972, see p117 for address.

ANOTHER MAN-POWERED AIRCRAFT

APPRENTICES at Halton RAF School of Technical Training, Bucks, took over a partly built and partly burnt man-powered aircraft from a group at Woodford, Essex, in September 1970. Under the direction of Flight Lieutenant John Potter, a Cambridge science graduate, they have completed it after 4,000 man hours of work and have flown it five times over a distance of about 200 yards. They will now try to beat the British record of 993 yards set up by the Hatfield group in 1961. The attempt will be made at RAF Benson, because Halton has only grass runways, and Flt Lt Potter will be the pilot (*RAF News*).

The first British man-powered flight was made by Derek Piggott at Lasham, on a machine designed and built at Southampton University.

HIGH-SPEED JET TRIALS IN SW ENGLAND

JAGUAR aircraft are undergoing high-speed flight tests in the area west from Boscombe Down to airway Amber 25 for an initial period of six months from early January, 1972. Flights will be between 3,000ft and 40,000ft and for much of the time their pilots will not be maintaining a lookout for conflicting traffic. Pre-flight information on the Jaguar programme can be obtained from Boscombe Down, telephone Amesbury 3331 extension 2398.

FIRST JOHN PLAYER AWARD TO DICK STRATTON

THE recipient of the first John Player Award for Achievement in General Aviation was R. B. "Dick" Stratton, CEng, FRAeS, FSLAET. The award was made in recognition of the contribution he has made to light aviation as an engineer and technical adviser and for his many years of voluntary service at flying club and private pilot level.

He is very active in gliding circles, especially the RAFGSA, where he is a familiar figure as an instructor and tug pilot at Bicester. He is a BGA instructor and inspector, and a member of the BGA technical and motor glider committees. He is currently working on the introduction of "on condition" aero-engine overhaul philosophies for both the BGA and BLAC.

TPs FOR BADGE FLIGHTS

PILOTS are reminded that the photographic zone for Badge triangle turning points is now within 45° on either side of a line which is the extension of the leg flown approaching the turning point,

and not the line bisecting the approach and departure legs. Also, turning points should be defined more accurately, eg, the control tower on an airfield or a railway station or cathedral in the case of a town.

New forms have been issued for the use of Official Observers. Applications and renewals will only be accepted on the new forms.

CONTROL COLUMN JAMMING INCIDENT

DURING solo aerobatics recently, the rear seat of a Blanik came loose and partially jammed the control column. Fortunately, sufficient control remained for the machine to be landed without damage.

Ray Stafford Allen, the BGA Chief Technical Officer, states that the seat is retained by two press studs and these, it is felt, constitute something of a risk. The trouble can be completely obviated by removing the rear seat and stowing it in the space aft of the rear seat's back whenever solo flying is carried out. It is most strongly recommended that this is made a standard practice.

GOLDEN JUBILEE CELEBRATION OF ITFORD PLANNED

THE Southdown Gliding Club is planning to organise a meeting on the weekend of September 2 and 3, 1972, at its site at Firle, to celebrate the 50th anniversary of the Itford meeting. The club adds that although most people associate the pioneering 1922 gliding meeting with Itford, most of the flying in fact took place at Firle, a short distance away on the same part of the South Downs.

The club plans to hold a display on the Sunday which would feature three main events: A "Concours d'Elegance" for pre-war gliders, including opportunities to fly them; a flying display of "exotic" gliders such as the Nimbus 2, Kestrel 19, etc; and a glider aerobatic display.

People who would like to participate in any of these events should write as soon as possible to Derek B. Eastell, 20 Scotts Lane, Shortlands, Bromley, Kent BR2 0LH.

JUNIOR INTERSERVICES COMPS — DATE CHANGED

THE Junior Interservices Competition, originally scheduled for August 19 to 28, will, because of the *Daily Telegraph* competition, now be held at Bicester from May 13 to 21.

OIL PAINTINGS FOR AVIATION ENTHUSIASTS

PETER CHAMPION, who glides at the Southdown Club and is a member of the Guild of Aviation Artists, is undertaking commissions for oil paintings on all aviation subjects, including sailplanes. Prices range from 15 to 100 guineas. Details from Champion Aviation Art, 32 Ladies Mile Road, Patcham, Sussex.

TWO-SEATER CONTEST PROPOSED

IT is proposed to hold an experimental two-seater contest at Dunstable from May 20 to 29. Aerotows would be provided at normal club rates and accommodation at the club is available. Details from P. Fletcher, c/o London Gliding Club, Tring Road, Dunstable, Beds.

WORLD CHAMPION TO COMPETE IN DAILY TELEGRAPH COMPETITION

HELMUT REICHMANN, present World Standard Class Champion, is among pilots who have entered the Daily Telegraph Invitation Competition, to be held at Dunstable from August 19 to 28 to aid selection of the British Team for the Australian World Championships.

Overseas entries received up to March 14, 1972, are: Reichmann, Hans Werner Grosse and Klaus Tesch (West Germany); Georges Defosse (Belgium); Ejvind Neilson (Denmark); J. Becke (Holland) and R. Plenert (Austria). In addition, Wolfgang Gross (West Germany) will enter if he can hire a glider in Britain.

British pilots are reminded that invitation to the *Daily Telegraph* competition will be based on their performance in the 1972 Nationals at Shobdon or at Dunstable.

WORLD CHAMPIONSHIPS APPEAL FUND

DONATIONS and loan of equipment to the British Team World Championships Fund up to March 15 from the following are gratefully acknowledged. The target has been set at £2,000, and we are therefore still short by £1,773.10.

Amoco Ltd.
Anonymous (1 individual)
Blackpool & Fylde Gliding Club.
British Petroleum Co Ltd.
Christy, Naomi.
Cisavia.
Courtaulds Ltd.
Day, C.
Devon & Somerset GC (Saturday course)
Ellis, J. J.
Gillies, G. E.
Harper, R. D. M.
Harwood, J. E. G.
Justerini & Brooks Ltd.
Lane, D. J.
Lathbury, J. F. F.
Lathwell, P. G.
Lawley, G.
Lawson, W.
Lillywhite Ltd.
McEvoy, Sir Theodore.
Manthorpe, H.
Montsion, A. (Canada).
Mosford Joinery Ltd.
Poynter, Daphne.
RN Gliding Club Singapore.
Rouse, J. E.
Simpson, C. R.
631 Gliding School.
Slingsby Sailplanes.
Stanley, J. H.
Strachan, I. W.
Strugnell, J. C.
The Rover Company Ltd.
3M Company.
Urwin, A. W.
Watts, P. J.
White Horse Distillers Ltd.
White, S. A.
Winfield, K. W.
Zealley, T. S.

Total received so far £226.90.

GLIDING CERTIFICATES

ALL THREE DIAMONDS

No	*Name*	*Club*	*1972*
23	H. V. Howitt	(in Australia)	15.1

DIAMOND DISTANCE

No	*Name*	*Club*	*1972*
1/41	H. V. Howitt	(in Australia)	15.1

DIAMOND GOAL

No	*Name*	*Club*	
2/413	N. V. Parry	Southern Cross	29.12.70
2/414	T. Moss	Oxford	17.8 71
2/415	N. W. Smith	Airways	1.1 72
2/416	H. V. Howitt	(in Australia)	2.1.72

GOLD C COMPLETE

No	*Name*	*Club*	*1972*
315	N. W. Smith	Airways	1.1

GOLD C HEIGHT

Name	*Club*	*1971*
W. R. Longstaff	Cairngorm	4.9
R. M. Rimmington	Imperial College	19.7

GOLD C DISTANCE

Name	*Club*	
N. V. Parry	Southern Cross	29.12.70
T. Moss	Oxford	17.8.71
N. W. Smith	Airways	1.1.72

SILVER C

No	*Name*	*Club*	*1971*
3092	A. I. Molineux	Nakuru (Kenya)	12.12
3093	E. J. C. Vann	Cranfield	28 12
3094	H. J. Law	Kingardy (Aus)	30.8.70
3095	N. V. Parry	S Cross (Aus)	29.12.70
3096	W. D. Treadwell	Nakuru (Kenya)	4.12
3097	A. W. Brooks	Culdrose	12.2.72

CORRECTION: The caption for the map of German airspace proposals (S&G February, p3) should read: *"Gliding forbidden: A—completely; B—above 1,000ft; C—above 1,700ft"* and not as printed.

INTERNATIONAL GLIDING RECORDS (correct as at 8.3.1972)

Single-Seaters

Distance	W. A. Scott (USA), 26.7.70, ASW-12	1,153.82km
(jointly held)	B. W. Greene (USA), 26.7.70, ASW-12	1,153.82km
Height Gain	P. F. Bikle (USA), 25.2.61, SGS 1-23E	12,894m
Absolute Altitude	P. F. Bikle (USA), 25.2.61, SGS 1-23E	14,102m
Goal Flight	H. W. Grosse (Germany), 4.6.70, ASW-12	1,032.2km
Goal & Return	K. Striedeck (USA), 7.11.71, ASW-15	916.30km
100km Triangle	W. Neubert (Germany) (in USA), 5.7.70, Kestrel 604 ..	155.06km/h
300km Triangle*	W. Neubert (Germany) (in Kenya), 3.3.72, Kestrel 604 ..	153km/h
500km Triangle	M. Jackson (S. Africa), 28.12.67, BJ-3	135.32km/h

Multi-Seaters

Distance	J. Kouznetsov & J. Barkhamov (USSR), 3.6.67, Blanik ..	921.95km
Height Gain	S. Josefczak & J. Tarczon (Poland), 5.11.66, Bocian ..	11,680m
Absolute Altitude	L. Edgar & H. Klieforth (USA), 19.3.52, Pratt-Read Gl ..	13,489m
Goal Flight	P. Antonov & A. Oplatchko (USSR), 24.6.64, Blanik	702.74km
Goal & Return	J. Lincoln & C. Crowl (USA), 23.5.70, SGS2-32	651.13km
100km Triangle	J. Lincoln & C. Crowl (USA), 24.5.71, SGS 2-32A	117.37km/h
300km Triangle	B. Stevens & H. Keartland (S. Africa), 10.1.70, SGS 2-32 ..	104.47km/h
500km Triangle*	H. Keartland & H. Michaelis (S. Africa), 1.1.72, SGS 2-32 ..	86.98km/h

Single-Seaters (Women)

Distance	Olga Klepikova (USSR), 6.7.39, Rot Front 7	749.20km
Height Gain	Anne Burns (GB) (in S. Africa), 13.1.61, Skylark 3B	9,119m
Absolute Altitude	Betsy Woodward (USA), 14.4.55, Pratt-Read 195	12,190.2m
Goal Flight	Tamara Zaiganova (USSR), 29.7.66, A-15	731.60km
Goal & Return	Susan Martin (Australia), 6.2.70, Libelle 301	656.04km
100km Triangle*	Susan Martin (Australia), 29.2.72, ?, ...	115km/h
300km Triangle*	Susan Martin (Australia), 11.2.72, ???	114.93km/h
500km Triangle	Anne Burns (GB) (in S. Africa), 25.12.63, Std Austria ..	103.33km/h

*Subject to homologation

Multi-Seaters (Women)

Distance	T. Pavlova & L. Filmechkina (USSR), 3.6.67, Blanik ..	864.86km
Height Gain	A. Dankowska & M. Mateliska (Poland), 17.10.67, Bocian ..	8,430m
Absolute Altitude	A. Burns (GB), & J. Oesch (in USA), 5.1.67, SGS 2-32 ..	9,519m
Goal Flight	I. Gorokhova & Z. Koslova (USSR), 3.6.67, Blanik	864.86km
Goal & Return	P. Majewska & R. Sokolowska (Poland), 14.7.68, Bocian ..	467.2km
100km Triangle	Y. Leeman & M. Human (S. Africa), 27.12.67, Kranich 3 ..	90.95km/h
300km Triangle	O. Manafova & V. Lamova (USSR), 12.6.64, KAI-19 ..	74.31km/h
500km Triangle	T. Zaiganova & V. Lobanova (USSR), 29.5.68, Blanik ..	69.6km/h

BRITISH NATIONAL RECORDS (correct as at 8.3.1972)

Single-Seaters

Distance	P. D. Lane (in Germany), 1.7.62, Skylark 3F	741km
Height Gain	G. J. Rondel, 18.6.60, Olympia 2B	8,870m
Absolute Altitude	H. C. N. Goodhart (in USA), 12.5.55, 1-23	11,500m
Goal Flight	H. C. N. Goodhart, 10.5.59, Skylark 3	579km
Goal & Return	E. Pearson (in S. Africa), 4.1.71, Std Cirrus	620.66km
100km Triangle	E. P. Hodge (in Rhodesia), 1.11.70, Diamant 16.5	126.4km/h
300km Triangle	E. Pearson (in S. Africa), 1.1.72, Std Cirrus (Subject Hom)	130.36km/h
500km Triangle	C. M. Greaves (in S. Africa), 2.1.72, Std Cirrus (Subject Hom)	112.07km/h

Multi-Seaters

Distance	J. S. Fielden & Vera Fielden, 14.8.70, Bergfalke 3	421.5km
Height Gain	L. S. Hood & M. V. Slater (in France), 3.2.70, K-7	6,300m
Absolute Height	Anne Burns & Janie Oesch (in USA), 5.1.67, SGS 2-32 ..	9,519m
Goal Flight	J. S. Fielden & Vera Fielden, 14.8.70, Bergfalke 3	421.5km
Goal & Return	A. H. Warminger & R. Tucker (in S. A.), 4.1.69, SGS 2-32	362km
100km Triangle	E. Pearson & A. Martin (in S. A.), 7.1.68, Kranich 3 ..	83.52km/h
300km Triangle	A. H. Warminger & R. Tucker (in S. A.), 29.12.68, SGS 2-32	72.3km/h

Single-Seaters (Women)

Distance	Anne Burns (in S. Africa), 31.1.61, Skylark 3B	524km
Height Gain	Anne Burns (in S. Africa), 13.1.61, Skylark 3B	9,120m
Absolute Altitude	Anne Burns (in S. Africa), 13.1.61, Skylark 3B	10,550m
Goal Flight	Ann Welch (in Poland), 20.6.61, Jaskolka	528km
Goal & Return	Anne Burns (in S. Africa), 6.1.66, Std Austria	545km
100km Triangle	Anne Burns (in S. Africa), 12.1.63, Skylark 3B	84km/h
300km Triangle	Anne Burns (in S. Africa), 31.12.65, Std Austria	93.6km/h
500km Triangle	Anne Burns (in S. Africa), 25.12.63, Std Austria	103.3km/h

Multi-Seaters (Women)

Absolute Altitude	Anne Burns & Janie Oesch (in USA), 5.1.67, SGS 2-32 ..	9,519m

UNITED KINGDOM RECORDS (correct as at 8.3.1972)

Single-Seaters

Distance	H. C. N. Goodhart, 10.5.59, Skylark 3	579km
Height Gain	G. J. Rondel, 18.6.60, Olympia 2B	8,870m
Absolute Altitude	G. J. Rondel, 18.6.60, Olympia 2B	9,300m
Goal Flight	H. C. N. Goodhart, 10.5.59, Skylark 3	579km
Goal & Return	G. Lee, 18.7.71, Std Libelle	520.5km
100km Triangle	G. E. Burton, 14.6.69, SHK	95.4km/h
200km Triangle	J. S. Williamson, 7.6.69, Dart 17R	74.7km/h
300km Triangle	R. Jones, 17.7.71, Std Cirrus	81.9km/h
400km Triangle	A. D. Purnell, 19.4.69, Cirrus	66.36km/h
500km Triangle	S. A. White, 28.4.71, Std Cirrus	77.4km/h
100km Gl Speed	K. A. Harrison, 13.4.69, SHK	128.4km/h
200km Gl Speed	I. W. Strachan, 2.6.63, Skylark 4	114.3km/h
300km Gl Speed	E. A. Moore, 27.5.57, Skylark 2	92.1km/h
500km Gl Speed	H. C. N. Goodhart, 10.5.59, Skylark 3	90.7km/h

