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British Gliding Association

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THE SAILPLANE & GLIDER

(*Founded in September*, 1930, *by* THURSTAN JAMES)

The only Journal in the World devoted solely to Motorless Flight.

OFFICIAL ORGAN OF THE BRITISH GLIDING ASSOCIATION.

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CONTENTS.

SAFETY IN GLIDING

THE occurrence of two serious, though fortunately not fatal, accidents to glider pilots within a fortnight cannot but raise in the minds of the general public, as well as in those of recent recruits to this fascinating sport, the question of the safety of gliding. It does not require many such accidents to shake public confidence in a relatively new venture and, therefore, it is as well to look facts in the face and to see what lessons can be learned from the accidents, rather than to shirk the issue.

One feature which stands out in the two recent cases is the promptitude with which the British Gliding Association has investigated the accidents. In accordance with the normal procedure full reports, on forms drawn up specially for the purpose, were obtained immediately and the fullest possible investigation made. Such action on the part of the Controlling Authority of the British Gliding Movement goes a long way to restore confidence which may have been shaken by these untoward happenings.

The number of serious accidents which have occurred in connection with gliding has been remarkably small. This is all the more remarkable when it is remembered that in Germany, where gliding is most advanced, upwards of 200,000 individuals, mostly youngsters, have been trained, largely as *ab initio* pupils. The reason for this immunity is not far to seek. The Gliding Movement in Germany has always been under the control of competent and experienced men, and it has been pursued from the very beginning with safety as the first consideration. While flying experience has been gained, the technical aspects have not been overlooked; developments in both spheres have gone on side by side. In America, on the other hand, gliding appears to have been developed from a rather different viewpoint. There has been a tendency towards the spectacular rather than a gradual development along safe, sound lines. It is remarkable that, in that country, most of the serious gliding accidents have happened to aeroplane pilots.

Any sport which is worth the name involves a certain amount of risk. Similarly, there is risk attaching to any form of locomotion. Many, if not most, of the accidents which occur, however, are due to those involved either not realising or disregarding the risks and failing to take the necessary precautions to minimise them.

So it is with gliding. Developed upon sane lines, with safety as the first consideration, no sport could be safer, for, with such precautions, all risk is practically eliminated. The supervision exercised by the British Gliding Association and the regulations drawn up by its Technical Committee have this end in view. But no amount of supervision or regulation will prevent accidents if individual pilots go out of their way to take unnecessary risks. In the two recent accidents there is no question that neither of the pilots ought to have been flying the machines they were using in view of the weather conditions prevailing. Both accidents can be attributed, primarily, to flying deliberately in unsuitable weather conditions, while in one case there was the additional factor that the pilot was not securely strapped in his seat.

Glider pilots who go out of their way to court disaster are doing a great disservice to the Movement and to aviation generally. One accident which may be seized upon by the Press and given undue publicity may do incalculable harm. Stunting, in particular, is not to be encouraged. Even if a glider has been specially stressed to withstand the forces involved, and is stunted safely by an experienced pilot, there is a danger that his example may be followed by a young, inexperienced enthusiast, with serious results. And, after all, there is nothing to be gained by stunts. They serve no useful purpose, and they tend to terrify rather than interest the casual onlooker.

Motorless flight has a great future before it. An individual who takes it up and progresses will find plenty in it to call for courage and resource, but, provided he proceeds cautiously, he need not run unnecessary risks. With the supervision exercised in this country and the methods of training, which follow closely those developed in Germany, gliding is a safe but exhilarating pastime. It only becomes dangerous when individuals deliberately make it so.

A cautious policy in the Gliding Movement does not mean lack of progress. Progress, in fact, is hastened rather than hindered by due precautions against accident being taken at every stage. It is up to everyone concerned to see that he contributes to the progress of the Movement and does nothing to retard it.

CLUB CONSTRUCTED MACHINES.

By "SEGELFLIEGER."

VIII.—THE MANUEL METHOD OF CONSTRUCTING RIBS.

(This is the last of the series by "Segelflieger." Previous articles appeared in Vol. II, Nos. 11 and 12, and Vol. III, Nos. 1-5.)

The making of ribs for sailplanes and gliders is always an irksome job. And, as generally forty ribs at the most are required per machine, it does not always seem worth while making a complicated jig for them, especially when only one machine is going to be built.

But if the machine has tapered wings, and the amateur has to be certain that each rib is exact in its measurements, the job of rib-making presents some difficulties.

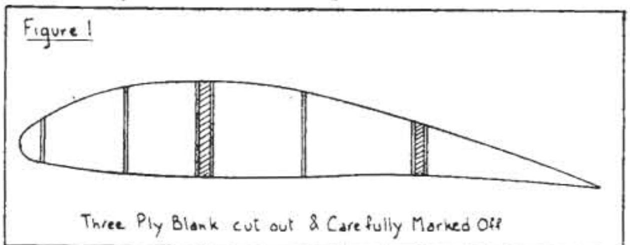
A simple jig has already been described in this series of articles, but Mr. Manuel has devised a new method which may be useful to others who are building machines.

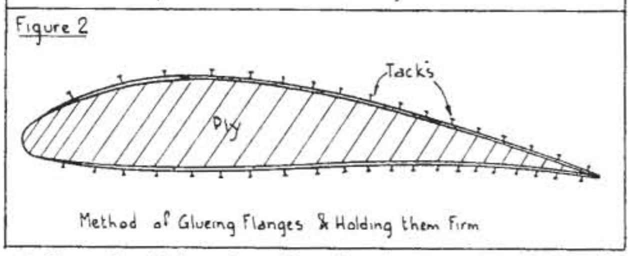
The main idea is that each rib is built up on a web of three-ply, which is shaped to allow for the addition of the flanges and, in the end, gives a satisfactory rib.

Mr. Manuel describes his method as follows:—

"The great advantage is that no jigs are necessary at all.

"The main ribs, which have all the same profile, are dealt with in one batch. Suppose we have two dozen main ribs to make, split up into two lots. Take twelve pieces of three-ply (1-16-in. ply was used on the "Crested Wren") and tack them together. Then, with the template, pencil round the outline and cut out with a saw, leaving the pencil line in. Then finish off with a plane. Twelve blanks of three-ply are about the maximum that can be done at once, as they form a solid nearly one inch thick.





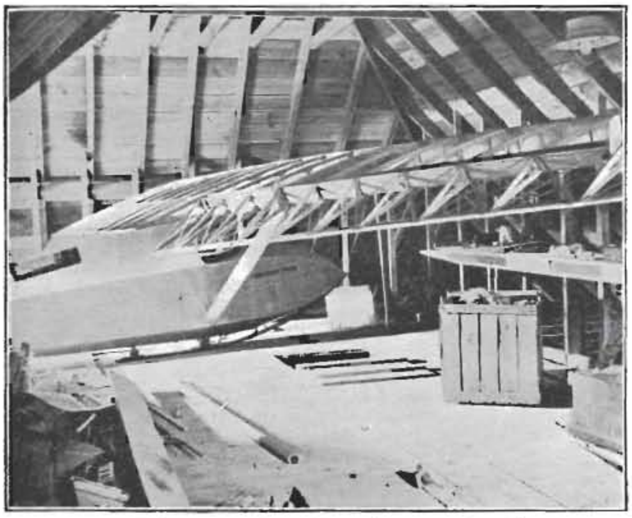
"Care should be taken that the edges are squared, otherwise some of the blanks will not be true.

"Now mark off the spar members and other cross-members. To do this, carefully lay your template on the sections, which are still tacked together, and square down the edges, both top and bottom. Take the sections apart and mark across the face of each one.

"The flanges are now made of spruce ¼-in. square, and grooved by a circular saw one-eighth of an inch deep. Care should be taken to see that the sixteenth ply makes a nice fit; the set of the saw will decide this.

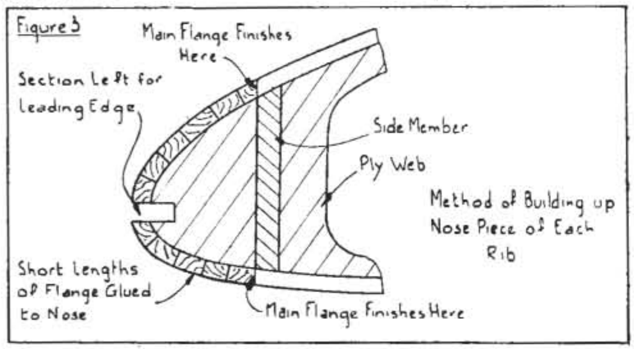
"Glue and tap on the flanges, and then lay the rib on a stout board (failing that the workshop floor will do) and tack nails in around the flanges to hold the latter firmly on to the three-ply web.

