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QUARTERLY

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GLIDING

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Cover Photograph.—The Slingsby "Sky" high-performance sailplane.

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Adventure in Safety

"SAFETY FIRST," wrote Lord Mottistone, "is a vile motto . . . soul-destroying, a pestilent heresy which will rob the race of man of all incentive." But these words were written at the end of a long life, not the beginning of a short one. To judge by his autobiographical books alone, with titles such as "Adventure" or "Fear and be Slain", it was a miracle that he survived to write them; maybe the truth was that his conscious mind handed over the despised motto to his subconscious, which took very good care of it.

Safety and Adventure are not opposites, or even incompatibles. The proper attitude to safety measures is to use them, not as a curb upon adventure, but to remove the worry from it and thus leave it free to be enjoyed to the full. When Francis Chichester crossed the Timor Sea in a single-engined light aircraft, he could sit back and enjoy it because, he said, he had done everything possible to have his plane in good order and taken every precaution in the event of trouble.

Gliding has something to offer to suit all comers, from the timorous to the adventurous; in fact, there are people who use it as a means of transfer by easy stages from the first class to the second. There have been clubs whose members obtained such a thrill from low hops on their Primary trainer, that they never wanted to progress to anything more ambitious. There are others, at a more advanced stage, whose attitude to a day's outing at a gliding club reminds us of a passage from our favourite essay of Hilaire Belloc's—the one "On Railways and Things," where he describes how two London men decide to go sailing :—

"They left London in a nice warm, comfortable, rich-padded, swelly carriage at four, and before dark they were letting everything go, putting on the oilies, driving through the open in front of it under a treble-reefed storm jib, praying hard for their lives in last Monday's gale, and wishing to God they had stayed at home—all in the four hours."

Nowadays most sailplane pilots could only achieve this state of mind by flying into a thunderstorm; normally they set out on a flight with no more emotion—at least to outward appearance—than when starting for a walk, a drive or a ride. But all, whatever their temperament, should read the two articles on Safety published in this issue; the one by "Delta" suggesting schemes for safety prizes, and the other on the work of the B.G.A. Accident Analysis Panel. They may even feel inspired to have a go at the three-guinea prize for an article on Accident Prevention, announced in the B.G.A. News section.

The rewards which gliding has to offer to its devotees can all be secured as easily with safety as without—and more frequently. We feel sure that even Lord Mottistone, if he were alive today, could derive full spiritual satisfaction from it in safety without destroying his soul.

Two Favourable 300-Kilometre Routes

by M. R. Chantrill

Bristol Gliding Club

THIS island, being a very small place, presents well-known difficulties to straight-line flights of a distance which is presentable by modern standards. Added to these is the difficulty of fitting a 200-mile track to a stretch of country which can be regarded as "good" thermal country. While some Continentals can soar this distance over unchanging terrain, we are hindered by inaccessible mountains, fenland, and vast, smoky industrial areas, all in comparative juxtaposition. Further, since our prevailing airstream is from a generally westerly direction, conditions will most frequently dictate a flight in an easterly direction.

Thoughts such as these must engage all those glider pilots who buy themselves a map large enough to plan a flight of "Gold C" distance.

In considering the matter from the aspect of a start from my habitat in the Bristol area, it struck me that those of us in this part of the country live at the right end of possibly the only two strips of country which meet the requirements discussed in the first paragraph. Recognition of the fact that these are probably the easiest routes along which to fly 300 kilometres prompts this article, for circumstances are such that anyone can quite conveniently get himself launched here at any time and so exploit the routes.

The accompanying map shows the suggested tracks. These were drawn in conjunction with a geological map with the aim of keeping over chalk or sandy soils. It is a coincidental and happy feature of the tracks that they lie so close to several pleasant centres of gliding activity. The starting point in each case is the tip of a promontory north of Weston-super-Mare, known as Sand Bay Point. This is chosen as being readily recognisable by the tug pilot, who would have to "officially observe" the place of release.

Different pilots will have their own ideas on how to fly these routes. My own idea would be to try to get airborne on tow soon after 10 a.m., having solemnly declared Coltishall as my goal. The climb and delivery to Sand Bay Point would probably take about half an hour, the aim being to arrive over the Point at 4,800 ft. Having released, one would turn and glide quietly inland until meeting the morning's convection currents. From this height and in a sailplane and wind suitable for a long flight, both Lulsgate and Whitchurch aerodromes are within comfortable reach if one has started too early and no lift is found. By now it would be 11 o'clock and therefore time for one more similar start—but only one if the full distance is the object.

A note on local conditions might well be inserted here. We at Lulsgate have frequently noticed that in unstable westerly and north-westerly winds early cumuli form evenly all over our local sky, including to the west of us—close to the sea. After mid-day the sky clears completely and all the cumulus growth begins about 20 miles downwind.

Assuming that one "connected" somewhere on the way back from the first tow, Roundway Hill provides the best initial goal. Not only is the direct route there the shortest crossing of the belt of anti-thermal country, but the hill itself might save the day if one is brought low by the bad country.

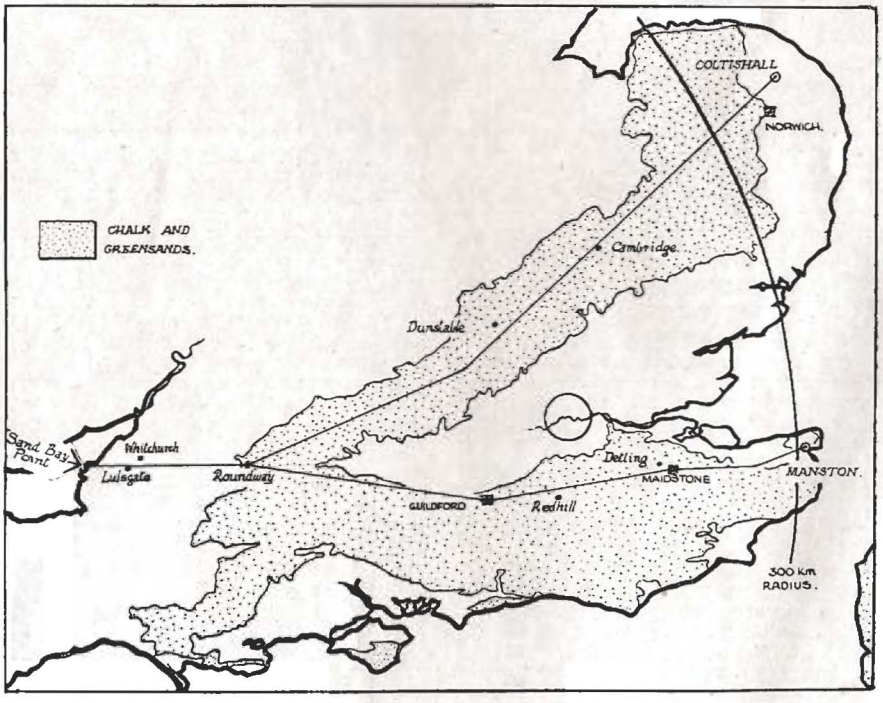
Roundway is also the place to take stock of progress made so far. Assuming that a maximum of seven hours is available for the trip, Roundway must be reached in not more than 83 minutes, or the average speed is inadequate to get to Coltishall. Depending on how long this leg of the course had taken and how feasible it seemed to make good a track N.E., one would now decide which way to go.

The southerly route diverges to Guildford which town should be readily identifiable. Then on past Redhill (for recognition don't reckon on seeing sailplanes on the ground!) to Maidstone, Canterbury and finally to Manston aerodrome. This should qualify for "Gold C" distance, but requires a ground speed of only 27 m.p.h. if seven hours are available.

The northern route is more exacting but offers bigger rewards. The route from Roundway is to the north of Marlborough, over Lambourn's railhead to a large "island" formed by railway lines between Thame and High Wycombe. From here the route is straight and passes the doorsteps of the London and Cambridge Clubs where, if the flight failed, one could land and pretend to have made a social goal flight. However, this is good thermal country and things ought now to be going quite well. If things go so well that one gets as far as Coltishall, then not only is "Gold C" distance and one leg of a "Diamond C" in the bag, but the British Local Goal Flight Record as well. The route requires a minimum of 31 m.p.h. groundspeed throughout the trip.

Because, given an early start, it is possible to remain airborne for seven hours, and because the average speeds required are really within the abilities of practically anyone who can fly cross-country at all, either scheme seems to me to be very feasible. Local aero-towing can be had on any day except Mondays, which fact, added to the other merits of the routes, should encourage some of the more determined seekers of gold.

It is curious how, when planning a flight such as this, the matter appears to become so straightforward that one begins to feel that actually flying the route is a mere formality. It is fortunate that nothing is more contrary in practice.



Correspondence

HANDICAPPING OF GLIDERS

Dear Sir,

I feel that the article by "Delta" in the Number 4 issue of GLIDING needs a reply.

The comparisons which he makes with sailing and the methods employed in the handicapping of boats are not directly applicable to gliders. In sailing the standard of helmsmanship is very high and the moderate man is only slightly worse than the best. Because of this the performance of the boat is of extreme importance, and so in order to get good racing either the boats have to comply to the rules of a particular class or they have to be handicapped very accurately. In gliding, the position is very different; the quality of the pilot is of far more importance than that of the aircraft, and a good pilot on a moderate glider will always beat a slightly worse pilot on a better aircraft. It therefore follows that the handicapping of gliders is not of nearly such great importance as it is with boats.

The introduction of one-design classes of gliders would be a retrograde step at the present time; it would stifle development, not only of gliders but also of their equipment. One-design classes are only satisfactory in a particular sport when there is sufficient background of experience to show what are, and what are not, the desirable qualities which the boat, car, or whatever it is, should possess. Competition flying in gliders has not yet reached that stage.

Delta's suggested method of handicapping seems wrong. He takes a Performance Factor:—

$$j = \frac{\text{Best gliding ratio x speed for this}}{\text{Minimum sinking speed}}$$

and says that this gives a fair approximation of the competition value of a glider. Now, since the minimum sinking speed is very little different from the sinking speed obtained when flying at the best gliding ratio, this expression can be rewritten with a fair degree of accuracy as:—

$$\frac{\text{Best gliding ratio x speed for this}}{\text{Sink at best gliding ratio}}$$

which equals (best gliding ratio)^2

This would appear to be unfair, since a glider with a ratio of 29 (Weihe) would have a factor of 840, while one with a gliding ratio of 25.5 (Olympia) would have a factor of 650. In other words, a flight of 100 miles in a Weihe would be equivalent to one of 77 miles in an Olympia. This handicaps the high-performance glider unduly. Surely it is more logical to say that the competition value of a glider depends directly on its gliding ratio, and not on the square. For example, when considering distance flying, the distance divided by the gliding ratio gives a measure of the total height which the glider must climb. Working on gliding ratio for a 100-mile flight in Weihe (1 : 29) the Olympia (1 : 25.5) would have to go 88 miles.

Delta says, quite rightly, that it is impossible to handicap a glider on its performance figures, and then attempts to produce a rating based on the physical dimensions of the glider. His rating:

$$\sqrt{\frac{\text{all-up weight x span}^2}{\text{wing area}}}$$

can be rewritten as :

$$\sqrt{\text{all-up weight x aspect ratio}}$$

To pretend that this is in any way proportional to the gliding ratio is manifestly absurd, since the gliding ratio is independent of the weight; it depends purely on the shape of the aircraft.

However, it can be shown that the gliding ratio depends on the cleanness of the glider and the square root of the aspect ratio. The cleanness of the glider cannot be easily assessed, but the aspect ratio can. It would appear that this is a reasonable basis of assessment.

If one accepts these two arguments: (1) that the gliding ratio should be the main consideration for handicapping and (2) that the square root of the aspect ratio gives a measure of the gliding ratio, a simple method of handicapping is possible.

There are two alternatives: (a) to give each glider a rating based on the square root of the aspect ratio, or (b) to divide gliders into various classes. Method (a) is theoretically superior but it does introduce complications in marking; (b) is easier to apply, and for this reason was used in last year's competitions. Gliders with aspect ratios of more than 17 (Weihes) were

scratch, those with aspect ratios between 17 and 14 (Olympias, Mu-13, etc.) received a 10 per cent. bonus, while those gliders with aspect ratios of less than 14 received 25 per cent.

As far as I know, none of the competitors objected to this method of handicapping; it worked well, and competitors were able to work out their own marks for themselves without any difficulty. Is this not sufficient justification for continuing with the present system until it has been proved to be unsatisfactory?

LORNE WELCH,
Surrey Gliding Club.

JAMBOREE

(The following correspondence arises out of a communication from Mr. C. A. Kaye, entitled "For Fun or for Glory," published in No. 2 issue of GLIDING, *page* 115, *on which Mr. Charles Ellis commented in No.* 3, *page* 144. *As Mr. Kaye's reply just missed our last issue, he has consented to its being published here together with Mr. Ellis's further reply.*—ED.).

Dear Sir,

Either my letter on this subject was badly phrased or your correspondent Mr. Charles Ellis has missed a point or two. Clubs do hold very enjoyable Jamborees; in fact, most of Club life is nothing but Jamboree because that's the way their members like it, and the function of the B.G.A. is to encourage the type of flying which the Clubs enjoy and not to push the high-performance boat out. H.P. stuff is magnificent but it is not the stuff of which good Clubs are made —and it is the Clubs who form the B.G.A. not vice versa.

The essence of the gliding movement is community effort—everyone works so that everyone can have a go—but the high-performance racket is inherently selfish—my machine, my launch, my flight, my marks, my retrieve, someone to do this and someone to do that, all based on the curious idea that amateur gliding can operate on the R.A.F. and power-flying principles that there are those who fly and lower orders who work. That is the closed shop, Mr. Ellis.

The question of shamateurism *is* another matter and the time must come when the futility of amateurs competing against professionals under amateur rules is recognised. The distinction between the two classes in any sport is not difficult—a professional is a man or woman who earns his or her living by means of the activity in question (flying, in this instance) or any of its ancillary activities. An amateur ceases to be an amateur when he or she receives any payment in cash or kind, directly or indirectly, for participation in that sport.

Thank you, Sir, for the opportunity to make this point.

C. A. KAYE.

Dear Sir,

It was with some concern that I first read Mr. Kaye's article in your Autumn issue, and I hastened to write to you because I did not think the British Gliding Association should be accused of foisting unwanted competitions upon the gliding community.

I still maintain that the B.G.A. is not needed to run Gliding Jamborees and if, as Mr. Kaye now says, "club life is nothing but Jamboree," surely the intrusion of the B.G.A. into this activity would be most unwelcome? I'm sorry to see that he has been unfortunate in some of his gliding acquaintanceships, but relieved to find that this "closed shop" is not of B.G.A. manufacture.

Whilst I am gratified for the definition of professionalism, still I do not think it is quite as simple as that. For example, if we interpret ruthlessly Mr. Kaye's rather sweeping (but probably logical) definition, we are likely to find that there are at least as many, if not more professionals in the British Gliding movement than in the European. Which is not what he said in his original article—hence my doubts about the possibility of producing a universally acceptable definition.

Finally I should like to give a word of warning against thinking that the B.G.A. consists solely of "The Clubs." At the last Annual General Meeting the members of the B.G.A. decided to broaden its constitution so as to make it fully representative of all forms of gliding activity in the country. The result is that, whether we like it or not, the B.G.A. cannot ignore the requirements of the Service gliding organizations.

CHARLES ELLIS.

YE OLDE TYRNE AND BANKE

Dear Sir,

We have read with very great interest your Winter Edition of GLIDING.

Under "Instrumental History" may we be permitted to correct the possible impression that Mr. Philip Wills's Turn and Bank Indicator had to be discarded through unserviceability? This instrument is one of the first electrical types produced and although by present-day standards is out of date, it is still capable of very many hours accurate service. After an absence of 16 years from the manufacturers the only deficiency was that of oil for bearings and pivots.

With reference to Mr. Philip Wills's article on the World Championships, we would respectfully suggest that the answer to icing of pitot heads used in conjunction with Turn and Bank Indicators is to throw the head away and rely upon electric gyroscope fed from dry batteries.

p.p. R. B. PULLIN & COMPANY LIMITED
H. M. WHITCOMBE,
Manager—Sales and Contracts.

APPRECIATION AND AERODYNAMICS

Dear Dr. Slater,

Your winter number of GLIDING just arrived in the mail. I want to take this opportunity to tell you and your associates what a fine contribution to motorless flight your magazine is making. Your good work will, however, merely put more pressure on you to make it a bi-monthly and then a monthly.

I was particularly interested in Philip Wills's evaluation of the World Competitions. His appreciation of the work of "cleaning up" which Paul MacCready had done on the Weihe should go far in emphasising the importance of flight performance measurement and the aerodynamic evaluation of flight tests in your movement.

As an example of performance measurement of flight I would like to offer a little tit-bit. In Philip Wills's description of the Slingsby T-34, Mr. Wills estimates the loss in glide ratio due to the single wheel on the sailplane as 1 or 2 per cent. We recently made a measurement of a sailplane, the Krohne Comet modification of the Laister-Kauffmann, and found its minimum drag coefficient to be 0.003 less than that of a similar ship without a retractable wheel. In other words the percental improvement in drag coefficient due to removing the wheel is about 20 per cent. Although this 20 per cent. improvement in drag coefficient means only a 10 per cent. improvement in glide ratio, Mr. Wills himself points out in his article on the World Competition that 10 per cent. is not to be scoffed at. Especially not when one considers that there was only a 2 per cent. difference between first and second place at Orebro.

