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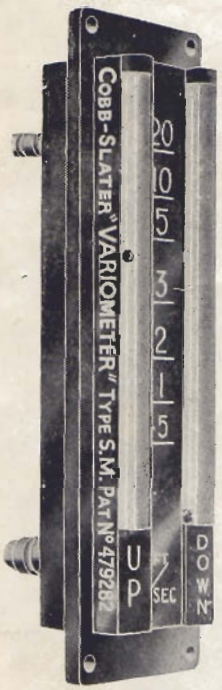

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Sailplane and Glider

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FEBRUARY 1947 ★ Vol XV No 2

EDITOR:
VERNON BLUNT

ASSOCIATE EDITOR:
ALAN. E. SLATER

ADVERTISING
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CONTENTS

EDITORIAL

THE Annual General Meeting of the British Gliding Association Ltd., held on January 24th, 1947, at Londonderry House, was a very successful and heartening affair. It is clear that if Gliding in Great Britain last year got off to a false start, or did not get off, things are going to be different this year, other conditions remaining the same. There are more Clubs who are members of the B.G.A., more Associate Clubs, the manufacturers report machines will be available, there will probably be more petrol, Clubs have got their rotas of instructors and pupils arranged, and finally, but not by any means least important, there are signs of Government interest in Gliding. But as Col. Preston, the Secretary General of the Royal Aero Club said, there probably will not be a subsidy, but if not, there will almost certainly be indirect help. His figure of the possibilities of 30,000 people being devotees of the sport confirms our own estimates.

At present there are two Committees sitting on Private Flying. One, an Informal Committee, consists of various invitees under the Chairmanship of Mr. Peter Masefield, Director of Development at the M.C.A., and has no officials sitting on it. The other, known as the Straight Committee, consists of representatives of various official bodies. It may include Members of both Houses of Parliament at a later date. Both Committees have now reached a stage in their deliberations at which Gliding is to be considered. Mr. Peter Masefield's Technical Committee is considering the specification of various types of Gliders and Sailplanes, which may become officially approved. At any rate they will set a standard. The Straight Committee is considering Policy. It seems odd that *Sailplane* should have been invited to send its Editor to the Technical Committee and not to the Policy Committee, where presumably the wide contacts which any Editor must have, might be brought to some use in so far as they represent public opinion.

One aim of the Masefield Committee is to create acceptable technical conditions in which Sailplanes can be built at a price more within the reach of poorer people than those who at present are able to indulge in the sport. Presumably on the recommendations of this Committee it may be possible for the Straight Committee to found a Policy. To the extent that no Government has before gone to such lengths to see if help can be afforded, this is indeed a great step forward.

If other things were equal, we might look forward indeed to the best year ever. But as it is we are under the cloud of the National Economic Crisis. It is doubtful whether materials will be forthcoming, and difficulties have already been reported in that direction. If the Ministry of Supply or Board of Trade do to Sailplanes what they have already done to small boats, and prohibit their manufacture, we may yet see all our plans remaining on the shelf. This is the unhappy side of the picture, and we shall need a good deal of determination and endurance to bring our plans to fruitation under these circumstances.

But as the Government want foreign visitors to come to our shores and are to lay themselves out to attract and entertain them when they get here, it may be that we shall be allowed to operate and get new machines under that heading.

" It's an ill wind " and all that, but in the ill wind there might indeed be some crumbs of comfort for the Sailplane Movement which might, because of the export drive and the need for hard currencies, derive benefit from possibly lower prices accruing from large production of Sailplanes for export. Certainly our Sailplanes will be more up-to-date. For example Slingsby's new fifty foot span high performance machine has a calculated performance better than that of the " Olympia," with a gliding angle of one in twenty-nine. Presumably the development of this machine will be a number one priority for the 1948 International Contests.

So far the only events of which we have official notice are the Easter Meeting at Leicester, and the National Contests in June. Will Secretaries please inform us as soon as possible of any arrangements for Camps and other events so that they may be published in the columns of *Sailplane* ?

RELATIVE AIRFLOW INDICATORS

By

A. YORK BRAMBLE, A.R.AE.S., F.R.MET.S.

THE article in the December 1946 issue of THE SAILPLANE AND GLIDER on "The Angle of Attack Indicator" (August Raspet) focusses attention, once again, on a subject of flight which should receive far greater attention in its practical applications, than hitherto.

But there are pitfalls. Like those of the magnetic compass, they must be recognised and can then be "flown on."

In 1939, whilst engaged in the training of pilots for the R.A.F., the author of the present article spent some time in designing an instrument to indicate the approach of stall conditions at all speed ranges at which the aircraft may encounter them. This instrument integrated the airspeed indication from the pitot-head with the aerofoil airflow condition, and flashed a red light on the dial for all points of stall coincidence. In common with many other inventions the value of which has been proved, it has never yet come into general use.

The theory of the principle governing the function of the instrument, while simple enough in fact, seemed to puzzle many pilots both old and new. This should serve to urge all theory-of-flight students to determine to grasp thoroughly the details of the subject; particularly so that in abnormal conditions of flight, when normal reactions do not appear to "cope," common sense and clear thinking may maintain safe flying.

Some time later the author, working on the principle of integration above indicated, developed the design of a fairly simple instrument, primarily intended for use in gliding and soaring flight, named a "Relative Airflow Indicator."

This indicator was designed to include functions similar to those described in Raspet's article, *i.e.* to provide indications of variation of airflow direction in a vertical plane; but, in addition, to give indications of lateral airflow variation, *i.e.* of the aircraft's slip and yaw (skid). The instrument also derives the indicated airspeed and from means less liable than the normal pitot-head to "pack up" through icing.

But, there are pitfalls! Before describing this instrument it may be wise to look into some of these pitfalls fairly closely, taking our texts from Raspet's article.

Pitfall No. 1 *Re* **"Relative Airspeed."** In his first paragraph it is stated that an angle of attack indicator gives a true indication of the reserve lift of the aerofoil. Now "angle of attack," being the colloquial expression for angle of incidence of the aerofoil's chord to the mean line of airflow past it, is the factor that gives rise, as it varies, to change in the lift component of the reaction on the aerofoil. In other words, keep the angle steady, and, *other factors being equal*, the lift coefficient will remain steady. If we call this coefficient of lift C_L, the wing area S, the velocity of the airflow V, the "thickness" or density of the air (r), and the "reserve lift" L, then we have the well-known physical fact that the lift (L) is given by multiplying the effect of the angle of attack (or lift coefficient, C_L) by half the density value of the air ($\frac{1}{2}r$), by the airspeed multiplied by itself (V^2), by the wing area (S). Or, put shortly in simple equation form:—

$$L = C_L \times \tfrac{1}{2}r \times V^2 \times S.$$

It is clear, then, that the "reserve of lift" depends upon things other than, and in addition to, the angle of attack (in effect, C_L), and it is equally clear that if these other things are changing, for example if V drops a bit, L will alter quite a lot, since these other things are multipliers. The truth is then, that an angle of attack indicator can only "give a true indication of the reserve lift of the aerofoil" if we are all the time aware of how the other things are behaving, *i.e.* steady or changing. Now the wing area is steady, and, in the main, the density of the air *locally* is steady. But the velocity of airflow changes. So that we *must* have a ready-present indication of airspeed if the angle of attack indication is to mean anything really useful and reliable, since the airspeed can vary quite quickly in "free" flight.

Again, in the fifth paragraph it is stated that the stalling speed in a turn is "somewhat higher than the stalling speed in machine flight." (Presumably by "machine" flight is meant uniform flight in level or near-level attitude.) But here, "somewhat higher than" needs to be interpreted as "varying up to at least twice that of"—depending, in fact, upon the *rate* of turn.

Again, at the foot of column two of the article it is stated that an "angle of attack indicator is really a stall warning device" and goes on to refer to an "angle of attack reaching a dangerous stall." But the truth is that a "dangerous stall" condition can be reached at different times for almost all angles of attack, depending upon the different conditions obtaining at the time. So that to these words must be added some such phrase as:—"when read in conjunction with the relative airspeed," if disaster is to be avoided. For example, in a thermal a sailplane flown in the attitude of a diving *turn*, at an indicated angle of attack of, say, 20°, may be flying within quite safe limits, depending upon the rate of turn, *i.e.* upon the airspeed, in effect; whereas in straight and near-level flight it may have already passed the danger-line of the stalling condition, at an indicated angle of, say, 15°, depending always upon the airspeed, or relative speed of the airflow over the wings.

Pitfall No. 2 "Attitude." In paragraph 6 of Raspet's article it is stated that the airspeed indicator is . . . "an instrument which indicates a history or summation of past attitudes of the aircraft." Yet in paragraph 6 (column 3 of the article) it says, "The attitude of an aircraft is not absolutely de-

Relative Airflow Indicator (Schematic only)

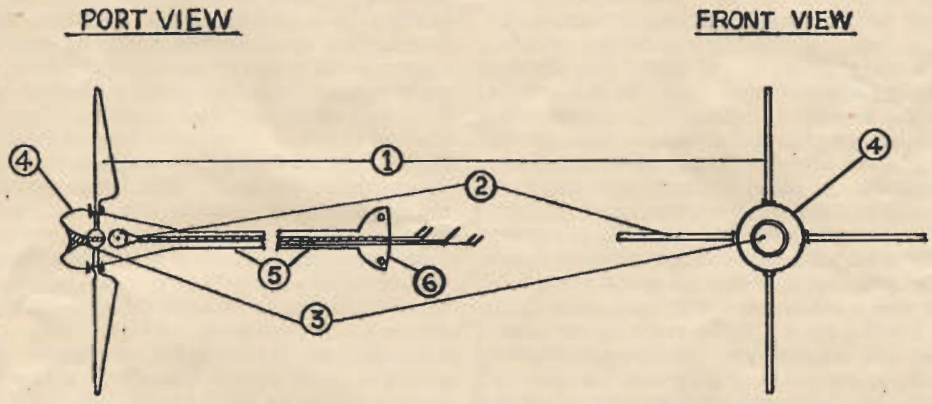


Fig 1. Operating head of R.A.F.I.

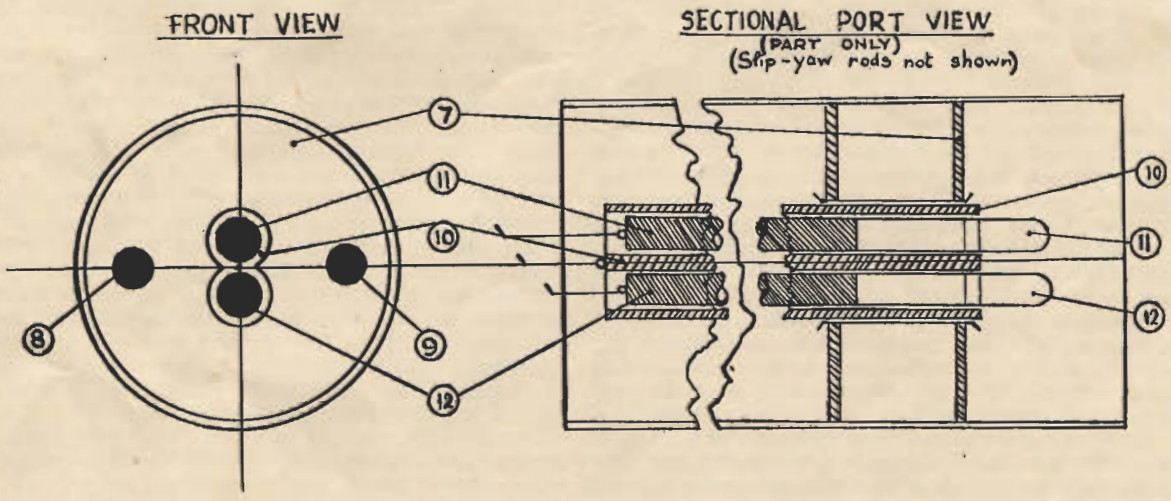


Fig 2. Dial & Indicating head of R.A.F.I.

termined by the airspeed indicator." Now the real truth is that the " attitude " of an aircraft can be determined by neither A.S.I. nor A.A.I. As Professor Joad would say, " It all depends on what you mean by ' attitude '." If we accept the popular interpretation (the same as is provided by gyro-controlled indicators) *i.e.* attitude relative to earth's datum planes of reference, then (with due respect to Raspet) not even A.S.I. plus A.A.I. in combination can give the pilot a full picture of his aircraft's attitude; though this combination can be very helpful up to a point, in that particular respect. But if we accept what Raspet apparently means by " attitude," *i.e.* relative to the local airflow channel, then his earlier statement as to " history or summation of past attitudes " is not what the A.S.I. tells, particularly as to local varying air currents. For example, in the practice of dynamic soaring, the relative dynamic thrust due to a gust would give a sudden change in airspeed indication, having no reference to the aircraft's past attitudes.

Pitfall No. 3. Gyro Substitutes. Later in paragraph 6 of Raspet's article it is stated that in flying upside down at 60 m.p.h. a sailplane pilot would at once be informed by the angle of attack indicator that he is in inverted flight. Now this is really rather a bad one ! For if the flying were of the non-acclerating order (*e.g.* non-looping) the pilot would be aware of his inversion through the pull of his safety straps on his body, long before anything else. But if he did not feel such pressure, though inverted, then he would necessarily be flying with angular acceleration in the pitching plane (*e.g.* looping), and in this condition the angle of attack of the main planes to the local airflow would certainly be *positive*. (In other words you can't have it both ways !) The indication of " negative value of angle of attack " could only be provided in inversion by steadily maintained flight (which gives the " upside down feeling " anyway), unless the machine entered suddenly a strong relative upcurrent. In brief and in general, the A.A.I. will not show any inversion of flying of which the pilot has not already become physically aware.

Incidentally, some years of research in gyroscopy, still continuing, including the invention of the non-toppling gyroscope (British Patent 553730, etc.) have proved conclusively that there is no fully satisfactory substitute for the gyroscope, *properly suspended*, for providing an earth-related space datum for use in blind flying. From all this it may be seen that the statement a little lower down in the article—" When this is done, the pilot need not change the attitude of his airplane in order to determine whether he is inverted and whether his speed is due to diving "—needs to be accepted with reservation, *i.e.* with certain clear, but limited, interpretations in mind.

If the discussion has been followed so far, with special reference to Raspet's article, sufficient will have been said to show that the claims for the use of the A.A.I. may not be so reliably wide, in practice, as may have appeared. But that, read always in conjunction with the indicated airspeed, it can be made to serve widely and reliably in the practice of soaring flight, though not as a complete substitute for references by gyro datum.

With these concepts in mind, an examination of the earlier-mentioned Relative Airflow Indicator may be useful.

First, a clear idea of what it will do :—

In common with the Angle of Attack Indicator it will *not* present to the pilot a complete picture of the attitude of his machine in space; but it *will* give an indication ot the attitude of the machine with reference to the relative airflow, in both pitching and yawing planes, and it will do this for *all* attitudes of the machine in space, though without necessarily indicating what those space attitudes are. Additionally it will indicate the relative airflow speed. Calibration of the instrument fully, however, for airspeed and angle of attack, is optional; since the instrument's main function is to act as a safety limit indicator, *i.e.* in permitting sailing as near the stall as is safe. It is not intended to replace either the A.S.I. or the gyro-instruments. Normally its operating head is to be fitted forward of the nacelle of the machine; but an adaptation of the instrument, with suitable adjustment for position error, may be fitted with two modified operating heads, one off either wing-tip, with integrated reading on one dial of port or starboard lift component differen tiation. This version of the instrument would function like the membranes in the bird's head, giving an indication of the direction in which to turn to gain lift in thermals.