"Care should be taken to see that the flanges do not tend to spring out away from the three-ply web.



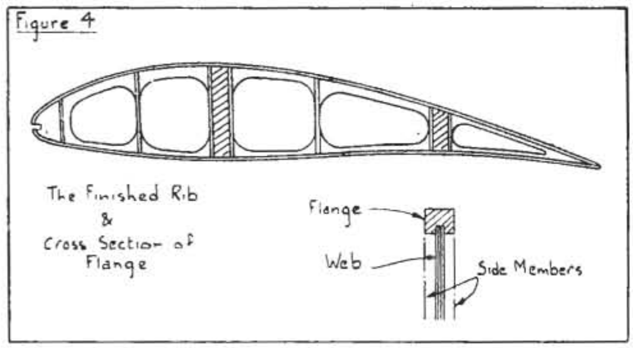
The "Crested Wren" during construction.

"The next step is the fixing of the upright members. These are 3-32 in. by ¼ in., glued on either side and clamped or temporarily tacked into position with fine cabinet-maker's pins, which must be removed when the glue is dry.



"The nose of the rib is finished with short lengths of the flange glued round, as shown in sketch.

"Cut out the lightening holes with a key saw."



Taper ribs are built in exactly the same way, except that they are shaped in pairs. The outline can be plotted straight on to the blanks, or on to paper and then pricked through.

This method is obviously an excellent one to use, if only one machine is going to be built, particularly if the construction is to be carried out by amateurs or a Club which cannot afford the time and expense of jigs.

The dimensions of sections for the ribs which Mr. Manuel used on his "Crested Wren" have been given as a guide to others who may wish to use his method.

1932 COURSES AT THE WASSERKUPPE.

The Wasserkuppe Flying School announces that, owing to an alteration in the date of the period of the competitions, the instruction courses for July, August and September have also had to be altered.

The course for advanced pupils and those with previous instruction, originally arranged for July 4th to 26th, will now take place between June 15th and July 15th.

The Scientific Training Course arranged for July 18th to August 3rd (preparation for the competitions) will now take place from July 1st to 15th.

For the period August 25th to September 24th an instruction course was to have been provided for advanced pupils and beginners; it will now take place between August 12th and September 10th.

In the period September 14th to October 14th another instruction course for advanced pupils and those with previous instruction is to take place, which will overlap the final course of September 28th to October 29th.

The Flying School further announces that, in response to many requests, beginners without previous instruction will be taken on in each of the courses for those with previous instruction, namely, from May 2nd to 31st, June 6th to 30th, June 15th to July 15th, August 12th to September 10th, September 14th to October 14th, and September 28th to October 29th.

The winter construction programme is almost completed, so that at the beginning of the courses a fleet of twenty school machines will be ready for use.

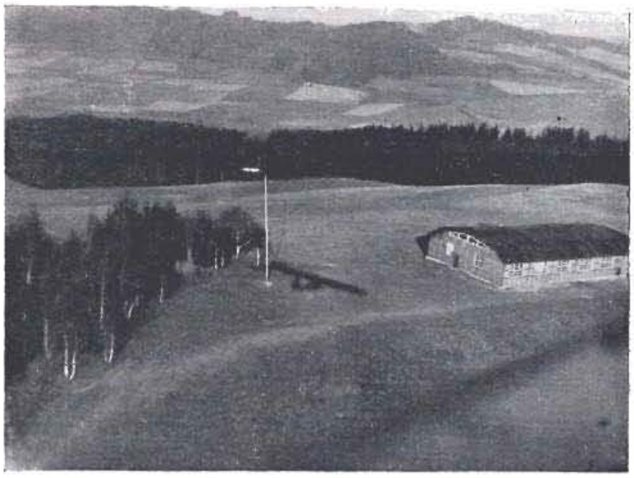
It is to be observed that, apart from the programme of courses already published, a continuity of courses for advanced pupils extends throughout the whole year. This arrangement allows of the possibility for advanced pupils (power pilots or glider pilots with "B" Certificate) who cannot fit in with the times of the courses to join the School at any time. In the case of pupils who are not in a position to attend a whole course, the fees are fixed as follows:—

	Members of (German) Flying Associations.	For Foreigners.
A whole course	R.M.100	R.M.300
A half-course	R.M. 60	R.M.150
A third of a course ...	R.M. 40	R.M.100

Whole groups (ten to fifteen participants), whether beginners, advanced, or trained pilots, can be taken on at any time independently of the regular courses. The courses for "Vorgeschulte" (those who have had some previous instruction) can also be taken, with permission, by absolute beginners.

The Wasserkuppe Flying School, with a fleet of over twenty machines of the most varied types, offers the assurance that no cessation of flying can occur through lack of machines. A tractor, which fetches the machines back to the starting-point after flight, allows of the simultaneous inclusion of several machines in a flying group and thus the fullest possible use of the available flying days.

When the wind direction is unfavourable for the Wasserkuppe (East and North), opportunity is given for autotowed flights, so that such days can also be fully utilised.



Photograph of the "Galgenberg," taken from a Sailplane, the shadow of which can be seen near the base of the pole supporting the wind sleeve. In the distance can be seen the main soaring ridge used by the Grunau School.

The types of machines used include: "Zögling," "Falke," "High-performance Falke" and "Professor."

The Flying School will at any time willingly answer inquiries concerning school instruction.

HOW TO GET YOUR "SAILPLANE" FREE.

It has been decided that in order to encourage members of the Association and subscribers in obtaining new subscribers to THE SAILPLANE, free issue of the journal will be awarded as follows until further notice:—

To Members of the Association.

Free issue for six months to a member obtaining one new yearly subscriber.

Free issue for one year to a member obtaining two new yearly subscribers.

Free issue for one year and renewal of membership of the Association on obtaining four new yearly subscribers.

To Subscribers.

Free issue for one year on obtaining two new yearly subscribers.

"SAILPLANE" PHOTOGRAPHIC COMPETITION.

The competition for February was won by Herr Paul Kuschel, Instructor at the Grunau Soaring School, for the photograph of the "Galgenberg" taken from a sailplane, which appears above.

It is regretted that the two excellent photographs published on page 47, No. 4, Vol. III, and on page 56, No. 5, Vol. III, were disqualified, as they had already been published elsewhere.

The competition is still open.

THE DESIGN OF MOTORLESS AIRCRAFT.

By E. H. LEWITT, B.Sc., A.M.I.Mech.E.
(Vice-President of the Imperial College Gliding Club. Member of Technical Committee of the British Gliding Association.)

(Continued from p. 53, No. 5, Vol. III.)

ANALYSIS OF METHODS OF WING SUSPENSION.

There are three distinct methods of suspending the wings of a glider:—

(a) As a simple cantilever, fixed at one end.

(b) As a cantilever, fixed at one end, and supported by a flying wire or strut, at about one-third of its length from the free end.

(c) Connected to fuselage by a pin joint and supported by a flying wire or strut, as in (b).

These three methods each produce a bending moment on the wing spar, but the magnitude of this bending moment varies greatly with the different methods of suspension. In the following, the bending moment produced by these three methods of suspension will be considered in turn, for the front spar of a glider wing with a net loading of 5 lb. per foot run on the spar. The length of the wing is 16 feet.

(a) Simple Cantilever Suspension.

In this case the bending moment diagram will be a parabola with the maximum bending moment at the fixed end.

Let w = net load per foot run on front spar, in lb.
l = length of front spar in feet.

Then,

$$\left.\begin{array}{l}\text{maximum}\\\text{bending}\\\text{moment}\end{array}\right\} = \frac{wl^2}{2} \text{ lb. ft.}$$

For the particular wing in question,

$$\left.\begin{array}{l}\text{maximum}\\\text{bending}\\\text{moment}\end{array}\right\} = \frac{5\times 16^2}{2} = 640 \text{ lb.ft.}$$

The bending moment diagram for this case is the parabola abc in Fig. 8.

(b) Cantilever firmly fixed at one end and supported by flying wire or strut.

The calculation in this case is more complicated, as the pull in the flying wire or strut is not known. The problem may be solved by assuming the point of attachment of the flying wire or strut to deflect vertically when the load on the wing is applied.

The beam ABC (Fig. 8) represents the front spar firmly fixed at the left-hand end, A. It is also held at the point B by the flying wire or strut. The assumptions made are:

(1) That the point B deflects vertically upwards.

(2) That the flying wire or strut remains at the same slope after the deflection.

Both these assumptions are justified if the deflection of the point B is small compared with the length of the wing, which is the case in actual practice.