Multi-Seaters

Distance	J. S. Fielden & Vera Fielden, 14.8.70, Bergfalke 3	421.5km
Height Gain	R. P. Saundby & B. Roberts, 7.6.64, Blanik	5,410m
Absolute Altitude	R. P. Saundby & B. Roberts, 7.6.64, Blanik	5,800m
Goal Flight	J. S. Fielden & Vera Fielden, 14.8.70, Bergfalke 3	421.5km
Goal & Return	B. J. Willson & H. Daniels, 27.7.69, Blanik	324km
100km Triangle	B. J. Willson & H. Daniels, 19.4.69, Blanik	77.57km/h
200km Triangle	B. J. Willson & H. Daniels, 20.4.69, Blanik	64.63km/h
300km Triangle	B. J. Willson & H. Daniels, 15.5.66, Blanik	55.8km/h
100km Gl Speed	D. B. James & K. O'Riley, 27.5.57, Gull 2	96.5km/h
200km Gl Speed	B. J. Willson & H. Daniels, 11.7.70, Blanik	77.8km/h
300km Gl Speed	W. A. H. Kahn & J. S. Williamson, 14.4.58, Eagle	69.2km/h

Single-Seaters (Women)

Distance	Anne Burns, 10.5.59, Skylark 3B	454km
Height Gain	Anne Burns, 10.5.59, Skylark 3B	5,100m
Absolute Altitude	Anne Burns, 10.5.59, Skylark 3B	5,600m
Goal Flight	Anne Burns, 12.4.58, Skylark 3B	309km
Goal & Return	Angela Smith, 14.8.70, K-6E	303km
100km Triangle	Anne Burns, 14.6.69, Cirrus	80km/h
200km Triangle	Anne Burns, 22.8.64, Std Austria	69.3km/h
300km Triangle	Anne Burns, 28.6.66, SHK	60.2km/h
400km Triangle	Anne Burns, 5.8.67, SHK	60.6km/h
500km Triangle	Anne Burns, 28.4.71, Cirrus	67.9km/h
100km Gl Speed	Rika Harwood, 27.5.57, Olympia 2B	83km/h
200km Gl Speed	Anne Burns, 2.6.63, Olympia 419	85.5km/h
300km Gl Speed	Anne Burns, 12.4.58, Skylark 3B	63.9km/h

Motor Gliders

100km Triangle	I. W. Strachan, 13.6.71, SF-27M	57.3km/h
100km Gl Speed	I. W. Strachan, 16.7.71, SF-27M	85.7km/h

* * *

1,000km FAI Diplomas

At the CIVV meeting on March 5, 1971, it was agreed to issue FAI Diplomas to pilots who achieve, or had achieved, 1,000km flights. So far the following pilots have exceeded that distance:

1	A. H. Parker (USA), 31.7.64, Sisu 1A	(distance)	1,041.52km
2	H. W. Grosse (Germany), 4.6.70, ASW-12	(goal flight)	1,032.02km
3=W.	A. Scott (USA), 26.7.70, ASW-12	(distance)	1,153.82km
3=B.	W. Greene (USA), 26.7.70, ASW-12	(distance)	1,153.82km

International Motor Glider Records

Distance	W. Collée (Germany), 28.7.68, SF-27M	536.95km
Goal Flight	E. Klüh (Germany), 3.6.70, ASK-14	528.8km

(MG) Subject to homologation

Height Gain	D. Mayr (Germany), 19.11.71, SF-25B	approx. 6,220m
Absolute Height	D. Mayr (Germany), 19.11.71, SF-25B	approx. 7,536m
Distance	O. E. Venator (Germany), 4.6.71, SF-27M	approx. 608km

New records have to exceed the old ones by:

Distance	10km
Heights	3%
Triangles	2km/h
Straight Goals	5km/h

Conversion factors:

Multiply km by 0.621 to get statute miles
Multiply km by 0.54 to get nautical miles
Multiply km/h by 0.539 to get knots
Multiply km/h by 0.621 to get mph
Multiply metres by 3.28 to get feet

No side of a triangle may have a length of less than 28% of the total distance of the course when the flight is made to obtain a record. (FAI Sporting Code, 1.1.1971, paragraph 2.1.5 (d).)

SELECTION FROM THE GUILD OF AVIATION ARTISTS EXHIBITION "SOUTH PACIFIC"

Photos courtesy Flight International

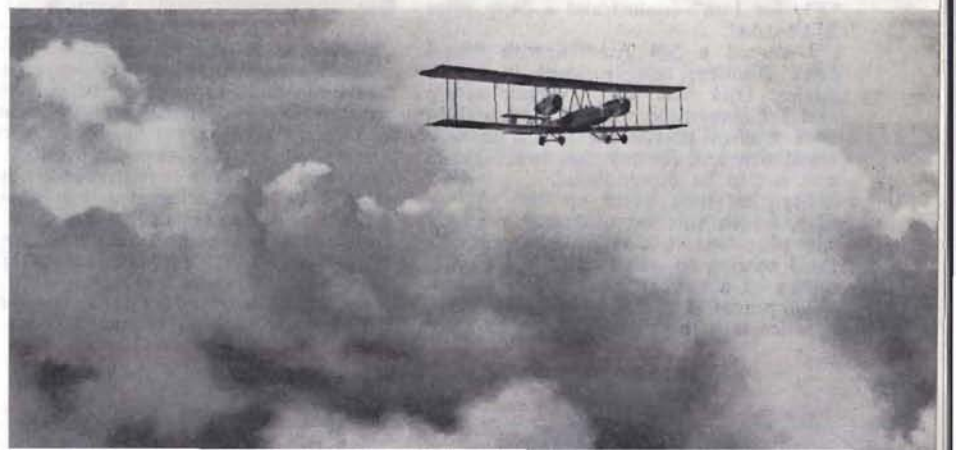
Qantas 747B — John Young

Sunday Symphony — Roy Wensley-Smith

Outback — Mary Steer

Boomerang — Margaret Kahn

Vickers Vimey, 1919 — Roy Nockolds



OVERSEAS NEWS

Please send news and exchange copies of journals to the Overseas News Editor's new address: A. E. Slater, 7 Highworth Avenue, Cambridge, CB4 2BQ, England.

IMPRESSIONS OF THE SOUTH AFRICAN NATIONALS

By STEVE WHITE

AS in previous years, Championship and Competition tasks were set on alternate days, thereby making team entries possible. The Championship is an unhandicapped contest, split into Open, Standard and Limited classes, and the results are used for declaring the National Champion, South African team etc. The Competition is a handicapped "Fly for Fun" contest and a daily prize is awarded.

I shared a Std Austria with friend Dick Bradley, now resident in South Africa. Dick was to fly Championship and I Competition tasks. I had arrived with tales of 10kt thermals and 15,000ft cloudbase, and for my first two flights I was not to be disappointed.

My first took place on New Year's Day, which was set aside for practice. My plan was to do an hour or two's local soaring to get used to the combination of a strange machine and a new environment. I would leave the 300km practice task to the pundits.

ANDY GOUGH WINS SOUTH AFRICAN STANDARD CLASS

Britain's Andy Gough, flying a Std Cirrus, put up an excellent performance in the South African National Championships, taking over the lead in the Std Class on the last day from Tim Biggs of South Africa to win with 3,812 points. The event was held at Tempe airfield, Bloemfontein, from January 2 to 14, but was hampered by wind, low cloud and rain, and only four contest days were achieved in the Open and Std Class Championships.

A record entry of 55 sailplanes took part, with visiting pilots from Germany, Holland, Norway, Rhodesia and the UK.

I released after a rough tow—I was still suffering from the previous night's activities—and in about 10 minutes climbed to 15,000ft asl, still well clear of cloud. Ambition got the better of me and I soon set off down the first leg of the task. Suffice it to say that some hours later, I was most relieved to see Bloemfontein and Tempe airfield reappear. I had covered a distance greatly in excess of the planned 300km! No records for me (winner's speed 133km/h) but I learned a number of important lessons.

Forty minutes out on the first leg, I

overflew a cluster of houses, expecting to see my turning point (a large town) appear ahead. Yes—you've guessed it! Also I had not allowed for the great boost my height gave to my True Air Speed and was therefore not expecting to be at the turning point so soon—lesson two.

On landing I felt very tired and depressed. Oxygen is essential on long flights at altitude. Dick and I hadn't had time to get the bottle filled. I was determined to improve on my dismal performance.

I got my chance the following day. Harvey Quail, our excellent Met man, set us a 500km triangle, but warned that there was a risk of cu-nims developing during the afternoon. Bearing this in mind and flying one of the slower machines I elected to go early, and was rewarded with a fairly trouble-free flight. Only once, on the final leg, did I have to detour round a cu-nim. The lessons of the previous day paid off and I surprised myself by being first back home and winner (by one point) on handicap from Con Greaves. Con, who left considerably later in his Std Cirrus put up an excellent performance to break the British National 500km record at 112km/h (subject to homologation).

The remainder of the contest was flown under far poorer conditions. A large low pressure system developed and gave rise to considerable amounts of low and medium layer cloud and rain, all too familiar to us here in the UK, but almost unheard of in South Africa.

Partly due to a reluctance by the contest organisers to set tasks involving the possibility of many outlandings under weak conditions, only nine contest tasks were achieved: four Competition and five Championship.

From the results it would appear that many of the local pilots were not too happy with the European-type weather. As for myself I flew three Competition tasks to score two firsts and a third. Despite its poor rating in UK I found the Std Austria well suited to South Africa; the faster one flew it, the better it went.

I had gone to South Africa with some trepidation at the thought of having to land out in the "bundu". However, I found in fact that the Bloemfontein area had no shortage of large and suitable landing fields. It is true that further south and west the terrain does get rather inhospitable. However, tasks of a magnitude involving those areas are only set under ideal conditions.

One important piece of advice given to me at the start of the contest was always to land near a telephone. I shouldn't like to have to face a long walk in the blazing sun!

The one thing that struck me most about flying at Bloemfontein was the effect that altitude has on glider performance. Only on the odd occasion in the UK when flying in wave had I previously experienced the great cross-country speed advantage to be gained by flying at altitude. Bloemfontein itself is roughly 5,000ft asl and on a good day cloudbase can be expected in excess of 15,000ft asl. The difference between Indicated and True speed at 15,000ft is more than 25%, so that flying at these heights is rather like carrying water ballast. For a given glide angle you achieve a much better TAS. The performance polar is shifted down and to the right, but without the detrimental effects that water ballast can have on handling.

There is no doubt that had the weather been up to the usual SA standard, we might have had the first ever completed 1,000km triangle. The equipment was certainly there at Bloemfontein with a Nimbus 2, ASW-17, ASW-12, BJ-4's and numerous other "hot ships".

Final leading results Open Class		
1 Eckle (Germ)	Nimbus 2	3710
2 Heiriss (SA)	ASW-17 (21m)	3580
3 Goudriaan (Holland)	BS-1	3501
4 Jackson (SA)	BJ-4B	3481
5 Liegner (SA)	Phoebus 17	3333
Standard Class		
1 Gough (GB)	Std Cirrus	3812
2 Gebäuer (Germ)	LS-1	3792
3 Eisele (Germ)	Std Cirrus	3525
4 Biggs (SA)	Std Cirrus	3340
5 Pearson (GB)	Std Cirrus	3337

Tasks: Jan 1 (official practice day) 300km triangle, five National records broken.

Competition: Jan 2, 500km triangle, three National records broken. Jan 3, 100km triangle. Jan 6, 233km triangle. Jan 8, 112km triangle.

Championship: Jan 4, 232km goal-and-return. Jan 5, 270km triangle. Jan

7, 180km goal-and-return Limited Class only. Jan 11, 212km goal-and-return. Jan 14, 195km goal-and-return.

The Limited Class flew on five Championship days.

My last but strongest recollection of Bloemfontein is of friendliness and hospitality shown to me by all whom I met there, and this despite me telling them from time to time how to run the contest! Many, many thanks especially to my hosts Dick and Brenda. Please will you let me come again next year?

19m GOLD CUP TO CARRY CHAMPION STATUS—CIVV

THE 19 metre Gold Cup, to be awarded at the World Championships to the highest-placed Open Class competitor flying a machine with a span not exceeding 19m, would carry "Champion" status, it was agreed at the CIVV meeting held in Paris, February 4 and 5, 1972. It would not be awarded if the minimum 4-day requirement for a championship was not met.

Although the Yugoslav dinar had been devalued, entry charges would remain at 12 US dollars per day.

It was agreed to minute a "Guidance to International Jury" note to the effect that should competing gliders collide, the pilots involved would be credited with the shortest distance of those concerned with the collision, if responsibility could not be resolved before the next flying day. This would not be a Regulation.

Crossing the frontier would result in no points for the flight being given.

1974 MOTOR GLIDER CLASS POSTPONED

IT was agreed to postpone the start of the motor glider class in World Gliding Championships, scheduled for Australia in 1974. This was due both to lack of preparedness of the rules and lack of manufacturers producing competition motor gliders. There should first of all be a trial International competition in Europe, probably in summer, 1974, the meeting added.

Meanwhile, the Germans were working on rules based on a penalty being made for total use of engine time. Very small use of the engine would carry a small penalty, but this would jump very steeply with increased use. Members of the CIVV Bureau have been invited by the German Aero Club to the motor glider championships at Burgfeuerstein in June to study the matter.

OTHER BUSINESS AT CIVV

IT was agreed that airspace would be put on the agenda for the November meeting. Although airspace control was not a function of either CIVV or FAI, it was agreed that it would be helpful to members to have an exchange of problems, ideas and possible solutions.

Several delegates deplored the fact that flights carried out before the setting up of International Motor Glider records had been accepted by the FAI as records. It was agreed to express CIVV dissatisfaction to the appropriate FAI committee to avoid repetition of this situation.

Pirat Gehriger was re-elected President of CIVV; Bohdan Jancelicwicz (Poland), Seff Kunz (West Germany), Pierro Morelli (Italy) and Ann Welch re-elected Vice-Presidents and Willy Grandjean (Belgium) re-elected Secretary.

The next meeting would be held on Friday, November 3, 1972.

IRAQUIS LEARN TO INSTRUCT

SEVEN glider pilots were sent by the Iraq Ministry for Youth to take an Instructors' course at the East German gliding centre at Schönhagen. Under the guidance of Gerhard Blex they all qualified successfully; two also qualified as Instructors in Gliding Technology, while another also trained as a tug pilot and power-flying instructor.

At a final ceremony two Bocians were presented to the Iraq Ambassador to East Germany for forwarding to his country. The newly trained tug pilot, Akran-El-Sadi, said he had already received about 200 applications from young people in Iraq who wanted to learn gliding (*Flieger Revue*).

DEVELOPMENT OF AN AMERICAN CLUB

IN contrast to most of our overseas flying news, which consists of reports on national contests and record flights, an account has been received from John R. Boyce of how a small local group in the United States built itself up in the course of 16 years into a large and flourishing gliding centre. The following is a condensed version of Mr Boyce's history of the "Nutmeg Soaring Association".