The normal R.A.F.I., then, comprises a bow-positioned operating head and 3-in-one indicating dial on the dash-board. The operating head (*Fig.* 1) is preferably made of light-alloy metal or plastic and comprises two twin wind-vanes and a wind pressure plate. Vane 1 is that for detecting the aircraft's yawing-plane component of the direction of relative airflow, and gives indication of slip to one side and yaw or skid to the other, and *vice-versa*. Vane 2 detects the aircraft's pitching-plane component of the direction of relative airflow, and gives indication of angle of incidence of mainplanes to relative airflow. The concave plate 3 detects the wind pressure, by reference to a resisting, sprung-loaded rod and gives *approximate* indication of the relative airspeed. Light transmitting gears are enclosed in the streamlined body 4, the rod-passing holes in which are fitted with glycerine-soaked wads to minimise icing-up. Linkages are conducted in the tube 5, which terminates in the fixing-plate 6, for attaching the whole operating head to the nose of the aircraft.

The dial of the instrument (*Fig.* 2) may be only about 2" in diameter and without window. Its matt-white disc (7) has a central orifice and two lateral holes, and is set back in the matt-black lined casing about 1½". Rods project about 1" through the lateral holes, red (8) on the left and green (9) on the right. They move reciprocally, being actuated by the angular movement of the vane 1. If, for example, the machine yaws to the right, green recedes and red extrudes, just as in rudder control movement. This is also the natural indication for left side-slip. Other-sided movements are *vice-versa*. Through the central orifice projects a double-barrelled tube or sleeve (10), sliding in and out actuated by the movement of the wind pressure plate (3 in *Fig.* 1). This sleeve is of glass or some transparent medium is whitened at the forward edge

(*Continued at bottom of next page.*)

MY FIRST SOLO IN A SAILPLANE

By REAR-ADMIRAL L. D. MACKINTOSH

I CONSIDER myself very fortunate to have been able to celebrate my 50th birthday, recently, with my first solo sailplane flight, 13 fascinating minutes in a " Mu 13." Earlier in the day I had a dual instructional flight in a " Kranich " with Lieutenant-Commander Sproule instructing, which enabled me to connect the variations in the note of the airflow as it hissed past the canopy, with the A.S.I. readings ; to feel the controls ; to get a good idea of the effect of the air brakes and the type of approach required.

We were having aero-tows behind a " Tiger Moth " and I found this, if anything, the most difficult part of the business, particularly in the " Mu," which surprised me by its delicacy in fore and aft control. The day was unfortunately not one for soaring flight by one of my inexperience, and I cast off just below ten-tenths cloud at 1,500 feet. The exhilaration of the free flight that followed I can only compare to that of skiing or perhaps sailing a thoroughbred small boat. Lazy turns over the airfield at Donibristle, near the Forth Bridge, from which we were operating brought me all too soon to the position from which I started my final approach. I found the brake operating lever in the " Mu 13 " less natural in its sense of application than that on the "Kranich" which works in the same sense as the throttle in a powered aircraft.

Although I am a comparatively inexperienced amateur pilot (and not a very good one at that) who has not flown solo since 1941, I was, nevertheless, confident in my ability to achieve a solo sailplane flight. This was, I think because I was thoroughly briefed, had a good sized airfield (by gliding standards !) to land on and because on the airfield my instructor was ready to warn me, if necessary, by a red Aldis lamp if I was undershooting or a green if I was overshooting. All went well and the " Mu " was quickly off again with another pilot.

It is my hope that sailplaning, which is on a par with boatsailing, will become a popular sport in the Royal Navy. I certainly intend to avail myself of every opportunity of gliding and next time I hope I may do some soaring as opposed to concentrating on tobogganing safely to earth, which was my main consideration in my first flight.

RELATIVE AIRFLOW INDICATORS

(*Continued from previous page.*)

and may be graduated for airspeed by marks along the sides. Lying in the bores of the sleeve are two rods above and below respectively, coloured red, but for the protruding ends ; upper (11) being white, and lower (12) being yellow. These incidence-angle rods may be graduated if desired, but at least the upper should be marked for the best L/D angle and the minimum-sink speed angle. The rods, actuated by the angular movement of vane 2, move in and out reciprocally.

" Reading " the dial is simple. At zero incidence, or at (preferably) incidence of neutral lift, the two rods project equally. If incidence becomes positive the upper projects more. If negative, the lower projects more. If a red portion comes out of the end of the airspeed sleeve, then the angle of incidence of the mainplanes, or angle of attack, is too high for the airspeed shown and the machine is in danger of stalling. The pilot's remedy is to increase speed, by easing the stick forward if the upper white rod is out, and by pulling the stick back (inverted flight) if the lower rod is out and if the pilot wishes to remain flying inverted and prevent the incipient inverted spin. When a high degree of skid is indicated, however, in conjunction with increasing airspeed (*i.e.* spinning in progress) the " offside " lateral rod will be extruded, and the remedy is for the pilot to centralize stick and (applying instinctive foot action) " push back the lateral " rod, *i.e.* correct the yaw by rudder action, *before* beginning to ease back the stick again to level out (or ease forward if inverted). This, of course, is the normal technique for spin correction. In actual soaring practice, the white incidence rod may extrude its red portion in a thermal and the pilot may ease the stick forward and note the airspeed sleeve come further out of the dial. In any event the technique is to " hide the red." In short, provide the increasing angle of attack with enough indicated airspeed to " cover " it. " Absolute," rather than comparative, readings of airspeed and angle of attack may be made against the edge of the dial orifice.

The actual construction of this instrument may be on such simple lines as to render it possible of maintenance on the amateur's work-bench. The linkages should be of the lightest kind, *e.g.* connecting " rods " of intervally-supported 18-gauge piano wire. Stepped-up gearing is simply adjusted for different aircraft by varying the length of crank arms, or by using different light, spur-gear pinions of suitable ratio. Care is required, of course, in determining the relation between the degrees of movement of airspeed sleeve and incidence rods, respectively, and this may best be tackled, perhaps, by fixing the length of travel of the airspeed sleeve to cover the flying-speed range for the sailplane concerned, and then employing incidence rods about ¾" longer. Relative movement ratio between sleeve and rods may be arranged by adjustment of crank lengths respectively, with reference to a table of values of incidence angle and stall-speed. For each type of aircraft, of course, there will be a particular table of these values, and no doubt the manufacturers would supply copies, and give also the optimum values for L/D and sinking-speed referred to above.

LET'S HAVE DONE with the "DAGLING"

By

WING COMMANDER G. E. P. GREEN

WHEN the R.A.F. was faced with the need for very rapid expansion at the beginning of the war, one of the first things to receive top priority was training research. The most varied schemes and experiments were carried out with the aim of producing the greatest possible number of efficient aircrew in the least possible time, and with the greatest economy. The Empire Central Flying School was set up as a sort of Laboratory of training, and many ways were found of reducing wastage of all kinds in the training organisation.

The Gliding Movement in this country to-day faces a rather similar problem. How to train as many Club members as possible in the most economical way. A drastic revision of training methods coupled with a programme of intelligent research will certainly yield dividends. The cost to the Club member of flying time can only be kept down to reasonable limits by reducing wastage to the absolute minimum.

The big headache in every Club is—Aircraft. Apart from the difficulty of getting them at all, the problem is to make each one earn its purchase price as soon as possible. This can only be done by keeping every machine in the air and out of the workshops, to get the maximum flying hours per repair. This means getting beginners safe in the least number of launches.

Now training methods in most Clubs to-day are right where they were ten years ago. Starting with those horrible Ground Slides on the "Elementary" which teach one nothing about flying and everything about the roughness of the Earth's surface, *via* the low hop that frightens the Instructor even more than the pupil, to the high hop that is frequently involuntary and often ends with a smashed wingtip.

Experience in starting up one of the first Clubs to be formed in B.A.F.O., and later in the A.T.C., has convinced the writer that a great deal of this "Elementary" stage is wasteful and unnecessary, and can be eliminated.

In the days when Gliding Clubs consisted of half-a-dozen enthusiasts who had to build their own machine, and then teach themselves to fly it, the "Elementary" or "Dagling" type was probably as good a machine as could be found. It was easy to build and repair, cheap, and could give quite satisfactory flying in the hands of a pilot familiar with its tricks. But nowadays the art of powerless flying has got beyond such crudities. Clubs have far more support and more money than they used to have, and aircraft built by reliable firms to the designs of aeronautical engineers can be bought like cars. New types are capable of doing the job both of the "Elementary" and the "Secondary," of taking the beginner through his low hops and later introducing him to soaring and the sailplane.

In 2 Group Club when it first started, the scheme was to get a beginner safe as rapidly as possible on the S.G. with its detachable cockpit fitted right from the start, and put him on to the "Grunau" just as soon as he was fit. Now the S.G. is of course an "Elementary" type, and does look very like a "Dagling," but it has different characteristics. It is more responsive to control movements, much more stable in every sense and not so likely to "rocket" in a gust, it has shock absorbers and a sprung skid so that a beginner can get an idea of what a good landing feels like, and is not so likely to injure himself in the event of a "parachute" landing. It is not generally realised that the "Dagling" with its solid wooden beam skid and absence of any padding or support for the pilot's back, has a long record of crushed vertebrae and worse.

The S.G. shares one big fault with the "Dagling," however, lack of "weathercock stability" owing to absence of keel surface. The practical effects of this are seen when a learner drops a wing in a bump, or because of harsh ruddering. The machine begins to slip, and will go on slipping until something is done about it. By the time the novice has got over the nasty feeling of falling out of the sky and got around to taking action, he may have smashed a wingtip, and even blown right round in a cartwheel if there is a little wind. An aircraft with a normal fuselage is much more ready to help him by tending to turn into the slip and fly out of it—crosswind maybe, but under control and right side up.

Recent A.T.C. experience has confirmed the opinion that most of the Broomstick stage can be scrapped. The Slingsby "Cadet," which is the standard equipment, is the ideal compromise between the S.G. and the "Grunau." Two courses were started parallel, one on the "Dagling" and one on "Cadets." Both followed the usual syllabus. By the time the "Dagling" boys were safe to begin hops, the "Cadet" bunch were getting their "A" certificates. These results were by no means accidental, as is shown by subsequent experiments. The average number of slides before a lad got airborne on the "Dagling" was around fifteen. On the "Cadets" they do low hops within six launches. Instead of needing anything from forty to fifty launches to get their certificates *via* "Dagling," they now qualify in around thirty. The results were good enough to persuade H.Q. to replace the "Dagling" with a "Cadet," and scores of lads have got their certificates without ever seeing an "Elementary" glider at all. Crashery has been reduced to the point where a cracked skid is a matter for a Court of Inquiry—very nearly.

Here, then, is food for thought for Club Committees. The average age of these A.T.C. lads is sixteen to eighteen, they get their certificates in around thirty launches and with very nearly no crashery at all. The Instructors can do their circuits and even sniff out the odd bit of lift in the same machines. When Mark II ("Tutor") wings arrive they will be able to soar in the same machines. Why waste time and money on "Elementaries"?

Leicestershire Gliding Club

Easter Soaring Rally

Following the success of the Easter Rally of 1946, at Rearsby Aerodrome, this Club has been asked to organise a similar event this year.

The Rally may be held at Ratcliffe Aerodrome with the co-operation of the Aero Club, who would provide power flying (dual and solo) at £2 and £2 5s. respectively. The gliding club expects to have its own " Tiger Moth " tug aircraft flying, apart from other machines that may be obtained as before.

The Club hopes to repeat the 1946 success, with the added facilities of a good club house, and asks you to bring your own aircraft, if possible, and save queuing.

It is suggested that a postcard be sent to

Mr. J. C. Rice, Cosby, Leicester
('Phone : Narborough 2277) as follows :—

From..... 'Phone....
.....

I would expect to attend the Easter Rally, April 4th to 8th with ..... persons in my party, staying for ..... days.
The sleeping accommodation required would be ..... I would bring a ..... aircraft.

Suggestions and remarks—(Films, talks, etc., for the evenings will be welcomed).

THE "L.S.D." OF GLIDING

By T. REX YOUNG

(*Chairman : Bristol Gliding Club*)

WHAT is hindering the revival and growth of our gliding Clubs ? To this question there is only one answer—lack of aircraft and equipment ! Those who clamour for an annual subsidy, or a premium for every pilot-member trained from *ab-initio*, may be reassured that their Club can be started, can undertake *ab-initio* training, and can be successfully maintained, if provided at the outset with a modest scale of aircraft and equipment as a basis for solvent operation.

It is not doubted that this assertion will evoke lively comment from the sceptic, but it has not been made without a careful study of present-day problems, the results of which will now be outlined for critical examination.

The scale of equipment suggested is 3 aircraft, 2 tow-cars, and 2 winches. At a special price of, say, £250 per aircraft, and with tow-cars and winches (ex-Ministry of Supply Disposal) at £50 per unit converted, this could be made available for a total cost of less than £1,000. Such equipment exists in plenty ; all that is needed is its allocation to the clubs.

Given this scale, there is not a dormant club in Britain which could not immediately enrol a minimum of 60 members, of whom the majority would require *ab-initio* training, and the total would almost certainly include a nucleus of qualified pilots who would act as club instructors.

These 60 members would be sufficient to ensure the first-year revenue of the club, and even allowing for a 50% wastage in each subsequent year of operation, a minimum of 30 new members per annum would, it is confidently suggested, be unfailingly available to every active club. Allowance is also made for 20 associate (non-flying) members, which again is a modest estimate.

On the basis now outlined, the flying facilities of the club would be at the rate of 20 members per aircraft. Too high a ratio ? No. Average attendance on any one date can be calculated at 50% of membership, which means 10 members per aircraft, and this is almost the ideal number for a complete training-team (*i.e.* 3 on winch, 4 on tow-car, and 3 at the launching end). For those who remain doubtful of the ratio, it may be said that the Bristol Club is at present providing *ab-initio* training on this very basis, and is finding it quite successful in practice.

The next and all-important consideration is that of subscriptions and flying-fees. These must be reasonable and within the reach of a wide range of members if the movement is to be of full encouragement to the air-minded and of steady and healthy growth. It is suggested that the maximum subscription should be £5. 5s. 0d., with £1. 1s. 0d. entrance fee, and that the flying charges should not exceed 2/- per launch. Annual revenue on this basis is £399.

With 2 winches and 2 aircraft in operation (1 aircraft in reserve), a total of 5,200 launches per annum can be made. This is equivalent to 50 launches per week per operating aircraft, calculated at the rate of 6 launches per hour, and is submitted as being a reasonably attainable target. The 2/- launching-fee is intended to apply only to members under *ab-initio* training, and would enable them to secure their " A " category for approximately £2. 10s. 0d., and " B " category for a further 10/-. Trained members would pay 9/- per half-hour for soaring time, this rate being calculated to maintain flying-fee revenue at the desired minimum.