Let l_1 = distance of B from fixed end of spar,
T = force in wire or strut due to deflection of front spar,
α = slope of wire or strut to front spar,
I = moment of inertia of front spar section about horizontal axis,
E = modulus of elasticity of front spar scantlings,
E_1 = modulus of elasticity of flying wire or strut,
a = cross-sectional area of flying wire or strut,
f = tensile stress in flying wire or strut,
y_1 = upward deflection of point B if flying wire or strut were removed,
y_2 = downward deflection of point B due to pull of flying wire or strut only,
y_3 = resulting deflection of point B.
$= y_1 - y_2$.

First assume the flying wire or strut to be removed and find the upward deflection y_1 due to the loading w per ft. run on the front spar.

$$\left.\begin{array}{l}\text{Then, deflection at B}\\\text{of cantilever AC}\end{array}\right\} y_1 = \frac{wl_1^2}{2EI}\left(\frac{l^2}{2} - \frac{ll_1}{3} + \frac{l_2^2}{12}\right)$$

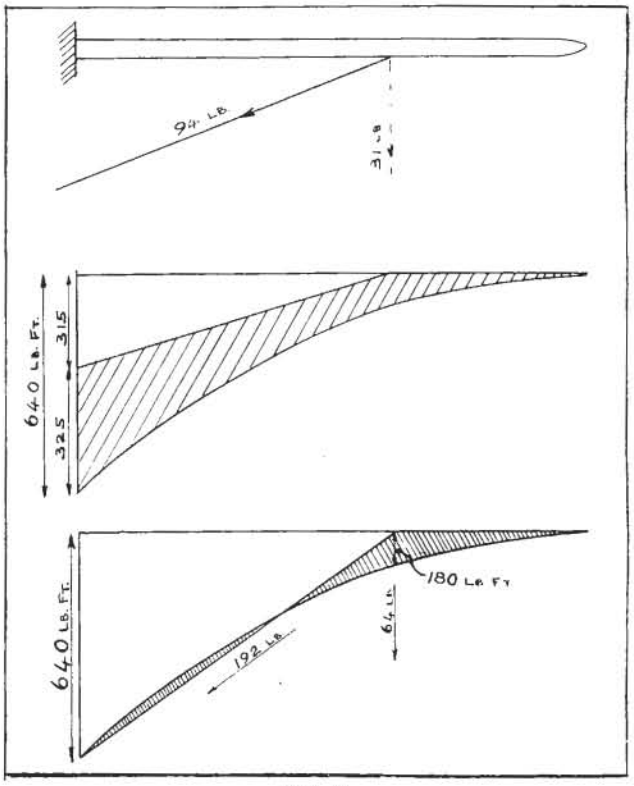


Fig. 8.

Next assume the wing loading to be removed and find the downward deflection y_2 due to the downward pull of the flying wire or strut.

$$\left.\begin{array}{l}\text{Then, for cantilever}\\\text{with concentrated}\\\text{load at end}\end{array}\right\} y_2 = \frac{(T \sin\alpha)\, l_1^3}{3EI} = \frac{fa \sin\alpha\, l_1^3}{3EI}$$

Next consider the extension of the flying wire or strut due to the net deflection y_3. Now the extension of the flying wire or strut will be $y_3 \sin\alpha$ (Fig. 9).

$$\text{Strain in flying wire or strut} = \frac{\text{extension}}{\text{original length}} = \frac{y_3 \sin\alpha}{l_1 \cos\alpha}$$

But from definition of the elastic modulus,

$$\text{Strain} = \frac{f}{E_1}$$

Hence, equating these two values of the strain,

$$\frac{f}{E_1} = \frac{y_3 \sin\alpha \cos\alpha}{l_1}$$

From which

$$y_3 = \frac{fl_1}{E_1 \sin\alpha \cos\alpha}$$

Now, the net deflection y_3 = deflection due to load alone — deflection due to pull of flying wire alone.

Or

$$y_3 = y_1 - y_2.$$

That is

$$\frac{fl_1}{E_1 \sin\alpha\cos\alpha} = \frac{wl_1^2}{2EI}\left(\frac{l^2}{2} - \frac{ll_1}{3} + \frac{l_2^2}{12}\right) - \frac{fa \sin\alpha\, l_1^3}{3EI}$$

or

$$f\left(\frac{l_1}{E_1 \sin\alpha\cos\alpha} + \frac{a \sin\alpha\, l_1^3}{3EI}\right) = \frac{wl_1^2}{2EI}\left(\frac{l^2}{2} - \frac{ll_1}{3} + \frac{l_2^2}{12}\right)$$

from which equation the value of f may be found.

On substituting the values of the above quantities for the glider wing under consideration, it was found that the value of f was 6,000 lb. per sq. in. This gives a value of 93 lb. for the total tension in the flying wire; the vertical component of this is a downward pull of 31 lb. on the front spar. The bending moment diagram due to this downward pull is shown by triangle ade Fig. 8. If this bending moment diagram is subtracted from the parabola abc, due to the wing load alone, the net bending moment diagram is obtained. This net bending moment diagram edbc is shown shaded. It will be noticed from Fig. 8 that the effect of fitting a flying wire to this wing is to halve approximately the maximum bending moment on the front spar.

For the spar under consideration,

maximum bending moment due to wing load alone $= \frac{wl^2}{2} = 640$ lb. ft.

maximum bending moment due to tension of flying wire alone $= T \sin \alpha \, l_1$

$= 31 \times 10$

$= 310$ lb.ft.

Hence resulting maximum bending moment on spar $= 640 - 310$

$= 330$ lb.ft.

It will be noticed that the effect of the flying wire, in relieving the front spar of its load, will depend on the relative stiffness of the front spar and of the flying wire, and on the magnitude of the slope of the latter to the horizontal.

The above results show that the flying wire of this particular glider took very little of the load on the spar.

The maximum bending moment on the spar could have been still further reduced by using a stouter flying wire or by substituting in its place a strut of a substantial cross-section.

(c) **Pin Joint Connection with Flying Wire or Strut.**

In this case the wing is connected to the fuselage by a pin joint of such a type that it is free to turn in the vertical plane. A flying wire or strut is then fitted in order to hold the wing rigid. As there can be no resulting bending moment at the pin joint, it follows that the upward bending moment due to the air pressure on the wing must equal the downward bending moment due to the tension in the flying wire or strut. Thus:

$$\frac{wl^2}{2} = T \sin \alpha \, l_1$$

From which we have

$$T = \frac{wl^2}{2l_1 \sin \alpha} \text{ lb.}$$

Substituting in the equation the values from the glider under consideration,

$$T = \frac{5 \times 16^2}{2 \times \sin 20^\circ \times 10}$$

$$= 192 \text{ lb.}$$

This is the tension in the flying wire or strut; it will be noticed that it is about twice the value of the tension in case (b).

The bending moment diagram for this type of wing suspension is shown shaded in Fig. 8; this has been drawn for the same machine and the same loading as in the previous cases. The parabola fgh is the bending moment diagram for the load acting alone. Superimposed on this, and to the same scale, is the bending moment diagram due to the tension in the flying wire, acting alone; this is the triangular diagram fkh. The resulting bending moment diagram on the spar is the difference of these two bending moment diagrams, and is shown shaded. It will be noticed from the shaded diagram that the maximum bending moment occurs at the point B, and is due to the load on the spar beyond the flying wire attachment. Hence,

$$\text{maximum bending moment} = \frac{w(l-l_1)^2}{2}$$

$$= \frac{5\,(16-10)^2}{2}$$

$$= 90 \text{ lb.ft.}$$

This maximum bending moment is by far the least of all three cases of wing suspension and, consequently, this type of suspension is the most efficient from the consideration of spar design.

From an inspection of the bending moment diagrams of the above three methods of wing suspension, it will be noticed that case (b) produces about one-half of the maximum bending moment of case (a), whilst case (c) produces about one-seventh of the maximum bending moment of case (a).

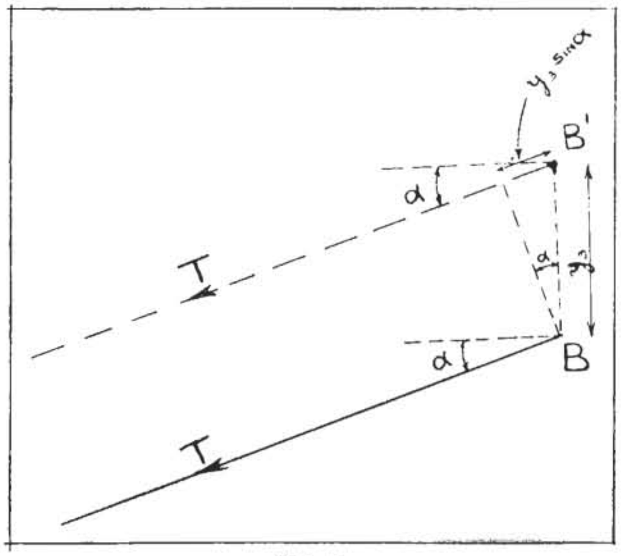


Fig. 9.