We in the Soaring Society of America have been striving to reduce the drag coefficient and improve the effective aspect ratio of our sailplanes. That we are succeeding is well demonstrated by the Ross-Johnson 5, which attained a glide ratio of 36.5 and which had a minimum drag coefficient of 0.0108. Dick Johnson hopes to reduce the drag to even a lower value for this summer's flying.

Your readers and sailplanists may criticize us for not sending more of such findings to them. Unfortunately until recently there has been no organization through which we could exchange new concepts in the science of low-loss aerodynamics (sailplane aerodynamics aims at minimum losses). We now have such an organisation in OSTIV and we hope all member nations will enjoy the benefits of a healthy exchange of research data.

AUGUST RASPET,
Chairman,
Scientific Section, OSTI V

Pullin Appointment

Messrs. R. B. Pullin & Co. Ltd. announce that Ft. Lt. R. T. Townson has joined their Sales Department as from January 1st, 1951, as Sales Engineer. Reg. Townson served in the Technical (Signals Radar) Branch of the R.A.F. until 1945, when he retired to specialise in the aircraft instruments field. Although working on the Continent for the last eighteen months, he is already well known in the British Aircraft Industry, and will be furthering liaison between his Company, the Service and the many users of Pullin equipment.

Performance Tests by B.G.A. Flight Test Groups

by F. G. Irving, M.Eng., D.I.C.

PERFORMANCE tests of the Weihe, Olympia Eon and Gull IV sailplanes have been carried out as part of the contract placed with the British Gliding Association by the Ministry of Supply for the flight testing of a number of British and foreign sailplane designs. The present report is a summary of the individual reports submitted to the Ministry of Supply on the above aircraft.

These performance tests were carried out by Nos. 1 and 3 Flight Test Groups as follows:—

No. 1 Flight Test Group (Redhill): Weihe and Gull IV.

No. 3 Flight Test Group (Bristol): Olympia Eon.

Object of the Tests

The object of the tests was to obtain a curve showing Equivalent Rate of Sink (i.e. $V_s \sqrt{\sigma}$ analogous to Equivalent Airspeed) as a function of Equivalent Airspeed V_i, at a known weight.

Description of the Aircraft

The condition of the aircraft and the weights at which they were flown during the tests are given below. It should be noted that the latter figures differ from the maximum permissible all-up weights.

WEIHE, B.G.A. 448.—A standard Weihe, built in Germany in 1943. The wing root gaps were left unsealed and the jettisonable undercarriage was not in position during the tests. The weight at which it was flown during the tests was 759 lbs., the C. of G. being at 27.5 per cent. of the mean aerodynamic chord.

OLYMPIA EON.—Three Olympias were used. Two (Works Nos. 099 and 034) were Mk. II versions, whilst No. 012 was of the Mk. I type. These versions differ only in that the former has a built-in landing wheel whilst the latter has a normal spring skid. No sealing strips were fitted to the gaps around the wing roots, tailplane fairing or cockpit cover. The weight at which the tests were made was 618 lbs., but the curves are corrected to a weight of 630 lbs. (The maximum permissible all-up weight is now 670 lbs.).

GULL IV, B.G.A. 602, Works No. 545.—This was the second Gull IV to be built, and differed from the prototype in having larger dive-brakes and in being fitted with an elevator trim tab instead of an adjustable tailplane. Other differences were of a minor character. The junction between the underside of the wing and the fuselage was sealed with rubber strip. The weight at which these tests were made was 656 lbs., the C. of G. being 15.86 ins. aft of the centre-section leading edge.

Externally, all the aircraft were in standard condition and were fitted with the makers' pitot/static heads. The finish was in good condition, and all surfaces were kept in a normally clean condition but were not specially polished.

Olympia 099 and the Gull IV were flown in the 1948 International Gliding Contests in Switzerland.

Instrumentation and Position Error

In all cases height was measured by means of a calibrated Mk. XIV altimeter. The Weihe and Gull IV were fitted with extra-sensitive K.B.B. airspeed indicators, whilst the Olympias were fitted with Smith or K.D.G. instruments. All the aircraft were fitted with instrument-panel vibrators, in order to prevent the instruments sticking. All test instruments were calibrated.

Position Errors were measured using a trailing static. The corresponding Static Error Corrections to the altimeter are negligible.

Test Procedure

The majority of the tests were carried out in the early morning or late evening, when it was expected that the atmosphere would be least disturbed by convection currents. Even so, it was found that in all cases about 30 per cent. or 40 per cent. of the readings had to be discarded due to unsteady conditions.

All tests were made after the sailplane had been towed to 5,000 or 6,000 ft. by means of an Auster Autocrat. Air tempera-

tures were measured by means of suitably shielded thermometers mounted on the glider or the towing aircraft. Some of the temperatures measured at Redhill were compared with the corresponding upper air temperatures taken at Larkhill, and were found to agree within about 2°C.

Before take-off, the altimeter was set to 1013 mb. Partial glides were made at a series of trimmed speeds corresponding approximately to equal changes of lift coefficient. In the case of the Redhill tests, the usual height range for a partial glide was 800 ft., stopwatch readings being taken every 100 ft. The corresponding figures for the Bristol tests were 2,000 ft., and every 200 ft. Changes of variometer reading during a partial glide, or any rough air, were noted by the pilot.

Method of Reduction of Results

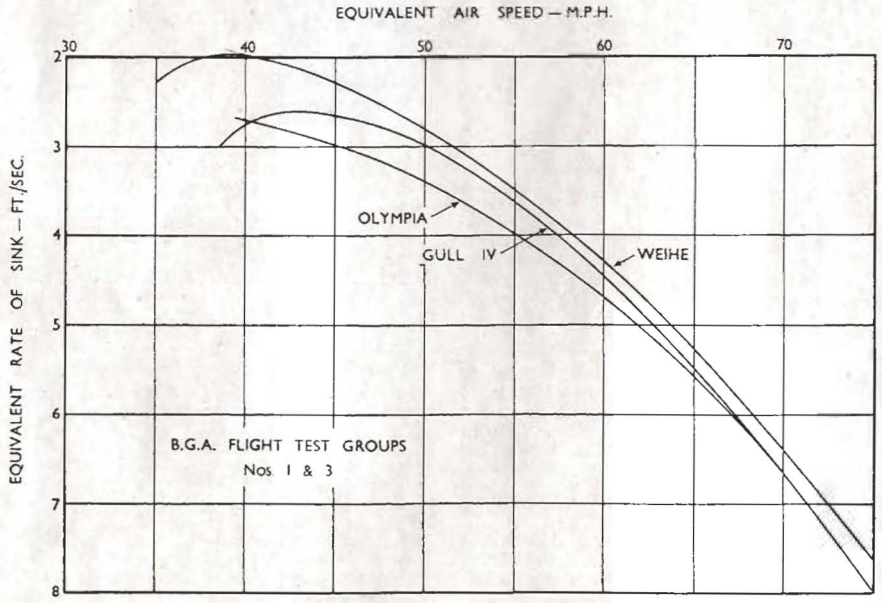
Having applied the altimeter instrument error correction, a time-height curve was plotted for each partial glide. The glide was considered satisfactory if a reasonably good straight line could be drawn through the points. It was discarded if the scatter of the points showed that conditions during the glide had not been steady. The gradient of this line was the "Altimeter Rate of Sink" corresponding to the mean pressure-height of the partial glide.

It may be shown that the temperature corrections to be applied to correct the observed figures to I.C.A.N. conditions are negligible (unless the actual conditions are most exceptional for this country). Hence, to a sufficient degree of accuracy, the equivalent rate of sink was obtained by multiplying the altimeter rate of sink by the I.C.A.N value of $\sqrt{\sigma}$ corresponding to the mean pressure height of the partial glide.

The corresponding values of the equivalent airspeed were obtained by adding the position error and instrument error corrections to the observed indicated airspeeds.

A mean curve of equivalent rate of sink vs. equivalent airspeed was drawn through the plotted points. In the case of the Olympia tests, the values of equivalent rate of sink and eqiuvalent airspeed were amended to apply to the aircraft at an all-up weight of 630 lbs., by multiplying the experimental figures by $(W_S/W_T)^{\frac{1}{2}}$, where

W_S = standard A.U.W. (630 lbs.).
W_T = A.U.W. on test.



The figures quoted for the Weihe and Gull IV apply to the weights at which they were flown during the tests.

The three performance curves are appended.

Conclusions

From the performance curves and the corresponding curves of C_D vs. C_L^2 the following values were obtained:—

Type	*Minimum Sink*	*Best Gliding Angle*	*Drag Coeff. at zero lift*	*Induced Drag Efficiency Factor*
Weihe	1.98 ft./sec. @ 39 m.p.h. E.A.S. (38.4 m.p.h. I.A.S.)	1 in 29.2 @ 42 m.p.h. E.A.S. (41 m.p.h. I.A.S.)	0.0160	0.92
Olympia	2.7 ft./sec.* @ 40 m.p.h. E.A.S. (40 m.p.h. I.A.S.)	1 in 22.5 @ 49 m.p.h. E.A.S. (50 m.p.h. I.A.S.)	0.0170	0.73
Gull IV	2.60 ft./sec. @ 42 m.p.h. E.A.S. (40.5 m.p.h. I.A.S.)	1 in 24.2 @ 45 m.p.h. E.A.S. (44 m.p.h. I.A.S.)	0.0187	0.85

* Figures relate to minimum speed of tests. True minimum rate of sink is probably a little less at a slightly lower forward speed.

A New Battery for Gliders

by A. H. Yates

THE artificial horizon is becoming more and more popular with cloud-flying pilots, but many gliders are not yet equipped because of the shortage of suitable instruments and the difficulties of power supply. One German combined horizon and turn-and-bank indicator is driven by alternating current from an inverter which is itself driven from accumulators. These accumulators are apt to be bulky and heavy and the demands on space and weight are so great that news of a lightweight battery is indeed valuable.

A new range of alkaline accumulators based on the silver-zinc reaction has recently been marketed by Venner Accumulators, Ltd. of New Malden, Surrey. These are much more compact and much lighter than the usual lead-acid accumulators but cost considerably more. They are unspillable, will stand heavy rates of discharge without appreciable gassing, and can be left discharged without ill effects.

A comparision is given below of the characteristics of these Venner accumulators and of the comparable Varley lead-acid motor cycle accumulators used by some gliders.

	Venner	Varley
	18 volts, 10 ampere hrs.	18 volts, 12 ampere hrs.
SIZE	6″ x 4⅝″ x 5.1/16″ (in plastic outer case with lid)	10″ x 7″ x 6½″ high (with terminals)
WEIGHT	5 lb.	25 lb.
COST	£38	£6

The new accumulators thus occupy one-third of the volume, and weigh one-fifth of the weight of the lead-acid type.

It may well be that the lightweight and compactness of the Venner batteries will enable the pilot to carry both horizon and oxygen without exceeding the gliding weight limitation, and that this advantage will offset the increased price.

The Work of the B.G.A. Accidents Analysis Panel

by the Chairman of the Panel

THE Accidents Analysis Panel of the British Gliding Association was created late in 1949, with the object of assisting clubs in the elimination of accidents by analysing and reporting upon all relevant information obtainable. The events leading up to the creation of the Panel were the rising, and frequently prohibitive, costs of insurance, brought about, so the insurance companies stated, by the high accident rate amongst Clubs and individuals seeking cover.

Clearly, the first task of the Panel was to examine the information available at the time of its formation, and to let Clubs know the result, and by the end of 1949 the Panel had issued two confidential reports covering some forty-five accidents and "incidents." From this preliminary examination, two important points emerged, which have guided the Panel in its subsequent investigations. First, every accident reported could, either by greater care, forethought or better training, have been avoided. Secondly, although many personal, and often prejudiced, or ill-informed opinions existed on the reasons for, and methods of preventing accidents, there had been little analytical examination of the facts; in fact, the Panel was much concerned over the apparent acceptance by some instructors of accidents as "one of those things" and their apparent lack of either ability or willingness to face up to the fact that the first duty of an instructor is to find out what went wrong, and to discover means to prevent a recurrence.

Guided by these two conclusions, the Panel has during 1950 attempted to do two things. It has, within the limits of its knowledge and experience, tried to find the real cause of every accident or incident reported to it, and has sent the results of its examination back to the originators of the report. Without doubt these comments have been critical of Clubs' methods, of instructors, and of methods of rendering reports; they have, of necessity, been formulated in the somewhat academic atmosphere of Londonderry House, away from the tension and excitement of those memorable first solo circuits, five hours completed at dusk with only a minute to spare, and the unmentionable frustrations of veering winds, unserviceable winches, and the unique aura of any gliding site in enthusiastic and stimulating life. They have, however, had one persistent and sometimes rewarded aim: to force instructors, pupils, Clubs' committees, and everybody concerned with gliding to find out why accidents happen, and to point out, all too often as it happens, that such an accident was avoidable, has happened before, and could have been prevented had the experience of a previous occasion been remembered and applied. These comments by the Panel are sent back to the originator of every report; in 1951 they will be returned much sooner than has previously been possible; and the Panel can say with confidence that, if the comments they have already sent out in 1950 are given thought and care equal to that with which they were compiled, there should be no accidents in 1951. This may sound a sweeping statement, but it is a fact that, during the course of the last year, it has become evident that the variety of accidents is small; the same old mistakes occur with monotonous regularity.

This is the theme of the Panel's second attempted task, namely, to undertake a statistical analysis of all material available; to issue it as a report, and to draw, from that analysis, conclusions which are based upon sufficiently factual evidence to be a sound guide to those seeking to eliminate accidents. This report has now been issued to all clubs in the form of the Panel's Sixth Quarterly Analysis. It should be carefully studied by all Club members, and what follows has been extracted from it.

First, let us look at the figures—and it must be noted particularly that the figures for 1949 refer to the last eight months of the year only, since the Panel received no reports relating to occurrences before that date (See Table).

Type of Accident or incident	1949 8 months only	1950	*Total*	*Per Cent.*
At Take-off ..	2	8	10	8.5
In Flight ..	7	5	12	10
On Approach	7	10	17	14.4
On Landing ..	25	24	49	41.6
During Slides or hops ..	15	4	19	16.1
Unpiloted ..	4	7	11	9.4
Totals	60	58	118	100

Before going on to comment on this categorisation, it must first be pointed out that the "type" is given according to the period of flight at which the accident occurred, and, as will be pointed out presently, not according to the time of flight at which the mistake which caused the accident occurred. For example, many landing accidents result from errors committed during the approach, or even earlier, and which involve the pilot who made them in an attempt at a landing beyond his skill. Chess players, or even noughts-and-crosses fans are familiar with this sequence of cause and effect. Secondly, the type "hops and slides" requires amplification, for it includes all accidents at this stage, and the other categories are confined to those accidents which occurred at the circuit stage and beyond.

Perhaps the two most remarkable things are the lack of injury to life and limb in this list of accidents, and the high proportion of landing accidents. During the period under review, there have been two accidents resulting in deaths, one of which was not, properly speaking, a Club accident at all, having occurred outside the normal routine of sailplane flying, and can be discounted for the purposes of this analysis. In making this comment, it should be noted that accidents in flight, which have a fearsome sound, were, in point of fact, incidents which terminated in safe landings, and which sometimes resulted from unskilled attempts at some manoeuvre which caused the aircraft to exceed the limits permitted by its Certificate of Airworthiness.

It is to the everlasting credit of our designers that failures in the air, even under the most adverse conditions, seldom occur and, when they do, are unlikely to be serious. Gliding is safe—far safer than motoring, and let there be no false impressions on that score. In fact, the safest place for a glider is, undoubtedly, in the air.

The landing accidents, on the other hand, which constitute by far the greatest proportion, tend to show what astonishing abuses a glider will permit, and still allow the pilot to walk away unharmed. Unfortunately, in doing so, the glider acts as shock absorber, and this is where the insurance costs are involved. These landing accidents also give the first indication of the results to be expected from a statistical approach to accident analysis, for, examined over the whole range, they can be divided into two almost equal types: one, the kind which is due to the inability of the pilot to make a safe landing, and in which the whole cause and effect is to be found in examination of the actual act of landing; and second, the kind of landing accident caused, not by the pilot's lack of landing skill, but by his failure to put himself into a position from which a safe landing could be effected.

The first kind (i.e. actual deficiency in landing skill) is closely allied to the accidents categorised as "during hops and slides," and seems to stem from shortcomings in instructional methods. In this connection the Panel have remarked upon the beneficial results of dual instruction, for those organisations which go in for dual instruction in two-seaters seem to suffer to a markedly less degree from this kind of accident. This seems reasonable, because a proper system of dual instruction should ensure that the student pilot is adequately prepared for, and able to cope with, any new evolution (or for that matter emergency) before he is faced with the necessity of working out the answer alone. The solo method of instruction does not offer this advantage, and not only the landing accidents in this category, but also most of the take-off accidents can be traced to this deficiency. This leads to the first important conclusion reached by the Panel, namely, that an important step towards elimination of accidents is the introduction of dual instruction, given by properly qualified instructors.

The second kind of landing accident (i.e. those which can be traced to an error during the approach, or earlier) seems to stem from a lack of appreciation of the theory of flight, or disobedience of instructions. Most of those which can be traced to insufficient appreciation of the theory of

flight, can be bracketed with those categorised as accidents on the approach, for they have been caused by lack of speed on the approach, turns too close to the ground, and similar failures. The cure seems to be more thorough instruction, both theoretical and by dual demonstration, in the peculiarities of airfoils at low speed; the effects of ailerons during low-speed turns; stalling; spins; and the study of airflow over a wing during the process of flattening out, when the angle of attack is progressively increased until a gentle touch-down is achieved. It is possible to couple with this the reasons for the accidents categorised as unpiloted, for many result from a lack of understanding of the behaviour of aircraft on the ground in strong winds, and deficiencies in the skill of ground handling parties. Study of reports of these sorts of accidents has led the Panel to the conclusion that there are deficiences in the instructional syllabi followed in some Clubs, and to doubts as to the ability of some instructors to give the theoretical teaching necessary. The second conclusion reached by the Panel follows, and is that there is need to ensure that all instructors are properly qualified, and that a proper syllabus of instruction, to agreed standards, is followed everywhere.