The Association was founded in September, 1956, by four gliding enthusiasts from Woodbury, Connecticut: Ev Keeler, Connie Moeller, Doug Irwin, and S. L. "Bach" Pond, with an early model of the Schweizer 1-26 (serial number 3), launched by aero-tow from a grass strip on Bach's farm. The first year saw 39 flights averaging 33 minutes. The membership grew to 12, whereupon another group was formed with a Schweizer 2-22 two-seater.

A second 1-26 was added in 1964, with another 14 members (including Mr Boyce) to finance it, and yet another 1-26 in 1967 with another 14 members. Since then, Nutmeg has acquired many associate members, and smaller clubs, individual owners and partnerships abound. The total glider population this summer will number 15, making a nearly complete roster of Schweizer's gliders, starting with the 1-19 and continuing through the 1-20, 2-22(2), 1-23, 1-26(4), to the 2-33. More exotic types include a vintage K-6CR, K-6E, Blanik, Diamant 16.5, Std Cirrus, and (newest to the fleet) SF-27. We own and operate our own tow-plane, a PA-18, and there is a Citabria as a back-up.

Operations are now based at Johnnycake Airport, with a grass strip for gliders and a paved strip for the powered craft; but we are a rather peripatetic group frequently moving *en masse* to some near-by State for a weekend, or a two-week summer camp in the mountains of western Massachusetts to the north. In the fall, we have often made camp in the mountains of Vermont and New Hampshire, where wave flights to over 29,000ft have been made.

There is a sprinkling of Gold badges among the membership, and perhaps a dozen Diamonds, six of which are owned by the father-and-son team of Rudy and Michael Opitz.

The club is not strongly competition-oriented, although we did enter two K-6's in the US Standard Class Nationals when they were in near-by Elmira. There was a time, though, before glass-fibre became so widespread, when Nutmeg's 1-26 pilots used to take home a disproportionate share of the hardware. But nowadays the small meets are beginning to become organised in classes, so that the little guy has a chance to share in the glory.

The future of soaring in our State seems assured; but for the long run we need to acquire our own site, secure from the steady encroachment of powered flight and housing development. The price of land goes up rapidly, making our problem ever more difficult. But we are working on it.

TWELFTH AUSTRALIAN NATIONALS

By MARTIN SIMONS

FIFTY-ONE sailplanes in three classes, Open, Standard and Sports, competed in the Twelfth Australian Nationals held at Waikerie, South Australia—December 27 to January 9.

The Open class contest was dominated completely by the Slingsby Kestrel 19 flown by Ingo Renner and John Moore who placed first and second in the individual championship and carried off the team prize also. Renner's score was a perfect 1,000 out of a possible 1,000. Flying on six days of the 11, he won every time. Third place went to Tony Tabart with his Kestrel 17.

Malcolm Jinks, last year's Open Class Champion, together with the author of this report, had entered a second Kestrel 19 in the competition, but the aircraft did not arrive in time. There was, however, little doubt that the 19-metre machine was performing better than the two 17-metre Kestrels, and Ingo Renner himself, an outstandingly able pilot who has now become a naturalised Australian, is considered by most to be Australia's great hope for the next World Championships.

Malcolm Jinks stepped down into the Standard Class, flying his club's Libelle H-301 with flaps taped up and parachute airbrake sealed. He faced very strong opposition from his club-mate, John Rowe, and the issue between the two was in doubt until the last minute. The author had almost resigned himself to not competing when the Adelaide Club offered a seat in its brand new "Salto", a 13.6-metre V-tailed sailplane from Ursula Hänle's new company. The Salto, with a claimed glide ratio of 1:35, was disqualified from the Sports Class but it proved to be outclassed by the 15-metre glass ships It is, nevertheless, a very easy machine to fly and may well prove to be a good early solo club sailplane and Sports Class competitor. Jinks won the class in the end, by a narrow margin, and his place in the team, which was never seriously in doubt, was secured again. "Mousey", as he is known for some mysterious reason, has been National Champion six times in all.

"Now what can I say about that?" Martin Simons in pensive mood. Photo by Dave Chandler

In the Sports Class, the competition was varied this year by the appearance of a variety of sailplanes, including a Vasama, L-Spatz, Foka 5, HP-10, Tern 15 (homebuilt) and a Skylark 4 (actually Chuch Bentson's old machine from Dunstable which was sold to Canberra in 1969). These new types competed against the ubiquitous Australian "Boomerangs" and "Super Arrows"; there was only one K-6. Murray Evans came out top in his Boomerang, but the HP-10, flown by Ian McClean, placed a good second and the Vasama came third, tending to spoil the long standing Boomerang record.

The weather during the meeting was not up to Waikerie's usual standards. On several days there were strong winds which reduced progress to a crawl along

the task routes. On other days there was often an inversion at something less than 5,000ft so that pilots who have become accustomed, in the Australian summer, to flying at heights between 6,000-8,000ft, often found themselves "scratching" around at 3,000. The average length of tasks set in the Open and Standard Class was 288km, somewhat less than previously, and no 500km tasks were set at all. Only on two days were there many outlandings; it is still the rule in Australian contests for all pilots to complete the task and land at home.

A notable and popular visitor to the meeting was Paul Bikle, World Altitude Record holder and well known also for his flight testing of sailplanes in California. Paul was flying in partnership with Jan Coolhaas in the latter's HP-14T.

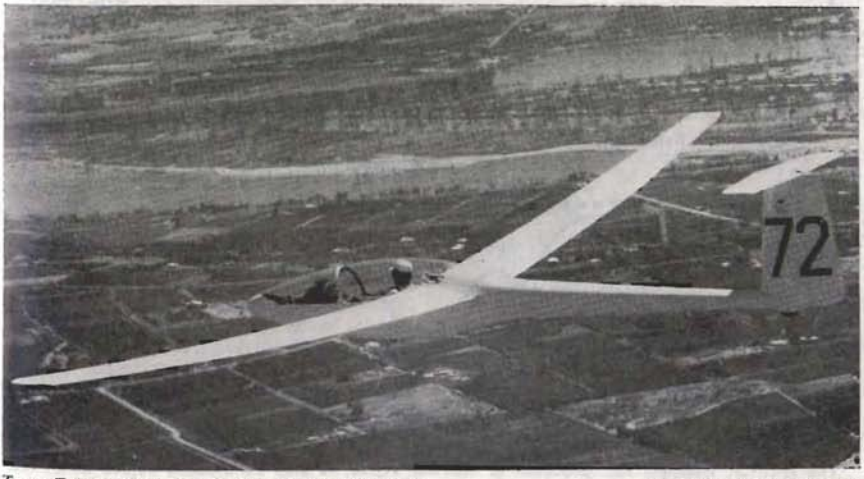
CRACK-UP

This aircraft, built originally from a Slingsby kit, provided every National newspaper in Australia with banner headlines when it broke up violently in the air at 8,000ft on the ninth contest day. Jan escaped by parachute and was able to walk to the telephone to give his "outlanding" report. The cause of the break up is not yet known. It was a roughish day and the author, who flew the Salto round the 245km task, found cloud base to be 11,500ft, which confirms Jan's report that the cause was not loss of control in cloud. Nor was he flying excessively fast.

At about 80kts he heard a crack and the aircraft began to vibrate and simultaneously rolled to one side. Ailerons and rudder failed to correct this and a spiral dive developed. The flaps had no effect and Jan experienced increasing *g* forces, tending to keep him pinned down in his seat. He decided to jump before these forces overcame him altogether, and after a cool check of parachute harness and buckles, he did so.

The HP-14 broke up with a loud bang immediately afterwards. Surrounded by falling bits, Jan was lucky to escape unhurt. The lower spar flange of one of the wings was ripped right out, tearing the skin from root to tip, while the other wing fell with the extracted spar flange still attached to it by the main pin. The fuselage lost the tail, presumably because the folding wing knocked it off.

Paul Bikle, who is very familiar with the HP-14 series since his own T-6 is a modified version of the original, inspected the wreckage and the DCA official investigation team removed some parts for X-ray examination. A report will no doubt appear in due course. Paul continued in the contest, flying another HP-14T, and placed eighth.



Tony Tabart flying his Kestrel 17 over Waikerie. *Photo by Dave Chandler*

WORLD CHAMPS TRIAL RUN

Regarded as a trial run for the World Championships to be held at the same site in 1974, the organisers learned many useful lessons from the fortnight. The Waikerie club has expended much effort in recent months, installing irrigation to encourage grass growth on the take-off areas, and a large new clubhouse, which will be the administrative HQ for the World Champs, is under construction. However, neither of these major schemes was fully completed in time for the Nationals, so a good deal of improvisation was necessary. In spite of this, the system worked well and it can be confidently stated that the next Nationals, also at Waikerie, will see many great improvements.

Of special interest was the adoption of "Wally" Wallington's scoring system for this competition. Some pilots were disconcerted when they discovered that they scored zero points if they were last man home. It was felt that a pilot who completes a lengthy task in difficult conditions deserves some reward in terms of championship points even if he happens to have come in last.

It was interesting that on one day when two pilots failed to achieve minimum scoring distance, they scored a point each because they tied, but on another occasion a pilot who actually finished the task about an hour slower than the winner, scored zero for being last. As he said, he might just as well have stayed at home all day! However, after some debate at which this and other, possibly less valid, criticisms were voiced, it was agreed that the Wallington scheme should be tried again next year, with some modifications to satisfy the more

Paul Bikle, A. J. Smith, Wally Scott, John Ryan, Ross Briegleb and Einar Enevoldson have been selected to fly in a unique trans-American cross-country 'Derby' contest to start from Los Angeles on May 1. Ed Butts, race-director, anticipates arrival at Baltimore by about May 18. The 2,900 air miles will be scored on points awarded for distance covered each day—average leg will be about 300 miles.

The sponsor, Heublein Inc, producer of Smirnoff Vodka, is also contributing $6,000 to the USA team funds.

important objections. As Wally has always maintained, the more usual (points) system and his own placing system seem on the whole to produce a very similar result in terms of the final order of merit. The psychological effect on the pilot, however, may be important. Under a points system he might, after a long struggle, come last in order but score seven or eight hundred points. This looks much better on paper than a blank zero, and such a figure might seem a fairer reflection of his performance.

Of the glass ships, the Libelle is easily the most common in Australian competitions at present, and many more have been imported during the past 12 months. The Std Cirrus is generally thought to perform slightly better, but it is more expensive and seems heavier for rigging and ground handling. The ASW-15 has not really shown up well in our competitions and the LS-1 has not yet appeared in Australia. Only two wooden aircraft, an SH-1 and a Foka 5R, were flying in the Standard Class.

In the Open Class, the Kestrels at present seem to have everything their own way, for on days when the 19-metre machine did not win, one or other of the 17-metre Kestrels invariably did.

Next year, the two-pilot system, whereby two pilots fly each aircraft more or less on alternate days, should finally be abandoned and while on the one hand this will leave some pilots without anything to fly, on the other it will at last enable a true comparison of pilots and aircraft to be made. This year, for example, Jinks, the new Standard Class champion, never flew against last year's champion, Sue Martin, because both were sharing one sailplane. Jinks and his close rival, Rowe, flew against each other only on two days and Rowe, as it happens, won both, but Jinks still finished first overall, on average.

STRONG CONDITIONS IN NEW ZEALAND CHAMPIONSHIPS

From ROSS MACINTYRE

PETER HEGINBOTHAM won the Open Class of the ninth New Zealand National Gliding Championships, held at Omarama (South Island) from January 2 to 15. He was flying a Nimbus 2 which had arrived in New Zealand only three days before the contest started.

Doug Yarrall became the new Standard Class Champion, flying a Std Cirrus, while the team of Peter Holthouse and Arie van Dyk won the Sports Class championship with a K-6E. A total of 30 gliders took part.

Selection of pilots for the World Championship Team was decided by combining 40% of last year's National Championships score with 60% of this year's (each class being kept separate). The second member of the team in each class was in doubt until the last day and, in the case of the Standard, the last minute.

There were nine contest days, flown in some of the strongest and roughest conditions yet experienced in a New Zealand championships, with thermals of 6, 8 and even 10kts or more to 8-9,000ft being common. Wave lift also occured on several days.

The Open Class included an SHK, two Phoebus Cs, two Cirrus, one Diamant 16.5, one Kestrel 17, one Kestrel 19, one Libelle H301, one Nimbus 2 and one Std Libelle (flown by last year's winner, Alan Cameron).

The Standard Class had three Std Libelles, three Std Cirrus, two ASW-15s, a Phoebus 15 and a K-6CR. The latter, flown by John Goddard, was not last by any means and won the cup for the most meritorious flight by coming second on the final day, a 300km triangle.

The tasks were the longest ever set in New Zealand competition and the contest was very demanding on both pilots and crews. Contest day tasks were: January 2, Open and Standard 145km triangle, Sports 132km out-and-return; January 4, Open and Standard 236km triangle; January 5, Open 345km closed-

circuit speed task with three turning points, Standard 319km triangle, Sports 132km triangle; January 7, Open and Standard twice round a 114km triangle, Sports 184km triangle; January 8, Open and Standard 382km closed-circuit race with three turning points; January 9, Open and Standard 309km triangle, Sports 161km triangle; January 11, Open three times round a 96km triangle, Standard twice round a 96km triangle, Sports twice round a 75km triangle; January 14, all classes Cat's Cradle (the longest distance, 582 km, was achieved by Ian Pryde in his Kestrel 17); January 15, Open and Standard 309km triangle, Sports 174km triangle.

Peter Heginbotham and Ian Pryde were selected to represent New Zealand in the Open Class of the 1972 World Championships, and Doug Yarrall and Tony Timmermans in the Standard.

Leading final results—Open		
P. Heginbotham	Nimbus 2	8233
S. H. Georgeson	Kestrel 19	7563
I. Pryde	Kestrel 17	7436
Standard		
D. Yarrall	Std Cirrus	8066
I. Evans	Std Libelle	7804
T. Timmermans	Std Cirrus	7327
Sports		
P. Holthouse & A. van Dyk	K-6E	7298
B. Chesterman	K-6CR	5583
J. Upton	Foka 4	5093

ANABATIC SOARING IN MALAWI

SOARING over the east side of the Mulange mountain massif, where a 3,000ft cliff rises from the plain, begins at sunrise throughout the year, so the lift is truly anabatic. So is the lift over the west face of Chambe peak, which is almost too hot to touch in the late afternoon, during the dry season. Thousands of soaring birds use it too.

The massif is 15 miles east of Malawi's flying club at Luchenza. Five miles to the SW, the Thyolo escarpment, which falls in a few miles over 2,000ft to the Shire valley, sets up waves in the regular southerly winds, but they are only usable in the early morning and evening when thermals are weak.

The club's second home is at Zomba, where the airfield is larger but with fewer amenities, though numerous hills make soaring interesting and thermals rise from steel roofs and black-surfaced roads.

A Motorfalke was acquired at the end of 1970 but, the report says, "Having allowed the glider enthusiasts to indulge in their whim for a year, the more numerous power pilots in the club have prevailed on the committee to put the Motorfalke up for sale. Regrettably, it could not attract sufficient support to make it an economical proposition for the Club" (*Wings over Africa*).

POLAND PLANNING INTERNATIONAL WOMEN'S CONTEST

THE Polish Aero Club proposes to hold an international women's gliding contest in 1973 at Leszno over a 13-day period. Participants would fly Pirats on a rental basis provided by the organisers. Minimum flying experience, 150 hours P1 and Silver C. Interested pilots should contact the BGA.