The disadvantage of fitting flying wires or struts is the increase of the drag of the machine which they cause; this may be reduced by making them of a streamline section. It should also be noted that the horizontal component of the tension in the flying wire or strut will cause a compression in the spar which must be taken into account in the design.

(To be continued.)

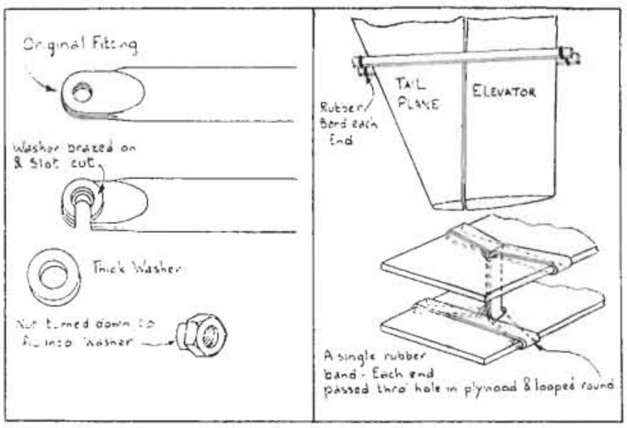
MORE DIXON DETAILS.

By J. CECIL RICE.

To avoid much fumbling with the nut which retains the upper end of the tail-plane strut, we have made the following alteration. The nut is removed and the corners turned off so that it will fit into a fairly thick washer. The nut, washer and the bolt are then assembled on the end of the strut, and the washer is brazed on concentric with the hole. A slot is then cut the width of the bolt hole.

The washer reinforces the end and it is now possible, by slacking the nut a few turns out of the recess formed by the washer, to withdraw the strut off the bolt. This saves a great deal of time.

Secondly, to avoid the ailerons flapping loosely, we have taken some pieces of plyboard and connected them with a rubber band as indicated in the sketch. These can be then clipped on at the trailing edge where the aileron butts out to the wing. This is a benefit when handling the wings. It has been found an additional advantage to have two pieces of wood fastened across each elevator and clipped on with rubber bands to keep the elevator rigid with the tail plane. Another advantage is that the tail unit can then be stood on its edge on the ends of these pieces of wood.



METEOROLOGY AND MOTORLESS FLIGHT

[Impressions of a lecture by F. ENTWISTLE delivered at a joint meeting of the Imperial College Gliding Club, the British Gliding Association and the City and Guilds Engineering Society on February 10th, 1932. Written by a member of the audience.]

" Time enough to think about Meteorology when I've got my 'C' and done a good few hours' elementary soaring." Anyone holding such a mistaken view must soon have been disabused of it after hearing Capt. Entwistle's lecture on " Some Aspects of Meteorology in Relation to Gliding and Soaring Flight."

We who attended the lecture found that meteorology does not merely concern itself with regions of the atmosphere to which we hope some day to penetrate, but which still seem aggravatingly as far off as ever; it has quite as much to say about the air which blows across our gliding grounds, swirls round our soaring slopes, and leads us such a hectic dance on our first attempts to fly over broken terrain on a windy day.

Even if meteorology seems of no immediate concern at the moment, its very unfamiliarity makes it advisable for one to begin studying it as early as possible, rather than put off the evil day to when a knowledge of it is really wanted.

It is often not realised that the amazing progress made by the Germans in the past few years has been due mainly to the co-operation of their meteorologists; especially have they a first-class scientist in the person of their President, Dr. Georgii. We in this country stand equally in need of such help if we are ever to get much beyond the " aerial tobogganing " stage, and we can count ourselves extraordinarily lucky that there are those in this country who have found themselves attracted to our problems and have given their services generously to the Movement.

The present writer, not having known at the time that he would be reporting the lecture, can only give a brief and somewhat incomplete résumé of it, but it is understood that Capt. Entwistle intends to republish the matter of it in extended form in subsequent articles in THE SAILPLANE.

After describing the " ideal case " of a steady atmosphere, which is the easiest of all to understand, but only exists in fancy, the lecturer entered upon the subject of up-currents, their varieties, causes, behaviour, force and extent, and the methods so far discovered of finding where they are and where to expect them.

Up-currents can be classified according to their causes under four main heads:—

1. Dynamic.
2. Frictional.
3. Thermal.
4. Frontal.

The dynamic up-currents are those caused by the topography of the ground over which wind is blowing.

The simplest case is that of an isolated hill in the middle of a plain. Here it is found that up to a certain level the air tends to flow round the hill rather than over it; it is only over the upper part of the hill that a good up-current is to be expected, and this up-current extends, under normal conditions, to about one-third of the height of the hill above its summit. In the case of a long ridge lying at right angles to the wind direction, all the air is forced to rise over the top, and the up-current in this case is far more extensive, reaching up under similar conditions to about four times the height of the ridge above its top. These figures are, of course, only approximate and, in any case, a glider cannot climb to the full extent of the rising current, but only so far as the latter is in excess of the glider's sinking speed.

If a hill is fairly steep, the rising current up its face may be complicated by the presence of a reverse eddy at the foot of the hill. Still more often there may be an area of comparatively still air, or even of reverse eddies, behind the hill, in which case there is usually a fairly definite boundary between this region of eddies and the main flow of smoother air which has come up over the hill. These effects are seen on a smaller scale when wind blows against a building, and the lecturer showed on the screen a diagram of such a case in which the various air currents had been fully mapped out. In this case, the air was blowing over a shed, and in the lee of the building the boundary layer, which rose and then fell in a gentle curve, was quite sharply defined, with the even flow of air above it and the eddying below. It is important for gliding pilots to realise the possible presence of such a boundary layer over a hill, since they cannot actually see it.

Further interesting examples of eddies were shown, including some examples at Rossitten, a curious spiral eddy in a mountain valley in California, and one discovered by the lecturer himself with a no-lift balloon at Itford Hill in 1922.

Now, although the foregoing rules of air flow apply to normal or fairly average conditions, all these phenomena can be profoundly influenced, especially in their magnitude, by something called the " lapse rate." This question of the lapse rate is perhaps the chief stumbling-block which divides those who find much of meteorology bewildering from those who feel more or less at home in the subject. The lapse rate is worth taking the trouble to understand, for, once its meaning is thoroughly grasped, half the meteorological problems which concern us are found to have become suddenly and unexpectedly simpler.

Anyone who climbs a mountain or goes up through the atmosphere by aircraft will usually find the air around getting gradually colder. Every thousand feet farther up it may become about 3° colder, or some other figure, but whatever the figure on that particular day it is known as the " lapse rate."

Now take a body of air which for some reason starts rising up through the atmosphere. This body of air, as it rises, becomes less and less compressed by the remaining atmosphere above it; it therefore expands, and in expanding becomes cooler in obedience to a physical law called the " adiabatic law." If it is dry air (i.e., does not become saturated with any moisture it may contain) and is not heated or cooled by any outside influence during its upward travel, it will get about 5° Fahr. colder for every 1,000 feet it rises, and this rate of about 5° per 1,000 feet is therefore called the " dry adiabatic lapse rate." Having reached a certain height, what will this body of air do? It may have started rising through becoming heated by contact with warm ground, or through being forced up the side of a hill, or through eddy motion within air which is crossing uneven terrain; but whatever the cause of its rising, it is obvious that the temperature of the atmosphere around it, in which it now finds itself, will have a profound influence on its further movement. If our body of air finds itself in surroundings warmer than itself, it will try to get down again. But if the atmosphere around it is very much colder than itself, it will continue to rise through that atmosphere even more violently than before.

This is where the lapse rate comes in. With an atmospheric lapse rate of only 3° per 1,000 feet, and a body of air rising up through it and losing heat at 5° per 1,000 feet of climb (the adiabatic rate), this body of air would soon find itself cooler than its surroundings; so it would either not rise to such a height at all, or, if it did through being forced up from below, would try to get down again. For similar reasons, any body of air moving downwards would tend to stop falling. In other words, if the lapse rate is *less* than the adiabatic rate of 5° per 1,000 feet, vertical movements of air, either up or down, will tend to die out. The smaller the lapse rate, the more promptly such movements will be suppressed. Atmosphere with a less-than-adiabatic lapse rate is therefore said to be "stable." The lapse rate may even drop to nothing or less than nothing; the latter condition is called an " inversion " and is very stable indeed, but usually occurs between restricted levels such as over a fog or in a layer of strato-cumulus cloud; as we pass up through such a layer we find the air around becoming warmer instead of colder.