It will have been noted that 2 winches are specified in the scale of equipment, and are kept in use throughout. This is to ensure maximum flying-revenue and also to provide against the possible breakdown of one unit, whereupon the second winch is still in action and thus prevents loss of revenue during flying hours. Revenue from flying-fees on this basis is £520 per annum.

Club revenue from other sources, as is shown in the following detailed Statement is calculated at £78, giving a total income of £997 per annum.

STATEMENT OF INCOME AND EXPENDITURE.

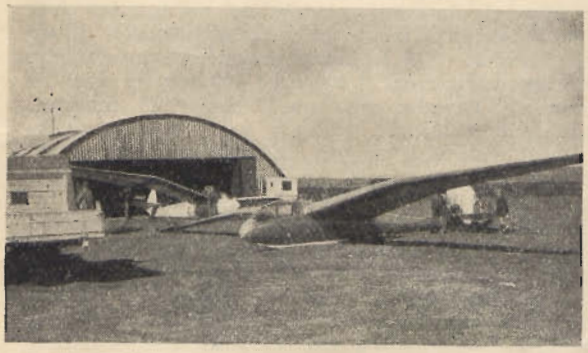
INCOME.	£	£
60 Members at £1. 1s. 0d. (Entrance Fee) ..	63	
,, ,, at £5. 5s. 0d. (Flying Sub.) ..	315	
20 Associate Members at £1. 1s. 0d. ..	21	
		399
5,200 Launches at 2/- per launch		520
Canteen, Social, Bar, and Sundry		78
		£997

EXPENDITURE.	£	£
Upkeep and repair of Plant and Equipment ..	130	
Winches, Running Costs 5,200 launches ..	78	
Tow-cars, Running Costs 5,200 launches ..	104	
Cables and Accessories, etc.	104	
		416
Renewal of Aircraft (20% depreciation) ..		150
Administration, inclusive costs		300
To Reserve Fund. Balance in hand ..		131
		£997

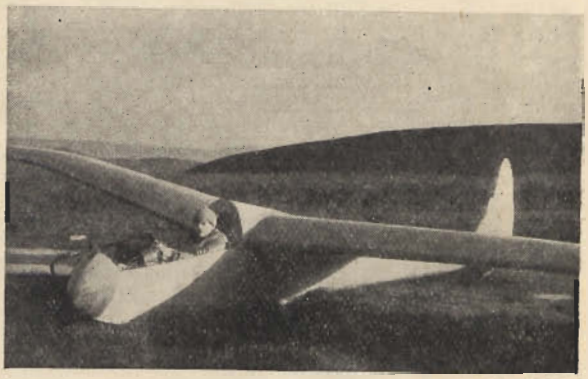
As regards annual expenditure, the items shown are more or less self-explanatory. They represent strict economy, but are considered to be adequate provided that careful attention is paid to efficient training-methods, smooth running on the site during flying activities, and wise control and recording of

(*Continued on page 30*)

MIDLAND GLIDING CLUB

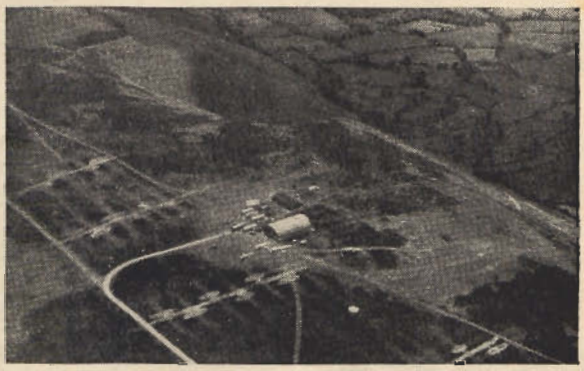


Club Hangar.



" Petrel " after evening flight.

" Kirby Gull."



Aerial View.

Sunset over the Mynd.

8,000 FEET IN THE MYND WAVE

LACK of a barograph deprived Theo Testar of the honour of setting up a British altitude record for Two-seaters at the Long Mynd on September 15th last. True, there was one in the " Petrel " which Roger Thwaite flew alongside, but orders is orders, and the regulations demand that the barograph be carried in the machine, not merely a few yards to one side of it. But, apart from the missed record, these flights have additional interest in that there seems little doubt that they were made in a standing wave, and are therefore worth describing in detail.

Testar took off in a " Falcon III " on an ordinary A.T.C. instruction flight (hence no barograph) at 11.35. There was a west wind of about 20 m.p.h., and six-tenths of good-looking cumulus at 2,400 feet —at least, it looked good from below, but from alongside and above it appeared flat and lifeless, with a thickness of only 700 feet. While showing his pupil how to circle, Testar reached cloud base at the north end of the Mynd at 2,400 feet above take-off level, and then proceeded out over the valley in order to come down. As the " Falcon " refused to descend even when flown at high speed, Testar reduced speed to normal and found himself climbing at 5 feet per second in clear air. He wandered around a bit, moving slightly forward, and found the area of lift to extend from off Pole Cottage to beyond Wentnor Ridge, and to measure about a mile in a cross-wind direction. He reached maximum height at 7,800 feet, where it felt warmer, and then, in order to come down, flew down wind over Church Stretton, where he sank at 10 feet per second, and finally landed on the Mynd at 1.15 after 1 hour 40 minutes in the air. The whole flight had been very smooth.

At the same time Roger Thwaite was flying in Espin Hardwick's " Petrel." It was only his second flight in this type. He took off at 12 noon, rose quickly to 800 or 900 feet in hill lift, and made for the north end of the Mynd. Finding strong lift there, he circled and climbed through a gap in the clouds, going up at 5 feet per second at first and later twice as fast, all in very smooth air. He saw Testar coming up, and passed close to him, thus confirming unofficially the altitude record; but Thwaite managed to get higher still and reach 8,100 feet above take-off, incidentally qualifying for Silver " C " height. The barograph record shows a straight line ascending from 3,400 to 7,400 feet in only 10 minutes. Thwaite was up 1 hour 25 minutes, landing at 1.25.

As the air was smooth and the cumulus clouds refused to grow, it is evident that this was not convectional lift. The lateral compression of air by the narrowing valley to the north is more effective the more south there is in the wind; moreover, this theory and that of a possible " evening thermal " effect are discounted by the fact that weather reports show the air to have been very stable at the heights reached. Stable air is necessary for the formation of standing waves, and the more stable the better. The nearest radio-sonde ascents for that day were at Liverpool, and they show the following features :—

6 a.m.: stable layer from 10,700 to 13,600 feet (above sea level).

12 noon: stable layer (isothermal at 34 deg.) 6,440 to 8,680 feet.

6 p.m.: the stable layer had become much more concentrated and was now an inversion, from 30 deg. at 6,039 feet to 38 deg. at 7,050 feet.

This stable layer, which the pilots must have climbed right through (allowing for their initial take-off height), is seen by further examination of the weather records to have been a frontal surface sloping upwards from a stationary front at sea level 400 miles to the south in the Bay of Biscay. Could the Club have been forewarned of its presence? Well, at Valentia, directly up-wind of the site, a radio-sonde went up at the preceding midnight, and there, sure enough, was an inversion of 4 degrees, stretching from about 8,000 to 10,000 feet. But who dares ring up Valentia at two in the morning, let alone plot a tephigram at that hour? A.E.S.

NEW HIGH PERFORMANCE SAILPLANE

ALTHOUGH at the time of going to press we have not had an opportunity of viewing the Short " Nimbus," the following details are available :—

The wing area is 240 square feet.
Span, 62 feet.
Overall length, 26 feet 10 inches.
All-up weight with two up to 850 lb.
Aspect ratio 16.
Best gliding angle 1 in 25.8 at 37.6 m.p.h.
Minimum sinking speed 2 f.p.s. at 35 m.p.h.
Stalling speed 30 m.p.h.
Maximum permissible dive speed 135 m.p.h.

Low wing mono-spar design is a new departure in this type of aircraft and a flight in the machine is anticipated with interest.

We hear that the tests are satisfactory.

The speed and efficiency of two-seater training, which has long been neglected through lack of suitable machines, should be given a considerable fillip—provided the price is right.

Free Gliding Course

THE Scottish Gliding Union have offered a free instructional gliding course at Balado Airfield, Kinross, to five members of the 1192 (Kirkcaldy) A.T.C. Squadron. The Union will bear all expenses.

Out of a complement of 40 boys, provision was only made for five, and seven were found to be eligible. One member sportingly stood down; the remaining six tossed a coin to see who should stand out.

The five boys who will go on the course have all obtained their " A " licences in gliding. They are F./Sgt. George Collins, aged 19, of Kinghorn; Sgt. George Bolton, 18, and Cpl. David Young, 18, of Burntisland; and Cadets Andrew Motion, 16, of Kirkcaldy, and David Walker, 17, of Woodside.

The gliding course will run for a year and during that time they will be under the personal supervision of A. J. Thorburn.

SUMMER CAMPS

AT a recent Committee Meeting of the Midland Gliding Club it was decided to hold three high-performance instructional Camps of nine days each during the forthcoming season. The Camps will be open to approved " C " pilots, approved and experienced aeroplane pilots, and to private owners of high efficiency sailplanes. The dates selected are :—

24th May to 1st June
2nd August to 10th August, and
13th September to 21st September

respectively, all inclusive. The inclusive fee fixed for accommodation, food, the use of Club single-seater machines, and dual instruction where necessary, is 12 guineas, and for private owners £6 9s., plus 2/6 for each launch, whether by winch or bungy. The numbers attending each camp will be strictly limited to fifteen, and each application will be subject to the approval of the C.F.I. Two guineas reservation fee should be included with the application, and this will be returned to the applicant if he is refused. The Club fleet will consist of two " Tutors," two " Kites," and a High-Efficiency Two-seater.

During the past year, great difficulties have been experienced in obtaining machines of any sort, but owing to the popularity of the site to other Clubs and visitors, a substantial amount of flying has been put in, the total hourage for the past season being well over 700 hours, and launches over 2,000. This yielded over 1,000 miles flown cross-country, the British height record by Philip Wills, official, of 15,300 feet, the unofficial height record by F./Lt. Testar on " Falcon III " with an A.T.C. instructor under training, of 7,800 feet, together with some thirty odd " C " certificates, and twenty legs to Silver " C's."

Much still remains to be done to get the Club really going as it should be, and a determined attempt will be made to remedy some of the deficiencies during the coming season. To those interested in the camps or club membership, enquiries should be sent to the Secretary, F. C. BATTY, F.C.A., 2, Lombard Street West, West Bromwich. Telephone : West Bromwich 0588.

British Gliding Silver Jubilee

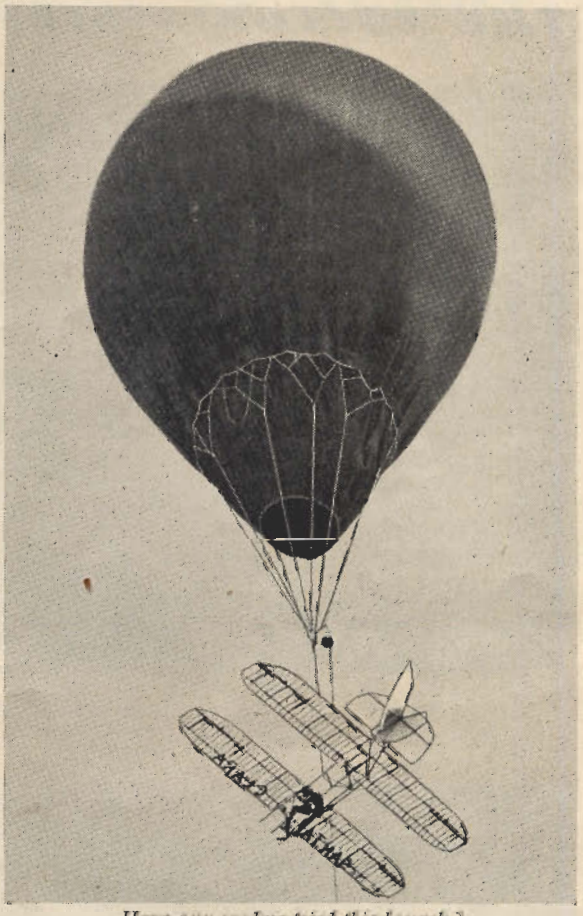
IN October of 1947, there occurs the Silver Jubilee of Soaring Flight in Britain.

At Itford in October of 1922, the first British Soaring meeting in Great Britain took place.

We understand that the Soaring Club of Great Britain proposes to mark the occasion by holding a Silver Jubilee meeting at Itford as near the original date as possible.

Further details will be published in SAILPLANE at a later date.

"GALLANT JOURNEY"



Have any readers tried this launch ?

DEFINITELY an instructive film. I learnt a lot. For instance, I never before knew how laterally stable were the gliders of the middle 19th century ; we would certainly do well to study their methods for our cloud flying sailplanes to-day. I never realised either that the plastic spectacle control column was in use at this time, or that a machine without any controls at all could be flown so safely just over the heads of a crowd of people.

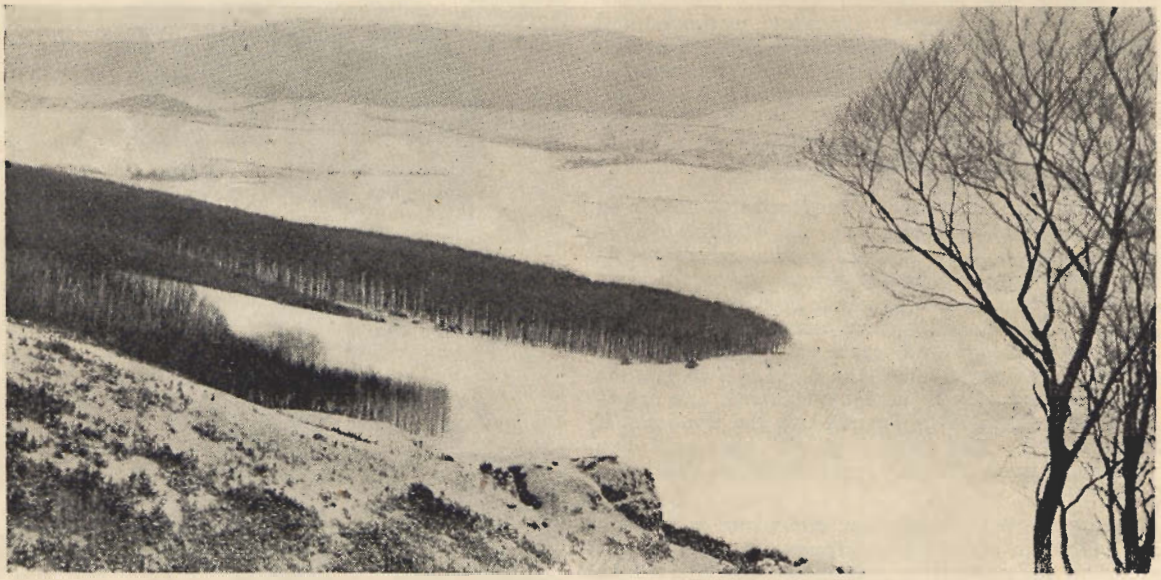
The glider of 1883, which according to my reference books should have been an ornithopter, seems well constructed—none of this split bamboo nonsense. Its performance, too, is good, definitely an improvement on the " Weihe " in angle of glide.