INTERNATIONAL COMPETITIONS IN BELGIUM

FOUR international gliding competitions are being organised in Belgium in 1972. They are: "Concours des Ardennes", Open, Standard and Club (less than K-6) classes, St Hubert, weekends April 29 and May 20; "Westrijd Keiheuvel", Open and Standard, Keiheuvel airfield, Balen, May 11 to 14; "La Meuse", Open and Standard, Temploux-Namur-Suarlée airfield, August 2 to 15; "Wedstrijd Limburg", Club class contest, Genk airfield, July 29 to August 6.

Pilots wishing to participate can obtain further details from Fédération des Clubs Belges de Vol a Voile, Rue Montoyer, 1, Brussels 4, Belgium.

LINKÖPING WANTS PEN PALS

LINKOPING Soaring Club in Sweden has a fleet of two Bergfalke 3's and a Libelle, Phoebus and Vasama; they launch by aerotow and are restoring a cottage to make a clubhouse. They would like to exchange correspondence with other gliding clubs or their members. Write to: Mr K. A. Hook, Adalagatan 4B, S 582 26 Linköping, Sweden.

GLIDING IN PORTUGAL

GLIDING takes place in Portugal between April and August near Evora, about 94 miles east of Lisbon, where thermic conditions are good. Visiting pilots are welcome but are advised to bring their own machines as the number of gliders available locally is limited. Further information from Jose de Andrada Baptista, director of the gliding section, Aero Club of Portugal, 226 Avenida da Liberdade, Lisbon.

PARTICIPATION IN GERMAN CONTESTS

THE German team will be participating in the 7th International Hahnweide Contest, to be held from May 5 to 14. Overseas pilots wishing to participate should apply to the Gliding Section, Deutscher Aero Club EV, 6 Frankfurt/Main-Niederrad, West Germany, not later than April 15.

Pilots interested in entering the International Club Class Contest, to be held at Dinslaken/Schwarze Heide airfield in Germany from June 18 to July 2, should apply to the BGA by April 21. The K-6 is the datum glider for determining eligibility; machines like the Skylarks, Olympias 463 and 419, Dart 15 and Vasama can participate.

Minimum qualifications: FAI competition licence, Silver C, aerotowing and contest flying experience. Entry fee, DM150 (about £18), excluding aerotows and accommodation.

BELGIAN AIR CADETS ORDER MOTOR GLIDER

THE Belgian Air Cadet Corps has ordered the RF-5B Sperber motor glider to supplement its fleet, which at present consists of 22 gliders and six towing aircraft. The British Air Training Corps is at present evaluating the suitability of the Falke for ATC training.

SWITZERLAND PLANS TO HOLD 1978 WORLD CHAMPS

THE Fédération Aéronautique Internationale has been informed that Switzerland plans to act as host to the 1978 World Championships. The place and other details are not yet worked out, but if by the end of this year it appears that the offer cannot be fulfilled, it will be withdrawn (*Aero Revue*).

• The Swiss National Championships, organised by the Grenchen Sailflying Group, will be held from May 20 to 28. The Soaring Flight Commission has power to invite pilots who have performed well in the last few years to participate even if they are outside the categories which are automatically allowed to do so (*Aero Revue*).

• Soaring badges earned in Switzerland during 1971 (1970 in brackets) were: Silver C, 76 (59); Gold C, 21 (7); separate Diamonds, 53 (18). Diamonds achieved during the 18 months to the end of 1971 were: 38 Goal, 13 Distance, 10 Height. There are 206 Gold C's in the country (*Aero Revue*).

RHODESIAN MIDLANDS CHAMPION

BARRY TURNER, in a Libelle, won six of the eight tasks in which he flew at the 1971 championships of the Midlands Club at Gwelo, Rhodesia. He also won the trophy for the fastest speed on a task—108km/h. There were 12 tasks (*Wings Over Africa*).

C PILOT AT 13

BRIGITTE Böttcher from Buxterhude, now a 14 year old gymnast, took her A, B and C gliding certificate at the Hornberg at the age of 13 and is the youngest German feminine glider pilot (*Aerokurier*). The youngest male is not stated.

NEW WORLD RECORD IN KENYA

GERMANY's Walter Neubert flying a Kestrel 604 broke the 300km triangle on March 3 in Kenya at a speed of about 153km/h. (Subject to homologation.)

GUERNSEY NOW MEMBER OF FAI

GUERNSEY (Channel Islands) has been admitted to Associate membership of the Fédération Aéronautique Internationale.

EQUIPMENT NEWS

TWO BOTTLE TOTAL ENERGY

By GEORGE BURTON

MOST pilots are familiar with the diaphragm and the venturi types of total energy systems. Another system which is becoming increasingly popular in Europe because it combines the accuracy of the venturi type with the absence of protuberances of the diaphragm type is the "two bottle system".

Frank Irving tells me that he first thought of this system some five years ago. However, the application of it within the limited space and facilities available in gliders has only become feasible within the last few years by the use of "space-age" micro-circuits. (Yet another system is possible using these devices but also needed is an airspeed transducer and this can cost up to £300.) This is a simplified argument as to how the "two bottle" system works.

The sink of the glider itself at any instant can be considered to be made up of two parts. First, the "polar curve" rate of sink where sink is related to speed by the performance curve. Second, the exchange of speed for height which can be considered to occur on a "loss-less" basis.

The behaviour of the glider is measured by reference to two pressures. First, the static pressure which should depend solely on the height of the glider and be independent of the forward speed. Second, the pitot pressure which is itself made up of the sum of the static pressure and the dynamic pressure resulting from the forward speed. It is a curious fact of dynamics that the change of dynamic pressure resulting from a speed change is equal to the change of static pressure caused by the height change involved with the speed change. I hope you are still with me!

Now for the system itself. It consists of two identical thermistor sensors each sensing the flow of air in or out of a variometer flask. One flask has twice the volume of the other. The large system is connected to the static pressure and the small system is connected to the pitot pressure.

The signal from the sensor connected to the large flask will be proportional to: (1) the size of the flask and (2) the rate of static pressure (height) change.

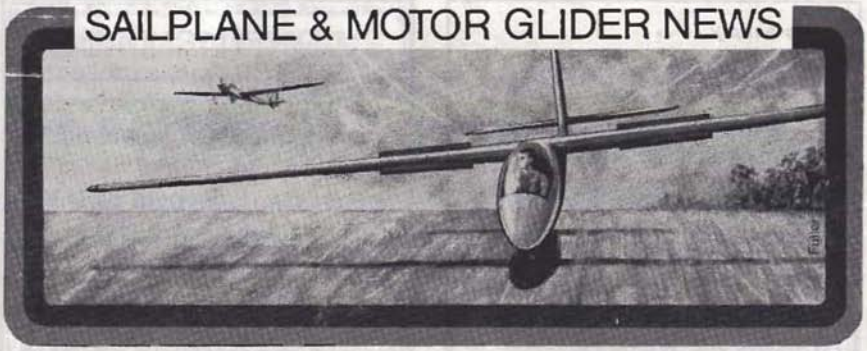
As explained previously, the rate of height change can itself be considered as being made up of two components, the total energy part and the polar curve part. Let's call these two parts 2x and 2y. Thus the signal from the large flask sensor = 2x + 2y. The signal from the sensor connected to the small flask will be proportional to:
(1) the size of the flask; (2) the rate of static pressure (height) change and (3) the rate of dynamic pressure (speed) change.

The total energy part of (2) is equal to the signal from (3) and they add because increasing dynamic pressure is associated with increasing static pressure (you dive to increase speed). Hence the total energy part is equal to 2x again (half-size bottle but two equal components contributing). The "polar curve" part of the signal from this sensor comes from the static pressure part of the pitot pressure and because the bottle is half-size this is equal to y. Thus the signal from the small flask sensor = 2x + y. Having got these signals, this is where the micro-circuit comes in. Using one of these in the form of an "operational amplifier" it is very easy to add or subtract two electrical signals. If we do this with our two signals we have

$$(2x + 2y) - (2x + y) = y$$

Hence the signal left is that solely due to the "polar curve" losses and the "stick lift" component is cancelled out. No diaphragm is introduced and the correction is independent of altitude.

A final point. This does not mean that the signal from a thermistor variometer is independent of altitude; the thermistor sensor measures a rate of mass flow which decreases with altitude so that in a simple system the signal for a given rate of climb will steadily decrease as altitude increases.



SIGMA'S WINTER'S TALE

By FRANK IRVING

THOSE of our gentle readers who expect to find a report of startling advances in the progress of the flight tests are, I fear, due to be disappointed. Noticeable progress has occurred, but with severe interruptions due to the weather, a month of work on the starboard wing, and the power crisis.

As winters go, this one has been pretty reasonable, but, even so, the number of days on which 5,000ft tows were possible has been rather limited. One has to be careful of ascending through hopeful-looking holes in otherwise continuous cloud with a rate of climb which averages 200ft/min, since dramatic changes can occur in 25 minutes. Dodging the clag without getting lost tends to be incompatible with the smooth flow of technological chat into the taperecorder. Also, as any devotee of Radio 2 will appreciate, the opening of the M3 motorway has caused almost incessant fog in Hampshire at weekends, often reducing visibility at Lasham to less than one Sigma-span.

The work on the starboard outer panel has been in the interests of adding more symmetry. It was suffering from cumulative errors in the top-surface profile which raised the trailing-edge, flaps out, by about 0.5 inches relative to the port wing. With its tiny aileron chord, averaging about 2¼ inches, errors of this magnitude required large aileron angles to cancel-out the rolling moment. After extensive un-mantling, modification, and re-mantling, it is now distinctly symmetrical and it is a great relief not only to be able to enter right-hand turns but to come out of them as well.

Having attained steady straight symmetrical flight, as it says in all the textbooks, we increased the rudder mass-balance to 130% of complete balance. This, the gospel according to Mr Honeywell assured us, would abolish flutter. Our courage has now extended to 130kts, with remarkable freedom from the sinister twitches previously lurking aft. The mass-balance remains pretty obnoxious in terms of both weight and drag; whilst most designers use mixtures of resin and micro-balloons to add lightness, we have been filling up the front end with added heaviness made from resin and lead shot, to keep the C of G in the right place. Ultimately, as we keep saying, the hope is to replace the mass-balance with a more subtle device.

Having wound it up to fairly high speeds, an elegant external towing bracket (by Imperial College) was fixed to the rear fuselage to tow a trailing static cone (courtesy of Howard Torode, Cranfield), so that we could measure the pressure errors. This combined display of academic virtuosity worked very well and represents a notable advance on the time-honoured technique of using a suspended static head consisting of about 10lb of very solid brass with a great lethal prong at the front. This was all

very well in roomy cockpits of the Skylark era, when one could take-off with RAE's bomb-like object attached to the side of the skid by Lorne Welch's improved Patent Quick Release (one cup hook, one nail and 3rd of string) plus 70ft of snake-like tubing on one's lap. Dropping the whole affair at the end of the flight at best filled the static's holes with mud and was much more likely to remove the prong after bouncing merrily off the perimeter track. With the pilot in Sigma laid out with his Z-axis along the aircraft X-erxis, he hasn't got a lap, so it comes as a great relief to be able to take-off and land with all the tubing trailing behind and nothing worse than a light fibre-glass cone grinding on the runway. After five configurations-worth of pressure errors, they were declared to be gratifyingly small.

We are now engaged in measuring the longitudinal static's stability by observing tail angles (Desynn installation by Imperial College) and stick forces (strain-gauge stick-force meter by Howard Torode, Cranfield) at sundry configurations and speeds. The equipment works very well: all we need is a lot of calm clear air to achieve really reliable results.

Time was when gliders had only one useful configuration: rigged. Then there was a long period when they had two: brakes open and shut. Now we have flaps and undercarriages, and a fair amount of cockpit work load is involved in ensuring that one is correctly configured. Sigma runs to 12 symmetrical configurations, some of them rather improbable in practice, or 24 if you consider the tail parachute. We are confining our efforts to the more probable configurations.

Spring is now in the air and plans for various championships are firming-up. Let us hope for improved testing weather and a rapid solution to the remaining problems so that we are (a) solvent and (b) airworthy.

ASW-15 IMPROVEMENTS

A NUMBER of improvements have been incorporated into the ASW-15B. They include a larger wheel (350×125mm), strengthened keel, longer cockpit and a larger rudder.

The bearings in the wings have all been replaced by ball-bearings and two 40-litre water ballast tanks can be fitted on request.

The all-up weight has been increased to 408kg and the payload to 120kg. The wing loading now varies from 28 to 37kg/m², depending on the water ballast carried (*Q-mulus*, January 1972).

CZECHOSLOVAKIAN BLANIK PRODUCTION TOPS 1500

THE 1,500th Blanik L-13 left the LET works in Kronolice towards the end of 1971. Of these, 1,300 have been exported to over 40 countries. No other all-metal glider has reached such a high production figure, adds *Aerokurier*, February 1972.

Since 1959, when the first Blanik left the works, thousands of pilots all over the world have received their training, up to aerobatic standard, in this glider.

A number of national and 12 world two-seater records have been flown on the machine. Alejo Williamson of Chile flew the Blanik from Chile across the world's second highest mountain range to the Argentine in 1964 and received the Lilienthal Medal for this.

Mü-23 MOTOR GLIDER—the problems of finding an engine

THE difficulty for most designers of motor gliders has been to find a suitable engine, and it is only in the last few years that reasonable steps forward in that direction have been made, according to a report on the new Mü-23 motor glider in *Aerokurier*, February 1972.

Designed by Akaflieg München (who built a motor glider from Mü-13 as long ago as 1937), the Mü-23 Saurier is described as a successful design overall, but the ideal solution to the engine problem has still not been achieved.

The object of the project was to achieve the same performance engine-off as that for a comparable glider. The main points taken into the design consideration were *ab-initio* training, meteorological research and cross-country training. As most of the Akaflieg's flying is carried out in the Alps, good flying characteristics, low speeds, manoeuvrability and short landing distances were also emphasised.

The Mü-23 has tandem seating and is laid out in glider fashion so that conversions are straight-forward and one only has to get used to the working of the engine and high ground clearance. The wheel is retractable and the machine has an all-flying tail.

To obtain the desired performance with the high flying weight of 700kg, the wing is of wood construction with boxed spar and has a centre-section of 8m. The forward-swept tips carry the 5.5m long ailerons. A 16% thick Mü-profile guarantees good low speed performance, and stalling speed is about 50km/h.

After trying out several engines, most of which proved to be too light for the job, a VW1500N (45hp) engine was fitted. Apart from being value for money and easy to maintain, it is easy to start and has a low petrol consumption. The 23 litre tank gives a duration of 3.5 to 4 hours. The specially designed propeller (1.6m in diameter) is of wood/GRP construction.

The flying characteristics of the Mü-23 are the same in engine-on and engine-off flight.

In all CofG positions control is good and for its size has good manoeuvrability, rate of roll being 5 seconds.

The stall is harmless and free of surprises and only with the CofG fully aft can a spin be induced; recovery is normal without building up of excessive speed. Side-slipping as an aid to landing is not very effective but the large brakes give good control on the glide path.

