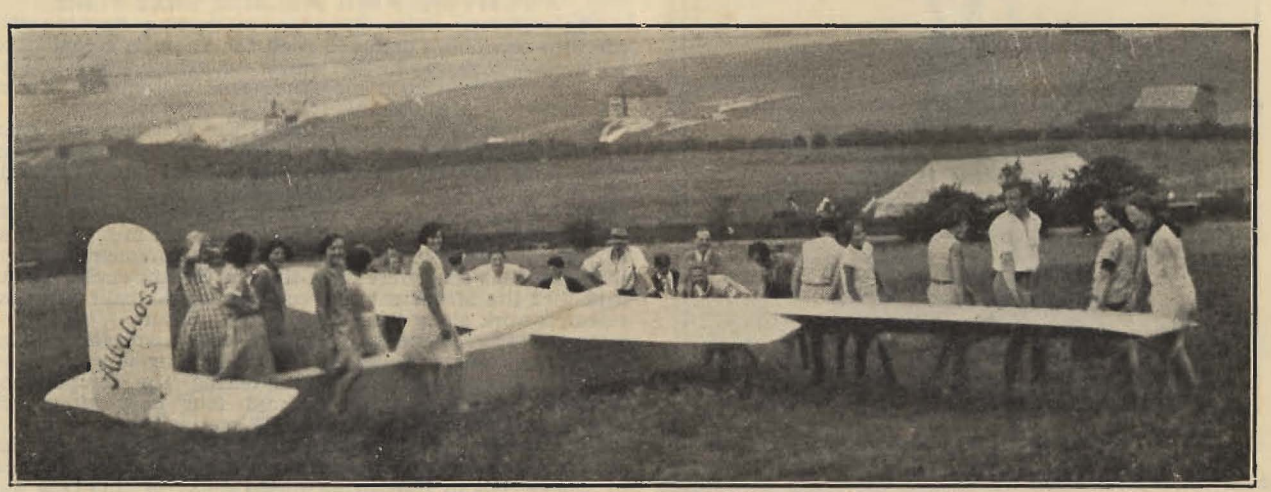
Nov. 21, 1930. Vol. I. No. 12.

THE SAILPLANE AND GLIDER

Price 3d.

A MEMORY OF SUMMER.



This picture appears to give an adequate explanation of why the Summer Camp of the London Gliding Club was so popular—there was another Camp in the neighbourhood.

WAITING TO BE WON.

That *The British Gliding Association* has a collection of valuable prizes waiting to be won is not generally known. We therefore publish a brief account of the prize list, together with a picture of the magnificent Trophy, which is the gift of Lord Wakefield of Hythe, whose generosity alone has made possible the existence of *The British Gliding Association.*

Gliding enthusiasts and members of Clubs, whose enthusiasm might be getting somewhat damped by the terrific amount of hard work involved in getting an "A" certificate, will learn that there are plenty of prizes to spur on their efforts, although at the moment the B.G.A. seem to have chosen rather curious achievements for reward.

Quite frankly, we think that to offer a prize for the fastest time over a closed circuit made in a glider is straining the bounds of possibility. There were only two persons who achieved an out-and-return flight at the Wasserkuppe this year, one was Kronfeld and the other was Groenhoff. It seems unlikely that this country will produce such skilled pilots for some time.

As the Wakefield Trophy is open for International Competition, and such Trophies have a habit of being wrested from us, witness the Golfing Championships, Tennis Championships, and so on down to the Wakefield Cup (for models), which have been taken from us by the United States, let us try and select some achievement in which the native-born have an advantage.

If the Trophy was given for a distance flight in a straight line the native-born pilot might secure some advantage from the fact that he could practise over his own terrain and learn something of its wiles and intricacies.

No doubt when a few more competitions have been held and we all know rather more of what can and what can-

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The Lord Wakefield Trophy.

not be done, ideas which at present are based on surmise and theory will be replaced by decisions made as a result of practical experience.

THE PRIZES.

THE LORD WAKEFIELD TROPHY.—This is a really excellent design, and A. E. Skinner and Co., of Old Bond Street, who are the silversmiths responsible for producing it, are to be congratulated on the way in which they have shown the glider supported on the wings of the wind. The Trophy is for annual and international competition. It will be awarded for the fastest flight around a closed circuit.

THE MANIO CUP.—This Cup has been awarded by Madame Manio to commemorate her husband, J. B. Manio, who was killed when flying a Blériot monoplane, near Lisbon, on June 13, 1913.

This Cup is to be competed for annually, and will be given for the fastest glider flight over a straight course.

THE H. M. VOLK CHALLENGE TROPHY.—This Trophy is to be competed for annually and is to be awarded as a prize for an Inter-Club Contest on suitable lines according to the development of the Art at the time of the competition.

THE CELLON PRIZE OF £1,000.—This prize is to be given to the first British Pilot to accomplish a motorless flight in a glider of all-British construction from England to France, or *vice-versâ*. The Competition is open for two years, from June 1, 1930, to May 31, 1932.

A MEETING IN LANCASHIRE THIS WEEK-END.

The Accrington and District Gliding Club have arranged a demonstration by Herr Magersuppe and members of the Scarborough Club to take place on Nov. 29 and 30 at a place known as "Green Hill," on the road between Blackburn and Edgeworth, Lancashire. The site selected is roughly 6 miles from Blackburn and 4 miles from Edgeworth, and from the south is approached through Bolton and Edgeworth.

A LIBRARY FOR THE B.G.A.

Although much study is a weariness to the flesh, *The British Gliding Association* are trying hard to start a library. They are anxious to collect any published matter dealing with aviation, and particularly its motorless aspects.

There are probably a certain number of readers who have books which they have read and which they would be prepared to donate towards the furtherance of the Movement. The Secretary of the B.G.A., 44a, Dover Street, W.1, would be very glad to receive such gifts, and also suggestions as to how this new activity of the B.G.A. can be best organised to give the greatest service.

A FLAPPING-WING MACHINE THAT FLIES.

The following notes about an interesting flapping-wing machine have been obtained from the German aeronautical publication *Flugsport*, the editor of which, Herr Oskar Ursinus, has been good enough to send us some pictures of this machine in the air.

During 1924-25 the authorities at the Wasserkuppe began to extend their researches to include kinds of flight other than those usually considered, and prizes were actually offered by the R.R.G. for flights achieved by new methods.

The results at that time were naturally poor, such a difficult problem could not be solved at once. In fact, the whole of the results achieved by the Gliding Movement in Germany at that time were such that in certain circles it was said that the Movement had come to a standstill and that research work along those lines had no future.