The met. conditions, in the district where the film was shot, are also interesting : the possibilities of an inversion, such as will clear an 8/10 cu. congestus sky for the period of a trial hop, then depart with Disneyan abruptness, would certainly upset soaring in this country.

The above are a few extracts from a mine of sentimentality, and I left the cinema certain that it was I who had made the gallant journey, and feeling not a little sorry for Professor J. J. Montgomery.

A.D.

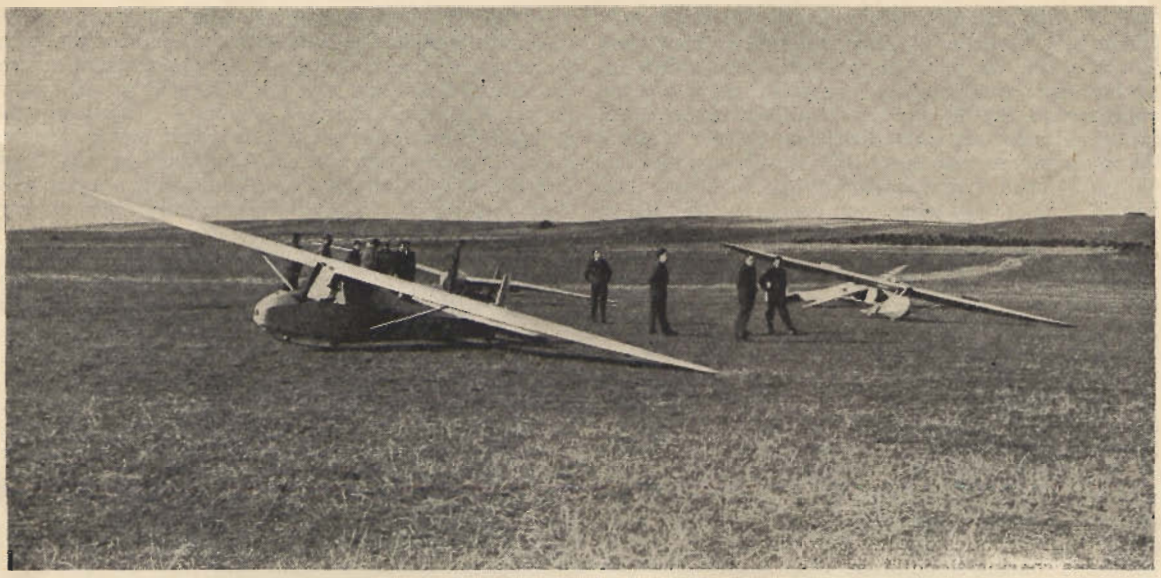
THE EDITOR VISITS SCHARFOLDENDORF



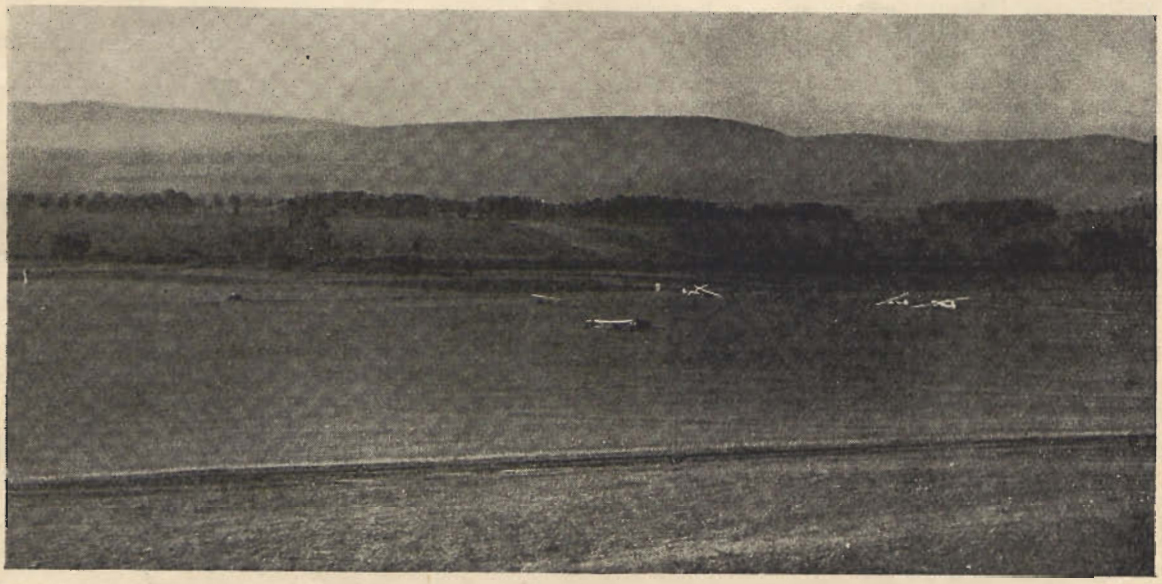
" Now is the Winter of our Discontent."

But in the Spring. . . . . .

SALTZGITTER SCHOOL IN ACTION



Left to Right: " *Grunau Baby*," " *Kranich*," " *Grunau Baby*."



Foreground: *S.G.* 38 *being retrieved.*
Background: *S.G.*38 *on groundslide.*
Extreme right: " *Kranich* " *and* " *Grunau.*"

THREE WEEK-ENDS AT EL MIRAGE

By W. G. BRIEGLEB

THE U.S. Weather Bureau had told us that from the middle of September to the middle of October we could expect generally poor soaring conditions on the Mojave desert. On October 12th, Harold Huber arrived with his " LK." Percy Wilson was there with his " ABC " sailplane and our TG 1A " Ross " was rarin' to go. Harold had claimed that it took more than ordinary thermals to fly his " LK " but by 11:00 a.m. he was managing to hang on for quite some time. The wind shifted to the south-east, and with it came a great number of thermals. Before long both " LK ' " were above 3,000 feet. The writer, having to worry about student instruction, was only able to reach 6,800 feet above the lake, but a total of 4½ hours of instruction was given between 10 a.m. and 4.30 p.m. Several of the flights were over the 5,000 feet mark. When Harold and the other " LK " owner returned, Harold said he had been to 8,700 feet and the other " LK " to 7,800 feet. Most of the thermals in mid-afternoon were found to be strongest near Gray mountain, a 400 feet hill 1¼ miles due west of the airfield. More about this soaring slope later.

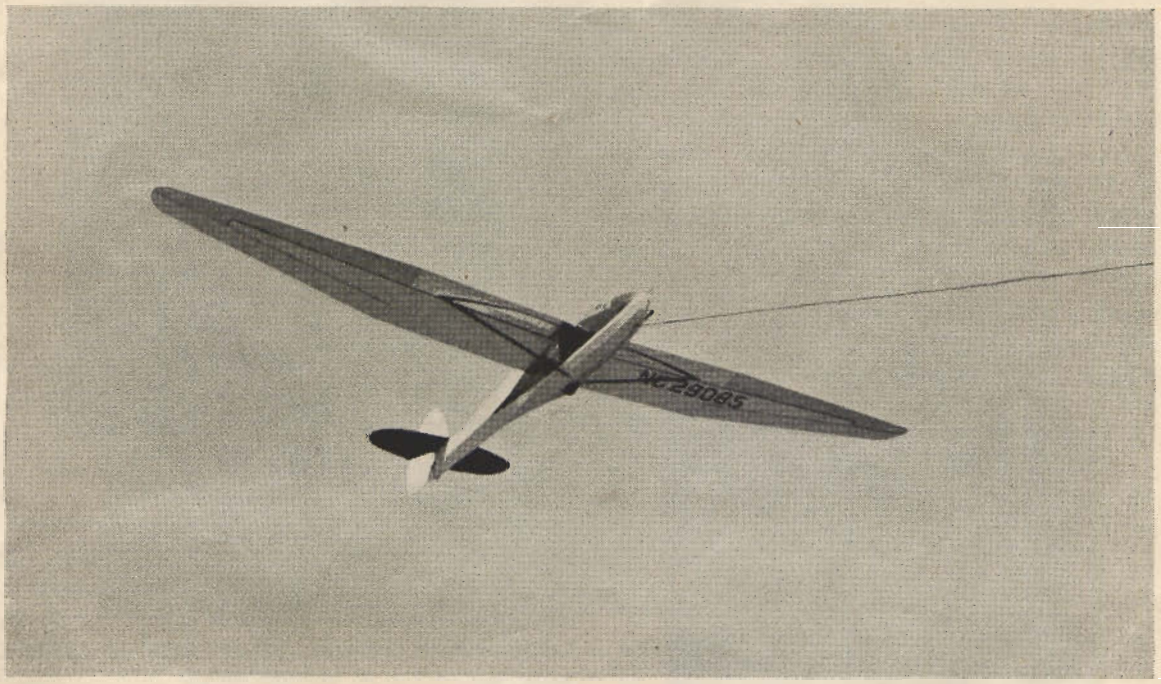
As evening approached, Harold flew his " LK " to the airport and tied down next to the " Ross." That evening we gathered around the camp fire, roasted marshmallows and did some hangar flying.

On Sunday, the 13th, conditions were just about the same except the wind shifted to the west and Harold, flying his " LK," managed to do a good bit of slope soaring on the ridge at the east end of the dry lake. Several times, as the thermals broke over the ridge, he was able to gain a good deal of altitude. At one time he passed up the " BG 7," which usually is on top of the " heap," thermal that is, as though it were stark standing still. Rod Rogne, flying the " BG 7," found it difficult to get down above 3,000 feet. Sunday did not seem to be quite as good for altitude work, however, everyone was quite satisfied with the week-end of flying.

On October 19th, John Clarke brought his recon ditioned " LK " to the lake. The thermal activity was quite poor on Saturday with the best altitude around 3,500 feet. The writer had a chance to again fly an " LK " and enjoyed its ease of control, also, the hot landings were quite different from the " TG 1A." Again, it was interesting to note that with an east wind, the best thermals were found in the vicinity of the airport and Gray mountain, even though they were quite light in strength. As evening approached, we retired to the airfield and the party enjoyed a quiet repast in the barrack, which by now had windows and doors installed. The following day, Sunday, was very bad, with a definite top to all thermals at 1,300 feet. It is interesting to note that the two " LK's ", when in a thermal, could soar just as easily as the " TG 1A " on this particular day. It appeared as though the thermals were of the bubble type, because on several occasions the author would enter the thermal several thousand feet above the " LK's " and would apparently lose the thermal. Shortly thereafter the " LK's " would be forced to leave the same area due to sudden cessation of lift. This Sunday must have been the type the weatherman predicted for this time of year. It was undoubtedly the poorest soaring day we have encountered at El Mirage.

On October 26th, Percy Wilson returned with his " ABC " glider, as did Harold Huber with his " LK." We set up the " TG 1A " on the airport and towed off about 11.00 a.m., after having completed painting the barracks. I encountered lift at 700 feet and soared to the East end of the dry lake some 3½ miles, only coming down when John Olley arrived with the tow-car. Mr. Wilson had brought along two crew members to whom I proceeded to give instruction. On the first flight I met Percy at 3,500 feet, flying straight ahead with about 400 feet a minute climb. We cruised down the lake together, still maintaining this rate of climb for approximately 2 miles. My student then turned away and we continued co-ordination exercises until we had passed the 5,000 feet mark. Stall and spin instruction was then given, and we landed 53 minutes after take-off. The student only wanted 45 minutes, but we had a tough time getting down. Anne in the meantime had arrived with hamburgers and hot tea. The other student was ready to take off, so with a hamburger in one hand I climbed aboard. Between trying to correct the student on auto-tow and juggling the hamburger on the instrument panel, the hamburger lost out and ended up on the floor of the ship. All through the balance of the flight I was picking up pieces of onion, tomato, lettuce, etc., from various parts of the ship. However, it still tasted very good, and I have ordered Anne to staple the sandwiches together the next time she brings them out. On this flight, due to the fumbling of the hamburger, I lost the thermal and arrived over the landing area with about 400 feet. Suddenly I felt a gentle surge and then some very rapid gusts. Taking the controls from the student, we soon found ourselves at 3,000 feet. I turned the controls back to him and before long we were over 7,000 feet. In the meantime, Harold Huber had set up and seemed to miss every one of these excellent thermals. I imagine he was very much put out. Finally, he caught a good one and I saw him once at about 4,000 feet. This second student wanted an hour's time, and after going through stalls, spins, co-ordination, etc., we landed with one hour and two minutes for the flight. I then finished my lunch and John Olley took off solo, and I couldn't believe my eyes when I saw him catch a thermal near the ridge and begin circling until he was a mere speck against the blue sky and suddenly into view came the " LK," Harold Huber no less. He, too, was in the same thermal, and they both

continued climbing until practically out of sight. Howard claims that the only reason he came down was that his passenger became a member of the upheaval club, which necessitated a quick descent. Johnny landed after about 45 minutes in the air, and was really excited since this was his best thermal flight to date. After taking one more student up, we prepared to make our last flight to the airport. Harold was also ready to fly over, so we both took off just as the sun set. On the tow I realized the 1,500 feet a minute climb was abnormal and could only attribute it to the fabulous evening thermal which is encountered only periodically. After cutting loose at 1,600 feet I flew in a straight line, climbing 100 feet a minute until I had reached 2,100 feet and was forced to cut loose at a low altitude. Since Rod wanted to fly the "TG 1A" we had to leave Harold to his own devices and Rod and I stayed aloft for about 30 minutes. Anne arrived with lunch and hot tea, so we called off flying for a little while until our inner man was taken care of. John and I then took off and we noticed a sudden wind shift. We therefore landed at the west end and this time soared to over 5,000 feet. The cloud base was at this altitude, and being close to the airway we flew away from this lift area. John was practising stalls, spins, etc., and we were about to land when we noticed a flock of what seemed to be seagulls flying across the airport. We chased them and discovered on closer examination that they were migrating



SCHWEIZER AIRCRAFT CORPORATION.

S.G.S. 2—8 (Army T.G.—2) Sailplane in which Dick Johnson soared to new American Distance Record— **314** *miles—Sept.* **1946.**

above the airport. As it was getting darker and cold, I dove and finally landed. Shortly thereafter Harold came in and told me that he had had exactly the same experience. Unfortunately neither of the ships were equipped for night flying and both of the pilots were too tired to fly longer.

On Sunday morning Harold towed to the dry lake. When I took off, I again encountered lift at 800 feet. This looked like a very good day, and I couldn't understand why the "LK" was not in the air. Upon landing we discovered that Harold's crew had not arrived, and since he was trying to give Irving Prue some time, Rod Rogne went to their assistance and towed them off. Unfortunately, Harold encountered the down draft preceding a strong thermal geese. They had begun circling and we entered a very strong thermal with them. I glanced above me and, to my surprise, discovered a very large number of geese practically covering the sky on this same thermal. We estimated there were several thousand all soaring and in several layers about 500 feet above the other. We decided that Rod should have a try at this sort of soaring, so went in and landed.

After Rod's flight we flew to the airport and folded up for the day. Again we discovered that Gray mountain gave off a good deal of lift, so decided to investigate this ridge in the near future.