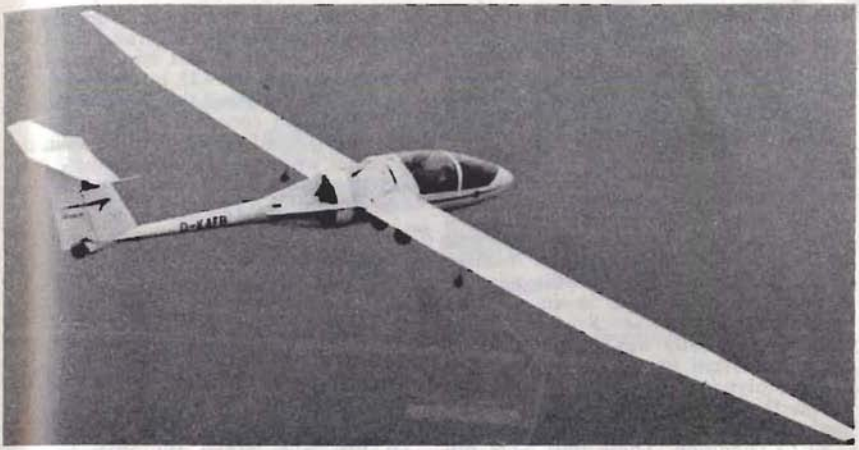
The gliding performance claimed for the Mü-23 puts it at the top of all two-seater motor gliders, the glide angle being 27:1.

This project has proved to be very satisfactory for the Akaflieg München, especially as the design and construction have been carried out over a long period.

TECHNICAL DATA

Span (m)	20
Wing section, Akaflieg München	
Wing area (m^2)	24
Aspect ratio	16.67
Wing loading (kg/m^2)	29.2
Empty weight (kg)	477
Pay load (kg)	223
All up weight (kg)	700
Max speed (km/h) at ground level	135
Rate of climb (m/sec)	1.7
Min sink (min/sec) at 70km/h	0.75
Glide ratio	27:1
Stalling speed (km/h)	50

The Calif A21s (see opposite page)



Sirius 2

CAPRONI CALIF A-21J

IN our first report on the Caproni Calif A-21J jet motor glider (S&G Feb 1971, p20), a micro-turbo Eclair jet engine was used to provide the power. Since then, the prototype has been completed, and had its first flight in January this year. The power plant now used, however, is a Sermel TRS 18 single-speed turbo-jet weighing 100kg.

This is mounted in the lower fuselage behind the seats. Fuel is carried in 160 litre tanks fitted in the wings and the fuselage.

A Calif A-21 glider flew in the Italian nationals last year and as far as we know came well up to expectations. The makers claim that the high performance is completely unaffected by the addition of the engine.

TECHNICAL DATA

Span (m)	20
Wing area (m²)	16
Max wing loading (kg/m²)	43.5
Aspect ratio	25
Empty weight (kg)	434
Payload (kg)	266
Max take-off weight (kg)	700
Calculated performance at max take-off weight	
Min sink (m/sec) at 90km/h	0.60
Glide ratio at 108km/h	43:1
Stalling speed (flaps up) km/h	75.1

SIRIUS 2

THE Sirius 1 was the first major motor glider developed by VFW-Fokker, and was an adaptation of the all-metal single-seater FK-3. It was fitted with two Fichtel und Sachs Wankel rotary engines of 20hp each.

The Sirius 2, which first flew on January 18, has been adapted from the all-metal two-seater Calif A-21, and has two coupled Wankel engines of 30hp each.

Price or delivery for both the Calif A-21J and Sirius 2 are not yet known.

TECHNICAL DATA

Span (m)	20.38
Wing area (m²)	16.10
Aspect ratio	25.8
Glide ratio	40:1
Min speed (km/h)	72
Max speed (km/h)	270
Take-off run (m)	200
Rate of climb (m/sec)	2

SIE 3 CLUB CLASS GLIDER

A TOTAL of 17 Sie 3 Club Class gliders have been produced since 1970 by the firm of Paul Siebert in Münster (see S&G April 1970, p174). Three have so far been exported, says *Aerokurier*, February 1972, which adds that type certification should have been completed in January.

Owing to its all-wood construction (and consequent easy maintenance and repair) the price lies below that of a comparable glass-fibre glider. This, coupled with a glide angle of 34:1, has made it of special interest for club purchase.

NEW-DESIGN BG-135 FLIES

THE third prototype of the Birmingham Guild's "BG-135", equipped with the new-design production wings, was taken to 4,000ft by Roy Proctor on her maiden test flight at Lasham on Saturday, March 4, in a rising gale that was shortly to stop flying altogether. Tests continued from aero-tow and auto-launch on Sunday in beauteous weather, save for a 10kt cross-wind for all take-offs and landings, writes L. P. Moore, a member of the design team. The results were altogether gratifying and, in such conditions, quite impressive. Roy's flight on Saturday especially was testimony to his confidence from experience on the first two prototypes.

For this series, there was a cockpit load of 210lbs in the fully-forward C of G condition. These tests were primarily to measure the power, weight and range of all controls and the trim, at speeds up to 90kts. At this fairly high load auto-tow take-off was around seven seconds; on aero-tow one or two seconds less, both hampered by cross-wind.

The stall, helpfully heralded by normal buffeting, occured at 35kts or a fraction less and was deliberate and balanced, while the standard roll reversal took 3½ seconds. Circling speed was 40kts in the roughish air, and stability, control and trim at all speeds tested left nothing to be desired. Cross-wind behaviour was particularly pleasing and there were no problems on the wire launch or the aero-tow. Not least of all was the relief of finding good behaviour from the redesigned trailing-edge airbrake.

An interesting if not historic sideline was to see the BG-135 in company with Sigma—the long and the short of modern British design conception.

Trials in the fully-aft C of G condition, together with spins in both extreme loading conditions, will follow and will be reported in due course.

POLARS — CALCULATED AND ACTUAL

AN article in *Aviasport* discusses the fact that polar curves based on actual performance are found to be always "below" those calculated by the designers when drawn on the usual graph. It illustrates this by reproducing both curves on the same graph for each of nine modern sailplanes.

The compared minimum sinks were found to be practically the same in Std Libelle and ASW-12 and nearly so in Diamant 18. The greatest difference occurred in LS-1c.

The actual speeds for minimum sink were about the same as the calculated in Std Libelle, ASW-12 and 15, Diamant 18, Phoebus C and Kestrel; greater in the rest.

The high-speed end of the polars differed least in LS-1c and little in Std Cirrus, a little more in Std Libelle and most in Phoebus C. With Cirrus the difference was small when the all-up weight was 460kg, but larger at 400kg.

The BG-135

BOOK REVIEW

British Gliders. Edited by P. H. BUTLER. Published by Merseyside Society of Aviation Enthusiasts. Obtainable from B. E. Workman, 11 Leybourne Grove, Gateacre Park, Liverpool L25 4SS. Price 35p.

THE main body of this booklet is a complete list of all gliders registered by the British Gliding Association, all the way from No 101, the Kent club's Primary glider of early 1930, to No 1574, a K-8B with works number 8803. In addition to the BGA numbers, type names, works numbers and date of registration, there is a column for historical remarks on many of the individual gliders, especially if they went abroad, were "impressed" for war service, or "crashed" (meaning written off). Any errors seem to be due to ambiguous BGA files, except that "Nimbus", given as the type name of the H-17, was actually the individual name of the first one built in England.

Further lists show all British gliders which bore registration letters, starting with the five that went to the first International Contest in 1937, followed by all those acquired by the Air Training Corps, the RAFGSA, and the Army Gliding Association, but little could apparently be discovered about the RNGSA. Another list shows general data of glider types active in Britain, and all the British gliding clubs are listed, with their locations. Finally, the centre pages carry 44 photographs of different glider types with a few lines about each.

This is the gliding equivalent of those popular Ian Allan books which give lists of all the engines running on our railways. A glance through it makes one long for stories of the exploits of each individual glider; but that would take an encyclopaedia. By the way, this would not have been much of a book if published at the end of 1932, when, after three years of gliding, there were less than 50 gliders in the country.

A. E. SLATER

CORRESPONDENCE

CLOUD FLYING AND WORLD CHAMPIONSHIPS, ETC.

Dear Sir,

In the February issue of our magazine *Sailplane & Gliding* appeared a leading article commenting on the article by Gerhard von dem Hagen published in the October issue of *Aerokurier*, entitled "Will gliding still have a future in Germany?" and reproducing a quite shattering map showing proposals for future controlled airspace in Germany.

Sailplane & Gliding also reported that it was only in November 1970 that the German gliding movement decided to set up an airspace committee. Here I should say that the British Gliding Association foresaw the overwhelming importance of this matter to the future of gliding (and indeed of all sporting aviation) and set up its own airspace committee as far back as 1957 and for 15 years have been fighting a dogged and not unsuccessful battle to retain a reasonable degree of freedom for gliding in the United Kingdom.

Whilst we must all sympathize with our German colleagues and wish them success in their efforts to modify these proposals, it is sadly necessary to point out that they are in some degree to blame for having delayed their opposition so long. For some years now Germany has been one of the few advanced countries where all cloud-flying for gliders has been prohibited, and in my many arguments about this at CIVV meetings with my friend Seff Kunz I have gained the impression that the German Aero Club really thought this was a necessary safeguard, so this battle was lost before it was begun. Let me assure your readers that there are numerous systems of control, operating satisfactorily in countries with traffic densities as heavy as or heavier than in Germany, which still leave gliders some degree of freedom to cloud-fly and preserve acceptable safety standards.

Now all this, you may think, is not our business, but in fact it is very much so, because at the November CIVV meeting Germany proposed that cloud-flying should be prohibited at all future World Championships. The reasons given were two. The first was that since German pilots were not allowed to practise it, this gave other countries an unfair advantage. Effectively this is to say that since German glider pilots have allowed themselves to be enchained, the rest of us should follow suit. I hold the reverse view—since most of us have managed to retain a degree of freedom, German glider pilots should use our freedom as a weapon to regain their own.

It was interesting to read in the same issue of our magazine that many competitors in the 1971 USSR Nationals were penalized for circling below 300 metres, which was against the regulations. What would German glider pilots say if at the next CIVV meeting our Russian friends used this as an argument to prohibit circling below 300 metres in all future World Championships, on the grounds that Russian pilots could not in their own country learn the necessary skills?

The second argument used against cloud-flying in World Championships is the collision risk. This is simply a false one: To prohibit cloud flying in Championships *increases* the collision risk, because all contestants will circle up as high as they can and then fly along at exactly the same height and on the same course in and out of the ragged base of the cloud. To rule that one must stay at least, say, 150 metres below cloud-base is simply a way to safeguard the rule-maker, who can sit back if there is a collision at cloud-base and say that he is not responsible because the pilots were breaking his rules. But it is no safeguard for the pilot (with whose life we are really concerned) because the rule is both unenforceable and impossible, since you cannot tell the height of cloud-base without first climbing up to it, and it varies throughout each flight.

I am glad to know that the German proposal was negatived, and during my nearly 25 years at CIVV meetings I always tried to get agreement that if two countries offered to hold a World Championships simultaneously, preference should

be given to the one offering cloud-flying. I am sure that our BGA will continue to press that view, for CIVV must never join the many outside interests who are trying all the time to restrict our sport more and more, and I do plead that Germany should not again take such a retrogressive proposal. Since this subject is of such cardinal importance to the International gliding community I am taking the liberty of sending copies of this letter to a number of journals in other countries, so that we may perhaps find out the views of as wide as possible a spectrum of international gliding.

London PHILIP WILLS

CLOUD FLYING . . . A REPLY

Dear Sir,

I believe that Philip Wills had good intentions in writing his letter, but unfortunately his arguments are full of mistakes.

The circumstances in Germany are extremely complicated and one must be really well informed in order to be able to write about this matter.

You people in England are to be congratulated for the simple and clear relationship which exists between the BGA and the Government. There are only a few official regulations in England and the BGA has the responsibility for the necessary control of gliding matters in its own hands. In Germany, however, there are many governmental regulations appertaining to gliding matters. The causes which bring them about are very complex.

In Germany we have a Federal Republic made up of 11 States. Each State has its own Local Government and all of them have specific powers in connection with aviation.

In each of these States there is also an independent Aviation Sporting Association, which has the control of all the clubs in its area. These 11 States form the German Aero Club. I have described this briefly so as to show the complicated structure in the German Aero Club compared with the simple structure in England.

Of course it is quite easy to write a short letter. The answer, however, may have to be ten times as long in order to clear-up mistakes and misunderstandings.

I will, therefore, restrict my answer to the two points only:—

For the first part of his letter Philip has used information from the article in *Aerokurier* by Gerhard vom dem Hagen. It is a good article but it does not contain all the details needful to be able to pronounce upon procedures in another country.

For instance the article says that we set up an Airspace Committee in 1970, and Philip has picked on this statement. He is not aware, however, that we have had an Airspace Committee for many years in the German Aero Club and gliding section. The 1970 Airspace Committee was set up with very special terms of reference.

Now here is something very important on which Philip Wills is evidently not informed. We in Germany would undoubtedly also have achieved a good and satisfactory agreement if an incident of far-reaching importance had not happened.

This was the Air Traffic Control strike and the bringing in of the Trade Union, thereby broadening the problem of Flight Safety by extending it to internal political levels. The difficulties and complications which arose from this event would take too long to describe here.

I will now reply on the subject of cloudflying in World Champs. According to our regulations our National Gliding Team has the right to make proposals, which are for submission to CIVV by the German Aero Club. It is not the case that our proposal to CIVV to prohibit cloudflying in World Championships was based primarily on the lack of opportunity for practice for German pilots.

The truth is that at the November, 1971 CIVV meeting this basic reason was suggested by the Aero Club of a different country. The German Aero Club then for the February, 1972 CIVV meeting included this other Aero Club's reason in its own proposal.

The main reason, however, for our request to the CIVV of the FAI is the collision risk while cloudflying when so many pilots take-off shortly after each other and fly together.

Philip Wills' criticism that a ban on cloudflying merely shifts the area of collision risk to a different level may well be right, but the problem of collision risk in cloud has not thereby been disposed of.

I would bring to mind here what happened 20 years ago at the International Gliding Commission of the FAI. Every year for three years the same proposal was made, to discontinue world records for duration flights. At that time the record stood at over 56 hours, and a pilot would have had to fly continuously for three days and the two nights in between in order to break the record.

Notwithstanding that the proposal was based on the risk of accident it was turned down every time. Then, during the third year, two fatal accidents occurred, and so at last—but too late—the proposal was accepted.

For many years I have been friendly with Philip Wills, and I know therefore that he has written his letter in good faith and in the interest of all glider pilots. But had he been better informed before writing his letter it would have saved this information being given subsequently.

Solingen, Germany. SEFF KUNZ

EDITORIAL NOTE: Seff Kunz is the President of the German Gliding Committee of the German Aero Club, and is a Vice-President of the CIVV.
(Translated by Rika Harwood).

AIR CADET GLIDING IN CANADA

Dear Sir,

I was very interested to see in the December 1971 issue of S&G the short article "Thirty Years Ago" on the formation of gliding on p478 and "How ATC Gliding Began" on p479.

In December 1939 I joined 120 Hendon Squadron Air Defence Cadet Corps as a very young cadet. My memory fails somewhat on names but one CO we had in 1940 was by the name of Hendy or Hendry and he was an ex-member of the London Gliding Club.

F/L Hendy introduced gliding as a subject to the squadron training programme and I remember seeing some early films on gliding in Germany and Dunstable. At one time a number of the more enthusiastic cadets went to see some gliders all in storage. I haven't a clue where we went; it wasn't Halton as it seemed to be only about a half-hour journey and was not an RAF station. Eventually we did visit the site at Harrow and I was one of the lucky ones to be strapped into the glider, a Dagling, and had two ground slides at which stage I got about a foot off the ground for about 20 feet.