Pursuing the same line of reasoning, if the atmospheric lapse rate is equal to the adiabatic rate (i.e., it is about 5° per 1,000 feet instead of the more usual 3°), vertical movements of air are more likely to persist; if even greater than the adiabatic rate, vertical movements, when once started, will even become exaggerated. Atmosphere in this condition (with an adiabatic or more-than-adiabatic lapse rate) is therefore described as "unstable." In it, thermal currents, eddies, and up-currents over hills will be well developed and may even tend to grow to greater dimensions.

The tremendous importance nowadays attached to the lapse rate was one of the most striking lessons of Capt. Entwistle's lecture; one had previously thought of it as something that vaguely affects the size of cumulus clouds, and never realised what an influence it can have on rising currents over hills and even on the eddying of wind near the ground.

When the atmosphere is stable (lapse rate small), air which is made to rise up a hill will be trying to get down again, as we have already seen; it will therefore keep as low as possible, close to the surface of the hill, and the soaring area will consequently not extend far above the hill-top. But owing to the same reason (small lapse rate) eddies will tend to die out, so such an up-current will be very steady, free from irregularities and pleasant to fly in.

With a greater lapse rate (nearer the adiabatic rate) the soaring area will extend higher above the hill, for the rising current will not be so hindered in its upward motion; a glider will then soar to a greater height, but such air will be more turbulent to fly in, for eddying will have more chance to develop.

A further influence of the lapse rate is that which it exercises on the eddies in the lee of a hill, or at its windward foot, or in other situations in hilly surroundings. If the air is stable, with perhaps a layer of strato-cumulus overhead, a single large eddy is likely to develop in such situations, if at all; this happens if the wind speed is not more than 20 or 25 m.p.h. With stronger winds, however, such an eddy becomes broken up into a number of smaller ones. This multiplicity of the eddies will also be found even in light winds if the air is unstable (high lapse rate).

Capt. Entwistle next discussed some new methods now used for discovering the best soaring areas in mountainous districts. It is well known that such places get more than the average rainfall; the rain is derived from moist air which rises upwards in crossing the mountains and, owing to its expanding as it ascends, can no longer hold its moisture. It is obvious that the areas where there is most rain coincide with the areas of biggest up-currents. Prof. Georgii has actually used rainfall charts to map out the best soaring areas in mountainous country, and Capt. Entwistle showed us a chart of the rainfall in the Pembrokeshire mountains which might be used for such a purpose.

Up-currents may only form cloud, not rain, in which case the cloud will melt away when the air descends again. This gives us a method of finding the extent of the down-currents in the lee of a mountain by noting the areas in which clouds have been observed to dissolve away.

The next type of up-current is that due to friction, such as when wind is blowing from sea to land, or from open country on to irregular or wooded ground. Owing to the increased friction, the air near the ground gets slowed up; more air coming along behind tries to get past it, and does so by climbing over the top, thus producing an up-current. Slides were shown explaining this action.

Thermal currents are coming more and more into use nowadays for soaring flights; they are columns of air which are rising owing to the irregular heating of the earth's surface by direct solar radiation. Here again the lapse rate is of importance. If the lapse rate is high, the air is unstable and thermal currents easily develop. Such currents may mount so high that cumulus clouds are formed in their tops; we were shown pictures of such clouds, one being a particularly large one yet with a quite level base. The base of an actively growing cumulus cloud is at the level above which the rising air can no longer hold its moisture. As regards the lower limit of the type of currents which form cumulus clouds, it is believed that they start at a height of about 150 to 200 metres (500 to 650 feet), but this is only an average figure, and the actual heights vary widely in different cases.

Finally, there are the frontal up-currents. These are due to meteorological conditions not connected, in the main, with the nature of the ground below. The chief example is the line squall associated with the "cold front" of a depression; in this phenomenon an up-current is caused by cold air advancing across country and undercutting the warmer air which was previously there. Rising air is also associated with the "warm front" of a depression, where warm air in the "warm sector" overrides the cold air in front of it. The warm sector is to be found on the southern side of such depressions as they advance over the British Isles from the Atlantic, and occupies the area enclosed by the warm and cold fronts; the warm front arrives first after the rain has begun, and the cold front usually brings a clearing squall some time later.

At the conclusion of the lecture, Col. H. T. Tizard, the Chairman, invited questions.

Sir Gilbert Walker, in opening the discussion, emphasised the importance of investigating the lapse rate (or "vertical temperature gradient," as he termed it), when determining the favourability or otherwise of soaring conditions. He suggested various means of measuring it, such as sending up recording instruments by small captive balloons. As an example of up-currents caused by friction, he instanced the enormous development of cumulus often to be found in India when a sea wind strikes the coast.

The discussion covered a wide range and it will not be possible, owing to lack of space, to report it in detail. Mr. Buxton raised several interesting questions, including the possibility of soaring over an area of tarmac; he had observed gulls climbing well in soaring flight over a parade ground. Other questions related to the speed of travel of cold fronts, which was stated by the lecturer to vary within wide limits, but to be of the order of 30 m.p.h. on the average; inexpensive methods of carrying out meteorological investigations; and the air flow over a soaring slope backed by a plateau.

So ended a highly instructive, interesting and useful lecture of a type we get all too seldom; we have had nothing like it since the one given by the same lecturer just a year ago. Capt. Entwistle assured us at the beginning that, not only could meteorology be of service to motorless flight, but that flights by gliders and sailplanes could obtain information of much value to meteorologists. He has kept his side of the bargain. What about ours?

A GLIDING CENTENARY

February 18th, 1832, saw the birth of Octave Chanute, one of the small band of gliding pioneers who, towards the end of the last century, brought heavier-than-air flight into the realm of practical achievement.

Though born in Paris, Chanute was, while still a boy, taken by his parents to the U.S.A. There he carved out for himself a brilliant career as a railroad engineer, taking a leading part in the rapid spread of railways over the Continent and building some of the biggest of the bridges required for the purpose.

Then, a few years after his retirement in 1889, when over 60 years of age, this astonishing man suddenly took up gliding. He had, it is true, interested himself in the problem of flight for some twenty years previously, studying chiefly the flight of birds, and in 1891 had published his first book, "Aerial Navigation." This was followed in 1894 by "Progress in Flying Machines," a work of great value historically and especially for its account of the classic researches of the Frenchman, Mouillard, on bird flight.

His interest in practical gliding was then aroused by meeting one of Lilienthal's pupils, A. M. Herring, and in 1895 these two set to work to construct a Lilienthal-type glider. With it they repaired in the summer of 1896 to the sand-dunes at Dune Park on the shores of Lake Michigan; but, after a number of trials, they became alarmed at its lack of stability, so they discarded it and set to work to find the remedies for its defects.

It was at this point that Chanute's own original contribution to aviation really began. He embarked on the construction of a series of gliders which culminated in the famous biplane, the prototype of all the biplanes of to-day.

His first machine, however, was a multiplane with five pairs of narrow wings, to which a sixth pair (left and right) was added behind to form a monoplane tail; other ways of distributing the six pairs were also tried. In designing it, Chanute's idea was that, instead of the pilot swinging his body about in a never-ending chase after the errant centre of pressure, it would be better to give the pilot a rest and control the centre of pressure itself by allowing movement of certain parts of the supporting surfaces. To this end he arranged for the wing-tips to swing back whenever they were struck by a gust, thus keeping the C.P. more or less in its proper place. The tail was also made flexible for the same reason.

With this machine two or three hundred glides were made entirely without accident, using sand-hills of various heights up to 95 feet. Chanute had gathered round him a small group of young enthusiasts to do the actual flying, but the old sportsman was not going to be left out in the cold; he could manage a few modest hops himself, and was not too old to discover that "there is no more delightful sensation than that of gliding . . . the air rushes by one's ears; the trees and bushes flit away underneath, and the landing comes all too quickly." His assistants took off in all kinds of winds, even up to 31 m.p.h., often hovering for several seconds above their starting-point, and sometimes rising suddenly 10 or 20 feet in response to a gust. The body movements required for balancing were only about one-sixth of what was needed with the Lilienthal glider; in fact, when high off the ground they did not bother about shifting their bodies at all, but just allowed the glider's own automatic stability to take charge of it.

After three weeks of good fun, the party retired on July 14th to Chicago for a spot of work. They changed the multiplane into a quadruplane, and built an entirely new machine, a triplane. The latter, when they had returned to their gliding ground on August 20th, was almost immediately converted to a biplane, and this they found so much better than anything they had flown before that Chanute remained faithful to the biplane form ever after. It was a remarkable machine, weighing only 23 lb.; the aeronauts made seven or eight hundred glides in it, the longest being one of 120 yards. It flew at an air speed of between 22 and 30 m.p.h., and the gliding angle is variously given as 1 in 6 to 1 in 10. Only a single covering was used for the wings, leaving the ribs exposed. But the most important point historically is that Chanute, the ex-bridge builder, conceived the idea of giving it the strength and rigidity of a trussed girder by adding struts and diagonal wire bracing; he is thus Father of All the Biplanes.