(With acknowledgment to the Southern California Gliding Association).

WATERSPOUTS IN THE NORTH SEA

THE following extract of a letter from the master of the Trinity House vessel "Discovery II," dated May 16, 1946, has been forwarded by the Marine Branch of the Meteorological Office :—

"When in the position of the Sunk Light Vessel at 10.45 B.S.T. on May 16, 1946, three waterspouts were observed, bearing S.E. distant six miles in the vicinity of the Kentish Knock. Two had disturbances underneath but none was fully formed.

"Weather conditions: Wind S.E. force 2, Sea calm, Barometer (aneroid) 30.08 in., Temperature 51° F. Sky overcast with high stratus, but in the direction of the spouts was dark with rain-squalls.

"At 11.15 B.S.T. in the storm area in position Lat. 50° 45′ N., Long. 01° 45′ E. the ship passed between five waterspouts (one coming within three cables), four of which were fully formed. The wind was observed to veer to S.S.E. and then to S.W., increasing to force 4, barometer dropped 0.02 inches and temperature two degrees. The disturbance at sea level was of approximately 20 to 40 feet in diameter, decreasing to 10 feet at one-third the height and then broadening to the cloud base. At the cloud base there was considerable anti-clockwise circular disturbance over an area approximately 300 to 500 feet in diameter. There was a strong downward movement on one side and upward movement on the other, in the upper part of the spout as well as the anti-clockwise gyration. The speed of travel was estimated to be at a maximum of six knots.

Fig. 1.

Fig. 2.

"Thunder was heard after passing through the area (approximately two miles wide and ten miles long) and the temperature rose one degree. Rain was not experienced at the ship at any time."

(Sgd.) H. W. T. OWEN.
Commanding Officer.

COMMENTS BY COMDR. C. E. N. FRANKCOM, R.N.R.

This interesting letter records a comparatively rare phenomenon in Home Waters. Little has been done, however, on the frequency of waterspouts in any part of the world. Exact frequencies of isolated pheno-

(Figs. 1 & 2) A Waterspout on September 29, 1942 in the Eastern Mediterranean, off Haifa.

mena are not obtainable by analysis of ships' observations, since ships are neither stationary nor distributed evenly or in large numbers in all parts of the world, or even in any limited region.

With this proviso, the following information is given (from the *Marine Observer*, 1932, pp. 153-5, "Waterspouts," by L. E. Fletcher :—

1. Lat. 40°-50° N., Long. 0°-10° E. (covering the greater part of the North Sea). Total of six waterspouts observed by British observing ships during the 12 years 1920-1931.
2. These were not analysed by months, but a monthly analysis of 28 waterspouts observed in Home Waters (and including the above six) is as follows :—

January ..	0	July ..	3
February ..	0	August ..	5
March ..	2	September ..	11
April	0	October ..	1
May	2	November ..	3
June ..	0	December ..	1

The area includes the whole British coast, North Sea, Southern Baltic and Bay of Biscay.

3. Monthly analysis of 739 waterspouts all over the world shows a maximum frequency at about the equinoctial months, viz. March-April, and October. For this purpose all observations in the northern hemisphere and all in the southern hemisphere were taken separately.

Editorial Note.—The attention of readers interested in this subject is drawn to the note "The Structure of a Waterspout," by Sir Nelson K. Johnson, K.C.B., which appeared in the *Quarterly Journal of the Royal Meteorological Society* for 1944 (p. 127).

R.A.F. Photographs] [*Crown Copyright Reserved*

Waterspouts on October 4, 1943 near Sardina (40° 49′ N., 11° 11′ E.).

Figs. 1 and 2 are reproductions of the photographs of the waterspout discussed by Sir Nelson. In the picture showing the full length of the column the spout is moving from right to left. The other view—a "close-up" of the base of the column—show the dense upper portion (and the dark core traversing it) suggestive of spiral movement. At the sea surface an "eye" can be seen clearly in the centre of the column. The photograph above shows waterspouts between Sardinia and Naples on October 4, 1943.

(*With acknowledgment to "Weather"*).

FORMATION AND OPERATION OF A GLIDING CLUB

A LECTURE READ BEFORE BEROTECH F.C. No 1 ON DEC. 19TH BY ANN C. DOUGLAS

(Hon. Secretary British Gliding Association)

THE actual formation of a Gliding Club is divided primarily into 2 different classes, and quite often neither has any bearing on the other. They are :—

(*a*) What you want to do, and

(*b*) How you are going to do it.

To start with, then, it is necessary to consider :

The Locality, Nearness of Population, and Transport Facilities.

If it is desired to run a full sized club, there must exist a continuous flow of members who can get to the site easily. In addition, the locality must be such that it is not, for months in the year, either under water, or in cloud.

With gliding, as it is at present operated (no reflection on the Clubs), cities such as Sheffield or Bristol, are really needed within 20 miles to feed a Club. If the Clubs were operated on semi-military lines, such as A.T.C., then smaller communities would be adequate, as attendance could be regulated to operate equipment to economical capacity.

In an ordinary civil club, aircraft are often swamped at week-ends or holidays, and sit uneconomically (but probably safely) in the hangar for the rest of the time.

If sufficient attendance is required to make summer evening operation worth while, transport facilities should be such that the total journey from the centre of the nearest large town should not take longer than 40 minutes, and should not include more than 1 mile of walking, preferably much less.

One often hears, " We have very keen members, they come miles and miles to fly." This is all very well, but is not conducive to regular operation, which is the key to gliding club economics.

The Type of Club and its Facilities.

Having decided where you want to operate, the next consideration is what sort of Club or Group you want to have. Will the locality support a full size Club which offers full facilities, or would it be wiser to operate as a Group, whose numbers and experience are all a known quantity, and who will not require the extensive ground equipment required by a proper Club ?

There is nothing, of course, to prevent a Group developing into a Club, but the initial financial risk will be less, and farmers may often permit a known group of pilots to operate, whereas they would think twice before allowing the unknown quantity of a Club to settle on their property.

If there is any doubt as to the response the Club will receive, start small. (This is rather unnecessary advice at the present time !)

If, however, it is decided to embark on a Club, further considerations come so rapidly to mind, that it is difficult to know where to begin thinking.

(1) Is the Club to give elementary training only, or to carry on to Silver " C " standard ?

(2) Is it intended to operate only at week-ends, or throughout the week ?

(3) Are there to be paid staff or not ?

(4) What launching and instructional methods are to be used ?

(5) What catering and residential facilities are to be provided ?

These considerations really bring us to the " How you are going to do it " section, so having decided that (*a*) the locality is suitable geographically and meteorologically, (*b*) the population is close, co-operative, and has plenty of cash, (*c*) the transport facilities are fast and frequent, and (*d*) you are really set on starting a club, to give for example, training to " C " standard, we can proceed to the practical side of Club formation.

The Site.

Is this to be a hill site, or a flat field ? Some advantages of the former are

(*a*) The increased possibilities of sustained flying, especially in winter. This is a great benefit for passenger and post " C " flying.

(*b*) The simplicity of obtaining " C " certificates.

Some disadvantages are :

(*a*) The occasional prohibition of all useful flying, *i.e.* training circuits and soaring, due to the turbulence when the wind is blowing down the hill.

(*b*) Possibility of inhibitions or temperament developing in the pupil pilot, due to the immovability of the ever-present hill which often seems to bar his way.

On the other side, advantages of the flat site are :

(*a*) Flights can be made in any direction round the field irrespective of wind direction. This is of great benefit during early training.

(*b*) It is often easier to get a flat field near a main road and town than a hill site, and although it may suit the purist to do his gliding from an isolated crag, it certainly will not suit any clubs' finances.

I am certainly no advocate of forcing everyone into the air regardless, but I do feel that gliding clubs should be within reach of those who want to go and fly at them.

Some disadvantages of the flat site are :

(*a*) No practical means of continuous flying other than thermal soaring, and although this method has wider possibilities than at present realised, it cannot give the same amount of simple and pleasant flying per year, especially during the winter months, when hill soaring is about the only real flying attraction, at any rate on medium performance machines.

These are briefly the main differences between hill and flat sites, so if the prospective operator has not yet been able to make up his mind, I will give a short specification for each type of site.

Hill Sites.

The hill should have one or more ridges facing the more frequent wind directions. There should be one

face at least ¾ miles long with a constant direction. Secondary slopes need not be more than bowls which require flying continuous figure of 8's to remain in them, although if they are slopes which can be used for elementary soaring so much the better for the Club.

The height of the hill can usefully vary between 200 feet and 900 feet above the valley level. Less than 200 feet gives a hill which is fairly ineffective unless there is a good wind blowing straight up it. When the hill is over 900 feet high, the airflow sometimes behaves oddly, and lift may only be found well out in front of the hill, which is not a good characteristic for a training site.

The contour of the hill should be as smooth as possible, as a cliff-like face makes for turbulence. The surface of the face may be bare, like much of the chalk downs, or wooded like the Surrey hills, with equal benefit. But it is not desirable to have anything in between, such as is possessed by Inkpen Beacon. This boasts telegraph wires and poles, single trees, radar masts, and not least—a gibbet. Such things have a sinister attraction for the beginner.

An important consideration with regard to hill sites is the location of the landing ground; whether it should be at the top or bottom of the hill.

Some advantages of the top field are:

(*a*) Less interference with flying when the wind is blowing down the hill.

(*b*) Normally few surrounding obstructions, and no immovable hill to be avoided on circuits.

Some disadvantages are:

(*a*) The probability of a lengthy or tedious retrieve when the glider fails to soar, and sinks to the bottom.

(*b*) The increased exposure to the weather, and with it the greater risk of gliders being blown over.

The advantages of the bottom field are, of course, the opposite of the ones just mentioned, with the addition that if the bottom field is very sheltered it is often unnecessary to move the winch except for extreme changes in wind direction.

Whether the landing ground is at the top or bottom of the hill, it should be large enough to give an effective winch launch in more than two directions. The minimum length being 600 yards.

The Flat Site.

This is to be a landing and launching ground only, without the benefits of a hill, and so it should be as good as possible. Although for winching the surface need not be smooth, for auto- and aero-towing it must be, and anyway the life of retrieving cars must be spun out as long as possible.

It is almost essential that winch and auto-towed launches should reach 1,000 feet from a flat site, and therefore a ground run of at least 3,000 feet in two or more directions will be required. This means a really big field, and one that is probably not to be found in the vicinity of a large town.

Ex-R.A.F. aerodromes make excellent flat sites. The runways are good for auto- and aero-towing, except that cable wear is inclined to be high. There is grass available for landing on, with the additional benefit that it is usually cut up by tracks and runways into ready-made "force landing" areas for practice. On war-time aerodromes, the little huts and hangars scattered round the perimeter are a distinct advantage in temperamental weather.

Aircraft.

We have assumed that the Club is to begin operating by training to the "C" stage, with, if possible, a sailplane to keep the post "C" pilots and instructors happy.

At once the question of trainer types arises. Is training to be given solo or dual, or is a combination of the two to be used. Pure solo training is definitely cheaper in initial outlay, but is more expensive in maintenance and repair. It is not fair to compare A.T.C. and Club operation using this method of training, as the two organisations and their objects are so entirely different.

The A.T.C. has pupils of like age and inclination under discipline, and does not take them beyond a stage of training where the pupil is far outside the instructor's direct control.

The Clubs, on the other hand, have to take on the most unpromising and undisciplined people, by virtue of their being an open club, and make the best of what they get. Training is, of course, continued well beyond the A.T.C. stage to where the pupil becomes an independent pilot.

Pure dual training is really only practicable at a large Club, as in first cost machines are very expensive. At least two competent pilot instructors are required, so that waiting time on the ground for pupils is reduced. But perhaps the biggest problem is that of early solo flights. In theory these should be made in the training two-seater, which is one of the Club's most valuable assets, and anyway probably cannot be spared from instructional work.

Possibly a good method of training from a long-term economical viewpoint is to give the pupil considerable air time in an efficient two-seater. Perhaps, I should say here, that I consider low performance two-seaters a waste of time and money. You have got to have a competent pilot or instructor flying the thing anyway, so why not have a machine that his capabilities will make full use of, and which will give the highest ratio of flying time to launches. About two or three hours' air time is possibly about right, depending on what it consists of, and how it is spent. The pupil should then be transferred to a secondary sailplane of preferably "G.B. II" type, although the "Cadet" and "Tutor" can be used satisfactorily, and put on to low hops, high hops, and then circuits being given as many as seem necessary. The pupil should definitely *learn* to fly and land on the solo machine; the two-seater air time being most valuable for giving the pupil air sense, practice in co-ordinating controls and speeds, and general experience. In this way crashery should be kept to a very low figure.

As, at present, there are no two-seaters available, I will try to deal a little more fully with the solo training aspect. As you know, the general system of training using this method is to project the pupil through a series of ground slides, airborne slides, low hops, high hops, circuits and etc., until he can fly.

(*To be continued*)

BRITISH GLIDING ASSOCIATION LTD.

Statutory General Meeting

THE first Annual General Meeting of the re-constituted B.G.A., now a Limited Liability Company, was held on January 24th, 1947, at 4.0 p.m. in the late Dining Room of Londonderry House, Park Lane, London, now the Headquarters of the Aviation activities of the Royal Aero Club.

Shrouded in their overcoats the Club Delegates shivered in the newly created conference room, unheated in spite of the bitter cold—a reminder of the grim times in which we live in 1947.

There was an attendance of about 40 people, including Club delegates from member clubs, associate clubs, some ex-officio members and the Press.

After the formal business of apologies (there were none although several clubs were not represented) and the Minutes of the General Meeting held on October 4th last, Dudley Hiscox vacated the Chair only to resume it a few minutes later as the unanimous choice of Chairman for the ensuing year. Ashwell Cooke was similarly elected Treasurer, and Ann Douglas, Hon. Asst. Secretary. The Council were next elected and it so happened that the number of Clubs who had put forward nominations (12) was equal to the total number that might be elected, so the nominations were accepted "nem con" without further election.

The cash statement was then explained. It showed that a sum of £363 had been transferred to the new account of the B.G.A. Ltd., which at January 14th showed a credit balance of £478.

The budget for the forth coming year was then considered. It reflects the decision of the B.G.A. to run its own affairs as apart from the Royal Aero Club, from whom it will take over the issue of Gliding Certificates with effect from February 1st. Based on the 1946 figures it appears that the B.G.A. Ltd. will be able to afford its own paid secretary and clerks.

	£	s.	d.
Estimated Expenditure.			
Rent, Lighting, Heating, Royal Aero Club	250	0	0
Share Royal Aero Accountant ..	25	0	0
Salary and allowances of Secretary ..	600	0	0
Salary Clerks (2)	360	0	0
Printing, Stationery, Badges, Postage, Legal charges, Telephone, etc. ..	350	0	0
	£1,575	0	0

	£	s.	d.
Estimated Revenue. (Based on 1946 figures).			
Royal Aero Club Certificates ..	600	0	0
B.G.A. Badges	250	0	0
Logbooks	150	0	0
Publications	50	0	0
Club Subscriptions	400	0	0
	£1,450	0	0

The new departure clearly called for a word of appreciation of what the Royal Aero Club has done for Gliding and this was proposed by the Treasurer, Ashwell Cooke, supported by Ann Douglas. Col. "Mossy" Preston, Secretary General of the Royal Aero Club replied that it had been a pleasure to assist the B.G.A. even though it had cost the Club a lot of money. He was glad that at last the B.G.A. had the opportunity of becoming independent like the Association of Light Aero Clubs.