Finally, we have the accidents resulting from various forms of disobedience to instructions of various kinds: they include the accidents already mentioned, in which pilots have ignored the airworthiness limitations of their aircraft; in which pilots have attempted to continue soaring in doubtful lift, below the heights at which they were briefed to break off and begin their approach; neglect of the proper manner of making an approach; and a variety of foolishnesses like leaving the airbrakes extended during a launch or aero-tow. All these—and there are many—lead to the conclusion that in some Club flying discipline is lax, and that this laxity has resulted in accidents.

To summarise, the Panel, at the end of their 1950 work, have reached the following conclusions, and they recommend them to Clubs, pupils, private owners, and Committees, as well as those key persons, the Instructors, for serious thought.

FIRST.—Although the 1950 rate of reported accidents and incidents of 4.85 (four point eight five) per month is a reduction on 1949 rate, which was seven and a half, it is still far too high, and is capable, on the knowledge and experience already in the hands of Clubs, of drastic reduction.

SECOND.—The adoption of dual instruction offers the means of reducing accidents, provided that instructors are properly qualified to give dual. The B.G.A. panel of examiners is available for the categorization of instructors.

THIRD.—There is a need to ensure that a proper syllabus of instruction, including theoretical and ground instruction, is followed, and that instructors are properly qualified to give it. The B.G.A. Syllabus of Two-seater Instruction costs 5s. from the Association offices.

FOURTH.—There is, in some cases, an unnecessary laxity in flying discipline which has been the cause of a number of accidents.

FIFTH.—All accidents are avoidable.

B.G.A. News

Annual General Meeting

At this meeting, held on 17th March, Viscount Kemsley was re-elected President and Prof. Sir David Brunt Vice-President, and Mr. Philip A. Wills, C.B.E., was re-elected Chairman for the third consecutive year.

The Chairman reported that the British Gliding Association had 13 Full and 18 Associate Members, and in addition to these gliding organizations there were seven Private Owner Members and 16 Individual Associate Members. During the past year 12 Committees were set up, all of whose members do the work voluntarily in their spare time.

Member Clubs flew 7,560 hours from 42,518 launches during the year, not including the R.A.F. and B.A.F.O. clubs or the A.T.C. Certificates issued were : 1,604 "A,"

644 "B," 242 "C," 47 "Silver C" and two "Gold C". These figures, except for the "B", represent a reduction on the previous year.

The Kemsley Flying Trust had granted loans totalling £15,030, and, with Ministry of Supply support, jointly contributed £8,500 for three prototype high-performance two-seater sailplanes based on the winning design in the Duke of Sutherland's Design Contest. Prizes totalling 100 guineas were offered for the Winter Cross-Country Competition, and donations given to the National Contests prize fund, and the Trust had underwritten various other activities. Lastly, Lord Kemsley had presented a magnificent Cup to be awarded to the Champion Club Team at future National Championships.

The task of developing the Association's own scheme for Certificates of Airworthiness has been nearly carried to a conclusion. The Airworthiness Committee, having finished its job of creating the scheme, handed over the task of running it to the Technical Committee in October, 1950.

In accordance with the desire expressed during the discussion after the 1949 A.G.M., a new quarterly publication GLIDING appeared, and the Council appointed it as the official organ of the Association.

National Gliding Championships

The Council has accepted the offer of the Derbyshire and Lancashire Gliding Club to hold the National Gliding Championships at Camphill, Great Hucklow, Derbyshire, from 22nd to 29th July, 1951, inclusive.

Prizes for Technical Improvements

The British Gliding Association announce their intention to award a small number of prizes of value between £10 and £50 for technical improvements in gliding and soaring made during 1951. Entries for this competition should be sent to the Secretary not later than 31st December, 1951, and should take the form of a report outlining the invention or improvement, together with such exhibits or detailed appendices as are needed to describe it fully. The value of the improvement to the gliding movement as a whole will be the criterion by which entries are judged, and while entries are not restricted to any particular aspect of the sport, attention is called to the following topics in which it is felt improvement might be made :—

1. Artificial horizon suitable for use in sailplanes.
2. Air speed Indicator which will operate satisfactorily in icing conditions.
3. A method of enabling the winch driver to give launches at the correct speed.
4. An improvement in the technique for retrieving aircraft on the gliding field.
5. An improvement in the technique for retrieving launching cables on the gliding field.
6. Aerodynamic improvements to sailplanes.
7. An improvement in the speed or reduction in the cost of launching.

It is also proposed to award three small prizes of £3 3s. 0d. for the best reports on flights of scientific interest made during 1951, with particular emphasis on the obtaining of quantitative data about meteorological conditions.

Accident Prevention Prizes

A prize of three guineas will be awarded to the individual or, if the article is the work of more than one person, to the individuals who, in the opinion of the Accidents Analysis Panel, submit the best article on "Accident Prevention in Gliding Clubs."

The Articles should not exceed 3,000 words and must be received by the Secretary of the B.G.A. not later than 1st August, 1951. Competitors must be, on that date, members of a Club which is a member of the B.G.A.

The British Gliding Association will have the right to publish the prize-winning article in GLIDING, but with this exception copyright of all articles submitted will remain with the Authors.

Vg Recorder Test

A Vg recorder, reading from 0-150 m.p.h. and from +6 to —4, was installed in a standard Olympia glider by No. 1 Test Flight Group. The loads experienced in normal club flying and soaring were low, while those found during aerobatics reached a maximum of 4.5g at 100 m.p.h. and a minimum of —0.8g at 75 m.p.h. This result was the only one which was slightly outside the flight envelope, all the others being inside the flight envelope of the "semi-acrobatic" category.

Annual Awards

The Council has endorsed the following Annual Awards recommended by the Flying Committee :

DE HAVILLAND TROPHY to Flt. Lt. A. W. Bedford, A.F.C., for absolute height of 21,340 ft. and gain of height of 19,120 ft. on his flight from Odiham Aerodrome in an Olympia on 24th August, 1950.

MANIO CUP to P. A. Wills, C.B.E., for his goal flight of 134 miles in a Weihe from Camphill to Coltishall, Norfolk, at the National Contests on 27th July, 1950.

WAKEFIELD TROPHY to Lorne Welch, for his distance flight of 203 miles in a Weihe from Redhill to Melsbroek Airport, Brussels, Belgium, on 12th April, 1950.

VOLK CUP to J. A. C. Karran and W. A. H. Kahn for their out-and-return flights in Olympias of 141 miles, from Redhill to Netheravon, Wilts, and back, on 2nd July, 1950.

SEAGER CUP to J. Grantham and A. R. I. Austin in a Kranich for their goal flight of 85 miles from Camphill to Ingoldmells, Lincs., at the National Contests on 24th July, 1950.

The Annual Awards were presented after the Annual General Meeting at Londonderry House on 17th March.

Kemsley Winter Prize Flights

In the third annual competition for Winter Cross-country Flights, organised by the Kemsley Flying Trust, Mr. H. Cook won 25 guineas and Mr. P. W. Leech 10 guineas for the Derbyshire and Lancashire Gliding Club, and Mr. L. Welch 25 guineas for the Surrey Gliding Club. Accounts of other flights made on the same days have been added to their reports.

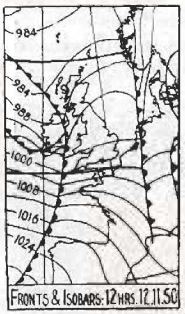
H. Cook's Flight

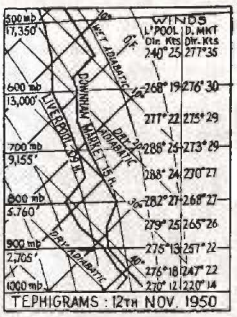
MR. COOK was launched at 10.20 on 12th November, 1950, from the Derbyshire and Lancashire Gliding Club in the Club's Eon Baby. The wind was a little N. of W., about 30 m.p.h.

He rose to 1,000 feet in five minutes, and then, in patchy but smooth lift, to 1,800 feet during the next half-hour; this was followed by 10 minutes' continuous climb at about 5 ft/sec., and then a slower climb to 8,000 feet at 11.30, and finally 8,200 ft. at 11.35 over Ladybower Reservoir to the north. The lift was then replaced by 2 ft./sec. sink in the same area, so he set off downwind and was surprised to find as much as 10 ft./sec. sink, which increased to 15 ft./sec. when he increased speed to 45 m.p.h. (indicated).

After a few minutes he got 2 ft./sec. lift above the upwind side of a rather woolly lenticular cloud which was at about 3,000 feet, but the cloud became more and more frayed at the edges until, in a few more minutes, the lift disappeared. So this wave was apparently fading as well as the first. He went on downwind at minimum air speed for about 15 minutes, sinking between 3 and 4 ft./sec., till at 12.00 he found another stationary area of lift, though there was no cloud to mark its position.

The rest of the flight was a downwind glide without meeting further lift, although at regular intervals of about 5 minutes he passed through areas where the rate of sink was reduced to one or two ft./sec.; but he did not turn to search for lift, being convinced that the system of waves was too weak to be of use. Four miles west of Finningley, at 2,000 ft. above ground, he passed through the bottom of a promising lenticular cloud which he had seen throughout the flight from afar, but it had now become ragged and broken and caused no change in the rate of sink, though it produced a sort of small-scale roughness. He continued gliding downwind, with an estimated angle of descent of about 1 in 40 relative to the ground, and landed 100 yards from the village of Scotter, Lincs. at 12.20 p.m., 45½ miles from the start.







P. W. Leech's Flight

WHEN Mr. P. W. Leech took off at 11.13 in a Viking, into a 20-knot wind from a little S. of W., the only obvious wave-cloud was far to the N.W. near Kinder Scout. But at 400 ft. the lift became smooth, and, flying northwards, he rose at between 5 and 10 ft./sec. up the front of a perfect lenticular cloud which had apparently just formed. At 4,000 ft. he was level with its top, and at 5,000 ft. he was over Ladybower Reservoir and above the middle of the cloud, which stretched about 5 miles N. and S. each way, though there was no lift to northward in front of it. The wind was still about 20 knots. There was 8/8 alto-stratus above.

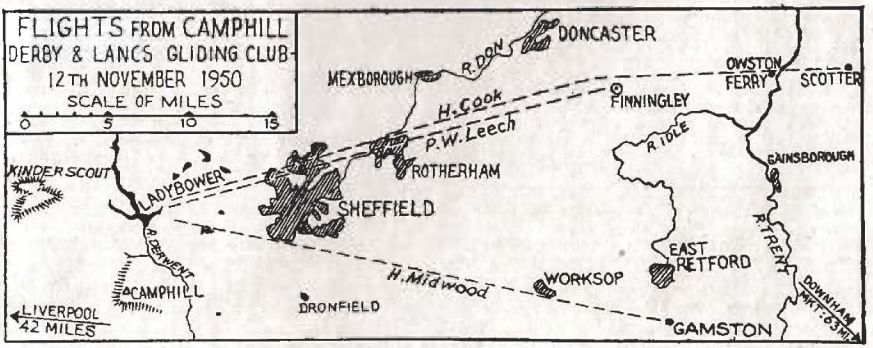
At 11.50 he reached 6,500 ft., the apparent limit, and noticed the cloud underneath was dissipating. So he turned downwind and saw three poor-looking roll clouds ahead. Crossing an area of 5-10 ft./sec. sink at 50 m.p.h., he reached the first after 3 miles, turned and climbed over the front of it at 2-3 ft/sec. to about 6,500 ft., where lift ceased. Then to the next cloud, which gave 6,800 ft., over the N.W. suburbs of Sheffield.

He repeated this process twice more, making five waves in all, the last giving 6,000 feet over Rotherham. From there he glided downwind with normal sink, reached Finningley at 4,000 ft., and landed there because the Viking's trailer was unserviceable and he had organized no retrieve, and because, being 32.2 miles from the start, it gave him "Silver C" distance.

Other Flights on 12th November

ANOTHER cross-country flight was made from the Club on the same day by H. Midwood. He started by using the same cloud as P. W. Leech, but probably a little later, as its top was only 3,000 ft.; he climbed above it to 5,000 ft. and then sank to 4,000 ft. He then flew downwind and encountered two more waves, in which he climbed to 4,500 ft. and 3,000 ft. respectively. He landed on Gamston aerodrome, south of Retford, after going 32 miles.

There were 7 or 8 people soaring in the wave over the site. J. S. Armstrong used the same cloud as Leech and Midwood, climbed to 8,000 ft. and then made for the next wave upwind, in which he climbed to 8,600 ft. when two miles to windward of Kinder Scout. Then he lost the lift as the pattern of the clouds changed. He found the wind to increase with height, but when he landed there was no wind at all.



Redhill to Westwell
by Lorne Welch

FEBRUARY was an unusual month with much more rain than normal, depressions passing continually over the British Isles. On the night of 21st February a cold front went through, leaving moist, cold air behind it. Unfortunately snow fell with the passage of the front, and as a result of this, and because the ground was very wet, the cumulus cloud which formed on Thursday (22nd) was very ragged with a low base.

On Friday, 23rd, however, the ground had dried out slightly and the air mass still possessed instability. Soaring conditions did not look good as there was considerable medium cloud, and although the cumulus were fairly large they were scattered and very soft in outline. By mid-day the cumulus had formed in ill-defined streets with considerable medium cloud above them. The average cloud cover was 6/8, but large areas were completely overcast. The weather forecast mentioned showers, but none actually developed, probably owing to the building up of the medium cloud.

Wind speed 20 kts. at 2,000 ft., and direction 280 deg. Strongest lift, 10 ft. per sec., strongest down-current 5 ft. per sec. Cumulus base 3,200-3,700 ft. a.s.l.; tops 5,000-6,000 ft. (?). Visibility 15 miles.

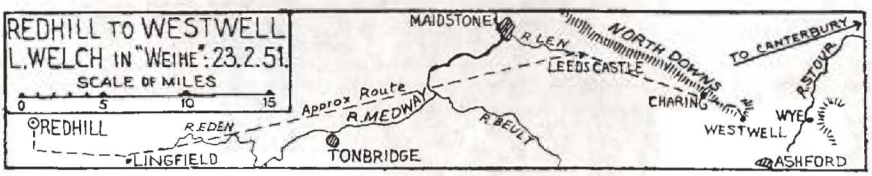
As conditions looked possible at about 11.45, it was decided to rig the Weihe and attempt a flight straight downwind. By the time everything was ready it looked rather hopeless, as although to the east the clouds were still in definite streets, to the west there was almost complete cover and a mess of ill-defined clouds.

I asked the tug pilot to take me underneath the best-looking street, and if necessary to go downwind of the aerodrome. The take-off was made at 12.50 hrs. and one good region of lift encountered at 1,100 ft. I considered that this was too low for releasing, and so continued on tow until the tug pilot eventually went under a decent-looking cloud. The height was 2,100 ft. a.s.l. and the position some two miles south-east of the aerodrome when I released at 13.00 hrs.

The lift was very smooth at about 5 ft./sec., and I soon reached cloud base at 3,200 ft. near Lingfield. From here the cloud stretched in a more or less continuous street to the east; it was between a quarter and half a mile wide. Lift was sometimes to be found under the middle of the street and at other times towards the northern or southern sides.

It was possible to maintain height by flying straight underneath the street, weaving from side to side to find out where the best lift lay at any particular time. The lift was not completely continuous, but little height was lost in flying from one section of the street to the next. In view of this I decided not to circle above 3,000 ft. but to fly straight on. Between Lingfield and Leeds Castle (near Maidstone) I circled on only three occasions and then for a very short time. In general, height could be maintained when flying at about 45 m.p.h., but there was one period of about five minutes when a steady straight flight was made at 70 m.p.h. without loss of height. As a result the average speed was high and the 32 miles from release point to Leeds Castle was covered in 37 minutes (52 m.p.h.).

The outlines of the street were very vague and it was difficult to determine the best route to follow, particularly as the inside of the cockpit-cover kept misting over. At 3,000 ft. the outside air temperature was 35 deg. F. During this part of the flight the cloud base gradually lifted and was at 3,700 ft. near Maidstone. Parallel to my street to the north and south were other lines of cloud 3 or 5 miles away, but they looked even more ill-defined than mine. There were considerable banks of medium cloud above. On arriving near Maidstone, conditions looked bad. The amount of medium cloud was larger, there was only a very small amount of sunlight on the ground and the streets looked very dead. Lift under a dark part of the street was quite strong,



about 8 ft./sec., and sufficient height could have been gained to reach the coast by cloud flying. But unfortunately I was immediately underneath an "airway" where cloud flying is prohibited, so this could not be done. Having got near cloud base, I therefore decided to carry on ahead and hope that there would be some lift. After going a few miles, it was apparent that there was nothing to be found. As the height was then just under 3,000 ft. it was obvious that a decision had to be made.

There seemed to be two alternatives, (a) to glide on ahead and land somewhere short of Canterbury, or (b) to turn south where there was more sun and conditions looked better, and where there was also the possibility of slope-soaring. I chose (b) and reached the end of the North Downs between Charing and Ashford at 1,800 ft. at 13.51 hrs. The surface wind, as shewn by smoke on the ground, was W.N.W. and thus very crooked to the hill, which faces almost S.W. Judging that I had insufficient height to reach the more westerly-facing hill near Wye (probably a mistake), I stayed over the hill near Charing.