Truly, as one reads of some two thousand glides in all carried out with at least as much freedom from accident as in present-day gliding, one is tempted to try to start a "Back to Chanute" movement. For, consider: the weight was that of a push-bike; the gliding angle little worse than that of a Zögling, and sinking speed probably as good; they flew it in winds which would make the average Zögling pilot blanch with terror; no bungy was needed, and no launching team who all have to fly before the pilot can get another turn; the undercarriage, although made of a pair of human legs, never suffered fracture; novices of all kinds, one reads, were allowed long glides even on their first flight; and, to crown everything, there was all the delight of taking off and landing like a bird. Not to mention the financial question!

It was not long before replicas of this successful model were produced, some of which found their way (figuratively, of course) to distant parts of the world. Anybody who cares to see one should go into the South Kensington Science Museum, walk past the Schneider racer, under the Wright aeroplane (the first ever), through into the next room, and look up. There, alongside of those of his contemporaries, the German Lilienthal and the British Pilcher, hangs a machine which, apart from minor modifications such as double-surfaced wings, is of the original Chanute design. With a span of 22 feet and a chord of 3·8 feet, it has a total surface of about 170 square feet compared with 135 square feet of the original machine. There are padded rests for the armpits and levers for the hands which control a rudder and elevator; Chanute, however, did not couple up these controls rigidly, but inserted a spring mechanism which allowed the tail to give way to some extent when buffeted by gusts. These levers, the forerunners of the joy-stick and rudder-bar, were an improvement on Lilienthal and Pilcher; but the inventor was not the first to use them, for Le Bris, in 1854, is stated to have worked levers on his "Albatros" to vary the angle of the tail and of the front edges of the wings.

It is strange that Chanute, for all his ingenuity, made no advance in the method of lateral control; he still expected his pilots to shift sideways, though possibly they discovered that the same effect could be got by using the rudder, as was done years later in the first French box-kite aeroplanes.

After September 27th, 1896, the practical experiments were discontinued and Chanute devoted himself to the study of aerodynamics. He was not prepared to fit an engine to his glider until the problem of stability was better understood. His assistant, Herring, however, made several attempts to do so, which came to nothing. It was calculated that 2 h.p. would suffice to keep the machine in the air.

It is remarkable that so many of the foundations of present-day flying were laid in eight short weeks of practical experiment. Chanute had the scientific spirit; he was an acute observer, and all his observations were carefully tabulated. He lost no opportunity of watching the birds, the smoke from chimneys, and the internal motions of fogs and mists, the latter especially teaching him much about thermal currents over woods. He also understood that "the incessant fluctuations of the wind probably result from the rotary action of its billows"; an action, he affirmed, of which more could be learnt with a piloted machine in a week than by years of experiment with models.

Yet even in his 70th year a most important part of his services to aviation was yet to come, for he heard of the Wright brothers' activities and intentions, and what must this white-haired old veteran do but go off and join them in their primitive camp among the sand-hills of North Carolina, putting up with every discomfort in the hope of seeing his life's dream come true.

Chanute, in fact, was a generous soul; his loyalty was to to the cause of aviation alone, and to that end he was at everybody's service. His attitude was well shown in his reply to Prof. Montgomery, a later gliding experimenter, who had independently invented the wing-warping method of lateral control and had asked Chanute's advice about patenting it. "Mr. Chanute," relates the Professor, "said to me he did not believe anyone should take out patents on any devices, because this was a problem of humanity. No one man was going to solve it. All should lend their work to the solution of this great problem, and anyone taking out patents might interfere with the progress of the science." Even the Wrights, who owed much of their success to his advice and encouragement, could not obtain his help until they had assured him that "we were interested in flying as a sport and not with any expectation of recovering the money we were expending on it."

Unlike most inventors, Chanute was a good hand at prophecy. He certainly scored a bull's-eye with a contribution to the American "Independent" in 1900. "Flying machines," he wrote, "promise better results as to speed, but yet will be of limited commercial application. They may carry mails and reach otherwise inaccessible places, but . . . they will not fill the heavens with commerce, abolish custom houses, or revolutionise the world, for they will be expensive for the loads which they can carry, and subject to many weather contingencies. Success is, however, probable. . . . It now seems likely that two forms of flying machines, a sporting type and an exploration type, will be gradually evolved within one or two generations, but the evolution will be costly and slow."

He died at Chicago on November 23rd, 1910. Thus he did not live to see his prophecies fully carried out, but perhaps it was as well, for in another few years he would have seen the invention put to a use which even he did not foretell: Chanute was a dreamer of dreams, not of nightmares.

Another prophecy concerns us more nearly. He believed "that man would one day 'soar' with a machine weighing about one pound per square foot. . . . With such a machine one would 'circle like a bird, rise spirally like a bird,' and soar in any direction." It is on record that he tried to persuade the Wrights, in their gliding days, to rise in circles when the birds showed the presence of a thermal current, but they refused to risk a landing among the eddies to leeward of their hill.

"It was Chanute's belief," states J. B. Weiss, in his book, "Gliding and Soaring Flight," "that in the perfect one-man craft of the future, no motor at all would be needed, and he maintained that there were then indications that such flight would be achieved before long." This is perhaps the most far-reaching prophecy of all, and it is up to us to see that it is fulfilled.

A. E. S.

GLIDING ACCIDENT AT DITCHLING BEACON.

We regret to announce that F./Lieut. Lee Roy Brown, of the Southern Sky Sailing Club, was involved in a gliding accident at Ditchling Beacon on February 28th. A strong north-easterly wind, which attained gale force at times, was blowing when F./Lieut. Lee Roy Brown took off. After a somewhat indifferent launch, the machine was seen to turn; the wind appeared to catch one wing, and the machine swung right round and crashed. The pilot suffered a broken leg and two or three ribs were broken. We are glad to hear that he is progressing favourably.

THE KENT CLUB DINNER.

The Kent Club Dinner was held at the New Inn Hotel, Maidstone, on Thursday, March 3rd. About sixty Club members and guests attended; among them were Col. the Master of Sempill, Messrs. Gordon England and Waplington, Councillor Gordon Larking (the Mayor of Maidstone), Corpl. Manuel, and a strong contingent from B.A.C., Ltd.

Without a doubt the real feature of the Dinner was Mr. Gordon England's speech, which would have put life even into a mummy. The Mayor's subsequent speech was equally stalwart. When the Kent Club has recovered from such shocks, there should be some effective activity in the Maidstone area, especially since the Mayor expressed his definite friendliness as well as his appreciation of Mr. Gordon England's refreshing criticism.

In effect, this criticism took the form of a series of reminders. The Club built the first primary machine in the country; B.A.C., Ltd., is at their doors; Maidstone is a sufficiently wealthy and enterprising country town; Kent has many hills. In spite of all this, the Club has a record no less feeble than that of many other gliding efforts scattered about the country following the reaction from the 1930 boom.

Mr. Gordon England's final appeal was based upon a comparison between the lackadaisical attitude of a section of the British gliding movement, and the idealism of German youth at its best. He might well have given instances of German clubs which arrive so penniless at the Wasserkuppe that they have to be fed and housed gratuitously, so that they may fly their *home-built, high-performance* machines.

Mr. Gordon England's speech was a call—not to arms, but to sturdy self-support. It is to be hoped that he will repeat his words to many audiences. S. H.

QUICK RELEASE FOR AUTO-LAUNCHING AND TOWING

DEVELOPED BY THE ULSTER GLIDING CLUB.

This release was designed to be fitted to the nose of a primary machine, over the standard open hook, so that either quick release or hook could be used as desired.

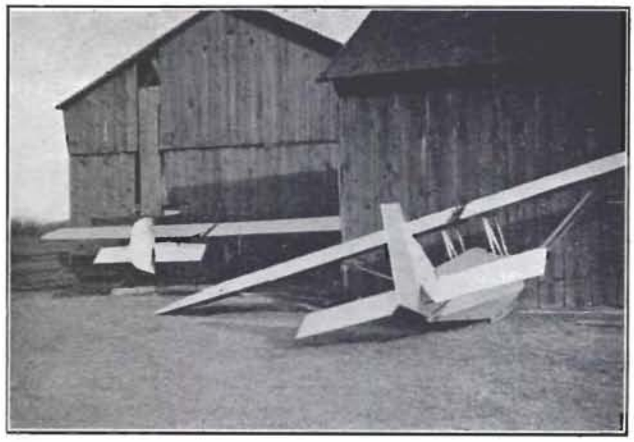
In order to obtain a light action the trigger arrangement is used, in which the action of release does not involve pulling directly against the ring which is to be released, as, for instance, is the case in the release described in THE SAILPLANE, Vol. 3, No. 2, page 19. The latter release is a neat and simple arrangement, but an examination of its action shows that the ring on the top-rope has to be pulled back through a short distance against the pull of the rope in order to release it. This means that the pull on the pilot's release cord is necessarily rather heavy.