The question of membership fees was discussed and it was decided to leave them as they were last year. Messrs. Smart, Son, and Bloor were appointed Hon. Auditors for the current year.

The next item was the question of the 1948 Competitions. Col. Preston who had just returned from an F.A.I. Meeting in Paris, said that he had said there that Great Britain was still willing to run the International Competitions to run concurrently with the Olympic Games—although there were to be no Gliding Olympic Games—but he had had to ask for 3 months grace in which to find out whether it was possible to raise the £10,000 necessary. He felt he could report however that if the Council of the B.G.A. did not want to take on this venture, or decided against it, the chances were that Switzerland would take it on.

S./L. E. H. Spence said that the £10,000 included the cost of development of special aircraft which could be sold later. Some of the money might also be recovered by way of fees to the public for admission to the events and entrance fees of various sorts. Dudley Hiscox said that five machines would be required, and these, said Ann Douglas, would cost a lot of money. Col. Preston asked if any regulation type had been laid down, to which S./L. Spence said that the Competition is to be Open, with no limits, as yet, as to style of machine. Bernard Thomas, of the Derby and Lancs. asked what would be required of the Clubs. He thought that the Clubs could themselves find good use for £10,000. It was decided to leave it to the Flying Committee. J. C. Rice, of Leicester, riased the question of what sort of site would be used—hill soaring or flat for thermal soaring. The Chairman said he had no bias but the matter was not pursued. (It roseagain in a later item).

It was reported that in connection with the proposed Czech visit, the Czech guests wished to bring their own machines, and might even aero-tow them here. Bernard Thomas, on behalf of the Derby and Lancs. Club was authorised to state that his Club would be at the disposal of the Czech visitors, whilst J. C. Rice offered on behalf of the Leicester Club, to entertain them for a short visit. The Secretary suggested that the visitors might be invited to enter for the National Contests and then go on for the Derby Aero Club week-end. Major Purvyse said the Army could entertain any members of the visiting team who might be serving in the Czech Forces. The matter was left to the Council to arrange.

The next item was the state of the Clubs in regard to aircraft which was reported as follows :—

	Jan., 1946	Now	On order or could operate
" Primaries " ..	21	12	59
" Secondaries "	18	5	44
" Medium " ..	10	12	22
" High Performance "	4	6	50
" Two-seaters "	3	6	22

In other words the clubs could operate four times the number of machines they have at present. There are 30 private owners.

There had been at least 10,000 launches, 1,600 hours flying, including 700 by the Cambridge Club, but not including any figures from Germany. There are 1,100 flying members but it was estimated that there is a potential membership of 3,000.

On the question of production, Mr. F. N. Slingsby said that Messrs. Martin Hearnes had some 15 machines available for sale. He also stated, to the great delight of all present, that, as in previous years, Major Shaw was prepared to develop a high performance machine and to offer four of them to the B.G.A. for the free use of their team in the International Competitions if the B.G.A. wanted them. He was willing to do this again in order to doo all he could to help maintain National Prestige. They were also developing a new " two-seater," like the one ordered for the A.T.C., which would be available this year.

Dudley Hiscox said that in considering the date and place of the National Contest, 1947—which was recommended for the 21st—29th June—regard had been given to the fact that those were the longest days of the year, with most hours of daylight for cross-country retrieving. There was a suggestion that the Admiralty might be approached to offer facilities for these Competitions.

Col. Preston said that the proposed date might clash with that of a National Air Rally. The Treasurer said that there might be some suggestions from Clubs, whereupon the Derby and Lancs. Club, the only Club who had communicated with the Secretary on the subject, said they might be prepared to offer facilities for the Meeting. C. Wingfield of the Midland Club thereupon raised two points. One was the question of hill soaring or flat site again, and the other was whether the Meeting should be run by a Club, the Club bearing any loss and taking any profit, or by the B.G.A.

The Treasurer thereupon said that as the budget of the B.G.A. had been passed he suggested that it be left to a Club. Col. Preston stated that it was an interesting point. As it might be proposed to raise the money from National Newspapers, such money would only be given to the B.G.A. The question of the site should be carefully considered from the point of view of the public. A flat site had the disadvantage that if thermals were contacted, in the words of Philip Wills, " the contestants disappeared into the sky and the public might want their money back." J. C. Rice said that if a flat site was chosen, he thought Ratcliffe Aerodrome might be secured. F. N. Slingsby said that his experience

(*Continued on page* 30)

AUSTRALIAN GLIDING

1. *" Kite " skid and controls.*
2. *" Kite " tail skid and boom.*
3. *" Kite," H. Ryan left.*
4. *" Kite," designed and built by M. Warner.*
5. *Steve Newbegin and Assistant repairing minor damage to " Gull."*
6. *Nacelled Primary 2-seater.*
   J. Watt—Sydney Technical Club (left).
   G. Clark—Hand on Centre Section.
7. *Water Glider (amphibian).*

AUSTRALIAN GLIDING ASSOCIATION

VICTORIA GLIDING CLUB

A party left Adelaide, Monday, 14th October, and arrived at Fremantle, Western Australia, on Friday, 18th October, at 8 p.m. They were met by members of the Perth Gliding Club and arrangements were made for screening of Gliding Film, " Flight without Power—the Art in Australia," on Saturday morning at the Shell Theatrette, Perth. Motor-cycles were unshipped on Saturday, and on Sunday a Gliding Meeting at the Caversham Airstrip was attended. Warren Major's " Grunau Baby II " sailplane was flown by himself, Ric New and R. Duckworth in Force 3 wind. Primary glider training was also carried out on the edge of the main strip. The Caversham Airstrip is located in scrub country approximately 18 miles north-east of Perth. It has wide bitumen runways (with rough grass edges) in several directions and is ideal for car-towed launching.

R. Duckworth made a short colour film of the activities. On the Sunday evening a Club social evening was held at Mrs. New's residence at North Perth and the Gliding Film was re-screened.

The party left Perth at 3 p.m. on Monday, 21st October, 1946, by solo motor-cycles, L. Milesi riding pillion with R. Duckworth on the latter's 500 cc. Velocette and J. Kelleher on his 500 cc. S.V. B.S.A. After spending two days in Kalgoorlie they then proceeded *via* Norseman and Eucla across the dry scrub and plain country (700 miles odd without any watercourses) arriving at Port Lincoln, South Australia, on Monday evening, 28th October, at 6 p.m. The party and motor-cycles were embarked on the M.V. Minnipa for Adelaide on Wednesday evening, 30th October, and on the next day at 1 p.m. reached Waikerie and met members of the Waikerie Gliding Club. New winch was seen in operation, and J. Kelleher had a passenger flight with Jock Barratt in the " Pelican " 2-seater in the evening. On the next day George Donaldson of the Renmark Gliding Club was visited, the party proceeding *via* Renmark and Mildura to Swan Hill (Victoria), arriving at 7 p.m. on 1st November. Melbourne was reached on 3rd November, 1946, after travelling 2,352 miles by motor-cycle and seeing an enormous amount of Australia and going through some interesting experiences.

Blue " Grunau " Syndicate.—This Syndicate, comprising N. Hyde, R. Dowling, L. Dowling, R. Duckworth, and E. Desmond was formed on 16th December, 1946, to acquire the Blue " Grunau Baby II " sailplane.

The Syndicate has built an open trailer to transport the machine. The trailer is to be converted to a closed type as soon as materials are available. The Blue " Grunau " has been fitted with the latest Cobb-Slater Variometer.

BEAUFORT GLIDING CLUB (MELBOURNE)

The first test flights of the two-seater glider built by the Club took place on Sunday afternoon, 8th December, 1946. The first flight was made at 4 p.m., piloted by H. G. Richardson and with John Wallis as passenger.

NEWS FROM THE CLUBS

LONDON GLIDING CLUB

From a precarious start with one scrounged "Tutor" at the beginning of 1946, the Club has finished the year with a fleet of seven aircraft and a full-time professional Instructor. The fleet now consists of three "Tutors" (two new and one old model), two "Cadets," a Slingsby two-seater, and the "Gull" formerly owned by Hiscox.

Our professional Instructor, R. C. Reid, was appointed on August 21, shortly after he had, as a new member, put in an immense amount of volunteer work on the August Camp at Eaton Bray. However, though new to the Club, he is not new to gliding, having had long experience in South Africa as an A.T.C. instructor, and obtained two legs of the Silver "C" in that country. His handling of the two-seater on instruction flights is a delight to watch; and he has quickly established authority over the Old Lags, who may not now hazard the club aircraft with impunity.

Our last consignment of news went no further than the middle of August, and it still remains to record that, during that month, Huxley did a 5 hours' flight in "Cadet," and Benson 5 hours 10 mins. in the "Scud II" which he now owns; this is the original "Scud" in which Mungo Buxton set up a British height record in 1934 and Philip Wills and the late Peter Davis did some notable flights. The last Sunday in August was a particularly busy day; the new "Tutor" was tried out, and the "Minimoa" was aero-towed over at a great height and sank slowly to earth, disclosing Sanderson, one of its new owners. He shares it with Latto, Laurence Wright and Dr. Edmunds. Prince Bira, in his "Weihe," recently acquired from Switzerland, found lift over the front of a cloud shadow, and later soared when the wind freshened.

On Sunday, September 1, as also on the day before, six machines operated; two club "Tutors" and the privately-owned "Weihe," "Blue Gull," "Minimoa" and "Olympia." There were cumulo-nimbus about and a soaring wind which gradually backed; in spite of the convection clouds, however, Hiscox could find no thermals. At about 3.30, Bira climbed to 1,000 feet and flew out towards a thunderstorm in heavy rain, but without result. The preceding lull had brought everyone else down.

Reid, our Instructor, slope-soared for 5½ hours on September 9th; having no watch, he had to rely on signals from the German "prisoners" to know when to come down.

"Falcon" over Dunstable Ridge.

Winds and weather were mostly poor in October. Visitors by aeroplane on the 13th were Bira in his blue "Auster" and Wills in another "Auster." Wills brought "Bonzo" Heath, who hasn't seen the Club since he went out to Egypt in 1937; since then he has got around a bit, and recently tried to start a gliding club at Graz in Austria, but the idea was suppressed for political reasons as, he was told, it would make the Austrians war-minded! While on the subject of visitors, two weeks earlier we had Johnny Ward and Stan Haynes, formerly of Salzgitter, J. A. Simpson of Canada, and Major Petre, our one-time Chairman, who was running an A.T.C. camp at Eaton Bray. Although the 26th was the only good soaring day, our activities in October included 225 launches, with six "A" and six "B" certificates.

In the first half of November, flying was restricted by bad weather, but the clubhouse remained well filled at week-ends. Mid-week flying, now made possible by the presence of a full-time Instructor, was enjoyed to the full on Tuesday, November 26th, when Laurence Wright and Marsh (who is on leave from the Navy) turned up to try for Silver "C" duration. Wright was launched in "Minimoa" at 11 a.m., and remained airborne till 4.20, while Marsh soared the "Tutor" from 11.20 till 4.25. Other members turned up during the day and there were six machines soaring, usually four at a time. What with Greig in "Blue Gull," Reid in the Two-seater, the Club "Gull" and "Tutor," and three Cambridge Club pilots with their "Tutor," which they are keeping here, 19 flying hours were put in. The Club "Gull," acquired from Hiscox, was flown for the first time as a club machine by Ellis. Pilots wishing to be promoted on to it must be vetted by Reid in the Two-seater first. Met. conditions were interesting: there were scrappy thermals causing rough air to 600 feet only; at 700 feet it was quite smooth. Later the wind backed from W.S.W. to S.W., and after 1 p.m. it was smooth at all heights

Activity during the first part of December was much restricted by bad weather, and in spite of members' enthusiasm little flying could be done.

On Sunday, December 1st, 18 hours' flying was put in. Next

day, Monday, Wheatcroft and Moore were launched on Silver "C" duration attempts; but owing to the intense cold Moore, in the "Cadet," was obliged to land after 2½ hours, and Wheatcroft came down after 3 hours 20 mins. Remember your hot water bottles next time!

Christmas week had been advertised as a week's gliding camp, and although the first few days were no good, on the 27th there was a good deal of flying. Saturday, Dec. 28th, was a perfect soaring day, with a west wind and plenty of sunshine, and members turned up in force. At one time there were six sailplanes soaring on the hill together—the "Minimoa," the blue "Gull," the "Buzzard," the Club "Gull," the two-seater and a "Cadet." Carter passed his "C" test on the "Cadet," but Cleaver failed after four attempts. Flying hours for the day totalled thirteen.

On Sunday, Dec. 29th, about twenty members arrived by 10 a.m. to find the Downs wrapped in a thick blanket of fog. Their enthusiasm was undamped, however, and under Greig's expert eye (Mr. Reid, the Chief Instructor, being on holiday) repeated bungy launches were given to eight beginners (Ross, Cleaver, C. and H. Hurry, F. Cooper, Dunkerley, Parker and Spence), who did low hops and groundslides. In all, forty-five launches were completed without mishap, although none of the landings were visble through the mist, and the bungy crew themselves could be seen from the launching-point only as dim ghostly shapes in the greyness. The last launch of all was to have been a particularly strong one, but when the greatest strain was just being taken, the rope broke, and the bungy crew fell on their faces in the mud, to the intense delight of those watching. On the whole, a very good time was had by all, and the beginners were extremely grateful for the hard work put in by the others.

In wishing all the other gliding clubs a happy and flighty New Year, may we hope that their thermals be always in the right place, and adequate without being uncomfortable.

MIDLAND GLIDING CLUB

THE general Club reaction to the past year has been in Mr. Churchill's famous words, "Give us the tools and we will deliver the goods," but alas, the former have not been forthcoming. Overhead expenses have been high and ordinary flying income low, owing to the fact that the Club has been operating with one sailplane only, a German "Wolff," bought at the end of 1945.

It soon become apparent that without the assistance of private owners who were wise enough to keep their machines, the season would be a major flop. It was then that Charles Wingfield stepped into the breach and kindly offered the use of his "Kite" to competent Club pilots on the basis that such flights should be charged at club rates and paid to the Club. This magnanimous gesture helped to keep together the small band of keen members who had put in so much work to get the "Mynd" going again; later on this was helped and augmented by the addition of a private "Petrel," again which experienced pilots were allowed to fly on the same arrangements.

As regards new members, these unfortunate people have had a thin time. Early on in the year, when the A.T.C. had had its fill of two-seater instruction, our instructors were able to pass several out as safe for solo, but when the A.T.C. finished their summer courses and the two-seater machine was withdrawn, no further new people could receive tuition or be passed out. It must be squarely faced that on a site like the Mynd it is both uneconomic and unsafe to attempt to cater for new, inexperienced blood without the safeguard of soaring tuition and passing out on a two-seater.