One of the competitors for the 1925 competitions, Dr. Martin Brustmann, appeared with a flapping-wing machine. In spite of discouraging trials during the competitions Brustmann did not give up, and four days afterwards achieved a modest flight of 15 to 20 metres.

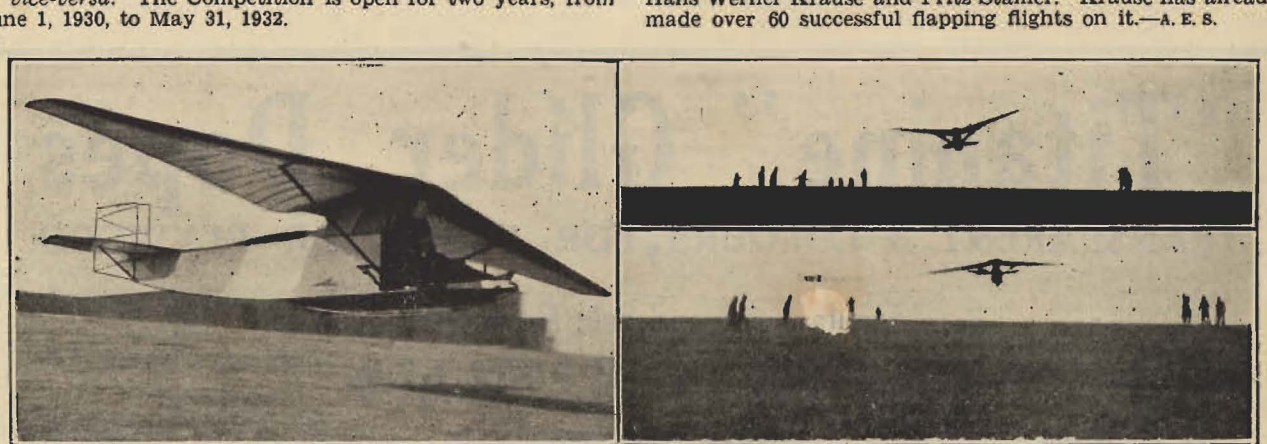
In spite of that, however, things got no further, and for some time subsequently experiments were held up for lack of money, but in 1928 an airworthy glider of this type was produced. This machine was designed, as far as the structure was concerned, by Herr Alexander Lippisch, and was built by A. Schleicher, of Poppenhausen.

It is a fuselage-type high-wing monoplane glider, with flapping-wings hinged about the centre-line of the fuselage and braced to the operating mechanism, with a single duralumin strut on each side. The wings are pulled down by the pilot extending his legs, rather in the same way as a man rowing a boat pushes the sliding seat back, in this case the feet move forward instead. The movement is transmitted to the struts through cords and pulleys.

There is no lateral control, and the elevators are worked by the control column, which also operates the rudder. The weight empty of the glider is 70 kgs. (152 lbs.), the span is 10 m. (32 ft. 9 in.) and the wing area 12 sq. m. (129 sq. ft.).

On the level, launched with a starting-rope, the machine can accomplish gliding flights of 6 to 10 seconds' duration at a speed of 8 to 10 metres per second (18 to 22 m.p.h.). By beating the wings the distance achieved can be increased up to double that obtained by a pure gliding flight, and the flying speed raised to 12-15 metres per second (27-34 m.p.h.).

The expenditure of effort required for flapping flight corresponds roughly to that used in rowing a racing-boat. The machine has been tried-out on the Wasserkuppe by Hans Werner Krause and Fritz Stamer. Krause has already made over 60 successful flapping flights on it.—A. E. S.



FLAPPING ALONG.—The Brustmann flapping-wing glider in flight. The wing-construction with the flexible trailing edge can be seen in the left-hand picture.

CHRISTMAS CARDS.

Quite a number of Gliding Clubs will probably be printing Christmas Cards for members. We have recently seen that chosen by the London Gliding Club, and think it remarkably effective. The cover has an excellent representation of two Pruflings over Ivinghoe Beacon. The black and white effect is that of an etching.

The card has been produced by The Aircraft and General Fine Art Co., Constitutional Buildings, East Grinstead, Sussex.

A NOVEL RELEASE-GEAR.

Mr. H. A. Searby, of the Nottingham Gliding Club, has evolved a novel type of release-gear which can be made up by any blacksmith. As, however, the gadget complete can be bought from the Secretary of the Nottingham Gliding Club, people would probably save money by buying it outright.

The release is made from ½-in. and ¼-in. mild steel bar. Iron must not be used. Essentially the release is rather like an elongated buckle. The ½-in. bar is made into a very elongated loop about two feet long and four inches wide. To this loop at one end is attached a kind of prong made of ¼-in. steel rod.

This prong is about a foot long and at its hinged end is bent to take a loop of rope attached to the glider.

The prong is kept within the plane of the loop by a small loop made of ¼-in. steel rod which is placed cross-wise over the larger loop and is free to slide along it. The rope is looped over the prong, which is placed in the plane of the large loop and kept in position with the small loop. No amount of load on the prong can force it out of the small loop.

To release, the operator merely pulls the small loop along the large loop, the prong is freed and flies up, releasing the rope. The large loop is anchored securely to the ground or a tree.

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SOME GENERAL NOTES ON THE DESIGN OF PRIMARY GLIDERS—II.

By Wm. J. Perfield.

The Fuselage.

The principal considerations in the design of a fuselage are ease of construction, transportation and assembly. The single truss type, which is braced laterally and torsionally by wires from the tail post to the rear strut points of the wings, is the easiest to build and transport. It is, however, somewhat less convenient to set up than other types because the rigging of four wires is necessary.

Another type requiring only two tail bracing wires is very popular. It consists of four longerons which form a horizontal wedge at the tail. The two upper longerons converge at the rear-spar root-fitting and the two lower ones at the rear of the skid. The tail section is detachable at these points. The cross-member which forms the point of the wedge serves as a rear spar for the tail plane, the tail plane being mounted permanently between the top longerons. The bottom longerons may be hinged at the rear so that they can be folded up against the top longeron for transportation. With this arrangement it is not necessary to disassemble the tail unit. [This type is represented by the R.F.D. in England.—Ed.]

Rigidly braced fuselages which do not require wire bracing have not gained favour because of their complicated construction. They are bulkly to transport, and although no rigging is required, are usually inconvenient to set up.

In the design of the front portion of the fuselage the mounting of the wings and the safety of the pilot must be taken into account. If the wing is mounted by wires or cables a cabane must be provided to support the landing wires. When wood construction is used, members near the pilot which are likely to break in a crash, should be wrapped with fabric and doped to prevent injury from splinters. Provision for a substantial anchorage for safety-belts must also be made. The Department of Commerce requires that the belt and anchorage be capable of withstanding a load of 850 pounds. The importance of this requirement was tragically demonstrated recently in a glider crash in which the pilot's skull was fractured when he was pitched out forward after the fastening of the safety belt broke.