It is difficult to establish any firm dates but it had to be 1941 because F/L Hendy retired as CO and the gliding activities appeared to fall by the wayside. However in the summer of 1942 the squadron went to Halton for camp and was inspected by King George VI and all the cadets were lined up at the field whilst a glider was launched for His Majesty to see.

My association with gliding ceased once joining the RAF as Flight Engineer but I became involved again when flying on Halifaxes that were glider-towing Horsas.

Now in a way for me history is repeating itself as I am now helping to develop the gliding programme for air cadets here in Canada.

Very briefly our gliding has only just got going into gear. For a number of years a few have been trying to get gliding approved as a subject for Royal Canadian Air Cadets. At last it has become a reality with the Canadian Armed Forces providing support and maintenance of gliders and winches. We operate with the Schweizer 2-22.

In the Province of Ontario we now have four Gliding Centres and primarily we are giving familiarisation flights to air cadets but started last summer to have student pilot training which will be initially to A and B standard.

As an Air Cadet officer I am pleased to see us get into gliding. We still have a long way to go but then the ATC has got 30 years on us, and we are getting a great deal of help from their experience.

My regards to some of my colleagues of *Sailplane & Gliding* editorial committee who might remember me, and Kent Gliding Club (of 1955-1960 era).

Royal Canadian Air Cadets
Ontario Provincial Committee

COLIN MOORE
Chief Gliding Instructor

HANGING GLIDERS

Dear Sir,

I think I remember writing an article on this subject a few years back under the heading of "Prospects for inflatable sailplanes" (S & G February 1961, p39). So far practice has not caught up with my theory. However, it is reasonable to discuss this class of glider much further.

The current crop of hanging gliders is by kiting out of water skiing. However, the Horten brothers' Parabola, built and burnt during the war, was an example of what could be done in this direction. This was a very light flying wing with a main spar and mean line in the shape of a parabola. It was deep enough in the section for the pilot to sit in the wing with only his head projecting. Circling performance was excellent but penetration was very poor. But if you are going to confine your flying activities to low wind conditions you can have a lot of fun out of this class of aircraft.

I don't particularly fancy the hanging configuration or the sail wing. Make a thick wing and put the pilot inside it for safety. Instead of excessive lateral stability use ailerons. Use a section with an S-shaped camber line for fore and aft stability. Charles Fauvel uses a very good section of this variety in his AV-36. He has cleverly arranged the section and camber line to cancel out so that a large area of the lower surface of the wing is flat. This greatly simplifies construction since a large table constitutes a simple jig.

Materials Polystyrene foam is still fairly strong right down to a density of one pound per cubic foot and it would seem reasonable to more or less carve the whole machine out of it and then skin it with a thin layer of glass-fibre or Melinex. A snag here is that polystyrene does not glue very well as it is very solvent-sensitive. One solution is to skin the polystyrene with tissue and PVA glue and then do a wet lay-up with glass-fibre cloth when the glue is dry.

Polystyrene foam is so cheap and so easy to cut with a hot wire that it is a natural choice for this application.

Having made one's aircraft one can load it up with a ballasted dummy and fly it as a kite to prove that it is reasonably stable and structurally sound. Once this is done it can be towed over water with a pilot in it by a motor-boat, and as his courage and experience develops, so will his ambition.

I like the idea of using legs as undercarriages. I personally find my pair are very useful for walking and running and they tell me that they feel quite up to the job of landing and taking off. If you insist on the hanging configuration the harness should pivot at the sides at about waist level so that the pilot can fly in the prone position. For landing, he can rotate into the standing position without disturbing the C of G.

I still like the idea of making an inflatable light-weight glider, as getting onto a bus carrying a glider with a 25ft span and 6ft cord is going to antagonize a lot of bus conductors.

If you are going to hang under an inflatable wing you can do this quite nicely since you can use a number of guy ropes to distribute your weight over the span parachute-fashion. If you want to wear it like a pair of trousers you have the problem of cutting a hole through it which is a bit difficult technically. Also your inflation pressure will be higher. Inflatables with a pressure of 20psi are quite strong and are often wrapped round the wheels of motor cars. If you fly with one wrapped around your tum ("t" not "b") you will get quite a lift-off if it bursts. However, you can proof-test it every day to normal inflation pressure times three if you like.

Another problem is that the differential pressure increases as you climb so you must have a blow-off valve as you climb and a pump as you descend. What I would like to point out is that all this has been accomplished about 10 years ago by D. Perkins at Cardington with his world-shaking "Durex-Delta" (now at Boscombe Down).

It is high time someone brought all this pioneer work into normal practice. Perhaps the hanging glider craze will mature technically as well as emotionally.

Marlow Common BRENNIG JAMES

WHY MILITARY ZONES AT THE WEEKEND?

Dear Sir,

Never in the history of Britain have there been such real prospects for a long lasting peace and, except for the Mintoffs of this world, the Ministry of Defence has only to fend off aerial intrusions, with Lightnings from Leuchars, and submarine violations, with Nimrods from St Mawgan and Kinloss. The US Air Force in Britain creates minimum aggravation with its F-111's from Upper Heyford and other "hot rods" from elsewhere.

So why, therefore, do we have to suffer the extravagant claims of the MoD for military control zones in peacetime at the weekends, when they too would prefer to have the weekends off—some of them, hopefully, gliding?

If Air Support Command *has* to have minimal movements into and out of Lyneham and Brize Norton on Saturdays and Sundays, let them do so under radar surveillance and the "see-and-be-seen" philosophy of airspace use.

UK users of airspace for recreational purposes should launch a united campaign to deactivate all military zones from mid-afternoon on Fridays to 23.59 on Sundays throughout the year, as is the case in some Continental countries.

Ryde, Isle of Wight. R. B. STRATTON

LOW AND SLOW

Dear Sir,

Ann Welch (S&G, February, p.19) argues that "sailwings, hang-wings and man-powered pedalos" might be "prohibited the use of aerotows, winches and other ground or airborne infernal machines", and they would then stay simple. "If, or when, someone builds a high performance sailwing and wants an aero-tow to go thermal soaring, then there is a perfectly sound existing framework of glider requirements with which he would have to comply—or stay low and slow".

Exactly so, Ann, exactly so! But why not apply the same philosophy when putting engines in gliders?

Cambridge ANTHONY EDWARDS

We would like to apply the same philosophy, but the Department of Trade and Industry won't. Still, the final compromise is not unreasonable—AW.

A CHANCE TO WIN £1,000

Dear Sir,

Concerning the article in the February S & G by Ann Welch.

You may be interested to know that the "hang-glider" revival started in this country as long ago as August 1971, when the Selsey branch of the RAF Association held an International Birdman Rally at Selsey. Large crowds were attracted, wide publicity followed and the RAFA together with the RNLI and other charities benefited by the resulting collection. At this event there were a number of serious attempts to glide the required 50 yards from a height of approximately 40 feet above the sea, using home built sailwings. No-one flew the distance and the prize of £1,000 offered was not claimed.

This year, in August, the RAFA is again putting up a prize of £1,000 for the first person to glide, flap, or fly in any way by his or her own efforts the same

distance from a platform on the Selsey Lifeboat Jetty, approximately 40 feet asl.

We are hoping that the interest in sailwings and hang-gliders stimulated by your article will produce a crop of contestants for the event this year. If any enthusiasts for this type of flying care to make an attempt on our £1,000 this year they should get in touch with the RAFA Birdman Committee, c/o Mrs M. Ogden, Yellow Sands, Thorney Drive, Selsey, Sussex, when they will be sent full details, rules and entry forms.

Finally, wasn't there a "hang-glider" on sale from Gamages of London before the war?

Selsey, Sussex D. NICHOLLS

STRATHALLAN AS A WAVE SITE

Dear Sir,

For many years I have been highly responsive to any appearance in the sky of alto cumulus lenticularis which is such a dramatic manifestation of wave conditions.

It is only now, with brief experience of operating a motor glider at Strathallan, Perthshire, that I have come to understand that the lenticular cloud is only a particular version of a general and common phenomenon and that, from the point of view of the soaring pilot, the basic division of clouds is into two categories—those that move with the wind and those that don't. Areas of cloud which do not move with the wind, however nondescript and ragged, and which are commonly associated with typical clear patches which equally remain in place, are clear indications of wave structure.

At Strathallan we are situated in a depression (Strathearn) about 10 miles across, between the sharp southern escarpment of the Grampians (the "Highland Line") and the Ochil Hills, both running roughly SW-NE. By observation the situation is a sort of climatic oasis, enjoying a greater incidence of clear weather than the surrounding country and also being mercifully free of the sea fogs which penetrate from the east coast and up the Forth valley in particular. The clear weather is to a great extent a reflection of the wave gaps which occur frequently in winds around NW and SE, and of the corresponding opportunities which occur for wave soaring at spectacular or modest heights according to the other factors in operation.

Wave conditions have been experienced frequently, but not fully understood, by pilots of powered aircraft operating from Strathallan. We may yet be aspiring to the title of the best wave site!

Penicuik, Midlothian. R. E. PEARS

FOR SALE (continued)

INSTRUMENTS FROM SLINGSBYS. ACCELEROMETERS Standard size £6.75, small £15. AIR SPEED INDICATORS P.Z.L., new, £18.50. Winter, new, £17.40. Smiths, surplus, £12.50. ALTIMETERS Winter, new, £23.5. Ex R.A.F. tested, £20. Ex R.A.F. with release notes, £30. AUDIOS Piep, for P.Z.L. varios, £38. BAROGRAPHS Winter, £59. Motor glider, £67.80. CLOCKS 8-day, surplus, £6. COMPASSES Cook, £17.30. P.Z.L., £21.60. Airpath, £12. Luft, £5. GLIDE CALCULATORS Glasflugel, £17.68. OXYGEN Regulators, new, £34.40. Bottles, 530 litre, £37.12. Masks, £2.30. Connecting Tubes, £2.20. PARACHUTES Ex U.S.A. surplus, £68. RADIOS Dittel, FSG15, £210 plus £9.50 per channel. Alpha 10, fitted 129.9, 130.4, £141. Alpha 360, 360 channel, 8 watt, £232. SLIP INDICATORS Winter, £5.50. SOLLFARHTGEBERS Combined ASI and VARIO, £72.00. TACHOMETERS with hours meter, £12. TOTAL ENERGY UNITS P.Z.L., £8.75. Burton, £5. TEC Adjustable adaptor for P.Z.L., £9. TURN AND SLIP INDICATORS P.Z.L., small, £62.20. Gauting, small, £90. Standard size, surplus, £16.50. VARIOMETERS Ball, £87. Ball Audio, £25. P.Z.L., £34.50. Winter, £28. Cook with Audio, £50.20. Crossfell with Audio, £45. Cosim, £11.30. VENTURIS Althaus, £6. CATALOGUE 40p.

WINTER Barograph, 10km Model, £33. Tel. Ipswich 45108.

PYE transistor Ranger car radio, newly overhauled, 130.4 or 129.9, £25. Sykes, 73 Greenway Road, Heald-Green, Cheadle, Cheshire. Tel. 061-436 1392.

PYE Cambridge 130.4 Dash Mounting. £90 in full working order. Box No. SG 376.

TWO places are available in a K-6E syndicate operating at the new aerotowing site at Sleat, Wem., Shropshire. Fully instrumented with good audio-variometer, radio, etc. Adams, Astbury, Congleton, Cheshire. Tel. 026 02-3525.

SCHEIBE SPECHT two-seater glider. Good club workhorse. £400. Contact Dr. Shearer, Strathaven 3589, Lanarkshire.

BLANIK for sale. Privately owned, complete with C of A Instruments, including horizon. No prangs. £1,675. Can be seen at Enstone. Tel. Great Tew 288.

T-21. Good condition £600. Secretary, Naval Gliding Club, H.M.S. Daedalus, Lee-on-Solent, Hampshire, PO13 GNY.

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WANTED

PYE Bantam single or three channel wanted urgently. Box No. SG 377.

PERAVIA barograph. Offers to Dr. Cedric Castle, Box 99, Collaroy Beach Post Office, 2097 Sydney, Australia.

BOCIAN 1E (T-49 considered) required by Aberdeen University Gliding Club. Full details to Secretary, 12 Irvine Place, Aberdeen. Tel. 50940.

SHARE in K-13 or K-7. Also audio vario wanted. Please phone Jason, 01-788 1960, 9.30 a.m.-5 p.m.

TUTOR with spoilers. Box No. SG 378.

SPORT/CLUB NATIONALS entrant (800 hrs, 10 contests, instructor) wishes hire sailplane for this event. Box No. SG 379.

SERVICEABLE Parachute, electric vario or PZL. H. Walker, 11 Wharfe Street, Bawtry, Doncaster 710142.

SHK or Dart 17R, details and price, ring Weston Super Mare 23201.

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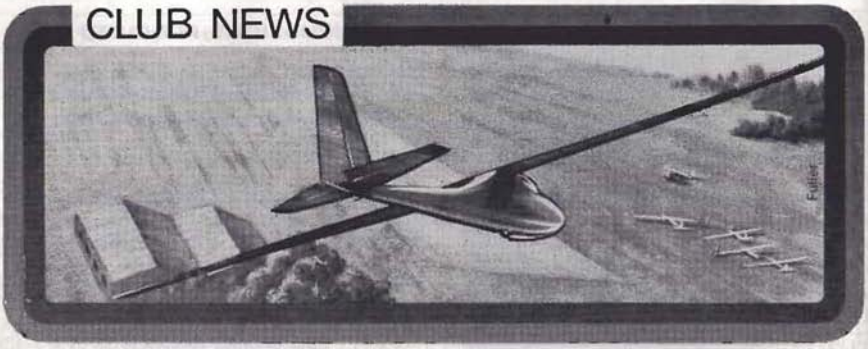
CLUB NEWS



Copy and photographs for the June/July issue should reach the Editor, S&G, British Gliding Association, Artillery Mansions, 75 Victoria Street, London, SW1, telephone 01-799 7548, not later than April 19.

Copy and photographs for the August/September issue should be sent to the Editor not later than June 14.

February 23, 1972

ANGUS — a new club's progress

THE Angus Gliding Club, Condor, Arbroath, was formed during 1970 and became operational in September of that year. It was formed after the winding-up of the RNGSA club. We started with one T-21, a two-drum winch, a Land Rover, three instructors and 50 *ab-initio* members.

The Deeside club, with whom we have a close association, and the Scottish Gliding Union generously helped to get the club off the ground at the start. Our CFI, Graham Smith, a member of the SGU at Portmoak, regularly made the trip of 130 miles from his home at Kincardine to Arbroath and back.

Often, during the winter of 1970/71, one long-suffering instructor sat for the whole day in the T-21's open cockpit, frozen, teaching pupils while an experienced glider pilot tried to sort us out on the ground. Chaotic at times!

We have come a long way in this comparatively short time. We have bought and sold a second T-21, bought an Olympia and now a Bocian. There are two retrieve vehicles as well as a caravan which provides shelter and snacks.

Most of our members have now gone solo. During the first year we made almost 4,000 launches with our original and second T-21 (acquired in December 1970). Heights achieved by the winch launches are seldom less than 1,000ft.

This is an east coast airfield and, because of sea breezes, not really good for soaring flights. Nevertheless, we have had a few good thermal and wave-soaring days.

Ron Davidson was the first to complete his Bronze C at Arbroath. Gordon Neill, our chairman, did his Bronze flights and Silver C height at Deeside, where Les Joiner, one of our instructors, completed his Silver C. Alex Black has been successful on an instructors' course.