Generally, however, and in the aggregate, the quantity and quality of flying done at the Mynd has been satisfactory insomuch as we have been favoured by visits of various Clubs and private owners. The outstanding camp of the season was the Cambridge camp, which has been fully reported in the SAILPLANE, when 315 hours' flying was done by the Cambridge team, private owners, and our own members who were up there assisting. Nineteen cross-country flights were made, aggregating approximately 1,000 miles, and it was at this camp when Philip Wills broke his own (British) record with 15,300 feet! Also at this camp 14 Silver "C" duration flights were recorded, and the level of enjoyment of the whole effort was universally voted as high. If evidence were needed, the advantage of having board and lodgings on the site was clearly proved in the number of hours flown. Good conditions were put to full use and no time was wasted on travelling backwards and forwards.

The A.T.C. Instructors under tuition did well with the two machines which they had up there. Twenty-one "C" certificates were gained and about 71 hours' flying put in in the aggregate.

The last camp of the year was the Holiday Club camp, and over 120 hours' flying were done. It was at the last week-end of this camp that F./Lt. H. T. Testar unofficially broke the British two-seater record "Falcon III" with 7,800 feet during an instructional flight with A.T.C. Instructor Dennett under training. They went out over the valley prior to coming in when they apparently picked up a standing wave which carried them up at three to five feet a second to the above-mentioned height. At the highest point they observed Roger Thwaite in the "Petrel" about 200 feet higher, and both machines were 3,000 feet above the cloud tops and had come up in the clear sky through a hole. The most meritorious flight by a Club member was Charles Wingfield's flight to Redhill, when he visited Ann Douglas by air.

The total time flown during the year was something over 700 hours—the exact figure is not to hand at the moment—but unfortunately the Club lost its only machine, the "Wolff," in September, and is now awaiting delivery of its first Taper Wing "Kadet" from Messrs. Martin Hearn. It also has two "Kite II's" on order, and two machines are being produced privately for the coming season.

On the whole, however, the Club feels that it has had a very hard deal from the authorities, in that it has been left to struggle without assistance of any sort in replacing

its commandeered fleet. Also, the terms upon which the unwanted R.A.F. equipment has been offered have been too high to be of any assistance to an organisation running on such economical lines as it is essential for us to run. The one exception has been parachutes.

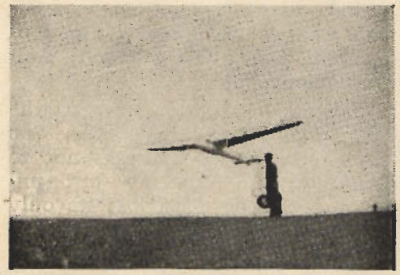
As regards the coming season, everything depends on our ability to obtain machines to fly. All the enthusiasm and all the organisation is valueless without machines, in fact it would appear that for the past year we have been over-organised and under-developed, chiefly through the uncomprising and unhelpful attitude of the authorities to the organisations catering for gliding and soaring flight. We feel that once they realise the importance of access to the air for the ordinary man, this will be remedied, but it is a long and depressing wait.

L.E.H.

(*Pictures on page 9*)

84 GROUP GLIDING CLUB.

The last gliding course of the season finished at the school in the last week of October, and flying has taken place since then only when the South West hill wind has been blowing. Because of the unserviceability of the field due to rain, there has been no elementary instruction, and flying consisted of winching from the top of the hill and landing back on the hill again at the completion of the flight.



" Weihe " being winched off.

We had eight good flying days in November with a total of 87 hours, 57 minutes and 154 launches. On the third of the month W./Cmdr. Paddy Kearon, O.B.E., in a " Weihe," and Captain Teddy Thompson in the " Mu 13 A," completed the duration leg of the Silver " C " with flight of 5 hours, 57 minutes and 6 hours, 59 minutes, respectively. This flight by Thompson raised the local R.A.F. solo record from 6 hours, 37 minutes. Ten days later Forbes, who held the previous record, flew the " Minimoa " for 9 hours, 50 minutes to regain this record, flying about 3 hours in darkness, and landing on a flare-path. On the same day F./O. Tony Mattock made a flight of 5 hours, 50 minutes in the " Mu 13 A."

Standing waves have occurred with some frequency during the month, but only under certain meteorological conditions which have been noted. F./Lt. Winter, D.F.C., when attempting Silver " C " duration in the " Mu 13 A," reached a height of 1,300 metres in a standing wave, but unfortunately he did not carry a sealed barograph. W./O. Trybulec, in a " Weihe," reached the same height without a barograph, and was still climbing steadily. He decided to land at once and install a barograph, but on the second attempt the wave had disappeared. Mattock, being warned by the mistakes of others, installed a barograph in his Silver " C " duration flight, but instead of " bungying " off the hill he was winched off, and although he reached 1,250 metres his height above release was only 950 metres.

When this School was in German hands, there were 3 Gold " C " heights made in this standing wave, but on each occasion it petered out between 3,500 and 4,000 metres.

THE AIRCRAFT CLUB

There is every indication that next year will be an important one for gliding and low-powered flying. Numerous gliders and low-powered aircraft are being constructed by individuals and clubs in all parts of the country.

The Harrogate and District Branch of the Air League has just been formed and the Club is represented in it.

The Aircraft Club has been co-operating with the Aireborough Flying Club, and a little gliding has been done in the Otley Chevin district where we have had joint use of an Army hut.

The Knaresborough Model Club has recently been formed, and we are advising members of our model section to join it, Knaresborough reciprocating by sending us gliding and flying members.

It has been decided for the present to concentrate on the overhaul of the old S.T.G. and completion of the new one, so that we can start the season with two machines in good condition. In order to ensure this the Club will be open every Tuesday, Wednesday, Friday and Saturday evening, also on wet Saturday afternoons, so that members can help with constructional work.

Three new members were elected at the last Committee meeting, and enquiries were received from two more.

Members who paid subscriptions for 1946, when very little expense was incurred, are to be credited with them for 1947.

The basic subscription for the Club is 10/- per annum, and that will cover the initial gliding subscription for members who do a reasonable amount of constructional work. In addition there is a charge of 3d. per launch, but for non-workers a higher gliding subscription and launching charge is made.

Former members who have previously been elected and have paid a subscription may rejoin the Club without election by sending their basic subscription of 10/- to the Hon. Treasurer, G. Smith, Esq., 3, Otley Road, Harrogate.

The Club welcomes new members, particularly the support of gliding and low-powered flying enthusiasts from all parts of the country at the basic subscription of 10/- per annum; these should write to the Hon. Secretary for an application for membership form.

Old members are asked to introduce new ones who are keen on the sport.

The Annual General Meeting was held in the Club Room at Starbeck on January 18th.

YORKSHIRE GLIDING CLUB

Flying Activity.—Except for the soaring on the 1st December, which was reported in our notes for last month, there has been no other flying during the month except on the 28th and 29th—there was an

hour or so in rough north-west wind on the 28th, and about 8 practice launches on the 29th, but no soaring. A fittingly flat end to a very flat year on the weather side, especially the last four months. A short analysis of flying this year (1946) is given below; it excludes all A.T.C. flying and there was no primary training due to shortage of aircraft and for economic reasons; for instance, if our only "Cadet" had been damaged on primary work, then there would have been nothing for "B" and "C" pilots in the training stages to fly, and rightly enough, they would have objected. Primary training, if everyone is to have a square deal, just cannot be done without some subsidy.

	Launches.	Hours.	Days Fit.	Club A/C.	Private A/C.
JANUARY ..	6	00.50	2	nil	2
FEBRUARY ..	7	00.39	1	nil	2
MARCH ..	31	00.30	2	1	3
APRIL	76	19.07	6	2	2
MAY	2	00.06	1	3	1
JUNE	91	34.54	9	3	1
JULY	110	51.50	10	3	1
AUGUST	91	32.54	10	4	1
SEPTEMBER ..	55	05.20	4	4	1
OCTOBER ..	—	—	nil	4	1
NOVEMBER ..	—	—	nil	4	1
DECEMBER (to 24)	12	04.25	1	4	1
TOTALS	481	150.35	46	–	–

It should be noted that "Club A/c" includes two private machines made available to certain categories of members.

Whilst no claim is made that the foregoing is an outstanding performance, it is considerably more than any of us would have forecast when we surveyed the wreckage of our Club at the end of hostilities; we are on the road again, and ready to take full advantage of any stroke of luck that the future may hold, but not so well fitted to take any more set-backs!

We intend to hold a camp for pilots with "B" or "C" gliding certificates in July or August, but before we can make any detailed plans, need to know more or less what the demand is likely to be; the job will be done at as little cost as is economically possible, but the Club will not be able to offer accommodation or food. The hardy ones will be given ground on which to pitch their tents, and for the more luxuriously inclined, we will give any assistance we can with local hotel bookings. This camp will of course be open to power pilots provided that they are not below power "A" license standard. The Hon. Secretary will welcome enquiries about this matter.

The last notes on the first post-war year should not close without reference to our relations with No. 28 G.S., A.T.C. The arrangement has worked very well and there have been advantages on both sides; a soaring school for A.T.C. instructors was of course a new thing, and under the control of S./Ldr. C. D. Hartness, long experienced in A.T.C. methods and himself an old Y.G.C. instructor (who has had the assistance and co-operation of Club instructors wise in the ways of Sutton Bank and its oddities), very good results have been obtained, and 25 or more A.T.C. school C/O's and their staffs have passed "C" certificate tests, and practiced soaring. Their experience will be of direct benefit to their Cadets under instruction.

It might be suggested in conclusion that all clubs who have made a start, and overcome or held at bay, a host of difficulties should press for assistance at least equal to what they have already done themselves. When all our aircraft were requisitioned, or rotting, during the war, the enemy was building, or making other nationals build, good sailplanes. Well, there must be some fine modern stock here and there in Germany; the Czechs grabbed whilst the going was good and good luck to 'em; why not this country too? . . . and let Germans fly 'em over on tow, just to discourage any misplaced patriotism with a hack-saw before they leave!

G.A.H.

LEICESTERSHIRE GLIDING CLUB

With the close of the flying season we are now in a position to review past progress and future prospects.

The Club has now been in existence for two years. Since the ban was in force during the first year's existence, Club activities were of a static nature, but we were busy working on aircraft, the winch and organizing social events and lectures.

When the great day arrived we had the "Dixon II" and the "Grunau" ready for flying while the winch was in good mechanical order. By kind permission of Messrs. Auster Aircraft Ltd. we were able to use Rearsby Aerodrome. Due to the inflated second-hand car prices one of our greatest difficulties was the acquisition of a suitable retriever. In the early days retrieving ranged from stooge power to a 4½ litre Rolls. We finally managed to obtain a 21 h.p. Chrysler, which has given good service for the greater part of the season.

The majority of our members were *ab-initios*, so the "Dixon II" was fully occupied at week-ends and for two evenings per week during the summer. To date we have obtained 17 "A" 10 "B" and 1 "C" certificates, nothing spectacular, but we are a new Club operating from a flat site. Most of the "B" holders were hoping to qualify for their "C" at the Club's camp at the Long Mynd, which was arranged for September, but this was cancelled due to our losing the "Grunau."

Most readers will know of the Easter aerotow rally we arranged and which has been fully reported in the SAILPLANE AND GLIDER. Unfortunately the majority of our members were not sufficiently advanced for aero-towing, however, a good time was had by all (we hope).

Prospects for next season are bright. We have two "Dixons"

for *ab-initio* training, the completely rebuilt "Grunau" will emerge shortly, the "Kite II" is expected any time now (Slingsby and Martin Hearn please note), and in addition there will be a privately-owned "Gull III" and an "Olympia." Aero-towing will be available by "Tiger Moth," which is expected shortly. As in the past season dual instruction will be available in the "Tipsy" at very cheap rates.

The ground equipment consists of two beaverettes and the Chrysler for retrieving, the winch we used last season is in good running order and another will be available soon.

During next season it is hoped to organize one or more visits to the Mynd (if the Midland G.C. will have us).

From the foregoing it will be seen that we have good reason to look forward to a really good season, but this will not be accomplished without hard work from all the members. We still have vacancies for hard-working enthusiasts, owing to some of our members being called up and others leaving the district. Full particulars can be obtained from the Chairman, Park Road, Blaby, or the Secretary, Ryecroft, St. Mary's Road, Leicester.

D.J.D.

DERBYSHIRE AND LANCASHIRE GLIDING CLUB

During December the emphasis was mainly on training and in particular bungie training. The "Nacelled Dagling" was worked hard on the few days that training was possible and given better weather we should have had a small crop of "A's" to finish the year off with.

One Sunday in a strong steady easterly wind the "Nacelle" became airborne on its own and was brought back to earth by the united efforts of the nearest people who just caught the skid and flying wires! The looks and the language can well be imagined, but all the people do really believe that machines do blow away in a strong wind if they are left unattended.

Nearly all the retrieving was done by hand, which kept everyone warm, and surprisingly, over forty launches were made in one quite normal day without any undue fatigue on the part of the squad. The easiest way we find is for the machine to be brought back tail first with two people supporting the tail booms on their shoulders whilst the remaining people push on the leading edge of the wing.

A little soaring was done during the month in the "Tutor" and "Kite," the pilots of the latter machine having the laugh during the cold weather as the "Kite" is now fitted with a totally enclosed hood, which makes things much more comfortable.

On Saturday 28th the met. people forecast a W.N.W. wind of about 35 to 40 m.p.h. and convection up to about five thousand feet.

This gave excellent hill lift to about 1,800 feet, which was used by Gerry Smith, B. Thomas and Stan Armstrong in the "Tutor" and "Kite." Stan Armstrong encountered a period of extreme roughness when cloud started to form much lower than before, and B. Thomas, who was flying the "Kite" at the same time, saw the "Tutor" in some very unusual attitudes.

Gerry Smith in the "Tutor" was able to fly backwards at about 10 m.p.h. ground speed for about half-a-mile and only had to make two turns on a flight lasting about twenty minutes. The Derbyshire Hand was not in evidence over the back wall, and was probably operating further back owing to the extremely strong wind.

Sunday, 29th December. The wind had backed to S.W., and after a late start due to trouble with the winch we had a good training day. The lift was not quite strong enough to soar, and the "Tutor" was flown on extended circuits to instructions under the eagle eyes of Louis Slater, who was the instructor of the day. The two youngest flying members home for the Christmas holidays were the only ones in the Bungie group to turn up for training, and so they had a field day and managed to catch up the rest of the group.

Only a few people turned up on Boxing Day, but about a couple of hours' soaring was done with the "Tutor" and "Kite." Stan Armstrong again went off to Eyam in the "Kite" and reported that the lift was fairly strong all along the south slope with the wind nearly S.S.W.

The total flying time for the year in club machines amounted to 228 hours 40 minutes, and there were 1,471 launches. Nine "A," 11 "B," 11 "C" and one Silver "C" certificates were obtained.

NEWCASTLE GLIDING CLUB

A black border to this column might be appropriate in our present position, as we are still without a reasonably local training field. But the prospects and undiluted optimism—an essential quality in present-day gliding—bid us refrain from requesting such sombre trimmings!

At the December General Committee Meeting two sub-committees were formed to organise the search for suitable ground on which we will be permitted to operate. One sub-committee, consisting of Allan, O'Grady and Varley, who will investigate possible sites in the North Tyneside area, and a second with Maw, Robson and another Sunderland member, to cover the South side. Likely sites are not scarce, but unfortunately many are bound by the fact that they consist of good arable land and are required for more important duties, and there are also still the landowners, some of whom class Gliding with Witchcraft.