Wing Design.

The wing construction closely follows standard aeroplane practice except that it has been found much simpler to glue the fabric to the wing structure instead of sewing and tacking. Ordinary casein glue is used for this purpose and if carefully done good results will be obtained.

Wings are always made in two sections to facilitate transportation. A rectangular plan form is used with either straight or curved tips. The aspect ratio is usually about 7.

Simplicity and economy dictate solid rectangular spars. If possible the front spar is located so that it will attach directly to the vertical fuselage member immediately back of the pilot. Location of the front spar may vary from 5% to 15% of the chord.

The rear spar is usually placed at about 75% of the chord so that the aileron may be hinged directly to it.

Single drag bracing consisting of square spruce drag-struts with wire cross-bracing is generally used. For this reason it is well to provide a rigid leading edge of either plywood or dural for torsional rigidity from the strut point out. Plywood is a little more expensive, but it is to be preferred because fabric cannot be glued to dural. 3/64 or 1/16 inch plywood is satisfactory or about .014 in. dural may be used.

The conventional girder type of rib has so far been used almost entirely. Ribs of 1/4 in. by 1/4 in. cap strip and diagonals using single plywood gussets have ample strength, but for gluing fabric greater width is necessary. Double ribs of the same material with the gussets between the strips may be used or single ribs of 1/4 in. by 3/8 in. strips will do. The latter are easier to build.

Ribs are spaced from 14 in. to 18 in. apart.

Wing-tips must be protected against bad landings. A 1/16 inch plywood covering on the under surface is usually sufficient unless the tips tend to rest mostly on the rear spar when on the ground. In this case small wing skids are advisable to protect the ailerons.

The tips may be cut off straight without tapering. The improved appearance and performance of curved and tapered tips, however, justifies the extra work required to build them.

A good grade of light-weight cambric or unbleached cotton serves very well for covering. The cambric is lighter and requires less dope, but is not as durable as unbleached cotton. Two or three coats of semi-pigmented dope sanded between coats make a good finish although some prefer to use clear dope and lacquer.

The ailerons should have a combined area of about 12.5 per cent. of the wing area. Their construction is similar to aeroplane ailerons except that the control horns are sometimes made of wood covered on both sides with plywood. The trussed type commonly used in steel tube construction may be fabricated from wood with little difficulty. A very light spar of 1/4 or 3/8 inch thick spruce may be used and the whole assembly will be very light and rigid.

The completed wing covered and doped should have a specific weight of .6 to .625 pounds per square foot.

Wing Bracing.

German influence is perhaps responsible for the general use of wires instead of struts for supporting the wings. Struts are, of course, somewhat heavier and offer slightly more wind resistance, neither of which is of much consequence in a primary glider. If welding facilities are available there is not much difference in the amount of work of installation of ten wires and ten turnbuckles as compared with four lift struts, two wires and two turnbuckles. It is to be noted that since the fuselage has no torsional rigidity in itself, some bracing is required to make the front and rear lift trusses deflect together. Two wires, one on either side of the ship, running diagonally between the front and rear lift wires or struts are sufficient for this purpose.

The difficulty of setting up and rigging a ship is appreciably decreased by the use of struts. Once they have been given their proper length in the shop the only rigging necessary on the field is the adjustment of the two diagonal wires.

Turnbuckles have a tendency to turn hard after a little time in service and often have to be replaced. For this reason it is advisable to avoid their use as much as possible where they must be taken apart or slackened for disassembly.

Another objection to the use of wire bracing is the tendency of wires to loosen up in use. This is especially true of the landing wires which are often subjected to high stresses because of the inefficient angle at which they must work. Failures are also frequent in the landing wires. Very often the entire adjustment of turnbuckles is used up due to stretching and wires must be replaced.

Lift struts sometimes bend under landing impact, but the damage is not usually serious. They are easily bent back into shape without removal and their strength for flight loads is not impaired.

It will be found much more convenient for transportation purposes to make all wing brace wires detachable at the wing. Loose wires are much more easily tied to the fuselage than to the wing and many patches in the wing fabric will be saved if this precaution is observed.

The Tail Unit.

In soaring machines fixed tail surfaces are seldom used. Primary gliders usually carry a fin and stabiliser for stability and structural simplicity.

Rudder control is more difficult to obtain than longitudinal control because of the relatively large moment of inertia about the vertical axis as compared with the moment of inertia about the lateral axis. A vertical tail area of about 9 per cent. of the wing area is necessary. The rudder should be 55 per cent. to 65 per cent. of the total vertical area.

A horizontal tail area of about 15 per cent. of the wing area gives good longitudinal control. Of this, the movable surfaces should be about 60 per cent. of the total.

The shapes of the tail surfaces is usually governed by structural considerations. Rectangular and triangular fixed surfaces are the most commonly used. When a single truss fuselage is used, the last bay is sometimes covered to serve as a fin. The tail-plane may be constructed similar to the

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wing, using two spars, or it may be made triangular, in which case the front spar is usually shaped into a leading edge former.

The movable surfaces may depend on their spars for torsional strength or the ribs may be triangulated as in the aileron, so that they will transmit torsional loads. The latter are much stiffer for the same weight and are just about as easily constructed.

The vertical and horizontal surfaces should be separately removable from the fuselage to conserve space in transportation and to simplify repairs. It may only be necessary to remove the horizontal tail for transportation, leaving the fin and rudder attached to the fuselage. This is best accomplished by making the fin and rudder cantilever and supporting the tail-plane with struts. The assembly and disassembly of the tail group is a troublesome detail of transportation and there is much opportunity for improvement along this line.

PROVISIONS FOR LAUNCHING.

For shock cord flights a simple hook on the nose of the skid is all that is required for launching. This hook is designed so that the ring in the shock cord will drop out when the tension is relieved after the take-off. A backward slope of 30 to 40 deg. with the vertical on the inside face of the hook is satisfactory. Too slight an angle will cause the ring to drop out before the full energy in the shock cord has been expended. If too great an angle is used the nose of the ship will be pulled down before the ring drops out.

Some means of holding the tail while the shock cord is being stretched is necessary. Usually a rope is tied to the fuselage near the tail for part of the ground crew to hold. If the tail-plane struts are used they may serve as hand holds provided they have sufficient strength.

Mechanical releases have also been successfully used for this purpose. Such a release may be operated by a member of the ground crew standing to the rear of the ship or it may be operated by the pilot. A stake or an automobile may be used for an anchorage. The use of a mechanical release makes more of the ground crew available for pulling the shock cord and when operated by the pilot gives more exact control of the time of release as verbal signals are sometimes confused.