It was just possible to slope-soar at 850 ft. a.s.l. (200 odd feet above the top of the hill). After doing this for about 25 minutes, I found, at the eastern end of the ridge, a patch of thermal lift which took me up to 1,200 ft. The lift was weak and I drifted some way downwind. On returning to the hill I was down to 800 ft. again, and as conditions upwind looked completely hopeless with almost full cloud cover, I decided to land.

The landing was made in a very wet stubble field in the village of Westwell at 14.22 hrs., 41.1 miles from release point, 280 ft. a.s.l.

Comments

1. Before take-off I thought that it might be just possible to stay up. Actually sonditions were good, although only for a chort period. This goes to show that we must have considerably more experience of winter soaring before we can assess the conditions from the ground with any degree of accuracy.

2. Had cloud flying been permissible, a longer flight might have been possible.

3. As events turned out, it would have been better to have gone straight on from Maidstone in a glide, rather than to have slope soared and waited for better conditions which, in fact, did not materialise.

Bourn to Bottisham

by David Carrow

EARLY on Friday, 23rd February, the same day as Lorne's flight, it looked very promising, with moderate west wind and clear blue sky. I was out at Bourn instructing, and as soon as the first cumulus puffs started, at 10.30, we started to organize the Auster and Kite, aiming to take off at 12.00 hrs. But I have seldom seen stuff build up so rapidly, and we were thoroughly caught napping. At 11.00 hrs. there was about 3/8 good solid cumulus, which seemed to have spread in from the west, and by 11.15 hrs. there were some of the best streets I have ever seen running E. and W. from horizon to horizon, and somebody came into the hangar and said that all the local rooks were circling madly at 100 feet!

But still I dallied around, thinking that it was too early, and the ground would warm up more, and it was not until 11.45, when we were ready to go, that I realized I had probably missed the boat. The streets were flattening out from the west and bits of strato-cumulus were forming between them. But it still looked quite good and I released at 12.00 hrs. at 2,200 ft. a.s.l. about 5 miles upwind of Bourn (near Papworth), under the best remaining street. The thermals were very small and weak, but there were quite large patches of no-sink and I drifted along to Cambridge, circling in no-sink, and flying downwind along the street when losing height. I never exceeded my release height and descended gradually to about 1,000 ft. a.s.l. Just N. of Cambridge I contacted the only thermal that was big enough and strong enough to give any serious lift, and in it I climbed desperately slowly to 1,600 ft. Then once again it was a gradual descent, possibly gaining the odd 100 ft. here and there, but on the average always losing, although maximum sink was never more than 3 ft./sec. and there was still lots of no-sink. I ran out of height just before 13.00 hrs. and just beyond Bottisham.

Distance 18 miles, but loss of height 2,100 ft.! When I landed and had time to study the clouds more carefully, the street I had been under could be seen to be largely stratified, and by 14.00 hrs. there was 8/8 strato-cumulus, which persisted for the rest of the day, with a *very* few isolated cu occasionally building up into it still.

A Safety Prize

by "Delta"

THE Council of the British Gliding Association recently considered a proposal to award an Annual "Safety Prize," having as its object the reduction of accidents. The prize was to have been a substantial (by gliding standards) sum of money. The exact conditions of the award were for discussion, and a sub-committee was detailed to examine the proposal and to report back to the Council.

Work of the Sub-Committee

The sub-committee met with some difficulty to begin with, because they were uncertain to whom the prize should be awarded—whether it would be most advantageously awarded to clubs, individuals, or groups of individuals. And what should be the relative status of private owners, or clubs using private owners' aircraft on a part-time basis? An additional complication arose when discussion centred round the relative advantages and disadvantages to clubs operating, some on comparatively restricted and rough fields, and others on large flat surfaces extending far in all directions.

In the face of these difficulties, the sub-committee decided to evolve two schemes, either of which, or any combination of the two, they thought might be selected by the Council when they reported back to it.

Conditions of Award

Having arrived at this conclusion, the sub-committee had no difficulty in reaching the next conclusion: that a "Safety Prize" awarded merely for not having accidents would fail to achieve any worth-while object. To quote an extreme example, a prize of that sort might be won by a club, group or individual who merely locked up their aircraft in a hangar and put a guard on it to prevent it being touched, or simply threw away the key! It seemed logical that the prize, if it was to achieve its object, should be awarded to the individual or organisation completing the greatest amount of accident-free flying in relation to their resources. And it seemed essential to take "resources" into account, since, to be of wide enough application to make it worth while, the prize had to cover a wide field of both large and small clubs and individuals, with both large and small resources. As will presently be seen, it was partly on this question of measuring resources that the schemes presented to the Council failed.

Marking

The conclusions described above then led to the problem of how to award marks for the award of the prize, and here there were clearly three conditions to be fulfilled, namely :—

(i) the system must be simple,
(ii) the system must not lend itself to disputes,
(iii) the system must be such that the marks may be assessed from the returns and records normally submitted to the B.G.A., since any increase in paper work is obviously undesirable.

With these three factors in mind, the sub-committee then had to decide upon what system to award marks for flying done, and upon what system to deduct marks for accidents. This is the point at which the problem began to be difficult, for satisfactory answers to both these questions depend upon the reliability of returns received by the B.G.A., and it is a fact that equal reliance cannot be placed upon all returns received. In fact, there are clubs professing to be a part of the Association who fail altogether to submit returns, in spite of their undertaking, when they become members of the Association, that they will abide by its mutually agreed rules and by-laws. The assessment of accidents also presented difficulties because, without a skilled survey of the damage in each case, it would be difficult, if not impossible, to calculate fairly the number of marks to be deducted.

The conclusions reached on these points were, first, that credit could be given for both flying hours and launches in proportion to the number of aircraft operated by the club, individual, or group; and that the deductions for accidents should be in the form of heavy penalties, not for damage to aircraft, but for damage to people.

Scheme I

As a result of these deliberations, a scheme was evolved which would be applicable to groups, clubs, or even individuals. Marks were to be awarded according to the following formula :—

$$\text{Marks} = \frac{a + b - y_1 - y_2 - y_3 \text{ etc.}}{x}$$

where a = Total flying hours from 1st Jan. to 31st Dec. inclusive,

b = Total launches from 1st Jan. to 31st Dec. inclusive,

x = "Aircraft days." This figure is arrived at by adding together the number of days during the year concerned during which each aircraft has been owned or operated by the club, group or individual concerned. For example, if the club has three aircraft on its books all through the year, acquires a fourth on 1st July, and has the use of a privately-owned sailplane for 150 days during the year, then its aircraft/days figure would be

$$3 \times 365 + 184 + 150 = 1{,}429.$$

y_1, y_2, y_3, etc. are each accidents for which marks are deducted according to the following system :—

For a broken limb	..	10
For a death	.. ..	50

It will be observed that, in this system, although there is no deduction for damage to aircraft, this factor is implicit in the formula, for credit is given for the utilisation of aircraft, and where aircraft are out of action, for accidents or for any other reason, utilisation will suffer, and so will the marks obtained.

One point which received attention is the habit of some clubs to keep a stored reserve of aircraft. Clearly these would have to be excluded from the aircraft/days calculation, until taken into regular use, when their aircraft/days figure would be calculated from the date they were taken into use. Some safeguard would then be necessary to prevent stored reserve aircraft being taken into use to replace accidents, or aircraft damaged being placed in stored reserve, and so escaping penalties.

Scheme II

This was produced in an attempt to overcome the disadvantages of Scheme I, where it depended so much on returns rendered by clubs. The sub-committee felt that it was necessary to guard against the possibility of any ill-feeling being caused by disputes between rival concerns over the accuracy of their returns. It was accordingly suggested that awards should be made to individual pilots, and that their claims should be submitted in the form of their log-books, certified correct by the C.F.I. or appropriate authority of their club. In conjunction with this scheme, it was also felt there would be advantages in dividing the prize money available into a number of smaller prizes partly with the object of involving as many people as possible, and partly with the object of encouraging as many individuals as possible, not only to fly safely, but to fly often.

The basis of marking in this case would be that competitors would have to be accident-free for the whole year concerned before they became eligible for consideration at all. The prizes would then be awarded to the individuals who had done the most flying or launches in the various categories; thus, supposing that one hundred guineas were available for distribution, the money might be allotted as follows :—

CATEGORY I : PRIVATE OWNERS OR GROUPS

For maximum hours flown during the year by a pilot :

First Prize	..	Twenty Guineas
Second	..	Ten ,,

CATEGORY II : CLUB-OPERATED AIRCRAFT

For the pilot who has flown the maximum hours :

First Prize	..	Twenty Guineas
Second	..	Ten ,,
Third ..	..	Five ,,

CATEGORY III : CLUB-OPERATED AIRCRAFT

For the pilot who has done the maximum number of launches :

First Prize	..	Twenty Guineas
Second	..	Ten ,,
Third ..	..	Five ,,

Clearly, there are also difficulties in this system. For example, no instructor worth his salt would have accidents; yet, by the very nature of his flying, instructors would be much favoured in a scheme of this sort, and it might be desirable either to exclude instructors, which seems hardly fair, or else to have another category for instructors only.

Conclusions

These two schemes, and variations of them, were then thoroughly examined, and no way seemed feasible to overcome the difficulties which have already been mentioned. Finally it was decided to offer the results to the Editor of GLIDING, asking that he would publish the information, first with the object of making known what had been discussed, and secondly with the object of discovering the reaction of clubs and individuals to the idea. Perhaps somebody can find a solution, acceptable to everybody, simple, and without the disadvantages of the schemes outlined above. If so, they will be doing a good service to gliding and soaring, for any stimulus to increased flying, and decreased accidents, is valuable.

How Not to Win Records

by Philip Wills

THIS is the sort of flight that is a good deal nearer the real thing than the ones that usually get into print; but if you like reading sentences like: "I had long lost sight of the green ball, and thought that it might have burst its way out of the top of the tube," or: "Brussels was now in sight, and I had to decide whether to land and net the goal-flight record, or to carry on for a stab at the World's distance"—if you like that sort of thing (and very nice too), well, skip this.

Once Upon a Time I visited one of our West Country clubs. One evening the forecast promised light westerlies and reasonably good instability. So we hatched a plot. From the Club aerodrome to the Norfolk coast wasn't far enough for a distance record, so we planned an aero-tow over to Wales, and a release somewhere north of Swansea. From there to the seaside gave a downwind run of around 250 miles, which was enough.

So, far into the night, we pored over maps and worked out courses and times, and drew enormous straight lines with the aid of the marble top of the hotel washstand. Came the dawn, a cloudless blue with a touch of haze

By 9.30 hours we were at the aerodrome: the trailer was out. We rigged, and by 10.15 were on the tarmac. The tug was refuelling, my wife getting the sandwiches. No cu.

By 10.30 the tug had arrived, and we found that everybody had thought someone else was getting the tow-rope. Someone went for it, and the tug stopped its engine. By 10.45 the tow-rope was fetched and laid out. By 11.00 I was in, with two sealed barographs. Then someone realised that the tug-pilot needed a third, so we waited whilst one was found, set and sealed. My sandwiches were tucked in beside my right knee, my maps by my left knee; in my breast-pocket were my boiled sweets, a handkerchief, my sun-glasses and a tube of benzedrine to sniff if my sinus gave trouble in rapid descents from great heights. I was strapped in, the tug started its engine.

My oxygen mask was strapped round my neck and I plugged in the tube and turned it on for a test. Nothing happened: I had forgotten to unscrew the tap on the bottle, which is *behind the seat*!

I sent a message to the tug to stop its engine (I didn't want it to have to go and refuel again); I was unstrapped. My sandwiches, maps, barographs and gloves were taken out and I undid my parachute and got out. I lifted the seat forward and turned on the oxygen. I put my parachute on again, got in, was fitted in with all the bits and pieces enumerated above. Someone shut the cockpit-cover—right away? The ring was put into the quick-release, the wing-tip holder lifted his tip, the signaller waved his flag. . . The tug-pilot, with a resigned look on his distant but by now rather red face, beckoned for help. He wanted someone to swing his prop. . .

A volunteer trotted out to the Tiger. . . . After he was worn out, we sent a second, then a third. The Gipsy engine, having registered its merited protest at our goings-on, came to reluctant life, not before—in my cockpit under the glare of the sun—my face, already somewhat red, had finally assumed the moist scarlet of boiled lobster.

11.20 . . . it was getting rather late, but still no cu. Tighten up . . . the aircraft crept forward, the rope tightened—all out! Slowly we rolled forward, the somewhat

derisive faces of my long-suffering helpers and watchers dropped behind, the wing-tip trotter trotted, ran, let go. We trundled along the runway, lifted.

By now my reasoning powers were almost suspended. I pulled the undercart release, to drop my wheels. With a slight twang the tow-rope came off—I had pulled the wrong knob. . . .

We landed back on the runway which we had left after so much toil, and came to rest. The tug had had to go on and take off. It was crossing the aerodrome boundary, climbing. But it didn't turn left to make a circuit and land again. It went on and on in a straight line, climbing away towards Wales. It got higher and higher and smaller and smaller, and vanished over the horizon.

My disillusioned team arrived to tow me back, and we looked at each other for a long minute. Then we all decided to laugh. We laughed and laughed. I unstrapped myself and got out, carelessly showering maps and sandwiches on the runway all round. We lay down in the shade of the wing and laughed until we felt better. Then we towed the machine back to the clubhouse and had a few drinks.

An hour later the tug arrived back, and its demoralised pilot confessed that he had never before towed anything smaller than a Horsa. He had not therefore been surprised at the brisk rate of climb of his Tiger, and had not thought to look back until he had reached our Welsh rendezvous.

He was feeling rather foolish until he was told why I had come detached, then he realised that he was only running second in the Pilot Prune stakes.

Anyway, the day never did boil up, and there wasn't a record to be had. So we went home. But I think I had some claim to at least one World's record—the Shortest Flight ever achieved in a record attempt. In setting out to do 250 miles, I must have covered all of 200 yards.



Philip Wills, awarded the Royal Aero Club's Britannia Trophy this year for winning the National Gliding Contests four times: and his wife Kitty, who does his retrieving.

Soaring on the Bishop Standing Wave

by Flt./Lt. R. C. Forbes

SINCE I first experienced the thrill of staying airborne without power, I have read and heard fantastic stories of inexplicable meteorological conditions known as Standing Waves.

Pre-war the only really well known wave was the "Moazagotl," and this was used frequently by the Continental glider pilots. Since the war, however, the Moazagotl has been "out of bounds," and two new waves have been discovered, one in France at St. Auban and the other in Bishop, California.

For the last three years I have been toying with the idea of visiting either the French wave or the Bishop Wave, and in the end, to suit the other two-thirds of my family, the opportunity arose to visit Bishop.

Prior to my leaving this country in the Queen Elizabeth on 30th November, I had spent some time at the Institute of Aviation Medicine at Farnborough. Apart from finding out my height limits in the decompression chamber, I also learned a little about the more recent developments of high altitude flying. This knowledge, unfortunately, was not used, but might have be n useful had circumstances been different.



Flight Lieut. R. C. "Jock" Forbes.

After a most enjoyable but really rough trip to New York, I landed in the midst of one of the worst winters the Western part of the States has experienced since they started to keep records of the weather. However, any discomfort caused by the snow and extreme cold was more than offset by the comfort in the homes, where central heating maintains an even temperature inside, no matter how much it may vary outside.

While in the States I spent half of the time near Chicago, and one evening I surprised Bert Handwork by contacting him at Indiana University, where he is now a student. Ex-B.A.F.O. sailplane pilots will remember Bert from Scharfoldendorf Gliding Club and his grand efforts in the B.A.F.O. Gliding contest at Gütersloh, where he flew the Minimoa. Over the 'phone we arranged to visit Joe Steinhauser's Gliding School the following Sunday. On the Sunday Bert arrived bright and early in a car which would have been perfectly in place at any gliding club in this country!

Joe's School is at Chicagoland Airport, near Mundelein, about 30 miles from Chicago, and after a hazardous ride over icy roads we arrived to find there was too much snow to allow flying to take place. Anyway, a most enjoyable afternoon was spent with Joe Steinhauser.

Little interest appears to be shown in the Gliding Movement around the Middle West—but a different state of affairs exists in the Eastern States.

The opportunity was also taken to contact Hollis Button 'way up in Valley City, North Dakota; British glider pilots will remember Hollis as being the recipient of the beautiful Horten IV. Unfortunately, the Horten was broken slightly on its first flight, but there are hopes that it will be flying again this spring. Button was recalled to the Air Force on the 1st of January of this year, and we might see him over here before very long.

On the 26th of December, after a real American Christmas and all the good things that go with it, I set off by train for Bishop.

The less said about this long journey the better, but the car journey we had planned (but had to call off because of weather) could not have been less enjoyable.

Sunny California really lived up to its reputation, and when I arrived at Mojave it was more like June than December. The 4½ hour journey by bus from Mojave to Bishop through the Owens Valley was made all the more interesting by my travelling companion—a cowboy who knew every inch of the area, and its history.

On arrival at Bishop on the evening of the 28th I booked in at the lovely Inyo-Mono Inn—the name derived from the two counties in the Valley, Inyo County and Mono County. I had barely time to sign the Hotel Register when Bob Symons came to drag me out again. A few words about this person would not be out of place.

When one thinks of Bishop one automatically thinks of Bob Symons at the same time. I would say without hesitation that Bob knows more about Standing Waves than anyone else in the World, because he has worked with them and played with them for many years. He runs a private Charter Service part of his time, and the other part is spent in the employment of the Southern California Power Company where his main job is to fly P38 (Lockheed Lightning) on rain and snow-making sorties. This is a highly specialised business and Bob obviously has it at his finger tips.