In the arrangement shown in the drawings the ring is slipped over the trigger, the latter being retained by a catch which the pilot may trip at will by pulling the cord. The trigger is made from 1-in. x ¼-in. tool steel bar, and the catch is made up of two pieces of 16 gauge planished sheet steel bent together and welded at one end. Both trigger and catch are drilled to take short lengths of mild steel solid drawn tubing as a bearing bush, the tube being reamed out to 5-16 in., after securing into the trigger and catch by welding.

At the point where the catch holds the trigger, the pull is taken by a roller off an old ⅝-in x ⅜-in. Renold motorcycle chain. The casing for the release is of 14 gauge sheet steel, bent to size in the vice, and having an oval hole cut in the top for the catch to work in. The fixed spindles for the moving parts are of 5-16-in. steel rod. As a refinement they are drilled axially about half their length, ending in a radial hole at the middle, and an ordinary push-on nipple (threaded ¼-in.—26 t.p.i.) is screwed into the head for use with grease gun.

This release has a light action and is of adequate strength. It has also the advantage of being enclosed, which is mentioned by Wolf Hirth in his recent article in THE SAILPLANE as being a desirable feature.

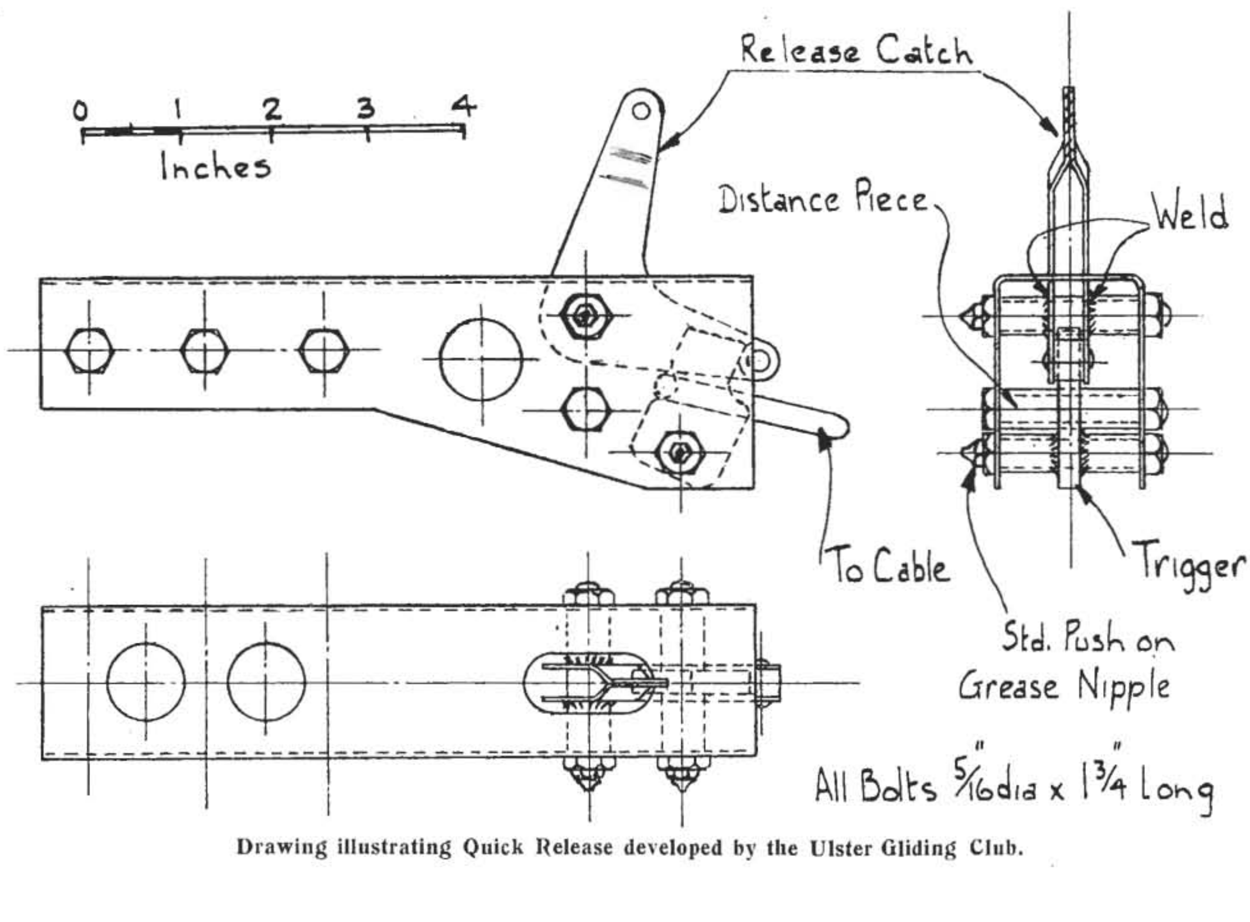
H. C. WYNNE.



Primary Trainer (background) and "Prüfling" secondary (foreground), built by the Oshawa Glider Club, Canada.

MORE NEWS FROM CANADA

I notice in "Flugsport" that you issue a periodical which is new to me, i.e., THE SAILPLANE AND GLIDER, and I should be very glad to know your subscription rate. I am one of the first pupils of Edwin Prosser, of Birmingham, having received instruction from him in 1913 on his Anzani-Caudron. Not having done any active flying since 1914, I have taken up gliding, and find it vastly interesting, having formed a Club here in 1930. We constructed a "Zögling" Trainer, and have since built a "Prüfling" after eleven months of labour (sic). We are now building a sailplane on the lines of the "Wien," and claim to be the only Club in Canada who are advancing to the real soaring stage. We have a ridge of bluffs close at hand, eight miles long, and averaging 250 feet in altitude. But, oh to be in England now, with so much gliding activity!—F. HUDSON, Oshawa, Ontario.



Drawing illustrating Quick Release developed by the Ulster Gliding Club.

NEWS FROM THE CLUBS

Mr. Dewsbery flying a "45" towards his "B" in the London Club's "Dagling."

LONDON GLIDING CLUB.

Sunday, March 6th.

Last week-end an easterly wind poured down the hill and even ground-hops in Zögling were soon stopped by a heavy landing and a broken wire.

This week-end we have been compensated. Yesterday a S.W. breeze blew obliquely up the hill. Prüfling made half a dozen prolonged glides, holding her height on the first beat and irrevocably losing it on the turn. In Dagling Stabb flew a confident "A" with 60 seconds, McClement and Collins flew a "45" with 50 and 80 seconds, and Dewsbery finished his "B" with 90 seconds.

Gibbons came over with his Pobjoy-Klemm and put up an amazing performance of dead-stick soaring, long steep climbs and tight turns.

To-day an irregular blustering wind blew straight up the hill. Once the machines had risen high above the ridge, conditions were not too rough; but lower down at times a pilot had to be either experienced or gallant to stick it out.

Dewsbery again soared Dagling so perfectly that at least two defeated "C" pilots wept with shame. He made a voluntary side-slip landing after 22¾ minutes, thus obtaining his "C." Dagling was then ignominiously condemned to beginners' ground-hops for the rest of the day, working with Zögling, to whom she was heard to say, "Well, what about *that?*"

In Prüfling Lee soared high and well for about a quarter of an hour, pulling off a hectic landing among bunkers on the top. His description of the perils helped to put his successor down without delay. After lunch Hamilton soared comfortably on a long beat; Grimstone, who has not yet taken out his "A," reached an admirable height and stayed up for 19 minutes; a few other pilots had a good run round.

Dent soared his Kassel 20 for about half an hour, but slight damage caused by a cross-wind landing was made worse when the machine took off accidentally while in tow behind a car.

Hols hovered high up, flown by Marcus Manton, and was blown back to a hill-top landing after a long soar by Bolton. Hiscox, like others, found the conditions too queer to be pleasant and called it off after a short flight.

Professor continued her monotonous career of soaring high above all, Symmons, Scott Hall and D. C. Smith taking her for long steady flights at 500 feet.

Hedges' winch worked perfectly. The club-house is overwhelmingly luxurious, thanks especially to the work of certain ladies. Gone are the care-free and inexpensive days when we ate bread and cheese behind a dandelion. Some stalwart "back-to-nature" veteran will soon have a following if he elects to start a new club based on a cow-shed perched upon a naked mountain, the be-all and end-all to be flying-time.