For auto-towing the problem is a little more complex. A mechanism which will enable the pilot to release at will from the tow rope while in the air is necessary. The safety of auto-tow flights depends to a great extent on the reliability of this release and great care should be taken in its design.

An important point which may be overlooked in designing an auto-tow release is provision for dropping a broken tow rope. Rope wears very rapidly from being dragged on the ground and it often happens that it will be weakened to the extent that a break may occur in flight. The air forces on the rope cause it to trail behind the glider and pull backward on the release mechanism which, if not properly designed, may not release. The danger of snagging a fence or a stake with a rope attached to the nose of a machine is serious and should be guarded against by ensuring that the release will operate with a back pull on the rope.

DESIGN LOADS AND LOAD FACTORS.

An elaborate stress analysis is not necessary for the design of an airworthy glider unless an Approved Type Certificate is sought. The main elements of the structure should of course be investigated, but such computations are very simple provided the magnitudes of the loads are known. Very little data on glider stresses is available at present and until such time as more research is done on the subject the procedure as outlined in the light aircraft section of the Department of Commerce bulletin on Airworthiness Requirements is about the only reliable source of such information.

While some Load Factors are arbitrarily specified in these requirements, the determination of wing loads require the plotting of a velocity diagram. This is a laborious procedure which one would hardly expect to follow in designing a privately-owned glider.

Through the courtesy of the Gliders Inc. division of the Detroit Aircraft Corporation, which has recently completed the stress analysis for an Approved Type Certificate on their primary glider, the information which they gained in the plotting of this diagram has been made available for the purposes of this paper. For the foremost centre of pressure location of the aerofoil, which corresponds to the high angle of attack condition, the Load Factor was found to be 4.15. For the maximum velocity in a gliding path of 1 in 6, which is a design condition of the Requirements, the factor was 6.5. For this latter condition the velocity along the flight path must be known in order to determine the centre of pressure location. The computed speed of the Gliders Inc. primary was 43 miles per hour.

The Department requires that the horizontal tail be capable of supporting a load sufficient to balance the wing reactions with a margin of safety of 30 per cent. Gliders Inc. found that this load did not exceed the specified minimum average loading of 6 pounds per square foot.

These results will not, of course, be exactly applicable to all primary gliders, but they are an indication of design wing and tail loads as required by the Department of Commerce.

The other requirements are self-explanatory and the designer will do well to follow them.

It will be found that in most cases the handling and landing conditions rather than flight stresses will be critical.

GLIDING CERTIFICATES.

We publish below the latest list of F.A.I. Gliding Certificates as issued up to date by the Royal Aero Club. In view of the interest which is being taken in the competition for the Dagnall Prize of Ten Pounds, we are interested to note that only eight Certificates have been actually issued since the start of the Competition (Aug. 15). Of these Surrey has three, Scarborough has four and Portsmouth one. Thus, on the Certificates actually issued, Surrey is leading the field of two, as we believe, but are open to correction, that the Scarborough Certificates were not obtained on a R.F.D. machine.

In view of the discrepancy which exists between the Certificates as officially listed and those claimed, either for the Dagnall Prize or for other reasons, we shall avoid, as far as we may, giving credit for Certificates until we receive official confirmation from the Royal Aero Club.

No.	*Name.*	*Certificates.*
1.	C. H. Lowe Wylde (*Kent Gliding Club*),	A. and B.
2.	C. H. Latimer-Needham (*London Gliding Club*),	A., B. and C.
3.	Marcus D. Manton (*London Gliding Club*),	A., B. and C.
4.	M. L. McCulloch (*London Gliding Club*),	A. and B.
5.	Geoffrey M. Buxton (*London Gliding Club*),	A., B. and C.
6.	Edward Lucas Mole (*London Gliding Club*),	A., B. and C.
7.	Colin Aubrey Price (*Portsmouth and Southsea Gliding Club*),	A.
8.	Denys Max Thomson Morland (*London Gliding Club*),	A.
9.	Col. The Master of Sempill (*London Gliding Club*),	A., B. and C.
10.	John Raymond Ashwell-Cooke (*London Gliding Club*),	A.
11.	Alan Goodfellow (*Lancashire Aero Club*),	A.
12.	Mrs. Dorothy Joan Bradbrooke (*London Gliding Club*),	A.
13.	Thomas Graham Humby (*London Gliding Club*),	A. and B.
14.	Leonard Charles Williams (*London Gliding Club*),	A.
15.	Harry Amein Abdallah (*London Gliding Club*),	A.
16.	Percy Michelson (*Lancashire Aero Club*),	A.
17.	Frederick Basil Tomkins (*Lancashire Aero Club*),	A.
18.	Eric Christopher Stanley Megaw (*London Gliding Club*),	A
19.	Basil Alfred Gregory Meads (*Lancashire Aero Club*),	A.
20.	Robert Gidner Spencer (*Driffield and District Gliding Club*),	A.
21.	John Cecil Weale (*Lancashire Aero Club*),	A.
22.	Reginald George Robertson (*London Gliding Club*),	A.
23.	Thomas Eaton Lander (*London Gliding Club*),	A.
24.	Hamish Allen (*London Gliding Club*),	A.
25.	Wm. James Molony Spaight (*Nottingham Gliding Club*),	A.
26.	Joseph Meyler Symmons (*London Gliding Club*),	A.
27.	Alexander Nelson Stratton (*Surrey Gliding Club*),	A.
28.	Alan Fleming McGlashan (*Surrey Gliding Club*),	A.
29.	Alan Herbert Reffell (*Surrey Gliding Club*),	A. and B.
30.	Frederick Slingsby (*Scarborough Gliding School*),	A.
31.	Stanley Cecil Howard (*Scarborough Gliding School*),	A.
32.	Thomas Littleton Green (*Kent Gliding Club*),	A.
33.	Norman Llewellyn Bowden Puttock (*Portsmouth and Southsea Gliding Club*),	A.
34.	John Craven Barnes (*Scarborough Gliding Club*),	A. and B.
35.	Frederick Louis Gardiner (*Scarborough Gliding School*),	A.
36.	Edward Hedley Fielden (*London Gliding Club*),	A.

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THE FIRST ENGLISH GLIDER BOOK.

Gliding and Motorless Flight. By L. Howard Flanders, A.F.R.Ae.S., M.I.Ae.E., A.M.I.Mech.E., and C. F. Carr. 112 pp. and thirty-six pictures and diagrams. (Sir Isaac Pitman and Sons, Ltd. Price 7s. 9d. post free from The Aeroplane Book Department, Cannon House, Pilgrim Street, Ludgate Circus, E.C.4.)