Two of his power-flying stories are worth recording. In February, 1950, in company with John McDonald, Bob was out in the P38 seeding the clouds. On their return to base the Wave was over Bishop and the dust rising from the Valley made it impossible for them to land. Bob calculated how long they could stay airborne flying for maximum endurance and reckoned they would stay up for an hour and a half, hoping for the aerodrome to clear in the meantime. Flying about 10,000 feet they encountered the Wave. John McDonald in the nose of the aircraft suddenly called over the intercomm: "Hey! Bob, the port engine has stopped." Bob, busy feathering the starboard propeller, replied, "Yes, now the other one has stopped, too." They were gaining height at 3,000 feet per minute with both props feathered in a machine weighing 8 tons! Above 30,000 feet the cold was such that Mac began to complain, and since they wanted to save the aircraft accumulator for unfeathering the props, they could not use their heated clothing. There was nothing for it but to come down again. Three times the aircraft went from 12,000 to 30,000-plus feet before the valley cleared sufficiently to allow a landing to be made, and the P38 was flown up and down Owens Valley with lift all over the place.

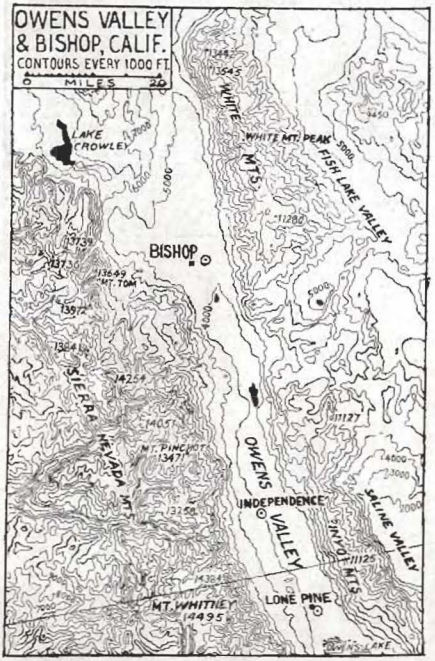


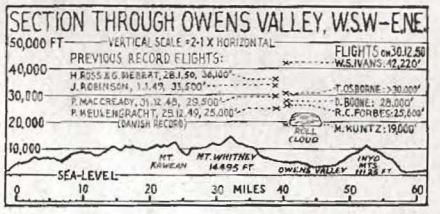
W. S. "Bill" Ivans, Jnr., who set up new international records for absolute altitude (42,220 ft.) and gain of height above release (30,100 ft.) on 30th December, the day of Flt. Lt. Forbes's flight. Photo by Warren R. Watson.

Bob and MacDonald between them hold the unofficial World's light 'plane altitude record with a height of 32,000 feet. Unfortunately the last 2,000 feet of the climb were made with the propellor of their Bellanca stopped. Naturally this flight was made in the Wave too.

Bob Symons and three or four others own a Pratt-Read and T.G.3 with which most of the wave soaring is carried out, and these are hired out to people who do not have their own sailplanes with them. These machines, to use an American expression, are "rugged." They are ex-Army surplus two-place machines and improved by their present owners, now carrying ample oxygen supplies including pressure breathing equipment, two-way radio which works satisfac-

torily, and electric turn-and-bank indicators. They have two features essential to Bishop soaring—they are strong, and have a really high rate of sink at high speeds. Far from being a drawback, the latter is essential where such terrific rates of climb are experienced. When I first saw them I was not impressed, but later on I was to change my mind about the Pratt-Read at least. In this country they would be absolutely useless as sailplanes because their rate of sink and angle of glide are, to say the least, exceptionally poor.





Tracing from the "half-million" map. The top left corner is 200 miles E. of San Francisco, and the lower border 170 miles N. of Los Angeles.

My first night in Bishop was spent meeting the pilots who were holidaying there with sailplanes. Among them were W. S. (Bill) Ivans of San Diego and Irving Gere, who was Bill's crew man. The latter two had the beautiful all-metal single-seater Schweizer S 1-23 with them, and this machine was perfectly fitted up. I had the opportunity of flying it later on, and I liked it, although it was a bit "short-coupled" for me. With only one flight, during which I attempted various aerobatics (without much success, I may add), it seemed to compare in performance with the Olympia—but perhaps I underestimate its performance.

Later on during my first evening at Bishop we all gathered at Bob's house to see his movie films and coloured slides of the Wave. The coloured slides were beautiful, but much more interesting from my point of view were the movie films, some of which were taken at one frame per second and projected at normal speed. One could see the Wave roll-clouds forming, and could just imagine the large vertical currents involved in the process.

Needless to say, we were frequently in touch with the meteorological station based on the Airfield, and the morrow promised nothing more than had occurred for the previous week. The half-a-dozen pilots who had been there for a week were getting a bit fed up with the non-appearance of the Wave. The met. people proved to be correct when the 29th December dawned as bright and clear as anyone but us could wish, so Bob took me up in the Bellanca to show me the local flying Area.

To save explanations I have enclosed a map of Bishop and the surrounding area, and it will be seer that Bishop lies in a valley about 4,000 feet a.m.s.l., bounded on the west by the Sierra Nevada mountains which rise 8,000 to 10,000 feet above the valley, and on the east by the much lower White Mountain range.

Like the Bishop sailplanes, this country is really rugged! I see now why sailplane pilots have not yet attempted long cross-country flights in the Wave. The conditions are very similar to the Swiss Alps, but on a much larger scale horizontally. I'd hate to land anywhere other than on the Airfield,

because even if I did land in one piece it would be an extremely hazardous task getting back to base again.

The 29th was uneventful and the met. forecast was so gloomy from the wave-soaring point of view that most of the pilots decided to return home on the following morning.

My room in the Inn faced the wrong direction, and to see the weather I was forced to get out of bed and walk out on to the street. This is quite an effort in the early hours of daylight, so when I awoke early on the 30th morning and looked out of the window at bright blue skies I decided the met. people were pretty good in this place and promptly turned over and off to sleep again.

I don't suppose I had been asleep more than 5 minutes when Bob Symons knocked at the door to tell me it was almost 7 a.m. and the Wave was waving.

I was out of bed like a shot and with Bob we rounded up the other pilots. Because of the gloomy outlook there had been little preparation for flying, and such things as refuelling the tow plane, a B.T.13, and rigging the sailplanes and checking oxygen etc. had been neglected, and in the morning all took time. In consequence the first machine took off around 9.30 a.m. The Wave was lying roughly north and south, just east of the Sierras and to the south, perhaps 15 to 20 miles, of Bishop. In consequence, with just one tow plane, some time elapsed between tows.

The first glider off was a T.G.3 flown by its owner. Bob came back to report good lift. Next a relatively inexperienced pilot carrying a passenger took off in the Bishop T.G.3. The pilot was well briefed prior to his departure and was told to find the downdraught before he got to 20,000 feet so that in the event of things going wrong a quick turn downwind would bring him down quickly in the downdraught.

Very soon, and before Bob had returned to Base, we heard this glider pilot call up to say that he was now at 22,000 feet and that this would be his last transmission because he did not want to take his mask off. (Hand microphones were in use at that time, but now the mikes are installed in the masks). This pilot landed about one hour later, having tried to get down from 22,000 feet and having reached 30,000 feet in the process! Next time he will pay more attention when Bob briefs him! The next pilot off



Looking S. from Bishop on the morning of 30th December. This photo, by Bob Symons, shows the Sierra Nevada range, the stationary roll cloud between 18,000 and 23,000 ft., and the western edge of the great lenticular cloud far above.

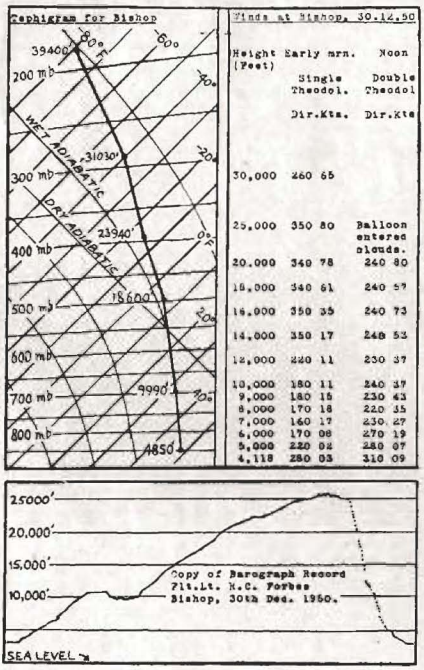
was Bill Ivans in his 1-23. Bob asked me to fly in the towplane this time to give me some clue as to what was happening up there. After take-off we headed towards the White Mountains, hoping to slope-soar en route to the Wave. No lift was experienced as the downdraught of the Wave happened to be striking the mountains where hill lift would normally be expected. After travelling parallel to the Whites we turned at right angles to them to pass through the downdraught in the shortest possible time. Soon we hit this downdraught, followed fairly soon by about one minute of severe turbulence. Then suddenly we were in absolutely perfectly smooth air climbing about 2,500 feet per minute, at which time we were at 12,000 feet. Bill Ivans cast off and almost at once disappeared from view. Most gliding people know by now of Bill's excellent performance when he reached 42,000 feet above mean sea level. He had originally planned to fly to Salt Lake City, about 500 miles

away to the north-east, but he used his oxygen extravagantly through forgetting to switch over from "emergency" to 20,000 feet during one of his downdraught periods, and he was left with about half an hour's supply.

I won't dwell on the story of Bill's flight because it will probably be in print shortly. However, he had grave doubts about getting back to base while still at 25,000 and 20 miles away, because of the strong downdraught and headwind. Eventually, after about 3 hours in the air, he arrived back at Bishop the holder of two World Records.

As soon as I came to Bishop with Bob Symons after towing Bill Ivans off, I wanted to get airborne, but there was still one machine to go before me. Since it was almost lunch time and we still had had no breakfast, we decided to have a meal in the town and be back in time for the next tow.

I was going to fly the Pratt-Read, and because it was a two-place side-by-side machine and because I knew Irving Gere had not flown all the week, I offered him the ride with me. I had just arrived at Bishop and still had about three weeks to stay there, and treated this particular flight as a practice flight, happy in the knowledge that this was the first of many flights I would have in the Wave!



Winds at Bishop, 30.12.50

Height (Feet)	Early mrn. Single Theodol. Dir.	Kts.	Noon Double Theodol Dir.	Kts
30,000	260	65		
25,000	350	80	Balloon entered clouds.	
20,000	340	78	240	80
18,000	340	61	240	57
16,000	350	35	240	73
14,000	350	17	240	53
12,000	220	11	230	37
10,000	180	11	240	39
9,000	180	15	230	43
8,000	170	18	220	35
7,000	160	17	230	27
6,000	170	08	270	19
5,000	220	02	280	07
4,118	280	03	310	09

Take-off was uneventful—if you call two pairs of hands fighting with the two control columns trying to keep the Pratt-Read on an even keel behind Bob's bucking B.T.13 uneventful. However, the turbulence was less than I expected. At about 10,000 feet a.m.s.l. we hit the smooth rising air and released. The variometer was an Askania 15-0-15 metre/sec. instrument, but because of the bottles being double-capacity it only indicated roughly 1,500 feet per minute.

After about a couple of minutes heading into wind, the lift began to fall off and I found myself dropping towards the ground at quite an uncomfortable rate. This was contrary to all the advice Bob had given me about flying more into wind. Bearing in mind this advice, I increased the speed, but all that happened was that the sink increased. I don't know what my lowest point was but it was well below my release point and I had visions of landing in the scrub and rocks below. After settling down I decided I was too far up-wind and turned around through 180° to find lift almost immediately. From that point onwards it was a case of flying straight and level at the same speed as the wind so that we neither lost or gained ground. Since this was my first experience in wave-soaring I thought it better to play safe and find the downdraught in case we required it. Having found this down-current we climbed on the edge of the up-current so that we kept the rate of climb inside the limits of the variometer. This became increasingly difficult to do, because as we went higher we found the wind was much stronger and we had to fly correspondingly faster, and our machine's rate of sink increased out of all proportion. By steps we reached 25,000 feet, and although the outside temperature as recorded on the thermometer was —20°C. we were quite comfortable in the cockpit. (This machine had been lined inside and all around the cockpit with glasswool and aluminium foil).

We were still going strongly when I saw large beads of perspiration on Irving's forehead. I asked him if he were feeling O.K. and he had just said "Yes" when he was



Irving Gere (in cockpit), Flt. Lt. Forbes's 16-year old passenger.

violently sick in his oxygen mask, stopping his oxygen supply. The height was now around 26,000 or 26,500 feet. He immediately pulled the mask off and the remainder of his early lunch or late breakfast was spread all around his side of the cockpit. As most people know, it is bad for one's health to hang around above 25,000 feet without oxygen, so I had little option but to turn down wind and dive at maximum speed to a healthier level. Poor Irving's troubles were not yet at an end. Around the 10,000 level he found he couldn't get his ears cleared, so we had to delay our descent as best we could while he swallowed and held his nose and blew. I don't know what our rate of descent actually was, but I know the barograph couldn't keep up with us and recorded dots instead of a straight line.

This finished my wave flying for that day, but I was not one bit worried because I was assured that the Wave would be there many more times before I left. Unfortunately this was not to be, and I spent the rest of the time at Bishop waiting for a Wave that didn't come. Just after I left there and had returned to Chicago I got a wire from Bob Symons to tell me that one of Elmira Club members, Clarence See, was at 32,500, and I still haven't heard whether he got any higher or whether he is still up there or what!

Although I got no more wave soaring, I had a thoroughly enjoyable holiday. On successive days I was a guest of the Bishop Rotary Club, and the Lions International, and later on Bob and I went to the monthly meeting of the Southern California Soaring Society in Los Angeles.

I said earlier on that there was little interest in gliding in the Middle West, but the reverse is certainly true in California. This is a go-ahead group of gliding enthusiasts.

It was a pleasure to renew acquaintance with Fred Walters and Doctor and Mia Klemperer, and to meet their charming daughter. Fred Walters gave an interesting talk on the International Contest in Sweden and his travels thereafter through various European countries.

Their charming and most efficient President, Stan. Hall, installed this year's officials, and the amount of Gold and Diamonds among them would make our

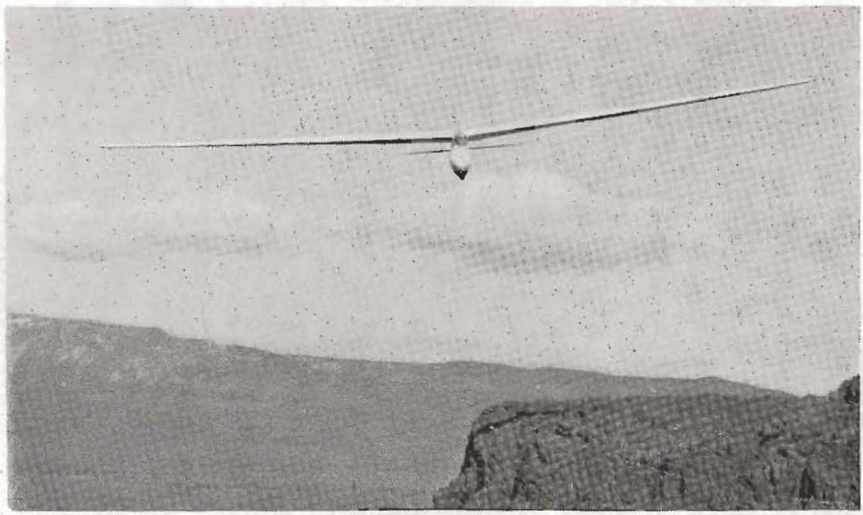
Treasury envious. Their projects for 1951 are enormous and include finding out what makes Bishop Wave tick. Johnny "Gold C" Robinson, the only "Gold C" in the World with 3 diamonds, is the pilot on this project, so we expect results—especially with Dr. Klemperer in the background.

I may add that I was sorry to leave Bishop to come back to the snow and frosts in the East, and more sorry still to know that the Wave came just after I left. I have promised myself another trip to Bishop in the not too far distant future.

According to Bob Symons and others the lenticular cloud lies between 80,000 and 100,000 feet with the roll cloud around the 20,000 feet level, so we can expect the World Height record to be beaten just about once more, i.e. 44,100 feet, before special equipment will have to be used. Failing the ability to procure a light-weight pressure suit, a pressurised sailplane will have to be built. This, I know, is in the process of being constructed, and when it is completed there is nothing to stop it getting to 60,000 feet or more. When Group Captain Cunningham made the World height record in a Vampire the point was reached where his critical Mach number and his stalling speed were only a few miles apart. This point in a sailplane will be reached at a much higher altitude, so there is no reason at all, apart from pressurization, why a sailplane should not reach much higher altitudes.

As far as flying in the Wave itself was concerned, I found it extremely boring just sitting there with the variometer showing "up" most of the time. However, the dangers are obvious, and should not be treated lightly. One must know one's height limitations, and the only way of finding out is to undergo tests in a decompression chamber. Normal precautions, such as carrying a baling-out bottle and having the oxygen and pressure breathing equipment thoroughly tested, should be observed.

In conclusion, I thank Bob Symons and Mrs. Symons and John McDonald, Bill Ivans and Irving Gere, Clarence and Mrs. See, all the willing helpers on Bishop Airfield as well as the members of the Southern California Soaring Society for all the excellent co-operation I received, making my holiday something to remember.