We are fortunate in having as members Bill Buchan, an engineer of seemingly unlimited genius and energy, Pete Murray, airframes and engines maintenance engineer who has now qualified as an inspector, and Jim Laing, engineer. These, combined with a hard core of enthusiastic members, have provided the skills necessary to keep our club airborne.

J.S.

BATH & WILTS — official Mk 2 monster

GORDON MEALING, the club's first CFI and the man who has taken on the job again every time someone else had to give it up, has resigned and been replaced by Bill Davis—renowned for his ability to get things done as well as for

his skill as pilot and instructor.

We have now switched officially to pulley operation. The Mk-2 monster incorporates a built-in wind-out and wind-up system using the outside rear wheel (one of twins) on the Bedford furniture van which carries the pulley.

Development work on ferrules for broken cables continues, but breaks are increasingly rare, even with the fully-loaded Bocian, and launch heights are more than satisfactory. Cable wear on our carborundum runways is substantially reduced.

The faithful T-21c is having a major C of A and the club Skylark should be back soon from a repair, following a fault following a repair following a graunch . . .

R.J.C.

BLACKPOOL & FYLDE — our President dies

WE regret to announce the death recently of our President, Herbett J. Liver, who took up gliding at the age of 70 and so enjoyed it that he bought a Grunau and a share in an Olympia which we have operated as club aircraft for 12 years.

Ray Stafford Allen came along to do the honours at our first annual dinner-dance, which included the presentation of five new club trophies. These went to Ken Fixter for effort (he builds winches), Derek Sandford for cross-country flights, Dick Seed for height (Gold with 20ft to spare on an escalator to anoxia), Stephen Hardy for progress (C on his 9th solo flight) and to Douglas Barber for enthusiasm. Doug's face was a study—one of his pieces of initiative had been to make the trophy!

On Sunday, January 30, we had several good thermal contacts and climbs of about 500ft.

A Swallow was bought recently to replace Mr Liver's Grunau. This will prepare our early solo pilots for the move to our new hill site, where work is now in full swing. We will move the aircraft there as soon as possible, when the land is cleared and levelled and a hangar has been built.

A careful survey of the barn has revealed even better prospects for turning it into an attractive clubhouse than we had originally thought. The layout is convenient and little structural alteration will be needed, while the floor area of 3,500 sq ft will be ample for our immediate needs.

K.E.

BORDERS — wave on first solo

WAVE has been found by Alan Urwin on his first solo. He kept the T-21 aloft for 21 minutes and later for a further 16 (just to show it was no fluke). We now have six solo members.

The AGM showed that, despite the spasmodic operations which we have had this year, we have kept our heads above water. Our aims for the season are: One new instructor from within the club; one new two-seater, hopefully a K-7; one new winch, the basis being a bus, whose chassis will provide launch point cover and snacks.

We are looking for new members and hope to double the active flying list this year. For those trailers we see passing us on the A697 (south of Coldstream) —why not stop and visit us; we would love to see you.

C.B.G.

BRISTOL & GLOUCESTERSHIRE — 8kt thermals in February

THE new year took its time in providing us with flyable weather, but the weekend of February 12/13 gave an early foretaste of what we all hope will be the best soaring season for many years. The Saturday was very windy, but later in the day Chris Hughes took Mike Davies up in the syndicate K-13, contacted wave, and reached 8,500ft over Tewkesbury before descending through cloud. The Sunday livened up to give 6-8kt thermals to cloudbase at 4,000ft asl in the afternoon, and several pilots had a cold but pleasant afternoon logging their first hours of 1972.

The major C of A job on hand is the Tiger Moth, under the direction of our aircraft engineer Cyril Pugh. A notable achievement was the completion of the T-49 C of A between Christmas and New Year, including a new canopy and a re-spray of the fuselage, by Dave Braham and helpers.

On January 1, Tony Pentelow took over as CFI and resident manager. He

has started regular weekday flying, and reorganised the weekend meals system. The club will now be able to provide a warm welcome for visitors at any time —just ring Tony on 045-386 342. We have also acquired the services of a full-time tug pilot in the shape of Santiago Cervantes, from . . . London!

By the time this appears, we will have held our annual dinner-dance, and George Burton will have presented the trophies for 1971. Derek Vennard wins the Cyril Uwins and Shaun de Salis trophies with his 326km triangle, and also the Ladder Pot. The *Evening World* trophy goes to Tom Bradbury for a 21,700ft height gain, and the Guinness trophy to John Mast for a Silver distance to Lasham in the club Olympia.

Our Chairman, Mike Harper, is to be Competition Director for the Open/Standard Nationals at Shobdon, run jointly by the Midland club and ourselves. He also directs our own Regionals from June 10-18; get your entries in now. M.J.C.

CAMBRIDGE UNIVERSITY — choice of two soaring sites

THE club has enjoyed a record year—more launches, more hours, and more cross-country kilometres than ever before. We had twice as many launches as we did three years ago and had almost twice as long in the air.

The increase in launches is largely attributable to flying from both Duxford and Cambridge airfields, and to our diesel winch which gives excellent launches at less cost than our former petrol-driven winches and tow-cars. Consequently winch launch charges are still the same as they were six years ago.

Now that our airspace restrictions at Duxford have been lifted we are in the enviable position of having the choice of two sites from which to soar. During the winter gliders and trailers have been proliferating so much that the tug and both winches will be fully stretched at weekends in the summer. However, visitors can usually be offered launches on weekdays.

The most memorable flight so far this year is undoubtedly Paul Sears' unintentional cross-country in wave from the Long Mynd. Having climbed through a gap, he travelled some miles upwind and then returned to look for his gap. He was somewhat surprised to find that he had overshot by about 80km and was over Abergavenny. Luckily the wave was still working and he returned to the Long Mynd without great difficulty.

P.A.K.

Waiting for a launch at the Cambridge club. Photo by John Kirsch

DEVON & SOMERSET — the case of the wheel-less trailers

TWO K-6Es and a Dart 15 were due for C of A over the Christmas holidays and were towed to a workshop. One K-6 was taken back to the site in case the weather proved flyable (which it didn't) over the holidays, the other two remaining under cover and presumably safe. The syndicates concerned were more than a little shaken to find on their return their trailers resting on the brake drums, the wheels having been stolen.

Clubhouse painting and floorsealing, hangar and workshop tasks have all been helped by the labour released by bad weather since Christmas. Flying is now possible on some Wednesdays and Fridays as well as the regular Thursdays and weekends. Arrangements are in full swing for our summer courses, four weeks of which are booked solid with youth clubs and technical colleges. The annual Task Week is from June 5-10.

The recent strong westerly winds have provided some exciting ridge soaring.

A.E.R.H.

DORSET — trailer take-off

ALTHOUGH a few members were out and up over the Christmas holiday the weather was not good and kept flying at a pretty low level as it has done for most of this year so far.

Since the internal redecoration of the clubhouse was carried out by a band of younger members, led by Robin May and Norman Osborn, it has been in fairly constant use in spite of its new colour-scheme! The monthly lectures (1st Tuesdays) are being augmented by weekly film shows and social evenings (Wednesdays) and occasional visits from gliding celebrities when opportune.

Our newest syndicate had the misfortune of discovering that their trailer had attempted flight (with the glider inside) in their absence one very rough Sunday morning, and had made a heavy landing. The trailer has to be rebuilt and the glider needs extensive repairs.

Jim Tudgey and Tony Bessant have been in constant attendance on our Auster for the past month to make it fit (we hope) for an arduous summer again, and other work goes on in the hangar under the supervision of John Light.

There was a dinner-dance before Christmas at which 150 members and friends enjoyed themselves outside the airfield environs for a change. A similar event in January was the occasion of a presentation to our Chairman Val Cockle, who retires from this office in April after three active years in charge of affairs. M.L.B.

DERBYSHIRE & LANCASHIRE — Camphill by candle-light

WINTER wave has been a prominent feature of our flying activities in recent weeks and several members have attained some respectable heights. One of our instructors, Don Hatch, carefully climbed to 19,300ft in his Dart, without, alas, a barograph! This is the second time he has been unable to claim Diamond height. If only Amber One were pushed back just 1½ miles west where it came from we would achieve many more Gold and Diamond heights.

We have taken delivery of our third Rhönlerche taking our two-seater fleet total to four. The hangar is becoming quite crowded and hangar-packing 10 aircraft is a work of art. The trailer park is also pretty full as new syndicates are formed. John Collins and Brian Morgan have their Dart on site, Chris Brown has bought into one of the other Dart syndicates and a new Oly 2B syndicate is joining the ranks with great enthusiasm. Ken Blake is re-building the Oly 403 and hopes to fly it in the Task Week to be held from May 13-21. Our courses also start in May and we again have a resident instructor for the summer.

The electricity blackouts have bugged us on some weekends. Hangar-packing has been difficult but eating in the mess has carried on with power from our tractor batteries, and drinking in the bar has taken on a new light—candles. To make matters worse our mains-supply water pump was attacked by gremlins and we had to draw all our water from the well. P.H.

ESSEX — management committee reshuffle

THERE have been many new developments at North Weald since we last appeared in these columns. At our AGM last December we had a reshuffle of the management committee aimed at streamlining the club's affairs during 1972.

One of its first actions was to sell both our Blanik and T-21 and buy a K-6CR. With a K-7, K-13, K-6 and Swallow our fleet should be well-utilised this year and, with our now professionally maintained launching vehicles, our launch rate should be much improved on last year's disappointing figures. But even with the lower launch rate our total soaring time and cross-country distance exceeded all previous club records. This was highlighted in the chairman's speech at our recent dinner-dance and the most enjoyable evening was crowned by the presentation of the chairman's trophy to Alan Vincent for achieving our first home-completed Gold C.

During late January and early February the weather was kind to us. Some members managed thermal soaring flights of up to an hour's duration and we all hope this is a good sign for the coming season. P.F.McE.

ESSEX & SUFFOLK — courses for the first time

THE end of 1971 saw a considerable improvement in the club's fortunes. Both the two-seaters were much in demand for *ab-initio* courses at the weekends right up to the New Year. We even got in some soaring on Boxing Day.

Flying has ceased during February to enable C of A work to be carried out—we anticipate being back in the air again early in March. The syndicate Swallow on which Ralph Brooker has been doing a major rebuild in his garage is now nearing completion.

The club is entering the field of week-day courses for the first time. We shall be running these during August for temporary members as well as for our own club. M.L.

IMPERIAL COLLEGE — major training change

SINCE our last notes a year ago the club training has undergone a major change. In common with other clubs at Lasham, all training is now done with the School on Falkes and K-13/K-7. The change was instituted as a result of having to sell our Eagle last June as it was becoming too expensive to run. As training started at the beginning of the College session in October, it is still too early to judge the effect of the change.

Last summer several members took the Skylark 4 to Aosta, Italy for four weeks. This was quite successful and was our first overseas expedition for several years.

As usual after Christmas we visited Portmoak, this time taking the Skylark and K-8, together with Frank Irving's Dart 17R. We were joined by the Cranfield K-6E. The weather was extremely kind to us though by no means exceptional for gliding. A few contacts with wave were made and some hill scraping was undertaken. We all enjoyed the change.

At the club annual dinner recently the guest speaker, Ian Strachan, as expected, spoke enthusiastically of motor gliders. The evening finished in truly noisy and happy style. M.P.S.

KENT — fluid drive with lead shot

FEBRUARY saw the first launches with our new two-drum winch, built mainly by Charlie Cramer, one of our pro-

The Kent club's new winch

fessional instructors. It has a fluid flywheel drive to the drums for really smooth launches. The fluid clutch is actually filled with fine lead shot and, after curing the initial overheating by inserting extra shot, the winch has been an unqualified success. We have already launched a T-21 to 1,500ft and winch drivers are volunteering for duty now instead of trying to evade what was once a chore.

We are introducing a new type of progress book along with a colour grading scheme necessitated by the growth in membership. With about 170 flying members and 32 instructors some loss of personal contact is inevitable. Our instructors will be able to tell at a glance how long a pupil has been a member, his proficiency, whether he is solo or cross-country standard, etc.

A new syndicate has been formed owning a T-21. Tom Rudge, a prominent figure (literally) in the group, has vowed to devalue everybody else's Silver C by doing all of his in this machine.

R.J.H.

LONDON — bank manager provides promise for 1972

AS with most clubs, the winter period has been a case of recovering from the last season and preparing for the next. Our entire launching gear has been overhauled, largely by the efforts of Geoff Naylor and Don Gerrard, and we start the season with three fully operational two-drum winches. The clubhouse is also scheduled to undergo substantial repair work, the loos and drains high on the priority list!

Thanks to a cooperative Bank Manager and the current Government, substantial long term loans have permitted us to go ahead with purchases of various aircraft, and the season will begin with four two-seaters and five K-8's, plus three tug aircraft. The major item was the purchase of an almost new 180hp Rallye Commodore. All courses will now get a high proportion of aerotowing, especially in the initial stages, which is expected to progress pupils quicker with less frustration. The Commodore will have radio fitted, so that gliders on tow can contact the pilot up front. All in all, this year promises to be the first time in the club's long history when it could be honestly said we have a full quota of aircraft and launching gear.

Dave Paton recently gave up the post of workshop manager, and has branched out on his own under the name of Chiltern Sailplanes Ltd. Peter Whatford has stepped into Dave's shoes.

Our annual dinner in mid-February was attended by about 120 members and guests. The principal guest was Naomi Christy, who told us much of the trials and tribulations of working at the BGA. I think all of us will check very carefully, in future, any forms sent to Artillery Mansions! We also appreciate her efforts in convincing the powers that our airfield is not just a pasture with a large hole in the middle! The evening finished with a dance, appropriately led by an electronic group called "Night Flight". The Commandant of Luton Airport, another of our guests, was obviously enjoying himself, and this we trust will be reflected in our future associations on the thorny matter of local airspace.

M.P.G.

MIDLAND — no bungeyed tea-trays

WE finished 1971 with a record 10,000-plus launches, but this year opened with a succession of unflyable weekends. Deprived, this mild winter, of being bungeyed on tea-trays across the frozen dew pond, or of finding new toboggan runs, members took to the pubs at the foot of the Mynd rather than the air above it.

When at last in mid-February we had the first strong westerlies, Bill Sykes in his Foka celebrated by a rapid climb of 9,500ft from a pre-breakfast launch, and Lloyd Forsey flew his 5 hours in a mixture of hill-lift and wave.

The first two numbers of Don Brown's MGC Newsletter, first mooted at the AGM, have now been circulated. They have been well received, and are providing an additional line of communication for a geographically far-flung membership. (How wide are catchment areas in gliding? For a "Midland" club, situated within sight of Wales, we seem to have an uncommon number coming with fair regularity from as far afield as London and from well north of the Mersey—not to mention the Aberystwyth contingent and the honourable member for Vale of Teifi.) W.J.T.

OXFORD — 12 years a secretary

A UNIQUE club record has been achieved by Arthur Speechley. Until the AGM last November he was honorary secretary for over 12 years. There is no trophy for this fine service but we are all very indebted to him for his frequent thought provoking arguments and continuous efforts in many directions for the furtherance of the club. We wish him enjoyment in all the other interests he hopes to pursue.

The new club secretary is Norman Woodward, an enthusiastic member and instructor of long standing.

A vote of thanks must also go to Dave Roberts for his extended time as CFI. The helm is taken by Mike Randle who will no doubt be ably assisted by his wife, Jane.