The subject of a relatively new thing—in England—is admittedly difficult to treat, but the enthusiastic young glider really had a right to expect that something a little better than this book would be prepared for his guidance. In its practical sections it will not lead him far astray, but surely there was no need to open the first chapter with remarks on the inspiration to fly which early men got from pterodactyls! Such remarks do not raise the prestige of the volume among schoolboys, who know that man is not generally believed to have existed until some æons after the last pterodactyl had flapped his last flap. Nor is "the transmutation of baser metals into gold still the dream of the scientific visionary." Even very visionary scientists would sooner turn gold into a non-corrosive metal lighter than aluminium and stronger than steel.

The historical section is interesting, but some very important attempts in England in 1922 receive all too little attention. The Itford meeting in that year is mentioned, and Maneyrol's feat, but the fact that Mr. Fokker established a World's soaring record with a passenger is ignored. Also ignored is the fact that the English Duration Record of 3 hrs. 21 min. 7 secs. was established, which has yet to be beaten, as Herr Kronfeld's flight to Havant from Lewes presumably does not count for a duration record. The soaring flight of Orville Wright at Kitty Hawk in 1911 is also forgotten, although this established an American Duration Record of 9 min. 45 secs., which stood until 1928.

The section on practical gliding is too short, and the very brief treatment of wind current merely suggests that England is very poor indeed in knowledge of them, which may be true, but at least some of the balloonists and airship people should be able to tell us more.

There is no adequate theoretical treatment of gliding, which is after all the very necessary basis of its practice; much more so than with powered flight. The aeroplane pilot is pulled about by his engine and learns the technique of controlling it whether or not he knows the principles involved, but the sailplane pilot will never stay up long enough to learn anything unless he has studied the theory of his art beforehand.

The necessity of some aerodynamic theory is clearly illustrated on p. 16, where the statement occurs that the glider "maintains its position in the air by virtue of the air pressure on its under surface." There, exactly, is what it does not do and what a great many beginners imagine that it does. That is why we see aspiring soarers attempting to kite up on a rising current in a practically stalled condition instead of gliding through it, to and fro, at their best gliding speed. Like any other aeroplane the glider gets most of its lift from its *upper* surface, and requires plenty of forward speed to make the most of it.

The suggestions for the formation of clubs are helpful, and the financial hints are the soundest views which have yet been expressed upon this important aspect of the Movement. There is useful material in the workshop hints. The chapter on gliding for women is futile because it gives little or no information. After all, when one has said that the operation of a glider requires no mechanical skill and little physical strength, and is therefore equally suitable to both sexes, nothing really remains to say unless some actual history is given of women's achievements in the field. At present there is not enough to make a chapter, and what there is has been left out.—F. D. B.

A TIRED ZOGLER'S THEORY.

The aim of all gliding is soaring, and transition from the aerial toboggan slide to real sail-flying is apt to be so long and laborious that club members and whole clubs are losing interest. While this may not be generally true the signs are unmistakable and will become more marked so long as half the pictures in The Sailplane are training types with more than a passing resemblance to the prototypical Zogling, with the other half of advanced soaring types invariably German. The home-grown soarer is represented by one machine only, and only a few lucky clubs have intermediate types, which occasionally persuade us that the sport of soaring will eventually grow out of the drudgery of glider training.

But what of the club which owns a primary trainer, inevitably bepatched and rather heavier with reinforcements than when first assembled? Perhaps many of the members have laboured up hill and down until they can fly to the limit of the available site, and it is not by any means always an "A" licence, and very seldom a "B" stretch. Perhaps also they have a soaring site which is ideal for an intermediate trainer but definitely dangerous for novices in the ordinary open primary machine with controls thoroughly blanketed by the mess of structure and the air-cooled pilot. Even if they have such a site, the expense of the Prufling, Hangwind, Hols der Teufel, B.A.C.II, or what you will, is often enough to put a stop to ambition and, if funds permit such a purchase, the necessary caution of the executive will probably reserve its use for the more skilled. The beginners remain at the deadlock, as they cannot quite achieve the official "B" licence on the primary field, and so cannot be trusted with the more delicate machine.

A glance at some of the quite adequate intermediate types shows that they are very little more than primary trainers with the pilot encased in a streamlined nacelle. Their wing-loading is nearly always slightly more than that of the primary trainer, their aspect ratio seldom any better, and their sole superiority lies in lower resistance and, probably, a more airworthy structure. The last is very important.

If the club members are as keen as most, and as handy with tools and aircraft materials as all glider pilots ought to be, there is no reason why they should not overhaul their primary trainer—as an important precaution for more advanced work—and build on to it a light and possibly detachable cowling for more ambitious work.

For instance, the ordinary Zogling has a span of 32 ft. 9 ins., a wing loading of 2.05 lbs. per sq. ft., and an optimum gliding angle of 1/11 at about 28 m.p.h. This gliding angle is apt to be a very optimistic estimate, be it said, especially after a few repairs. The Prufling, which is quite a capable soarer, has a precisely similar span, a wing loading of 2.39 lbs. per sq. ft., and an optimum angle of 1/14 at about 30 m.p.h. The only difference is obviously that of resistance.

To lower the resistance of a primary glider, the first thing is a fairing behind the pilot's body tapering off to a vertical edge, probably at the fin. This modification is used at Rositten for intermediate work, and many "C" licences have been gained on it. Its chief effect is that of smoothing out the air flow so that the control surfaces have a chance to work, and reducing the drag of the pilot's body, thereby improving the gliding angle.

The addition of a cowling in front over the pilot's legs and extending round at the sides to join the back fairing ought not to present insuperable difficulty. This plan is a regular feature of some American types. The pupil is first instructed without the cowling in order to get used to the feel of flying speed and also to minimise damage to both pilot and machine in the event of a mishap. Later the cowling is clipped on and the machine gains in performance accordingly.

If the same glider is still to be used for training the replacement of the flying and landing wires by struts is not advisable. Wires usually stand up better to heavy landings and the change requires skilled calculation and considerable work. Fairings may be designed to attach to the wing-tips to reduce the end-loss due to the crude shape of the existing wing-tip, if wing-tip skids are used, but otherwise they would not last long.

The theoretical advantage of these suggestions lies in the fact that the fairings need only be stiff enough to act as such, because all the necessary load-taking qualities are already built into the machine. Their structure is a matter of experiment and the type of use. Very light frames of wood and fabric might be used behind the pilot, where they would be less opposed to breakage and less likely to inflict injury by splintering.