Soaring in Iceland: a home-built Olympia over Mt. Vifilfell, near Reykjavik. Photo from A. Kofoed-Hansen: block by courtesy of "The Aeroplane."

Performance Measurements on some German Sailplanes

by Dr.-Ing. Werner Spilger

Translated by permission from "Thermik".

In estimating the aerodynamical efficiency, and in employing a sailplane for meteorological research, it is important to know the dependence of sinking speed on forward speed in calm air. From 1935 to 1942 the author carried out performance tests on various sailplanes, only some of which were published in the yearbooks of the Deutsche Luftfahrtforschung for 1937, 1938 and 1942.

After the towing cable had been released at about 3,000 metres altitude, the indicated air speed would be held constant for a few minutes while an Askania fourfold recorder registered the course of the air speed, acceleration in the direction of the vertical axis, and usually also the pitching movements or elevator position. In the tug 'plane a meteorograph was carried; its readings gave the relation between air pressure and density. To ensure that the measurements should not be falsified by vertical atmospheric movements, the flying tests were carried out chiefly at night, in calm conditions and stable structure of the atmosphere.

At first the air-speed measurements gave rise to difficulties since, as is well known, the static pressure in the immediate neighbourhood of the aircraft differs from that in the undisturbed air stream, and also because the direction of approach of the air stream changes with the value of the lift coefficient. In the end the total pressure was obtained by means of an extremely insensitive total pressure gauge in the deflected air stream, and the static pressure by means of a static tube articulated at its centre of gravity, fixed above the rudder fin. With this arrangement it was possible to reduce the mean relative error to one per cent.

Sinking speed was obtained from the change in atmospheric pressure with time. It could be ascertained to within 2 per cent.

The record of the accelerations served to ascertain the increase of loading in circling flight in comparison with the amount of bank, as well as for characterising the condition of the atmosphere.

The ascertained speeds were converted to ground level (density = 0.125 kg. s^2/m^4) and to all-up weight minus recording instruments, and entered on the speed diagram. In this the abscissa is the horizontal component of the forward speed, which naturally differs little from the actual forward speed in the region between minimum

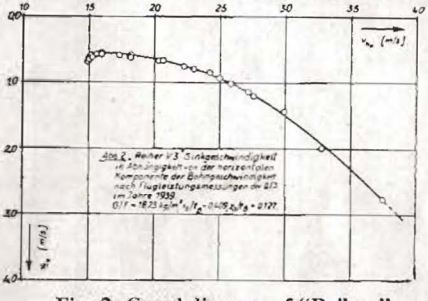


Fig. 2: Speed diagram of "Reiher."

speed and speed for best gliding angle. In Fig. 2 the speed diagram of the sailplane "Reiher" is given. Since in steady flight there is equality between the weight and the resultant of the air forces, the polars can be calculated from this curve. In Fig. 3, the polar of the sailplane "Habicht," ascertained in this way, is given. As this aircraft was the first to be measured in upside-down flight, the polars could be interpolated in the region around $C_L = 0$, which is difficult to measure. Angle of incidence and elevator movement were likewise measured and were included in the polar diagram, together with the actual Reynolds number. As the result of a comparison with wind tunnel measurements on a 1/8 model of the Habicht, a higher maximum lift and a lower minimum drag was obtained in flight. In the remain-

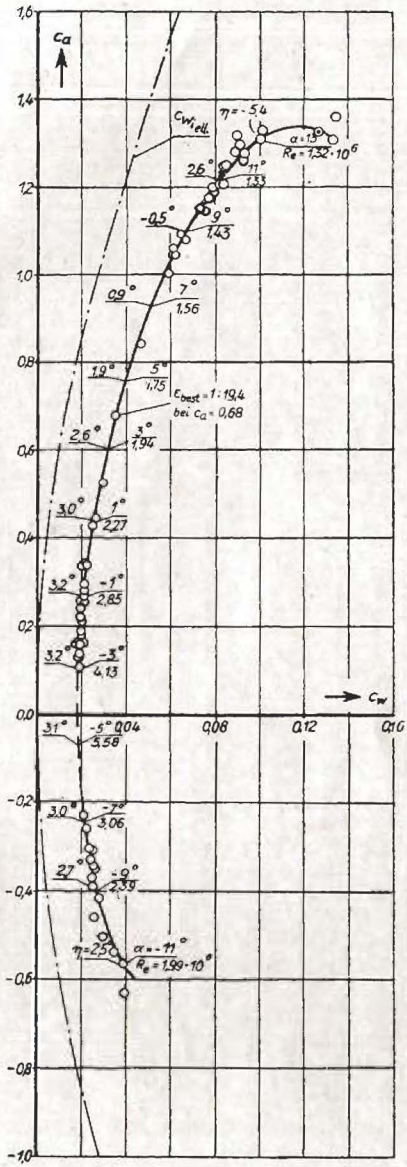


Abb.3 Polare des Segelflugzeuges „Habicht" bei fester Schwerpunktslage $x_s/t_B = 0{,}35$ und einer Flächenbelastung von 21,2 kg/m².

ing regions of the polar diagram the agreement between flight and model measurements is good.

The measurement data are set out in the Table. The speeds given have been converted to ground level.

With air brakes extended, the best gliding angle of the Mu-13d and Mu-17d deteriorated to 1 in 8, and that of the Habicht and Olympia-Meise to 1 in 7.5. All the data are not to be taken as absolute values, since the standard of construction, surface roughness, etc., influence the flying performance.

The use of the speed diagram for the technical investigation of soaring involves a presumption that the readings of the instruments are correct. With all aircraft, therefore, it is essential that the pressure tube above the rudder fin should be trustworthy. If the actual all-up weight differs from that used for the measurements by more than 10 per cent., a re-calculation of the speed figures is necessary. The actual gliding angle, indeed, remains unaltered, but the indicated speeds are changed in the same sense as the weight, though only by about half as much as the change of weight.

On distance flights it is easy to ascertain the speed for the best gliding angle in relation to the ground, if one regards the co-ordinates in the speed diagram as displaced by an amount corresponding to the actual wind; thus a system fixed in relation to the ground takes the place of one fixed in relation to the air stream. In Fig. 4, the values for best gliding angle of the sailplane Olympia-Meise for various strengths of up and down currents and of contrary and following winds are combined. By this and similar methods the measured performance data can be turned to account on distance flights.

In the measurements of steady circling flight it was established that the speed polar is not displaced as much as would be expected, through an increase of the apparent

Fig. 3 in adjoining column: polar diagram of "Habicht" aerobatic sailplane with wing-loading of 4.34 lbs. per sq. ft. Ca: lift coefficient; Cw: drag coefficient; Re: Reynolds number; alpha: angle of incidence; eta: elevator displacement. Commas are decimal points.

flying weight, in a properly flown circle; above all, it is also very much worsened, in the low-speed region, by increasing bank. The reason for this is to be found in the asymmetry of the lift distribution and the curvature of the flight path. However, there is no need to go into details, as the strength of the lift in an up-current region is for the most part unevenly distributed, and the variometer always furnishes the best check for the most economical circling in an up-current. When exploring an up-current region one should accordingly always try to reduce bank in order to avoid unnecessary impairment of the performance. It will serve as a check that to obtain minimum sink with 45 degrees bank, the flying speed must be increased by 25 per cent.

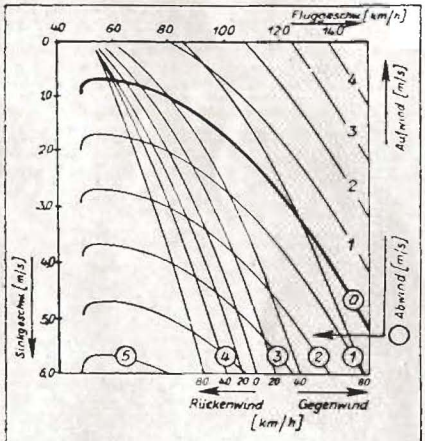


Abb 4 Geschwindigkeitsdiagramm des „Segelflugzeuges „Olympia". G = 245 kg, H = 0 m.

Fig. 4, adjoining: Speed diagram of Olympia. Ruckenwind: following wind; Gegenwind: contrary wind; Aufwind: upcurrent; Abwind: downcurrent.

Sailplane Type	*All-up weight* km. (lb.)	*Min. flying speed* km/h.	*Minimum sink in cm.(ins.) per sec. at flying speed of* km/h.		*Best gliding angle at speed of* km/h.	
Falke	270 (595)	64	93 (37)	64	1 : 19	65
Rhönbussard ..	240 (529)	50	88 (35)	58	1 : 20	67
Präsident ..	270 (595)	48	71 (28)	53	1 : 22	61
Seeadler—						
without floats	365 (805)	48	84 (33)	53	1 : 19	64
with floats ..	380 (838)	48	89 (35)	55	1 : 18	61
Rhönsperber ..	288 (635)	50	73 (29)	50	1 : 22	63
Sperber Jnr. ..	280 (617)	48	65 (26)	48	1 : 24	68
Sperber Snr. ..	290 (639)	54	74 (29)	56	1 : 23	67
Sao Paulo ..	380 (838)	54	63 (25)	54	1 : 26	67
Kranich—						
one up ..	380 (838)	43	68 (27)	47	1 : 22.5	62
two up ..	460 (1014)	47	75 (30)	51	1 : 22.5	68
Minimoa ..	333 (734)	54	70 (28)	61	1 : 25.7	70
Mü-13d ..	260 (573)	53	62 (24)	54	1 : 24.8	62
Mü-17 ..	250 (551)	51	64 (25)	54	1 : 25	64
Habicht ..	335 (739)	57	106 (42)	67	1 : 19.4	80
Reiher ..	350 (772)	54	57 (22)	58	1 : 31.1	74
Olympia-Meise	245 (540)	48	67 (26)	56	1 : 24.5	64

CONVERSION TABLE FOR SPEEDS :

Kilometres p. h. ..	1	43	47	50	55	60	65	70	74	80
Miles p. h.	0.62	26.7	29.2	31.1	34.2	37.3	40.4	43.5	46.0	49.7

About Scharfoldendorf

by M. Simons

I MUST first emphasize that, as it is now some time since I left B.A.F.O., by the time this appears the information will be almost a year out of date. With this reservation I will attempt to give a picture of conditions at Scharfoldendorf, site of the A.H.Q. gliding club, as they were when I left.

The site at Scharfoldendorf ("Der Ith") is undoubtedly one of the finest in Germany. The main ridge is an outcrop of limestone over twelve miles long, and can be soared in both east and west winds, though the east face is far less reliable than the west, which is over 600 ft. high for most of its length. Running eastwards from the main ridge is a steep but much shorter north-facing slope, the crest of which is well above the landing field and can only be reached from a high winch launch.

The landing ground, situated at the south end of the main ridge, is large but is nearly all steeply sloping, and the available area is so small that every landing must virtually be a spot-landing or a "cross-country." In west and east winds the approach has to be made through the lee downdraught and the landing, on a small flat patch only a hundred yards long, is far from easy. In north and south winds the available area is larger, but landings are usually made up or along one of the many gentler slopes.

On one occasion, after an east-wind undershoot had placed a Grunau Baby in the valley, on the west side of the ridge, the machine was launched up again with a winch placed on the hill, six hundred feet above it. The resulting climb was rather steep but the G.B. released overhead at a good height and proceeded to soar again on the east slope. Normally, however, with only three hundred feet of cable laid out, the winch launches are very low, and in east winds it is sometimes necessary to fly along the slope for two miles before reaching lift.

The most impressive thing about this club, however, is not the site but the sailplanes. In a flyable state when I left were two Weihes, two Kranichs, two Minimoas, five G.B. II B's, one Rhönsperber, one Rhönbussard, and two S.G. 38's, while a Mu-13 D III and a solitary Meise (Olympia) were being overhauled.

In fairness to the A.H.Q. Club, however, I must say that most of the machines in their hangar came as a legacy from other B.A.F.O. clubs which closed down, for although a list of their serviceable aircraft is impressive, a list of those unserviceable would be infuriating and heartbreaking.

The low membership of the club is caused in part by the isolated position of the site and by lack of official encouragement in the several units from which members could be recruited. Even the keenest of pilots can be prevented from visiting the site by lack of transport, or in other ways peculiar to the Service. Added to this, the cost of gliding in B.A.F.O. is slowly but surely rising. The supply of new aircraft, of which we heard so much in 1946-47, was exhausted long ago and all the B.A.F.O. clubs are reduced to the unhappy state of having to pay for repairs. Thus, with labour and material costs rising, subscriptions and flying fees are following. When I left the club, the subscriptions were already as high as some clubs in England, and flying fees, too, were showing signs of increase. Inevitably, if B.A.F.O. remains in existence much longer, there will arise the necessity for buying new equipment, and the money can come only from flying fees, which will have to be raised still further, or from official and semi-official sources. The ultimate result of this rise, if, as seems likely, it goes on, will be to bring the cost of gliding to the same, or—since all repair and maintenance is being carried out by paid German carpenters and mechanics—a higher level than in England.

The picture I have given is gloomy from any point of view. It may be that in the past few months some startling development has taken place which has changed the situation completely. If so, I have no doubt that readers of "Gliding" would be very glad to hear of it. Until we do, I am left with a vision of enough high-performance sailplanes to equip two or three international teams and enough Grunau Babies to supply every club in Britain with one, lying idle and almost forgotten in Germany.

CLUB NEWS

Army Gliding Club

THE club is now established at Lasham airfield (between Alton and Basingstoke), with John Free as the Resident Instructor.

During the winter the Committee has completely re-organised the club so that members can be sure of the maximum soaring and flying training.

The flying training syllabus is now established on an all-dual basis up to first solo and thereafter frequent dual checks and tests are given, culminating in the "Silver C" attempt.

Owing to the high cost of winch launching on an airfield with runways, we are converting to auto-towing with piano wire as the normal method of launching. Our long runway is nearly 2,000 yards long and in a fair wind we hope to get at least 1,500-foot launches, using our recently acquired Ford V8 auto-tow car.

During the summer a total of nine courses of one or two weeks' duration each are being run. A fortnight's course will cost £14 14s., including all flying and hotel accommodation, and a week's course £8 8s. The club fleet now consists of a T-21, a Cadet, a Grunau Baby and an Olympia; the last two have their own trailers. The club would, however, be glad to hear of a Prefect or other Grunau Baby: any offers?

Membership of the club now stands at nearly 80 members, full membership normally being limited to members of the Regular Army, the Territorials or the Reserves. Anybody may join as a day member, and visits by private owners or members from other clubs are always welcome. We hope to have some task-flying matches with members from other clubs during the summer. Come and challenge us on our Home Ground!

Bristol Gliding Club

THE amount of flying done this winter at Roundway has been limited by bad weather, mud and lack of suitable winds; however, on a few days the West Slope has been soared and some pioneering flights have been made over the North and South faces of the hill. Further work on the development of the clubhouse has been the extension of the electric light into the second cottage and the construction of a bar and a kitchen.

At Lulsgate early-morning parties are once again in fashion, and flying started one Saturday morning at 7.50. Fifty or sixty launches a day are made when the weather is suitable and four members have gone solo in the last few weeks.

The Winter maintenance programme is also making good progress. The Roundway Tutor was brought back to Lulsgate after a Sunday's flying, was overhauled on the weekday evenings and was flying again at Roundway the following week-end. The Olympia has also been overhauled.

A series of weekly courses are again being held at Lulsgate this Summer. These are intended primarily for beginners. Two or three soaring camps are also planned for Roundway, chiefly for our own members, but we also hope to have a few visitors.

During 1950 we made 4,807 launches, flew 355 hours and covered 576 cross-country miles. We got 67 "A," 42 "B," and 11 "C" certificates, 7 "Silver C" legs and 2 "Silver C's" completed.

J.N.C., P.D.T.

Cambridge University Gliding Club

THE Michaelmas Term—the beginning of the Academic Year—commenced with an Open Meeting at which about 30 new members joined the Club. Training was carried out for the first part of this term at Marshall's but we later started at Bourn, which proved a wise move. During the next term we were flying on five days a week and often were able to operate on the runways when rain made the airfield at Marshall's unfit for use.

Of our October new members, two ab initios—Angela Gore Browne and Steve Wiltshire—and five others with some previous flying experience have now flown the Prefect. These figures might have been better had our December training camp been blessed with better weather. Just before Christmas Basil Bell and about a dozen new members took the T-21 to the Mynd for ten days. Easterly winds pre-

vailed, however, and only about ten hours soaring were logged. On the other hand considerable progress was made in the kindred sports of skiing and toboganning. Our sympathy is extended to anyone who went to Switzerland and got nothing but dry west winds.

At the same time the Kranich and David Carrow's Kite were taken to the Clwyd Range in Wales. Some good soaring was had over Prestatyn Hill.

Our aircraft position is again quite good. We have flying: Cadet, T-21, Prefect, Cambridge I and Kranich, and hope to see the Olympia back soon. Modifications planned include the fitting of spoilers to the Cambridge I and belly-hooks to Kranich and Tutor.

Other equipment now includes a mobile two-drum winch of advanced design. It is mounted on a 3-ton Ford chassis and was designed and built at the Engineering Laboratories in Cambridge by David Martlew and David Clayton. "The Brute," as it has been christened in spite of its constructors, has just been operationally listed and has proved highly successful both in its trailer-towing and launching capacities.

At the time of writing eleven of us are sitting in the Midland Gliding Club's excellent club-room on the top of the Long Mynd listening to the howling of a strong easterly wind planning recces of the Malverns and/or other east wind sites.

J.K.W.