In the meantime, a few members have concentrated on the work still necessary at the City House. Week-ends see Hon. Sec. Miller, Callahan and Wilkinson, and occasionally others, filling the house with the aroma of paint, distemper and paraffin, as well as odd discordant snatches of song, though Sec. Miller would probably wish to disassociate himself from the last activity. Progress is good but could, of course, be greatly accelerated if otherwise interested members appreciated the fact that any asset to the club is worthy of the attention of all members, whether experienced or not.

Social evenings commenced on Monday, Dec. 23rd, and will no doubt become more sociable when the "licence" is obtained shortly after the New Year. Monday night will continue to be the social

evening until further notice, and no work will be done on that evening.

Allan has got construction of the new trailer well under way, and the coming Spring should prove its value to the full, its capacity having prompted one member to suggest that it would bring £2,000, with a little garden round it !

SCOTTISH GLIDING UNION

The period from 14th December to 11th January was almost a complete washout and " snowout " as far as flying was concerned.

At a meeting at Balado on 29th December there were twelve members present who had travelled an average distance of 40 miles each, single journey, to get there. The greatest distance travelled was 70 miles and the shortest 25 miles. We have now members who come from as widely scattered places as St. Andrews, Kirkcaldy, Edinburgh, Stirling, Glasgow, Renfrew and Paisley.

Funds were recently raised by us to enable young people to take up gliding cheaply, and on 10th December five A.T.C. Cadets, with previous gliding experience, were enrolled as members for one year under this scheme.

Two new members joined from St. Andrews University and have started their power dual instruction prior to going on the " Cadet."

LETTERS TO THE EDITOR

DEAR SIR,

I was interested to read Mr. G. E. Nunn's letter in your December issue regarding the article and photographs on the B.G.A. Delegation to Czechoslovakia, and was glad to see that he had been provided by Mr. J. C. Rice with some of the information that he required.

His desire for technical information is fully appreciated, and as has already been made known, such information is available from any of the delegates upon request from those sufficiently interested to communicate with them.

I would like to point out, however, that the article and photographs had a purpose which has not, I think, been envisaged by Mr. Nunn, namely, that of furthering good relations between the Czechoslovakian gliding fraternity and our own, a purpose surely worthy of conscientious pursuit.

Such was the generous reception given to the B.G.A. delegates, and the comprehensive flying programme that was arranged for them, that it was considered a first duty of the delegation to advise members of our British clubs of the extent of Czechoslovakian hospitality, and to show them something of the great-hearted people who were responsible for the splendid organisation that was laid on. Some of those people were the " people standing by machines" to whom Mr. Nunn refers.

As a result of the visit of the British delegation, many copies of SAILPLANE are now reaching members of the clubs and schools in Czechoslovakia, where they are perused with great interest in many parts of the country. Comments on the November issue have already reached us, and our Czech hosts have been happy to note our acknowledgment, in SAILPLANE's pages, of the truly wonderful programme that they gave us as representatives of British clubs.

This, surely, is just as it should be, because the exchange of technical information between the gliding fraternities of neighbouring countries is certainly best facilitated by the building up of congenial relations between the countries concerned.

Considered, then, in the light of " first things first," it is hoped that Mr. Nunn will now be more appreciative of the scope of the Novem ber article, and moreover, be reminded that his desire for technical knowledge can still be met by communicating with the delegates, several of whom, like Mr. Rice himself, have already spent a large amount of time telling what they saw and learnt during the visit, and have taken not only a pleasure, but a pride in so doing, as one more tribute that can be paid to the gliding and soaring enthusiasts of Czechoslovakia.

Yours faithfully,

T. REX YOUNG,
Chairman, Bristol Gliding Club.
Member, B.G.A. Delegation to Czechosolvakia.

DEAR SIR,

I heartily endorse Gracias' views on Blind Flying in your January issue. I hope this year we shall see lots of people blind-flying to great heights with apparent ease, having learnt the technique during the war regardless of expense. This spectacle must not mislead the newcomers, who will have to learn the hard way.

(*Continued on page* 31)

B.G.A. ANNUAL GENERAL MEETING

(*Continued from page* 21)

was that hill soaring sites were not very successful in June, whilst meetings at Easter at flat sites were invariably successful. The great difference was the cost of aero-towing, but should it be possible to get Admiralty assistance and obtain use of a Navy airfield, this might not be so expensive. Lt.-Cdr. Sproule said that Bramcote, near Leicester, might possibly be obtained. J. C. Rice said that surely the logical thing to do was to have the National Contests this year in the same place as the International Contests in 1948. Ann Douglas said that few hill sites were adequate for National Contests from the point of view of public support.

F./O. Jock Forbes then pur forward the surprising suggestion that this years National Contests be held in Germany. The Treasurer said that this would have no British propaganda value and might almost be said to be defeatist. Col. Preston thought that we must hold the National Contests in England but the International Contests might be held with advantage in Germany in 1948 as this would save freight costs for continental visitors. The Secretary said that the F.A.I. wanted the International Contests to be held in England because they would be taking place at the same time as the Olympic Games ; this competition was taking the place of an Olympic Games Gliding Competition.

The next item was a point raised by the North Somerset Club which said that the Lands Dept. of the Air Ministry wanted to charge them £200 per annum for Western Zoyland airfield with no hangarage. Bristol and the Imperial College Clubs said they were paying no rent or a nominal one, whilst the same was the case for Rearsby. Col. Preston said that a Canadian report was that the cost of upkeep of airfields was making flying there very difficult. He used this question to stress the importance of dealing with the M.C.A. and the Air Ministry through the B.G.A., and also said that in the Straight Committee on Private Flying they had the chance of a lifetime but they must have a concrete plan. He appealed to Club Secretaries to get their Clubs to get out a schedule of expansion. Bernard Thomas thereupon intervened to ask for some guidance in this report. Col. Preston replied that there would possibly be no subsidy but there would probably be indirect help. If there were at present 3,000 interested people they must envisage 30,000 in their budget. Finally J. C. Rice said that of the 40 Beaverettes he had bought for the Clubs there were still a number not allocated, and he would be glad to have early applications. They are £55 each with tyres. He had 20 winches on order at £35 each, of which some six had been dispatched after modification, the rest will be ready shortly. The Bristol Club asked if action could be taken to secure a further supply of winches and beaverettes. This, said J. C. Rice, would be difficult, and on the question of modifications for cable guides he would be willing to circulate any developments which might arrive from Germany.

The meeting then terminated.

THE "L.S.D." OF GLIDING—

(*Continued from page* 8)

expenditure. These essentials are the key to economical running, as well as to the sound progress of any Club.

For renewal of aircraft, the figure shown represents 20% of the capital sum on 3 machines, which might be criticised as being too modest a sum. In this case,, it is suggested that the Reserve Fund of £131 per annum is large enough to enable more generous provision to be made if so desired. A further £100, for example, would ensure one new aircraft per annum, which should be adequate.

Administration costs have not been detailed in the Statement, but are enumerated so that a full examination may be made :—

	£
Rent and Rates	125
Taxes, B.G.A. Fee, etc.	25
Printing and Stationery	15
Light, Heat, Telephone, etc.	20
Accountancy and Bank Charges ..	15
Cleaning, Upkeep and Minor Repairs ..	25
Insurances, etc.	60
Sundry unforeseen Expenditure	15
	£300

With a total expenditure of £866 against a revenue-total of £997, a club with a roll of 60 members should be able to maintain solvency, even if it undertakes *ab-initio* training. And since *ab-initio* training represents the life-blood of the clubs as a whole, it is contended that, given the scale of equipment herein suggested, every club would be in position to offer such training, and thus give the movement the aid and encouragement which it so richly deserves.

It is stressed that the foregoing proposals are based upon a minimum of only 60 flying members. It is certain that in practice this minimum would in every case be largely surpassed, and thus the clubs would be enabled to effect a build-up towards more aircraft (including a two-seater), more equipment, increased facilities, permanent establishment, and so forth.

What, then, is hindering the revival of our gliding clubs ? Again there is only one answer—lack of aircraft and equipment.

Lord Nathan (Minister of Civil Aviation) has said : " I am very anxious to encourage private flying and also gliding, which, perhaps, teaches air-mindedness to a greater extent than almost any other form of use of the air." These words may be a portent, in which event, should reasonable facilities for securing equipment soon be made available, let us not hesitate to set to work on the rebuilding of our British clubs, from whom so much is expected by thousands of air-minded enthusiasts all over the country. Finance may be difficult, but it CAN be done, and to show the way towards a full-scale development of British gliding we need only the will to venture.

Nothing Venture—nothing Gain !

WINTER LECTURES

A lecture on " Pathfinding " will be given by Wing-Cmdr. M. A. Smith, D.F.C., in the canteen of the Fairey Aviation Co., Ltd., Station Road, Hayes, Middlesex, on the 20th February at 8 p.m.

LETTERS TO THE EDITOR

(*Continued from page* 29)

I want to enlarge on one of Gracias' points. He says that one of the needs is "A sailplane of adequate strength, stability, and handling qualities." I am not qualified to write a comprehensive article on what has become a highly technical subject, but want to suggest a few tests that the would-be purchaser of a sailplane for blind-flying should carry out.

(1) The machine MUST fly "straight and level" at its normal cruising speed, hands and feet off the controls, with any weight of pilot.

(2) If hands and feet are taken off the controls at a speed in excess of this, the machine should tend to return to cruising speed.

(3) If hands and feet are taken off the controls in a turn, machine should either continue in the turn at unchanged rate and speed, or tend to return to straight and level flight.

(4) Controls should have "feel" be reasonably light, and balanced. (The usual fault is light elevator and heavy aileron.)

(5) Machine should have air-brakes to limit high speeds, and these when applied should increase pitch stability and so, if applied in a straight dive, with hands off the stick, machine should pull herself out of the dive more quickly than as in (2) above.

(6) Machine should have elevator trimmer so that pilot can trim her to fly at speeds from normal cruise to at least normal cruise plus 15 m.p.h.

The most important lesson I got from Germany as a result of my post-war visits there was the vital importance of good stability and handling in a sailplane. Why does the "Kranich" still hold the height records, both for single and two-seaters? There are many machines with a better performance.

Yours etc., PHILIP WILLS.

ROYAL AERO CLUB
GLIDING CERTIFICATES

"A" CERTIFICATES: 133 (Nos. 5952 to 6085)

"B" CERTIFICATES: 44

No.	*Name.*	*A.T.C. School or Gliding Club.*	*Date taken.*
1805	Francis William Jackson	Air Division G.C.	12. 7.46
2477	George Perry Lambourne	162 G.S., Gatwick	23. 8.46
2793	Victor Dobson	Air Division G.C.	26. 7.46
3145	Owen David Zanker	49 G.S., Wymeswold	8.12.46
4429	Albert Sydney Johnson	107 G.S., Coleby Grange	8.12.46
5952	Christopher Neil Foxley Norris	H.Q., 2 Group G.C.	1. 6.46
5953	Leon Woaciechowicz	72 M.T.L.R.U. G.C.	5. 8.46
5954	Wtadystaw Majcher	Ditto	24. 9.46
5955	Michel Alphonse Ernest Van Holderbeke	84 Group G.C.	18.10.46
5956	Mazur Grazyne	Quakenbruck G.C.	30. 8.46
5957	Rychard Lewandowski	Ditto	12. 9.46
5958	Calusinski Zbigniew	Ditto	25. 8.46
5959	Karol Jakubiec	Ditto	26. 9.46
5960	Jerzy Strzyewski	Ditto	14. 8.46
5962	Roman Kulik	Ditto	9. 7.46
5963	Stanislaw Kurowski	Ditto	4. 9.46
5964	Mika Kazimacrz	Ditto	16. 9.46
5965	Waclaw Wojcik	Ditto	17. 7.46
5966	Bertram Garth Bloomer	Air Division G.C.	24. 9.46
5967	Paul Gruenberg	Ditto	30.10.46
5968	Richard Edward Claude Skilton	Ditto	1. 9.46
5969	Charles Simpson	B.A.F.O. G.C.	27. 9.46
5972	Alan David Dick	70 E.G.S., Swansea	18. 8.46
5984	David John Holmes Davis	M.41 E.G.S., Hockley Heath	23.12.46
5986	Maurice Gordon Fountain	85 Wing G.C.	24. 7.46
5996	Peter Maurice Wright	2 Group G.C.	16.10.46
6004	Charles Edward McAndrew	151 R.U. (A) G.C.	28. 8.46
6014	Alexander Ian Charles Munro	4th Armoured Brigade G.C.	9.11.46
6017	Henry Christian Ewart Harding	R.A. Aero Club	6.10.46
6018	Roland George Marshall	4th Armoured Brigade G.C.	20. 9.46
6024	Ian Alastair Knott	151 R.U. (A) G.C.	18. 8.46
6031	Denys Edgar Gillau	Yorkshire G.C.	2. 6.46
6032	James Sydney Guthrie	7 G.S.	15. 3.46
6047	David Langford	M.41 E.G.S., Hockley Heath	3.11.46
6048	William Hughes	Lubeck G.C.	27.11.46
6051	Geoffrey William Morris Carter	London G.C.	10.11.46
6062	Marien Ludwig Niewolski	Replacement for Polish Certificate lost during the War	August 1935
6063	Marian Jawornik	Ditto	2.10.34
6066	Alan Keith Butcher	London G.C.	30.10.46
6070	Joseph Louis Douglas Palfrey	42 G.S., Loughborough	1. 9.46
6075	Richard Weston Herbert	4th Armoured Brigade G.C.	12.11.46
6080	Anthony Babington Dunford	Newcastle G.C.	3.11.46
6081	Leslie Barber	4 E.G.S., Abbotsinch	11.11.46
6085	Kenneth Herbert Ronald Jones	Lubeck G.C.	8.12.46

"C" CERTIFICATES: 14

1805	Francis William Jackson	Air Division G.C.	20.10.46
2570	John Scholes Aked	Yorkshire G.C.	1.10.46
5361	Terence Beville Adair Boughton	London G.C.	26.11.46
5833	Ernest Peter Sutton	84 Group G.C.	3.11.46
5952	Christopher Neil Foxley Norris	H.Q. 2 Group G.C.	2. 6.46
5953	Leon Woaciechowicz	72 M.T.L.R.U. G.C.	3. 9.46
5956	Mazur Grazyna	Quakenbruck G.C.	28. 9.46
5962	Roman Kulik	Ditto	11. 8.46
5965	Waclaw Wojcik	Ditto	26. 9.46
5966	Bertram Garth Bloomer	Air Division G.C.	3.11.46
5986	Maurice Gordon Fountain	85 Wing G.C.	2.11.46
6031	Denys Edgar Gillam	Yorkshire G.C.	2. 6.39
6062	Marian Ludwig Niewolski	Replacement for Polish Certificate lost during the War	September 1935
6063	Marian Jawornik	Ditto	16. 7.39

SILVER BADGES: 2

6062	Marian Ludwig Niewolski	Duplicate No. 2	Replacements
6063	Marian Jawornik	Duplicate No. 3	

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