In front the usual construction makes large use of plywood, and in special soarers this covering takes some of the loads. For a detachable cowl, however, plywood seems unnecessary, and, if thin enough, suggests difficulty in making the repairs that will certainly be needed sooner or later, even if only by reason of clumsy handling. An idea which is hereby offered gratis to any who care to experiment is the construction of a cowling from stoutish steel wire, fabric covered. The frame would have to be so braced to keep the fabric taut and to avoid deformation under doping, and the joints would have to be well taped for safety.

Turning economically is the first essential of soaring. The Zogling type has considerable aileron drag and poor rudder control, so that an adequate turn is only possible at a fairly high speed, and hence steep angle of descent. Fairing would certainly help the rudder and elevators enough to make turning a much more efficient operation. The ailerons would not be affected, but they are fairly adequate on the training type, and with the slightly higher speed that would produce the best gliding angle they should not need enlarging or changing.

The resulting machine would not compete with specialised intermediate soarers, but it would at least permit beginners to make longer flights, with turns, on sites where it would be impossible for primary training gliders. There is no reason why "C" certificates should not be earned on such a one under favourable conditions.

The most important consideration of all is to see that the somewhat haphazard airworthiness of the ordinary trainer is brought up to scratch for work at more serious heights, and that any fairings are so made as not to cut or impale the pilot if he should break through them.

A Tired Zogler.

NEWS FROM THE CLUBS.

WHERE GLIDING CAN BE SEEN.

Beds.—The Bedford Gliding and Flying Club. Week-ends at Wilstead Hill, 5 miles from Bedford on Bedford—Luton road.

Bucks.—The London Gliding Club. Meeting place, Turveys Farm, near Tottenham, on Sundays.

Dorset.—The Dorset Gliding Club, at Maiden Newton.

Edinburgh.—The Edinburgh Gliding Club. Sundays, at Comiston Farm, near Fairmilehead.

Glam.—Merthyr and District Gliding Club. Sundays, 10 a.m. to sunset. ¼-mile-left Dynevor Arms, Merthyr Tydfil—Swansea Road.

Herts.—Herts. and Essex Gliding Club. Sunday afternoons, Eastern Roadways Garage, one mile north of Stortford.

I.O.W.—The Isle of Wight Gliding Club. Saunders-Roe Aerodrome, at Cowes, every Sunday.

Kent.—Channel Gliding Club. Week-ends above Folkestone, close to Dover road, at the Valiant Sailor.

Kent.—Kent Gliding Club. Week-ends above Lenham, on the Maidstone—Ashford road.

Lancs.—The Furness Gliding Club, at Gleaston Park Farm, Gleaston, near Ulverston (midway between Gleaston and the Coast Road), every week-end.

Oxon.—Oxford and County Gliding Club. Week-ends at Ibstone, near Stokenchurch.

Staffs.—The North Staffs. Gliding Club. Week-ends at The Downs Banks, Barlaston Downs, near Stone, Staffs.

Surrey.—Surrey Gliding Club. Every Sunday, if weather permits, at Lockner Farm, Chilworth, near Guildford. 10 a.m. to sunset.

Sussex.—Sailplane Club of T.M.A.C. Horton Farm, Smalldole, near Steyning.

Sussex.—Southdown Skysailing Club at Ditchling Beacon. Sundays, 10.30 a.m. till dark.

Warwick.—Rugby District Gliding Club. Cote Hill Aerodrome, Husbands Bosworth, Rugby.

Wilts.—The Wiltshire Light Aeroplane and Glider Club at Easton Hill, Alton Priors Range, Bishops Cannings, near Devizes.

Worcs.—North Cotswold Gliding Club. Every Sunday at Fish Hill, above Broadway Village, from 10 a.m. to sunset. Saturdays and Wednesdays from 2 p.m.

Clubs are invited to send in full details as to where and when they can be seen at work. This feature should help Clubs considerably as readers who are not members can go to look at the nearest local clubs and see which they like best.

THE BEDFORD GLIDING AND FLYING CLUB.

We are pleased to inform all members that the Club rooms in the town, for which we have been negotiating, are now available, and it is hoped that all members will patronise them as much as possible, for it is only by this means that the Club rooms can be maintained. The rooms are cosily furnished and should become a welcome "rendezvous" for all members and friends.

On Nov. 15 the threatening elements did not deter some of our enthusiasts from turning up at the hangar, but unfortunately the rain came down in sheets and put an end to all hopes. On Nov. 16 quite a full day's programme was completed between 11 a.m. and dusk. Every member present was able to get in a number of glides and all showed considerable improvement and great confidence.

A tired but happy band hauled the machine home with its wings glittering in the frost, but it was very pleasant to finish up in the warm Club rooms with a "pow-wow" round the fire and a discussion on the day's work.

THE CONONLEY AND DISTRICT AERO CLUB.

The Club held another meeting on Nov. 2 under great difficulties, the regular field being under water. As we consist largely of novices, we dare not make use of the several hill sites available, and as there was no time to fit floats on the Club's Dixon, we compromised on a very rough field on the hill tops. As the wind was rather strong and the ground broken, it was found more difficult to stay down rather than to stay up, as is the usual case.

On Nov. 7 a very enjoyable dance, organised by the lady members, was well attended and a substantial increase made in the Club funds. This was enjoyed by the members, several of whom were seen going down in a flat spin afterwards. On Nov. 9 the members attended the Armistice services in the local church and spent the rest of the day overhauling the machine. Work has been started on another primary and one member is hard at work on a sailplane.

THE DORSET GLIDING CLUB.

Mr. N. W. Wright, Chairman of the Dorset Gliding Club, qualified for his "A" Certificate at Maiden Newton during the week-end, Nov. 15-16. He is an *ab initio* trained by the Club and made a faultless flight of 31 sec. He attributes much of his success to continual mental practice with imaginary controls!

Mr. H. J. Penrose soared for over two and a-half minutes in the Club's R.F.D. against a 45 miles an hour wind on Saturday. For at least half that time he was hovering about fifty feet above his starting point on the lip of the Dorsetkuppe, which is the Club name for their Maiden Newton territory. Mr. Penrose has qualified for his "A" and "B" Certificates and is also building a sailplane of his own design.

Ab initios continue to show great improvement—we are going all out for that R.F.D. prize. A humorous incident on Sunday morning was a landing by the Club's Hon. Ground Engineer in a gorse bush. Neither he nor the machine was hurt in any way.

THE EDINBURGH GLIDING CLUB.

The Edinburgh Gliding Club's first glider was demonstrated on Nov. 16. Mr. Lowe-Wylde of the British Aircraft Co., who had arrived in Edinburgh the night before, assembled the machine and gave a demonstration at Comiston Farm, near Fairmilehead. Mr. Lowe Wylde made several glides and then flights were made by members of the Club under his tuition.