Deeside Gliding Association

(Incorporating the Cheshire Gliding Club and the North Wales Cross-Country Soaring Club)

We can offer nothing sensational in this report; in fact, one will find it almost as depressing as the front page of any newspaper. The obstacles in our path of progress have gradually been overcome one by one, but we now face the biggest of them all, of prison-wall proportions.

For some months past we have been negotiating for permission from Air Ministry to use Sealand Airfield for training purposes. It was rather unfortunate that Uncle Sam should be looking for an airfield also! Having got so far as receiving written permission from the Ministry to take over two small buildings and use of the field w.e.f. 7th ult., we had this withdrawn by telephone a few days later, the Ministry having overlooked the American tenancy arrangement which was settled a few weeks earlier. In view of past assurances regarding this field, we have, with the good aid of Kemsley Trust and the generosity of the late Shoreditch Club, gathered together more than sufficient equipment to start immediate flying.

Fresh negotiations are already under way for permission to use Hawarden Airfield, and a further approach is being made to the powers that be at the American Embassy. In any case we intend chasing up as many sites as possible in future, having made a big mistake in banking on the one all this time.

Here is a Club with two aircraft (Cade and S.G.) complete with new C's of A. and ready for launching with our serviceable winch, a Club not exactly rolling in money but not insolvent, and all we ask is a large field and the white clouds flying. G.T.

Derbyshire and Lancashire Gliding Club

Since the two flights in November which earned Lord Kemsley's prizes for winter cross-countries, many aspirants have been standing by, waiting for suitable weather to oblige again, but in vain.

An unusual phenomenon was encountered on 28th January. At about 3.45 p.m., Betty Gayes in an Eon Baby and Harry Midwood and Jack Clare in T-21 contacted a small wave in front of the hill. Interesting points were that the wave system was creeping at about 5 m.p.h. *against* the 10 m.p.h. main wind. There was a complete roll, and while the wave was overhead our ground wind went temporarily east. Cloud base came very low, but they sat up in front of the cloud until it moved away, leaving them room to come in. Meanwhile we on the ground were getting very worried. Maximum gain only 1,600 ft.

Lectures and film shows have been laid on every Saturday evening through the winter; among the lecturers were Geoffrey Dorman on "50 years of Flying," and Lord Ventry on "Balloons and Airships."

Annual General Meeting.—This was held on 3rd March, and here is a summary of the Chairman's Report:—Membership has increased during the year from 219 to 246, which makes us the second largest club in the country. The site has been improved considerably by the removal of another

stone wall, and a new Bunkhouse has been built and equipped and is expected to be habitable for Easter.

Except for a few broken skids and minor damage, there have been no serious accidents at Camphill during the year. Two-seater training is now standard practice, and very satisfactory results have been achieved with the T-31 (two-seater Tutor), backed up by the T-21 as a reserve.

Excluding the National Competitions, flying took place on 109 days, of which 98 were soaring days. Training took place on 76 days and 3,208 launches produced a total of 1,177½ hours. Three "A," 3 "B" and 3 "C" certificates were taken by ab initio members. Five "Silver C's" were completed and three "Gold C" heights were obtained at Camphill.

J. S. Armstrong, who has been the House Secretary since the Club re-opened at the end of the war, has had to resign owing to pressure of business, but he will still retain the post of Club Treasurer. Louis Slater, E. Swale, C. L. Faulkner and B. A. G. Meads were re-elected to the Committee and two new members, H. Cook and L. R. (Curly) Bulling, were elected for the first time.

Various Trophies were presented: the Chairman's Trophy, for the best effort towards gaining a "Silver C," to H. Cook; the "Widow's Mite," for best progress by an ab initio pupil during the year, to Michael Kaye, our youngest flying member (aged 14), and the Dickson Tankard, for the best work on the ground, to C. G. Mackintosh.

The Club has been asked to hold the National Championships this year, from 21st to 29th July, and the Club has also accepted an invitation from the Royal Aero Club to submit proposals for the holding of the World Championships in 1952.

Handley Page Gliding Club

THE year 1950 for us opened inauspiciously with a declining membership, and operations were frequently carried on with six or less bodies. The limit to this sort of procedure was, however, reached one boisterous day in April when three optimists proceeded to fly the Tutor—winch driver, cable payer-on and pilot. (Running the wing-tip on the grass presented no difficulties whatsoever!).

The Rhönbussard spent the month of March with Southdown Club at Friston, when some very exhilarating cliff-soaring was experienced and Ratcliffe got his 5 hours "Silver C" duration. In this flight a height of 1,800 ft. was reached while flying over low cloud which obscured the site for half an hour.

Later, 2,000 ft. was bettered several times at Radlett, Vernon getting the club height record of 3,850 ft. in July. On this occasion the thermal was picked up at well under 200 ft., the height gained being thus sufficient for "Silver C".

The appeal for support made at the Annual General Meeting in July resulted in a new surge of enthusiasm and rise in membership. As the past committee officers decided to shed the reins of paper-work to enable them to concentrate more on the technical side, there was a complete change, John Rose taking over as Chairman with W. E. Pearce and H. Brittlebank as Hon. Secretary and Treasurer respectively.

During the summer holidays the Bussard spent a few days at Dunstable, and some useful hill-soaring practice was put in.

In spite of the small membership relative to the number of aircraft, most of the repairs and all C. of A. maintenance are now done by the members, only the larger items being contracted out.

Two-seater Cadet Project.—Two-seater T-21's are financially out of the question and we shall have to fend for ourselves. Some effort is at present going into a design study for a modification to the Cadet with an extended-span wing. This two-seater modification looks to be by no means the difficult technical problem it might appear, and the loss of minimum sink compared with the single-seater is estimated to be only 0.1 ft/sec.

In November our long-awaited replacement cable was obtained, and by retaining a little of the old one we now have some 4,000 ft. available.

Our improved position has recently been consolidated by the acquisition of a warm and comfortable office leading off the hangar where our machines are housed. In all, 1950 has produced 521 launches and 20 hours' soaring. Two "Silver C" legs were obtained, together with a sprinkling of "A" and "B" certificates.

January and February, 1951.—In spite of the exceptionally wet weather, we managed 50 per cent. more launches than in the same period of 1950. One interesting day was the 14th January, when, due to some unex-

plained evening thermal activity to the west of our site, the Tutor was able to maintain height for about 5 minutes on two consecutive flights. On 18th February the Bussard, with a party of four, visited Cambridge University Gliding Club at Bourn. We hope as a result of this visit to be able to introduce auto-towing at Radlett, where excellent runways are available. This should increase the rate of launching and thus increase our revenue.

C.O.V., G.R.

Hereford Gliding Club

It is interesting to recall that since 1930, almost without a break to the present time, Hereford has been one of the very few places in the British Isles where gliding has been kept alive and active over such a period.

From 1930-1931 the first Hereford Gliding Club operated with a small number of members, much enthusiasm, and a Zögling, upon the slopes of Dinmore Hill between Hereford and Leominster.

In 1934 a new club was formed with rather more members, the benefit of past experience, and a Dagling, and operated on a small hill site about 4 miles S.W. of Hereford at Haywood. This club struck a new note by being affiliated to the Midland Gliding Club as one of several primary training grounds. It disbanded just prior to the outbreak of war in 1939.

In 1943 Hereford was approached to provide an A.T.C. gliding school. By collecting bits and pieces from at least four club sites and executing the necessary repairs, a real "bitza" Dagling was built and No. 50 Elementary Gliding School was set up.

In 1948 the newly formed aviation company (Aircraft Hereford Limited) acquired some machines and intended operating a commercial gliding school, but this proved impracticable. With the idea of again forming a Hereford Gliding Club, a group was permitted the use of the company machines and carried on training a nucleus of instructors and other members.

By September, 1950, the Hereford Gliding Club was again in operation as a separate entity. The equipment consisted of a Cadet and a Tutor, together with a converted "Wilde" balloon-winch and a converted beaverette for retrieving. Up to date the club fleet has been augmented by the use of a member's Kirby Kite, which is generously loaned to the more proficient members of the Club. A T-31 has now been added, which should provide a very much improved method of training and of maintaining a general interest in the Club. There are many associate members looking forward to a circuit in this machine.

Although the weather has been extremely bad this winter and prevented flying on many week-ends, a quite considerable amount of steady training has progressed, and some thermal flying was enjoyed about the beginning of March, one or two flights being up to half an hour in length. The winch has now been fitted with a second cable drum with automatic pay-on.

J.A.B., D.C.W.

Luneburg Gliding Club

In reviewing the activities of our Club during the past twelve months, we feel that the year 1950 has seen a steady rate of progress in all sections. Eight thousand launches were made for a total of 610 flying hours, during which time the following certificates were gained: 19 A's, 15 B's, and 13 C's, together with four Silver C's gained by Cpl. Ansley, Cpl. McKercher, Sgt. Shattock and A/C Greenall. With the exception of Cpl. McKercher, our present C.F.I., all are now ex-members, Cpl. Ansley having been posted to R.A.F., Binbrook, Sgt. Shattock to R.A.F., St. Athan and A/C Greenall to Fontainebleau.

During the year, several cross-country flights were attempted, three of which resulted in "Silver C" distance. Sgt. Shattock flew the Bussard to R.A.F. Celle, a distance of 79 kms, Cpl. McKercher covered 54 kms. by Meise in the Lübeck direction, whilst Bill Greenall completed two legs of his "Silver C" in the Mu-13 by flying to Elmshorn, a distance of 70 kms., and staying up for more than five hours. Resulting from these flights, all three pilots completed their "Silver C" qualifications.

Turning from the distance and time factors to that of altitude, it is felt that by far the best effort of the year was that of Cpl. Bill Ansley in a Weihe, who at the time was our C.F.I. The launch from which this flight started was only intended for the flying of the aircraft from the hangar to the usual launching site. At 500 feet the pilot

TREASURE CHEST

MOST people have some carefully guarded box, "bottom drawer" or treasure chest, where they keep things which have, for them, special significance. This "treasure chest" is usually to be found tucked away in a corner of the attic, difficult to get at. Still more difficult is the task of sorting these "treasures" into order when they are periodically explored. Often they have suffered from being squashed together and from dust, damp and decay.

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cast off and shortly afterwards found a very strong thermal from which he climbed to 6,000 feet. At this height the Weihe entered the base of a cumulus cloud with strong development and everything continued to proceed most favourably with additional height being steadily achieved, until the altitude of 9,500 feet was reached. At this height the artificial horizon rapidly became unreliable and soon failed completely, the venturi having iced-up. Later, on landing, the pilot related the sequence of events after the artificial horizon had become unserviceable. He had no "clues" on what was happening, but whatever it was, it was taking place at a terrific speed. The pilot was on the point of preparing to jump, when he found himself hurtling out of the bottom of the cloud at a little over the vertical. Again the Weihe was back to 6,000 feet, and after levelling-out, the pilot carried on to the uneventful part of this flight, which terminated after a period of 5 hours 40 minutes. With this performance another "Silver C" had been completed.

Early in the year S/Ldr. Fawcett took over as officer i/c Gliding Club. This member began gliding with the Lübeck G.C. one of the first clubs to be formed in B.A.F.O.

F/O Howard, our secretary and only W.A.A.F. member, is still with us. She has had some very good flying this year and during one particular trip just missed her "Silver C" height by 200 feet.

F/Lt Bailey, our treasurer, joined the club at the same time as S/Ldr. Fawcett.

The membership now stands at approximately 20 per cent. more than nine months ago. For those members who were able to utilize annual leave, two special training periods were organized. During one period of 21 days in August, 14 good soaring days were experienced. On occasions in the early afternoons, thermals giving five metres per second lift at 1,000 feet were quite common over a large area. Six members gained their "Silver C" heights with flights varying between 5,000 and 7,000 feet. One particular day resulted in 14 flying hours from eight launches. Cross-country flights were not possible, due to the prevailing west wind and our close proximity to the Russian Zone.

On 22nd August we were unexpectedly visited by Guy Marchand, holder of the World single-seater duration record. The visitor was taken up by Mac in the Goevier on a familiarization trip of the airfield, and then had two trips in one of the Meises.

Our workshop continues to be a busy place, carrying out the odd repairs and the various inspections. In the capable hands of "Ziggy" and Werner, this section of the club maintains its very valuable and vital support, together with winch operation and cable retrieving, carried out by both of these German employees during off-duty periods.

During the winter months the opportunity is being taken to carry out complete overhauls of several machines. In particular, the Goevier is now back in service once again, looking very sleek and certainly less fearsome, now that the shark-like teeth and eyes painted on the nose have given way to a coat of plain cream colour. This aircraft is one of our most treasured possessions and is also strongly favoured by newcomers to the club. Particularly is this to be noticed among those who have not previously been airborne. The side-by-side seating inspires lots of confidence in the beginner and is also more reassuring to the instructor, who, apart from being able to instruct more efficiently, is in the best possible position should any emergency action be necessary.

With regard to the launching of aircraft, the winch method continues to be used with 1,000 metres of 15 cwt. cable. Altitudes attained off the cable vary between 1,000 feet for the-two-seater machines and 1,300 ft. for the single-seaters. Our plans for the coming season include the operation of two winches at the same time, one for learners, the other for advanced members. With this in view, Werner is taking every opportunity to give instruction on winch operation.

Our accident rate has been quite small, but, like most clubs, we have our special stories relating to certain accidents which could have been avoided if . . .

At the moment we are still without a club-room, and the workshop continues to serve the dual purpose, but in the near future we hope to have a club-room of our own.

Finally, we wish to extend a welcome to all ex-members of the Club, who wish to join us for the special training periods during the coming season. For further details, write to the Club Secretary, Station Gliding Club, R.A.F. Lüneburg, B.A.F.O., c/o B.A.O.R. 8.

N. E. FAWCETT, S/Ldr.
Officer i/c Gliding Club,
R.A.F. Station, Lüneburg.

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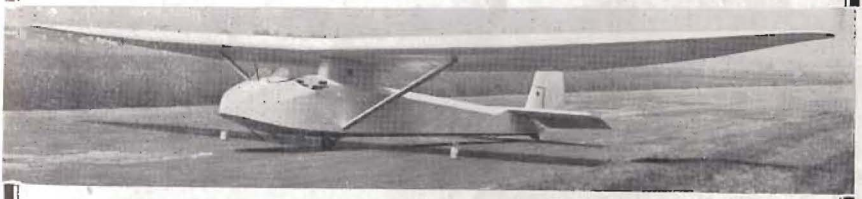
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London Gliding Club

FLYING during the year 1950 amounted to 2,239 hrs. 42 mins., from 6,936 launches.

December brought only one good soaring week-end, including something very like an "evening thermal" on the 16th, though it happened just after lunch. In a wind of less than 10 m.p.h., Buckley and Hands in Olympias could only maintain 400 feet above launch (150 ft. above hill-top), till they suddenly discovered better lift some way in front of the hill and rose to 1,200, 1,150 ft. respectively, while Rivers reached 850 ft. in a Grunau in the same way. This belt of extra lift, which felt noticeably warmer, was quite narrow, and lay parallel to the whole length of the hill, 600 yards to windward of its slope. The only explanation offered is that the cold, wintry surface-air was banked up against the hill by the wind, and itself formed a "pseudo-hill" (to use Cochemé's term), in front of which the overlying warmer air was forced up. In this forward area of good lift, the wind was doing about 35 m.p.h.—more than three times that of the cold air below, though it lifted Buckley's Olympia at only 1 ft./sec.

Flying for the month was 27 hours.

January flying time was much better—146¾ hours. On the 7th, which produced nearly 43 hours soaring, Slingsby's new "Sky" was brought along by Furlong and flown by him and Stephenson. Nobody got up alongside of it for comparative tests, but its good penetration against the wind was obvious enough from the ground.

Every week-end except the last was soarable, and many week-days too, but nobody found good enough thermals for going away on a Kemsley prize attempt. The impossibility of reaching great cumulo-nimbus clouds passing over on the 15th was particularly aggravating.

In the final week-end of January, Ann Douglas and Lorne Welch came over to examine instructors for B.G.A. categorisation. Seven were given their B1 and B2 categories: Dodd, Hanks, Hands, Simpson, Stephenson, Ellis and Tudor Edmunds. They have been well coached by our C.F.I., Dan Smith, and will now take much responsibility off his shoulders.

February brought several good soaring days but still no cross-country flights. On the 6th there was cumulus at mid-day and cumulo-nimbus in the afternoon, but the blue Olympia, with Hanks in it, remained obstinately at 350 feet above hill-top for three hours. On the 19th, four machines did 10¼ hours—quite good for a Monday in winter, and on the 22nd several people soared again, including Stephenson, who reached 1,200 feet.

The social event of the month was the Club's twenty-first birthday party on 17th February, when the many guests included J. R. Ashwell-Cooke and the Editor of *The Aeroplane*, both of them Founder Members of the club. The reminiscent speeches of Ashwell-Cooke and Dudley Hiscox cleared up many doubtful points about the Club's early history, especially the methods employed to keep itself solvent! They have been reported in the Club *Gazette* and *The Aeroplane*.

The old Minimoa, which Wills first brought to the Club in May, 1936, has been sold to Mr. Magnusson, of Iceland, by its present owners, Lawrence Wright, Dr. Edmunds and H. M. Latto. We were sorry to see the last of this veteran. Jacques Cochemé's Olympia has been bought by a syndicate of four in the Derby and Lancs. club.

A. K. Robinson has left for the north after two years' valiant work producing the Club's monthly Gazette. A. Ivanoff is taking his place, with Mary Greaves as assistant.

A.E.S.

Midland Gliding Club

FOLLOWING on the poor months of October and November, December proved to be little better, there being few days when soaring was possible at all, and the days that did produce a west wind lacked any vitality.