Another relic of a happy past is leaving us—Mr. H. S. Dixon, our ground engineer. He is succeeded by Mr. Abra, late R.A.F., but we are in mourning all the same. Dixon has been in aviation ever since he tuned up Noah's dove. We trusted his work absolutely, and he never came across a job that he could not and would not tackle. His skill, his ingenuity and his care were all perfect. These heart-felt words may sound rather like an obituary notice, but his death could not grieve us more than his retirement. We hope that his new venture will be a big success.

PORTSMOUTH AND SOUTHSEA GLIDING CLUB.

The most interesting piece of news concerning the Portsmouth and Southsea Gliding Club recently is that of the presentation to the Club of a magnificent trophy by a leaving member, Capt. R. L. Yates, of the Royal Scots Fusiliers. The trophy, which is intended for open competition, must be flown for from the Club's site on Portsdown Hill, thus ensuring inter-competitive zest and a promise of some interesting and instructive performances.

Capt. Yates, who has now left for Palestine, in his farewell address, expressed his very deep regret at having to leave the Club, and explained that in appreciation of the great sport, education and pleasure which he said he had derived from his membership, he wished to do something to help them. He pointed out that the prize can only be won by flying from Portsdown Hill, and, further, given proper support and an all-British glider, the Club's good pilots, of which, he said, it had many now, should be able to keep the trophy here against all-comers.

However, he expressed the hope that the possibility of losing it, if only for one year, would encourage all to extra effort, which would be all to the good of the Club, and, incidentally, to the good of the names of Portsmouth and Southsea throughout not only England, but all countries where gliders flew.

At the moment, the details of the rules for the contest are in the hands of the Britsh Gliding Association, and all that Capt. Yates could say was that it would be for British-designed and built gliders only. Also it was for distance, but the details would be available before long. In closing, he wished the Club the best of luck, and trusted that the trophy would never leave this district.

Trophy presented to the Portsmouth and Southsea Gliding Club by Capt. R. L. Yates.

During the short period of his association with the Portsmouth and Southsea Gliding Club, Capt. Yates has given of his best in time, skill and encouragement, of which the members are justly appreciative.

The trophy, which is illustrated here, is a copy of the famous "Mercury," by Giovanni da Bologna, and was chosen as being emblematic of gliding and soaring flight, for in his capacity of messenger of the gods, Mercury winged his way only with the aid of the winds.

* * *

Sunday, February 14th.

There was a north-easterly wind blowing and no hill flights were possible, so members made most of their time by having some auto-elastic launching and practising turning and returning to starting-point. Times as high as 36 seconds on a gently sloping field were made.

* * *

Sunday, February 21st.

The wind was again northerly and some more auto-elastic launched flights were made, this time with a new automatic release on the glider. On being tried out, this proved a great success, enabling members to gain more height than before.

Has any club in England a younger "A" than our R. E. Clear, who is just 15 years?

STAINES AND DISTRICT GLIDING CLUB.

The Club held its first Annual General Meeting on Tuesday, February 23rd, at Headquarters, when a hearty welcome was given to the new President, Major T. M. Barlow, M.Sc., F.R.Ae.S., and Vice-President, F./Lieut. C. S. Staniland.

In his presidential address, Major Barlow pointed out that in a Club such as this it was essential that all members should show the highest degree of enthusiasm. It was no good, he said, for a member to turn out to a flying meeting just when the weather happened to be fine—each member must do his (or her) bit in helping to keep the machines in condition, roping in new members and generally doing their best to push the Club on.

The President then suggested that it might be a good thing to alter the name of the Club to "The Thames Valley Gliding Club," and after a little discussion it was unanimously decided that this should be the Club's future name.

The officers and Committee of the Club were then elected —Mr. Redman, the retiring Secretary, as Chairman, Miss Mack succeeding him as Secretary. Mr. Hensby was elected Hon. Treasurer, and Mr. Enser reappointed as Captain. Mr. Redman will also act in the capacity of Ground Engineer.

It was reported by Mr. Redman that he had purchased, on behalf of the Club, an old Essex car which he considered would meet the Club's requirements in regard to towing and launching the machine, the present gliding site being particularly suited to this type of work.

OFFICIAL NOTICES

DIARY OF FORTHCOMING EVENTS.

Tuesday, March 22nd, at 6.30 p.m., in the Library of the Royal Aeronautical Society, Albemarle Street, W.1.—Council Meeting, British Gliding Association.

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Extracts from Proceedings of 33rd Council Meeting of the British Gliding Association, held at 6 p.m., on February 22nd, 1932:—

Present: Lieut.-Col. F. C. Shelmerdine, C.I.E., O.B.E. (President), P. Adorjan, J. R. Ashwell-Cooke, Lee Roy L. Brown, D. E. Culver, L. O. Kekwick, C. H. Lowe-Wylde, D. Morland, C. H. Latimer Needham, F. Pilling, A. N. Stratton, S. Whidborne (Hon. Treasurer), L. A. Wingfield and the Secretary.

Constitution of the B.G.A.—It was decided to recommend to the Annual General Meeting that the new Rules, as approved by the Registrar, be accepted.

Annual Report and Balance Sheet.—These were taken as read, and it was resolved to lay them before the Annual General Meeting.

Membership of the B.G.A.—The following were elected: Wing-Commander T. E. B. Howe, A.F.C., R.A.F., L. Heys, Esq., and P. S. Foss, Esq.

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Extracts from Proceedings of 34th Council Meeting of the British Gliding Association, held at 7.30 p.m., on February 22nd, 1932:—

Present: Lieut.-Col. F. C. Shelmerdine, C.I.E., O.B.E. (President), P. Adorjan, J. R. Ashwell-Cooke, Lee Roy L. Brown, D. E. Culver, A. F. Houlberg, S. Humphries, L. O. Kekwick, C. H. Lowe-Wylde, C. H. Latimer Needham, F. Pilling, A. G. Robertson, E. G. Sanquinetti, J. M. Symmons, S. Whidborne (Treasurer) and the Secretary.

In the absence of the Chairman, Mr. C. H. Lowe-Wylde was elected chairman of the meeting.

Election of Committees.—The following were elected:—

Technical Committee.—C. H. Latimer Needham, F. T. Hill, R. L. Howard-Flanders, E. H. Lewitt, C. H. Lowe-Wylde, W. O. Manning and J. L. Pritchard.

Finance Committee.—S. Whidborne, J. R. Ashwell-Cooke, D. E. Culver, F. Entwistle and G. R. Paling.

Contest Committee.—G. R. Paling, J. R. Ashwell-Cooke, G. Humby, H. Petre and F. Pilling.

Rules Committee.—S. Whidborne, R. L. Howard-Flanders, L. O. Kekwick, A. I. Logette, J. M. Symmons and L. A. Wingfield.

Election of Stewards.—The following were elected Stewards of the B.G.A. for the current year: The Hon. Alan Boyle, Sir Alan Cobham, R. F. Dagnall, Major Alan Goodfellow, Mr. Claude Grahame-White and Capt. A. G. Lamplugh.

Printed and Published for the British Gliding Association by Gale & Polden, Ltd., 2, Amen Corner, London, E.C.4.

BOOKS TO READ

Gliding and Sailplaning By F. Stamer and A. Lippisch.	An excellent handbook for the beginner. It represents the collective results of the writers' experiences since 1921, related in a clear and simple manner, and is admirably illustrated. 5/6 post free.
Gliding and Motorless Flight By L. Howard-Flanders and C. F. Carr.	A practical, up-to-date handbook giving expert information regarding training of pilots, organization of gliding clubs, construction and repairs, meteorology, etc.; with interesting facts regarding past achievements and pilots, and official information regarding Certificates. Second edition now ready. 8/- post free.
Henley's A.B.C. of Gliding and Sailflying By Major Victor W. Page.	A simple and practical treatise on modern Gliding. It describes the construction, launching and control of the leading types of gliders and sailplanes and gives instructions for building a strong, yet simple, primary glider, including working drawings. 11/- post free.
Gliding and Soaring By Percival White and Mat White.	Especially adapted for those with no previous knowledge of the subject, this book gives a complete review of Gliding and Soaring flight and is distinctly above the average. 13/- post free.
"Gliding" (The Year Book published by The Dorset Gliding Club.)	A valuable handbook full of useful information, and one that must make a wide appeal, both to those merely interested in Gliding and to the advanced pilot who requires more technical information. 1/9 post free.
Handbook of the British Gliding Association	A useful reference book for all persons and organizations interested in Gliding. It includes a diary, Rules and Regulations issued by the Association, a Glossary, and authoritative articles on a number of interesting subjects. 1/6 post free.

Obtainable from the British Gliding Association, 44a, Dover Street, London, W.1.