After one successful glide by an ex-War-time pilot, Mrs. McKelvie, wife of Sq. Ldr. J. A. McKelvie, who is Chairman of the Club, acted as pioneer for the women members of the Club. She had one slide and then an exceedingly well-controlled glide. Altogether 25 members had flights, three of these being lady members. The meeting was very successful in every way, and it was unfortunate that the last glide of all definitely finished our operations for the day.

The member pulled the stick right back, zoomed, and just before the machine stalled put the stick right forward and nose-dived into the ground. Luckily the victim escaped serious injury.

As the Club Construction Section is not yet organised, we have accepted the British Aircraft Co.'s offer to deliver another machine within a fortnight and take back the crashed machine for what it is worth.

The next meeting will therefore be on Nov. 30 at Comiston Farm, our temporary site.

THE ISLE OF WIGHT GLIDING CLUB.

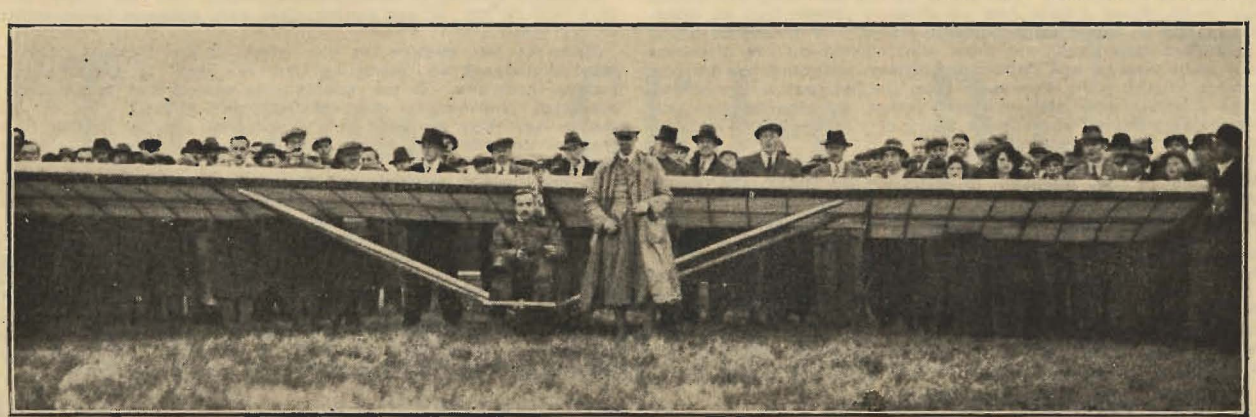
On Nov. 16 the glider was again in action after repair by members under Messrs. Richards and Thompson. We are gradually making this glider into a new type which will stand a lot of hard "knocks."

We are so happy at Somerton Aerodrome with the all-round facilities which have been kindly offered by the Directors of Saunders-Roe, that we are remaining another week or two. Quite a great deal of really good instructional work was put in on Sunday. All members got in some glides and some had as many as three turns. Mr. Feltham managed to break the rudder bar on making a heavy landing, but we soon replaced this with a much stronger one.

After a "Flutter" by the Club Captain, the following members carried on in a nice steady breeze:—Major Brannon, Messrs. Thompson, Richards, Aylward, Hirst, Gray, Hess, Allen, Hackshaw, Petty, and Bennett. Misses Merriam, Mack, and Stagg. The latter made a very pretty glide and smooth landing.

Mr. "Sam" Hughs, the manager of the Aerodrome, is always in attendance should any private owners care to fly over. Petrol and oil can be obtained.

Members will be busy getting on with the dual-control glider this week under the supervision of Messrs. Richards and Thompson, who are making improvements on the old Merriam-Newman type.



THE NORTH KENT CLUB with their B.A.C.II primary machine. The Club is now some sixty strong, which is good going, as the Club was only founded in July.

THE KENT GLIDING CLUB.

On Nov. 16 gliding tuition was given at Lenham. Unfortunately the wind direction was wrong to give the best results, but nevertheless the Club carried on throughout the day and under the instruction of Flt. Lt. Graham-Nicholls a large number of flights were made.

The hangar, which was recently demolished during a gale, just before completion, is now nearly rebuilt. It will be completed by next week-end, and will enable the machines to be left rigged, thereby saving considerable time, as at present they have to be dismantled and stored in a barn. It is hoped that it will be possible by this saving of time to hold gliding meetings on Wednesday afternoons in the near future.

Col. J. T. C. Moore-Brabazon has honoured the Club by becoming a Vice-President, and says that he hopes to visit Lenham in the near future and see the Club at work. It is interesting to note that Col. Moore-Brabazon is the holder of the first Aeroplane Pilots' Certificate to be issued in England, and Mr. Lowe Wylde, one of the Club's honorary instructors, holds the first Glider Pilots' Certificate.

THE LONDON GLIDING CLUB.

The Club was naturally very well satisfied with the success of its team, and the performance of individual members at the B.G.A. Inter-Club Competitions at Ditchling Beacon, where no less than six out of a total of nine available prizes, were won by the Club team and individual members.

Mr. Mathieson, who has now returned to New Zealand, where he hopes to start a gliding club, very generously offered to present the Club with the "Cellon" Tankard, which he had won, for a competition to be arranged by the Committee. The donors of the prize, Messrs. Cellon Ltd., when asked if they had any objection to this procedure, were amazingly generous, and said that as the tankard they had given was already engraved, they would like it returned to Mr. Mathieson and that they would present the Club with a second tankard which they wished to be called the "Mathieson Tankard."

This very generous offer was gratefully accepted, and the Mathieson Tankard is to be awarded annually to the *ab initio* pilot who makes the longest duration in a single flight, in the Club year in which he has commenced instruction.

Owing to the rapidly shortening hours of daylight, it has been found necessary to suspend all flying on Saturday afternoons, but to counteract this, arrangements have been made for two training machines and two instructors to be available from 11 a.m. till dusk on Sundays.

Excellent progress was made by the group under instruction on Nov. 9, and this was borne out by the performance on Nov. 16, when no less than five members made the qualifying flights for their "A" Certificates. They were Miss Nichol, and Messrs. Grice, Smith, Irving and Hiscox. We particularly congratulate Miss Nichol.

To-date the total number of glider pilots' certificates held by members of the Club is 30, and we are making a special effort to reach the half century before the end of the year, and at present the prospects of so doing seem distinctly bright.

The last week has seen another addition to the fleet of machines owned by members of the Club, as a small syndicate of members have bought the almost completely-constructed Dixon glider, which was being built by the Airship Gliding Club. This brings the total number of privately-owned machines in the Club to four, the other three being Capt. Needham, whose *Albatross* was the first British-built and designed sailplane, Mr. Lander, who owns a Kegel Prufling, and Mr. Beardmore, who owns a Kegel Professor.