During the month Cambridge University Gliding Club paid a visit with their T-21 "Bluebell" and put in 19 hrs. 20 mins. in about 5 flying days.

On 2nd December we had an unusual experience for the time of the year, i.e., winching into thermals. Alan Brook soared the Avia for 30 minutes and John Hickling the Club Olympia for 40 minutes. Wind at the time was W. 5 knots, with 4/8 cumulus cover; cumulo-nimbus visible over Wales.



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These clouds later clamped down and snow began to fall. Total hours for the month 27½.

Statistics for the year :—Total hours, 1,260; launches, 2,400 approx.; best month September, 212 hours; worst month November 3½ hrs. Individual totals: R. L. Neill, 76 hrs.; several others around 50 hours. Two "Silver C" badges completed, 2 more just missed on distance leg; 3 duration legs in one day with Cambridge I, and untold height legs.

During five A.T.C. camps in August and September, of 6-7 days' duration each, 50 instructors attended, had 491 launches totalling 188 hours, obtained 15 "C's", two durations and one height leg (5,500 ft.) towards "Silver C."

January, 1951.—On the 7th the Cambridge Club's T-21 joined all the club aircraft in the air and there was 6 hrs. 40 mins. flying. The 13th was also a good day, with cloud lift early on, in which Horrell reached 3,800 ft. a.s.l. Conditions changed later and John Hickling was able to soar well away from the Mynd towards the Stiperstones in gentle lift which must have covered about 12 square miles. Next day was an obvious Kemsley cross-country day, with 5/8 cu. R. L. Neill reached 4,000 a.s.l. in cloud, but these good conditions soon deteriorated and a typical wave downdraught set in over the Mynd slope. Total flying for January: 31 hrs. 10 mins.

February.—The 17th brought 5/8 cu. in a W.N.W. wind of 40 m.p.h., with hill lift up to 3,400 ft. a.s.l., and good lift under cumulus, but the wind was rather too strong for much circling. Best height 3,750 a.s.l. in Olympia by Horrell. Good cumulus appeared on the 24th in a N. wind but could not be contacted. In a very oblique N.N.W. wind of 15 m.p.h. on the 25th, the Olympia and T-21 managed to hold 400-500 ft. at the south end. Total flying for February: 13 hrs. 30 mins.

We had the pleasure the other day of signing on a new member by the name of Mr. Laver. We understand that Mr. Laver was responsible for organising one of Kronfeld's demonstrations in the south of England in 1931. He produced a "C" certificate the number of which made most of those present ashamed to call themselves gliding types. [J. Laver was the leading pilot of the former Dorset Gliding Club, and twice held the British duration record, 7 hrs. 22 mins. in 1933 and 12 hrs. 21 mins. in 1934.—ED.].

R.A.F. Bridgnorth are bringing their T-21 up to the Mynd soon, to get some of their instructors trained on gliders. They also have a Prefect. J.H.H.

Oxford Gliding Club

PROSPECTS of active flying being started by this Club look brighter than they have been for some time.

They have a nucleus of 35 members, of whom only five have any number of hours' gliding to their credit, but they have several experienced power pilots. It has been decided to buy, pending the approval of the Kemsley Flying Trust, a new T-31, a Tutor, and a second-hand Olympia, this latter to be either a Club machine, or to be owned at first, at any rate, by a syndicate—this again depending on the Kemsley Trust.

They have applied for the use of and hangar space at Kidlington airfield, north of Oxford. There will be winch launches for the T-31, in which all instruction will be given, and the Tutor, and arrangements have been made for a Tiger Moth to be adapted for aero-towing the Olympia. Subscription will be £5, winch launches 2s. 6d. each; aero-tows are expected to be about 10s. for 1,500 ft., £1 for 3,000 ft.

If the decision of the Trust is favourable, they hope to start flying towards the end of April.

Prospective members should apply to Mr. R. M. H. Goodall, Oriel College.

Portsmouth Gliding Club

THE first month of 1951 started for us all here in a rather depressing vein, because, besides C's of A, finishing off our Cadet and looking round for such things as a new block for the taxi (a real London Taxi), and a new pinion for the Buick, we suddenly had to look for a new home, and new homes (Gliding Clubs, for the use of) are even scarcer than blocks and pinions.

However, fortune smiled on us, and, thanks to the good work of Wing Cmdr. Coathe, Manager of Portsmouth Airport, we now have a hangar frame, of tubular construction, which we are renting from the Corporation. (Wing Cmdr. Coathe, incidentally, has been flying since 1914 and did some gliding in the very early days). Its removal from its original site to the other

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side of the aerodrome did not daunt our members, who, armed with tins of easing oil, various spanners, and dressed for gliding, and led (sometimes driven, sorry Bert) by Bert Parslow, dismantled the hangar structure in one week-end—Nice going!

We have decided to cease flying until we have broken the back of the hangar job; we have, in any case, had to suspend training owing to the waterlogged state of the ground—our winch is still bogged! But, our C's of A finished, come the first good flying day, and the hangar will look suddenly deserted.

Our Secretary, Audrey Johnson, and our C.F.I., Bert Parslow, decided to join forces on 3rd March, and were married at Portchester Castle, and we wish them all the Best Wishes and Happiness for the future.

J.P.

Royal Air Force Gliding and Soaring Association

WINTER activities are generally concerned with preparations for the coming year, and the R.A.F.G.S.A. has recently been concerning itself with flying rules and regulations, maintenance and insurance.

Flying Rules and Regulations are about to be published, and will concern themselves with three main subjects, namely: Operating Instructions, governing the actual procedures during launching, safety regulations and so on; secondly, a specimen Syllabus of Instruction to regulate the type and minimum amount of experience to be given under various conditions; and thirdly, Instructor Categories, and standards required to achieve them.

In this connection, it may be of interest that the Association intend to use dual instructional methods as much as possible, and, to put this intention into effect, have placed an order for four Slingsby type T-31 two-seaters. We have also acquired the Gull II, so that our two-seater fleet will shortly consist of the four T-31's, a pair of T-21's and the Gull II.

Maintenance and insurance, of course, are to some extent interdependent. The Committee are engaged upon rather protracted negotiating on both subjects now, but it is hoped shortly to announce schemes which will meet with the approval of all our Associate Clubs.

In the high-performance field, we now have several sailplanes and pilots who, it is hoped, are capable of performing well this year. It is the aim of the Association to make each high-performance sailplane into a mobile soaring unit, by providing trailer, vehicle and camping kit to go with it. When this plan bears fruit, we expect that numbers of R.A.F.G.S.A. teams will be able to visit sites in this country and elsewhere, and gain valuable experience. But, most of all, we intend to concentrate upon instructors and pupils, for the latter are our high-performance pilots of to-morrow; they are the reason for our present concentration on acquiring two-seater dual trainers. We hope more high-performance sailplanes will follow later.

Royal Naval Gliding and Soaring Association

AT the Annual General Meeting of the Association, held at Lee-on-Solent on 15th March, the Chairman, Captain D. McI. Russell, R.N., announced that since the last meeting the Admiralty had agreed to accord official recognition to the Association's activities, which was a great step forward in the encouragement of the sport of gliding and soaring in the Navy.

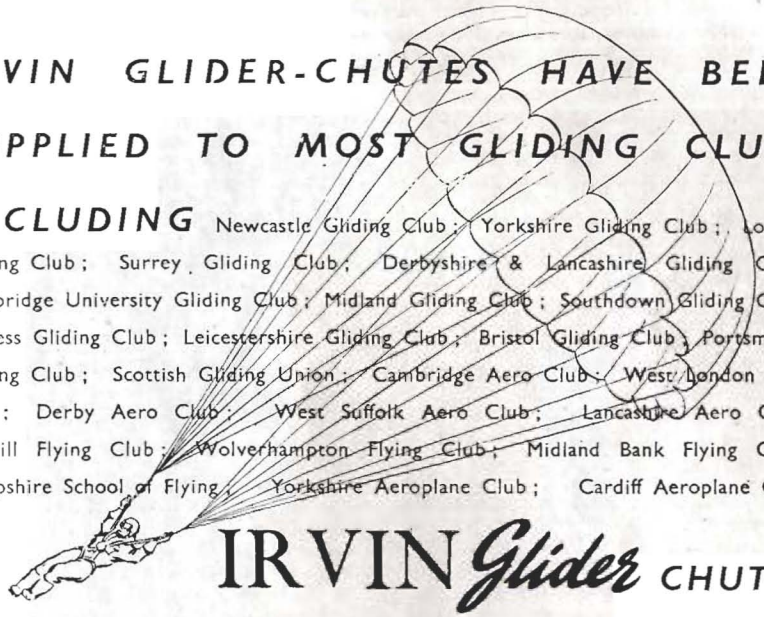
He said that two of the Association's branch clubs had doubled their number of flights in 1950 compared with 1949 :—

	1949	1950
Portsmouth Naval Gliding Club	950	2000
Fulmar Gliding Club (R.N. Air Station, Lossiemouth)	550	1100

The clubs at Eglinton (Gannet Gliding Club) and Arbroath (Condor Gliding Club) had managed 200 and 150 flights respectively, while the club at Stretton (Blackcap Gliding Club) had unfortunately been unable to start activities at all for lack of an instructor, although it had winches, gliders and plenty of members.

The Chairman went on to say that the Association had entered a team (Lieutenant Commander A. Goodhart and Lieutenant Commander (E) N. Goodhart) to represent the Navy at last year's National Gliding Contests. The team had flown the Mu-13a sailplane (loaned by the Admiralty) into second place out of 29 entries, and as a result the Association was now the champion gliding club of the country.

He also announced that, in company with



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the Gliding Associations of the Army and R.A.F., the Association had received a most welcome grant of £1,000 from the Nuffield Trust for the Forces of the Crown; and that the Naval Sports Control Board had been pleased to allot £200 to help with insurance —that very heavy millstone round the necks of all gliding clubs.

It was decided that the Association would buy two of the new T-31 dual training gliders from Slingsby Sailplanes, Ltd., and that they would be allocated this year to the Condor and Fulmar Clubs, as it was considered that they would be able to make most use of them, the Portsmouth Naval Club having already obtained, last year, a Slingsby T-21 two-seater with the help of the Kemsley Flying Trust.

In order to encourage branch clubs to accept the Association's gliders on hire, it was decided to subsidise insurance of these gliders, and of gliders owned by the clubs, to the extent of half of the premiums; and it was earnestly hoped that the clubs would be in a position at the end of the year to return to the Association one-third of the no-claim bonuses it was hoped they would receive.

In order to improve the standard of instruction at branch clubs as early as possible, it was decided to assist them financially to send their instructors to the B.G.A. Instructors' Course which it was understood would be held in April. The Association's Chief Flying Instructor agreed to advise, on instructional methods, any club which was unable to take advantage of the course.

The Association decided to invite Vice-Admiral C. E. Lambe, C.B., C.V.O., the new Flag Officer Air (Home), to become its President in succession to Admiral Portal, who had resigned on leaving the Home Air Command.

At the end of the meeting the Chairman said that he hoped the much improved state of the Association's finances, and the help that it had accordingly been possible to give to the branch clubs, would be reflected in an allround increase in the sport of gliding at the Naval Air Stations where clubs existed.

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Scottish Gliding Union

SINCE the last S.G.U. Club notes appeared we have experienced the most sustained period of bad weather for some years. With the approach of spring, the tempo of life at Balado has increased, and recently it has been usual for two lines of launch to be in operation while three or four parties were working on buildings or equipment. Two retrieving vehicles have been overhauled and the trailer winch is at present being done.

A successful experiment was made in fitting 700 feet of solid wire to the end of the winch cable. The wire, being lighter and smaller in diameter than the cable, allows higher launches to be made. It is also much cheaper, and the wear and tear caused by crossing intersecting runways is reduced. It is necessary to use a parachute at the end of the wire, and of course it is not possible to wind the solid wire on the drum.

Two-seater elementary instruction courses have been started with 6 pupils allocated to three instructors for a period of one month or four flying days. Two pupils and their instructor attend on Saturday, the others on Sunday, and they have first call on the T-21. Results so far seem promising, although non-flying weather has caused unfortunate delays.

On Sunday, 4th March, wave conditions were experienced at Balado. During most of the day large areas of 10 ft/sec. sink and smaller areas of reduced sink were encountered, but launches, which averaged 900 feet, appeared to be too low to contact the rising air. As evening approached, it became possible to gain height, but cloud, which had become 10/10, was entered at 1,200 feet. The waves were not lee waves, as the wind was blowing parallel to the Ochil Hills and along the shallow valley formed between the Ochil and Cleish Hills.

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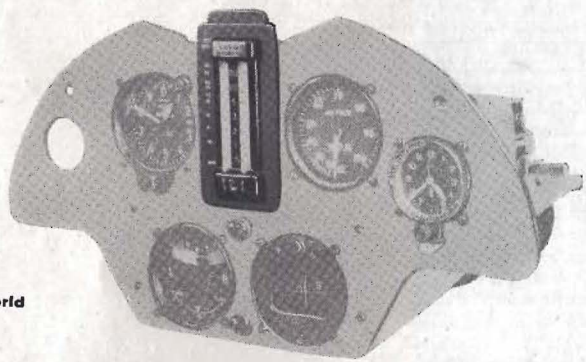
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Southdown Gliding Club

As I write these notes, this year of trouble and strife—no meat, and "Z" call-ups —is over two months old, and, although there is nothing to report in the way of flying, we have beaten the busiest of bees when it comes to hard work.

In the midst of overhauling our T-21B, Kadet and two Tutors, we also held our Annual General Meeting and Dinner, making the latter our 21st Birthday Party as well. This was very well attended, 90 members and guests mustering at Langford's Hotel, Hove, where we think we put on quite a good show. Our guest of honour was Philip Wills, C.B.E., accompanied by his team-mate, Mrs. Wills. Philip was prevailed upon to present our Cups to those members who had earned them, and Mrs. Wills, with due ceremony, cut the birthday cake. John Furlong, D.F.C., presided.

Jo Hahn (Southdown and Bristol G.C.) was awarded the Leaney Cup for his 23-mile cross-country flight at the Mynd in Tutor 1, and the York Cup for attaining a height of 3,500 feet on this flight. It was the first time that a Tutor has gone away from the Long Mynd. Then Dave Parsey collected the John Lawford Cup for the most outstanding flight of the year. Dave did five hours over East Firle, hill-scraping for the first two hours, and the final three fighting very rough conditions.

The room was then cleared, and fun and games went on until midnight. A series of colour photographs of aerial views of Beachy Head and the Cliffs (taken from the T-21 by a visitor) were of great interest, particularly those showing Eastbourne, a view that many of us have not seen so far.

The A.G.M. produced many changes in the Club's Officers. "Steve" Stevens resigned from the Chair and his place was taken by Don Snodgrass, with your unworthy scribe as Vice; Eric Jarvis agreed to do another year as Secretary (his address is 45 Havelock Road, Hastings); Maurice Rose took over the Treasury from Dave Parsey, and Peter Healey undertook to carry on the good work as O.C. Works and Buildings from Don.

Our C.F.I. is still Ray Brigden, and as long as we have got him in this position, we have very little to worry about. The things that chap can turn his hand to are amazing.

Finally, as mentioned in our last notes, the Olympia will be flying by the time you read these notes, and it may well be that the next issue of GLIDING will contain news of the progress of our long-awaited record seeker. The machine will be No. 1 of our mobile section, which this year again proposes to visit the Mynd, and will, we hope, bring home the bacon in the shape of the odd "Silver C."

SQUEEGE.

Gliding in the Air Training Corps.

DURING 1950, although severely handicapped by the bad weather, A.T.C. Gliding Schools carried out a total of 105,614 launches and trained 1,474 cadets to the F.A.I. "A" certificate standard. Of these cadets 252 received additional training and qualified for the "B" certificate and three cadets qualified for the "C" certificate.

The year 1950 was remarkable for three things: the introduction of new equipment including a Sedbergh TX Mk. I two-seater glider in each school which made possible the more advanced training of cadets, replacement winches and Bedford 15-cwt. retrieving vehicles in lieu of the well tried Beaverettes; the introduction of instructors' courses at an R.A.F. operated instructors' school at R.A.F. Detling; and A.T.C. participation for the first time in the British National Gliding Contests.

Valuable lessons have been learnt as a result of all these projects, the most notable of which is a proposal to introduce generally two-seater training instead of the old solo or single-seater method. Due to financial limitations, however, this proposal will probably be some time taking effect.

It is worth noting that during the year the Instructor School carried out 5,682 launches, flew a total of 673 hours 31 minutes, and passed out 304 students. The best results from an A.T.C. School was 72 "A" certificates and 15 "B" certificates for 5,307 launches carried out by No. 89 Gliding School at Christchurch.

(From Headquarters Home Command, R.A.F.)

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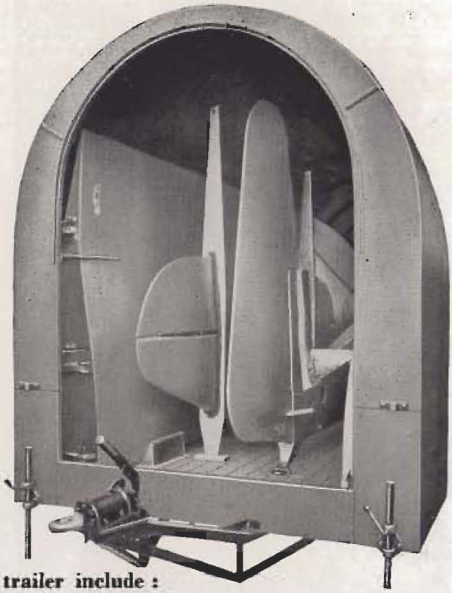
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