The Simpson trophy was awarded jointly to Trevor Moss, our vice-chairman, and David Lidbury for their momentous Diamond goal flights last summer, the first ever from the site.

Excellent progress has been maintained during the winter to complete three out of four Cs of A on club aircraft by the end of January. C.J.T.

PETERBOROUGH & SPALDING — on the map

LITTLE did I realise, when we christened our club quarterly newsletter "Turning Point" how appropriate this title would prove to be. Since our last notes the fleet has expanded 25% and now comprises two tug aircraft, Bocian, Capstan, Skylark 2, 3 and 4 and a M-100s; we are also contemplating adding another Bocian at a future date.

Our airfield, marked Crowland (in Lincolnshire), is on the latest air map, so we look forward to visits from a few of you this year. Mid-week flying on Wednesdays will be a permanent feature this spring and summer, and three combined soaring and training weeks have been scheduled: May 15-19, the last week in July and the first week in August.

The club's second annual dinner-dance on January 26 was very successful with 88 sitting down to dinner, and nearly 100 attending the dancing afterwards. A buffet-dance is scheduled for late April.

Furthering our value-for-money attitude to gliding and flying in general, three more of our qualified senior pilots will be attending BGA assistant instructors' courses within the next six months. As a relatively new club (18 months old) on aerotow only operations, with a very successful pre-bookable flight system in operation, we realise how important it is to give *ab-initio* pilots the correct training, etc, thus retaining their interest and enthusiasm and their support for club expansion. J.V.L.

SCOTTISH GLIDING UNION — landing on Loch Leven island

OUR usual autumn invasion from the South took place in October. The weather for our visitors was rather variable but some good wave flying was had.

Since then the club has obtained a

A long wet retrieve—Loch Leven, winter 1971-72. Photo A. Sambale

second Olympia 463, sold the Tiger Moth and is hiring a Condor for tugging. But there is a reduction in the number of our club solo aircraft following the loss of our second Swallow (see p120).

It has been done at last—a landing on St Serf's Island in Loch Leven. It can be done without damage to glider or pilot, but it is not recommended, except in emergency. Needless to say, the retrieve was somewhat lengthy. As there was a high wind blowing on the day of this event, getting a boat over to the island was an achievement. It took 3½ hours, since it necessitated getting a boat and boatman out from Kinross. The glider was not retrieved until three days later, when a raft had been constructed.

The bedrooms in the club rooms have been redecorated and carpeted—an improvement which we hope everyone, members and visitors alike, will appreciate.

Ab-initio courses start in April and continue through to the end of September. There are still a number of vacancies available for the courses. K.E.B.

SOUTHDOWN — two-seater blown over

A RATHER dismal winter's flying has been lightened by two good northerly days, although the number occupying the ridge on January 1 was limited by poor visibility. However, Bill Nicholson completed his Silver duration in the Swallow. Twenty-five knot north-easterlies on January 29 gave us bungey launches in the early part of the day and good ridge soaring. The day was marred by the loss of our T-21, blown over by an exceptional gust at 90° to the day's wind, despite two in the cockpit and five others hanging on. The only injuries were sustained by Gordon Newberry who abandoned his position by the nose from 10ft up, bruising his legs. The aircraft was written off and we await a replacement.

A very successful barn dance was held on February 5. The next event in the social calendar is the annual dinner-dance on April 14 at which we shall be glad to see our friends from other clubs. Details from Joyce Head.

The club 460 and several syndicate aircraft have planned an expedition to Portmoak in March in search of the wave. K.I.P.M.

SOUTH WALES — record year

THE AGM was held at the RAFA club in Cardiff on February 8 when Dennis Bryan was elected chairman with David Fletcher and Hugh Evans filling the posts of secretary and treasurer respectively. Danny Roberts has the unenviable job of CFI. This is the same team that took us through a record-breaking 1971 with more launches, first solos, Silver C's and cross-country kilometres than any year before. At this rate 1972 should produce some "home-grown" Diamonds!

The club trophies were presented by Lord Raglan at the annual dinner-dance in Caerleon. The club ladder trophy went to Andrew David, the Ivor Shattock trophy to Adrian Thomas and the cross-country cup was won by Ivor Shattock. S.P.P.T.

STAFFORDSHIRE — on moving to Morridge

DURING the winter months several teams have been active in preparations

for the move from Meir to our new site at Morridge. In the hangar, a new winch and a retrieve winch are being prepared, while to encourage and sustain site workers, a single-deck bus has been converted to a mobile canteen and dining room.

The bus was driven on site on the first Sunday in 1972 and at the end of the day, our own Master Chef, Bob Wilshaw, prepared a piping hot meal for everyone followed by many cups of strongly fortified coffee. As a result, a warm and optimistic atmosphere developed rapidly.

Our fund raising committee is also very active. It has planned a series of events for 1972 and is confident that last year's totals will be exceeded by a handsome margin.

Boris Clare will be organising our course to be held from May 22-26. We hope he will manage to lay on a supply of good weather as usual. C.J.R.

SURREY & HANTS — spending spree

OUR Skylark 3F has been sold to the Avro club and now graces the air of Denbighshire and Cheshire.

Much money has been spent on a new fleet of parachutes and barographs with some spare ones to cover repackings and calibrations.

Some of the Bronze C pilots are at Camphill for a week's expedition under the eyes of Tony Hayes—good experience for autumn wave camps.

We'll be after the pots again this year judging by the lines appearing on maps. C.D.L.

WYCOMBE AIR PARK — dull and drizzly

CONGRATULATIONS to our CFI Norman Smith on completing his Gold badge and on his Diamond goal flight. We've heard of pilots who go to Portmoak and to Shobdon to collect these treasures but Australia really!

Unlike last year it has been a disappointing start to the season, most weekends have been dull and drizzly; just bad enough to keep us grounded.

We are having our annual buffet-dance on Friday, April 28 at the West Wycombe Village Hall with the band of Philip Whiteman & his Jazzmen.

K.W.W.

YORKSHIRE — soggy three months

AFTER what must surely be the soggiest three months on record, soaring conditions returned over the weekend of February 12-13, supplying enough thermals and wave to lift everybody's spirits. It has been a time for overhauling the club gear and fleet, and the Swallow now has a new streamlined canopy and re-covered wings. Our second tug, a Beagle Terrier, has arrived and we anticipate a big demand for this and the Piper in the ensuing months.

We welcome Mike Wood, who has joined the permanent staff to assist our CFI, Henry Doktor, in instructing and tugging. S.V.G.

SERVICE NEWS

CHILTERNS (RAF Abingdon) — good cross-countries record

WE are in the depths of winter here, but now have a warm cosy clubroom, with all facilities attached, so lectures and talks fill in the time when the elements keep the hangar doors firmly closed.

At present the Club is without a two-seater as the K-4 is undergoing major servicing and recovering and our beautiful Bocian has been sold—exiled north of the border. We now eagerly await the delivery of a new K-13 in the near future. At the moment we are relying on the RAFGSA Centre at Bicester who have kindly lent us one of their two-seaters.

Despite the tragic fire which destroyed our entire club fleet in 1970 we can claim to have the maximum number of kilometres flown per hour in the RAFGSA. The figure works out to almost eight kilometres per hour flown and this can only be bettered (using BGA Annual Statistical returns) by the Polish Air Force Association (Lasham) and Surrey & Hants in the whole of the UK.

By the time this is published the club should have completed its first expedition of the year to Sutton Bank. We anticipate two weeks of looking down on continuous lenticulars—we're all optimists at heart! D.R.

CLEVELANDS (RAFGSA) and HAMBLETON (BGA) — summary of 1971

THE year 1971 was a reasonable one for the Clevelands and Hambleton clubs at Dishforth. The tug was away for C of A from July to Christmas and the ground equipment played-up a bit, so launches weren't always what one would have liked. Fortunately we were able to get a Chipmunk across from Leeming quite often. Dishforth is quite susceptible to mist and fog so November was a clamp-out; one Sunday we managed 14 auto-towed circuits of the peri track in the Primary.

We have had wave flights on and off all summer but the winter wave returned in all its glory on December 5 and 11. On the 5th, five pilots flew a total of 650km out-and-return in 15 hours flying time at 7,000 or so feet in the Blanik, K-6E, Pirat and Cirrus. On the 11th, six solo and four dual flights covered 840km in 25½ hours. Deputy CFI, Bob Beck, got his Diamond with a climb to 18,500ft in the Cirrus, and Gp Capt Brian Plenderleith took the K-6E to 13,500ft to get his Gold height. In the Olys, Bill Wintrip got all three Silver legs in one flight and Mike Robinson achieved Silver duration and height. Also worthy of note is Tom Drake's progress to Silver C in some 30 hours from April to November.

By the time you read this Sam St Pierre, club wave pilot *par excellence* and treasurer for several years, will have left the Service. Sam has done a great deal for the Club and has put Dishforth on the map as a springboard for wave cross-countries. Many thanks and the best of luck, Sam.

On the comforts front, the bar has been beautifully refurnished by members led by David Wass, Neil Burkenshaw, Geoff Morris and Bar Officer Colin Aber.

Dereck (Debbie) Reynolds and Alistair Arnold have worked very hard for months on the winches. We now have five, including a two-drum model converted from a single-deck bus by Reg Watson and Ray Harrison. M.I.O.

CRUSADERS (Cyprus) — combined ab-initio and instructors' course

THE Swallow major C of A was completed in record time and the year got off to a fine start. A combined *ab-initio* and instructors' course was held during January and a number of pupils gained their A, B or Bronze C qualifications.

Several of our members have recently departed for the UK or are shortly to do so; our thanks and good wishes go to Don Carey, John Dennis and previous club scribe Gordon Camp. F.P.G.

CULDROSE (RNGSA) — winch installed at Land's End

WE didn't do very much at all in 1971. Twenty first solo's, a couple of Bronze C's completed and Bob Green and Arthur Brooks claimed a Silver height each on the same sea breeze front. Arthur then executed a neat 91km to Tavistock in 1hr 10min for the distance.

What have we got to fly? Well, there's a Skylark 2 and 3F, Olympia and two Capstans. The other necessities consist of a Chipmunk, reverse pulley and two Mk 9 Jaguars. There are plans to visit a few other sites, run a couple of *ab-initio* courses (when operational helicopter flying permits), collect a few badges and earn lots of money.

All pilots are welcome at Culdrose but please check in as a bona-fide glider pilot at the airfield gates. On your final glide into Culdrose to complete your 300 or 500km distance we will accept a brief introduction on 130.4. Unfortunately, this only happens at weekends.

A winch will soon be installed at Land's End (St Just airfield) so if you feel like surveying the beautiful Cornish coast from the air call in sometime.

With the wind north of west it is possible to beat along nearly 25 miles of cliff from Land's End to St Ives. All this is by kind permission of Vic Bellamy of Westward Airways (Land's End) Ltd, who has now fitted a hook to his Cessna 172, but here's good advice—get a check ride first! P.W.

EAST MIDLANDS (RAF Swinderby) — wave in Lincolnshire

GLIDING at Swinderby is alive and well despite rumours from the "other club"! The CFI is Dave Cockburn; and the new chairman is the Station Commander, Gp Capt Kilduff.

The fleet comprises a T-21 (or K-4), a K-8, a K-6E and private Oly 1. We are still awaiting our K-13 which we lost in March '71.

On Christmas Eve, the CFI logged 24 minutes in the T-21, after a 2,300ft winch launch and climbing to 3,200ft (in wave?)

The New Year saw the loss of our aircraft member Gerry Wallace (to Germany), and our MT member Alf Newton, posted on promotion to Coltishall. Both have worked very hard to keep aircraft and vehicles serviceable.

On January 15, a party was organised for "summer pilots and forgotten friends". It served as a pre-AGM get together and was very successful with 43 people present.

The first solo this year was Pete Ramage. At this time, Pete Hatton will be on his Instructors' course. We welcome Roger Staines (who has been a Full Cat and a CFI) after his return from Goose Bay. We say goodbye to Pam Davies in March when she leaves with her husband for the Odiham area. Pam has been an example of a lady pilot always doing more than her fair share of work. We shall miss her cheerful face on the field. THE BARON

FULMAR — club magazine being produced

THE wave remains elusive but we progress elsewhere. Jeff Howlett has a share of an Olympia 2 and Bob Kerr of the Highland Club has bought Don Hanson's Dart. The HGC have been operating their Swallow to good effect and have a T-21 on the way. A pulley system providing self-retrieving launches will be in operation soon for both clubs.

Although snow has impeded car launches on some weekends our winter launch rate remains very satisfactory. The first edition of the Club magazine

"Fulminations" has left the printers and will become a regular feature providing information and advice to all members.

M.R.

HERON (RNAS Yeovilton) — chairman's death

IT is with a deep sense of loss that I report the death of our chairman, Commander Simon Idiens. Cmdr Idiens was respected in all circles and was well-known as leader of "Simon's Sircus", the Navy aerobatic team. He died when his Phantom aircraft crashed into the sea off the Cornish coast.

The traditional Easter task week will be held over the Easter weekend this year and will, unfortunately, be condensed into five days. This is due to a commitment to fly jet aircraft over the remaining leave period.

D.R.B.

RAFGSA CENTRE (Bicester) — flying scholarships

AFTER a lengthy absence from these columns our return is appropriately highlighted with the achievement of Andy Gough, our CFI in winning the South African Standard Class Nationals. At the same time Andy and Con Greaves took the team award.

Additions to the fleet this season include an AV-36 (Fauvel Flying Wing), and an Oly 2B owned by two of our USAF members. The money to buy the AV-36 was donated by the PSI RAF Brize Norton. The aero-tow section has been strengthened by the acquisition of a PA-19 (Cub). It is probable that two Kestrels will be operating here later in the year. The BS-1 is now owned by John Monteith, who having completed his Gold C recently must be a strong contender for the first 500km from Bicester.

Recent achievements by other centre members include a completed Gold C by Charles Shard, while Gerry Breen and Mick Drury have won Phillip Sassoon flying scholarships on passing out from RAF Halton. George Young received the Novices award for 1971; and honours for the first soaring flight in 1972 went to Tony Simms with 57 minutes on January 30.

The programme this year is well under way and the first *ab-initio* course, al-

though bedevilled with bad weather, produced three solos with others well on the way to that standard. Our much improved mobile canteen keeps Betty Burgess hard at work coping with the large numbers of hungry and thirsty members; she is looking forward to seeing many familiar faces when the Junior Inter-Services Competitions take place here in May. A.E.B.

SOUTHERN COMMAND (Upavon) — changes in club officers

UNHAPPILY, our first task in 1972 has been to say goodbye to our retiring CFI, chairman, and technical member, Major John Evans, MBE, REME, who left England on February 7 for South Africa where he has obtained an interesting post in Port Elizabeth.

John's commitment to gliding has been of particular use to this Club which was started 10 years ago by his obtaining a £50 grant from the Army. The original fleet of a T-21, Tutor and Olympia 419 has grown to two K-13s, a K-4, Skylark 2 and 3, T-21, T-31 and K-6E. His hard work in maintaining these craft and his wife's patience are greatly appreciated, and our sincere thanks and best wishes go to him and his family.

We welcome our new chairman, Major Donald Scarfe, previously vice-chairman of the Army Gliding Association. Eric Drummond, our new CFI, will be backed up by Lt Col John Welch as technical member. Capt W. Lombard has succeeded Major Peter Goldney as treasurer and we thank the last named for his service.

By the time this is in print we hope to be installed in our new home at Upavon. J.A.

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