As the Club Committee is strongly of the opinion that Gliding should not become a seasonal sport, it has been decided to offer special encouragement to those who join the Club during the next ten weeks, as those who join within this period will be elected as members of the Club until Jan. 31, 1932. In other words, those who join now, will get fourteen and a-half months' membership for twelve months' subscription. The number of applicants who will be elected under this arrangement will be strictly limited, so that early application should be made to the Club London Office, at the address given below. Special facilities will be available for persons without previous aviation experience.

Will everybody concerned please note that the Club London Office has changed its address. In future all communications should be addressed to the Secretary, The London Gliding Club, Empire House, St. Martins le Grand, London, E.C.1 (Telephone National 8682).

THE MERTHYR TYDFIL AND DISTRICT GLIDING CLUB.

On Oct. 26 the machine was taken out on the newly-constructed trailer to the flying ground, and all members present had an opportunity of two or three really successful "flips." A systematic course of instruction was given, and those who followed out the directions gave a really pleasing and satisfactory display, and much was learned. Numerous lengthy glides were made from the flat part of the ground, and no attempts were made to overdo things, the idea being to take things by easy stages, and a rigid policy of "safety first" both for pilot and machine was followed.

The following Sunday, being somewhat unsatisfactory from a weather point of view, was spent in perfecting the trailer, and placing thereon numerous "gadgets" for parts. Permanent fixtures were made for tail plane, centre-section, tail booms, etc., and a tool-box will be fitted, thereby making the loading and unloading a simple matter of a few minutes only.

During the week a "quick release" had been made and perfected by one member. This was tried the following Sunday with absolute satisfaction, and full details can be obtained from the Secretary upon application.

On Nov. 8, although the weather continued unsatisfactory, it was decided to "try it" in order to maintain enthusiasm and to try out the "quick release" previously referred to. The release was perfectly satisfactory, so was the flying.

Our "star artist" decided to have a go. The visibility was "nil" due to a low-lying cloud on the hill. However, the first attempt was a demonstration of kite flying, the machine was launched and ballooned up some 15 to 20 feet. It then dived and landed, damaging a landing wire. This was repaired, and our pilot, not being satisfied with his day's work, made a similar attempt.

The third and final effort was an unsuccessful effort to "write off" the Zogling. Launching was carried out according to the "book," a perfect zoom, stall—here the pilot realised he had his stick back and rectified his mistake—dive—which, by the way, was vertical. The patch of ground hit was bog and the only thing that prevented the machine from vanishing was the wing span.

No damage was done. The machine turned completely over on her back, and as the pilot had unfastened his belt during the turning over process he fell clear—into the bog.

Inquiries regarding the "quick release" and any information can be obtained from the Hon. Sec., S. Herbert, 11, Gwaelodygarth, Merthyr Tydfil, Glam.

THE SAILPLANE CLUB OF T.M.A.C.

A very homely General Meeting was held on Sunday morning last at the Castle Hotel, Bramber, Sussex. Mr. A. E. Jones took the chair and touched upon the remarkable progress the Club had made taking into consideration the late start (in August). The Club could congratulate itself on its wonderful ground which was, so far as he knew, unequalled from a practical point of view, and no less then three Clubs had approached the Sailplane Club requesting arrangements to use the ground. The subscription rate, which was higher than many Clubs, had also proved to be sound finance and the Club have every reason to look forward to a year of brilliant progress.

The Secretary announced that applications for membership continued to flow in, fourteen having been received during the previous ten days.

Several visitors were present and after an excellent lunch at the Castle Hotel the entire meeting motored over to the gliding ground at Smallidole. While the training machine was being brought out, visitors inspected the grounds and were shown how gliding is possible irrespective of wind direction, whilst the ground formation is ideal for soaring flight. Despite a patchy fog, which came over just as the machine was ready, it was taken up for a series of short flights by the members present, demonstrating to visitors the system of training.

At the end of the day, Mr. C. Compton-Paterson volunteered to save the handling party work by flying the glider back to the farm. Accordingly he was launched from a point about 400 feet high and crossing the car-park and tree-lined main road with about 150 feet to spare made a perfect landing in a field adjacent to Horton Farm. The flight was timed at 65 seconds.

Gliding takes place each fine Sunday. Road maps and particulars on application to the Hon. Sec., E. G. Smettem, 2, Wine Office Court, Fleet Street, London, E.C.4.

THE STOCKPORT GLIDING CLUB.

Another milestone was added to the history of the Club at a meeting held recently at Crossley's Café, when the members met to consider the report for the securing of a room in which to start the construction of a glider. The option of such a room has been secured and while the meeting was in progress another room was offered subject to it being suitable. It was resolved to thank the owner, view the room and discuss terms and conditions.

Some more new members attended the meeting, including Mr. B. A. G. Meads, who gave his experiences of Gliding with The Lancashire Aero Club (Gliding Section) and of their match with The London Gliding Club. It was resolved that the Secretary get the blue prints of the Dickson Glider, this, the meeting considered to be the best training type consistent with their resolve to "go slow."

When the glider is finished a field is to be secured locally in order to give the members a course of training on the level ground, then as soon as they have gained a little experience, and are used to the pull of the rope, they can take it to the hills and work on a gentle slope.

By this time it is hoped that the secondary type will be finished (the construction of this will commence as soon as the training type is finished) this would then come in for the more advanced members.

As a little money will be needed the members present each gave ten shillings as part of their subscription and it was resolved that Mr. Hallam, 168, Hall Street, Stockport, act as Hon. Treasurer.

A further meeting of the Stockport Gliding Club was held in Crossley's Café on Nov. 11, and further plans were discussed re the building of the glider.

Since the last meeting the blue prints of the Dickson glider had been secured and an interesting time was spent by the members in looking these over. It was unanimously agreed that Mr. Walton be appointed chairman of the constructional section. Also in order that a start may be made on the glider as soon as possible it was resolved that prices of certain raw material which would be wanted be obtained.

It was further resolved that Mr. Walton's kind offer of a room in his premises at The Wellington Garage be accepted, and to make this the headquarters for the time being at any rate.

Another resolution put forward was that they should try and get in touch with the Manchester branch of The Royal Aeronautical Society with a view to the interchanging of ideas and suggestions. The secretary was requested to try and make such an arrangement for the members to go over and view their glider.

To anyone interested, further details will gladly be supplied upon application to the Secretary, J. T. L. Mallard, The Radio House, Sandy Lane, Stockport (Telephone 3445 Stockport).

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