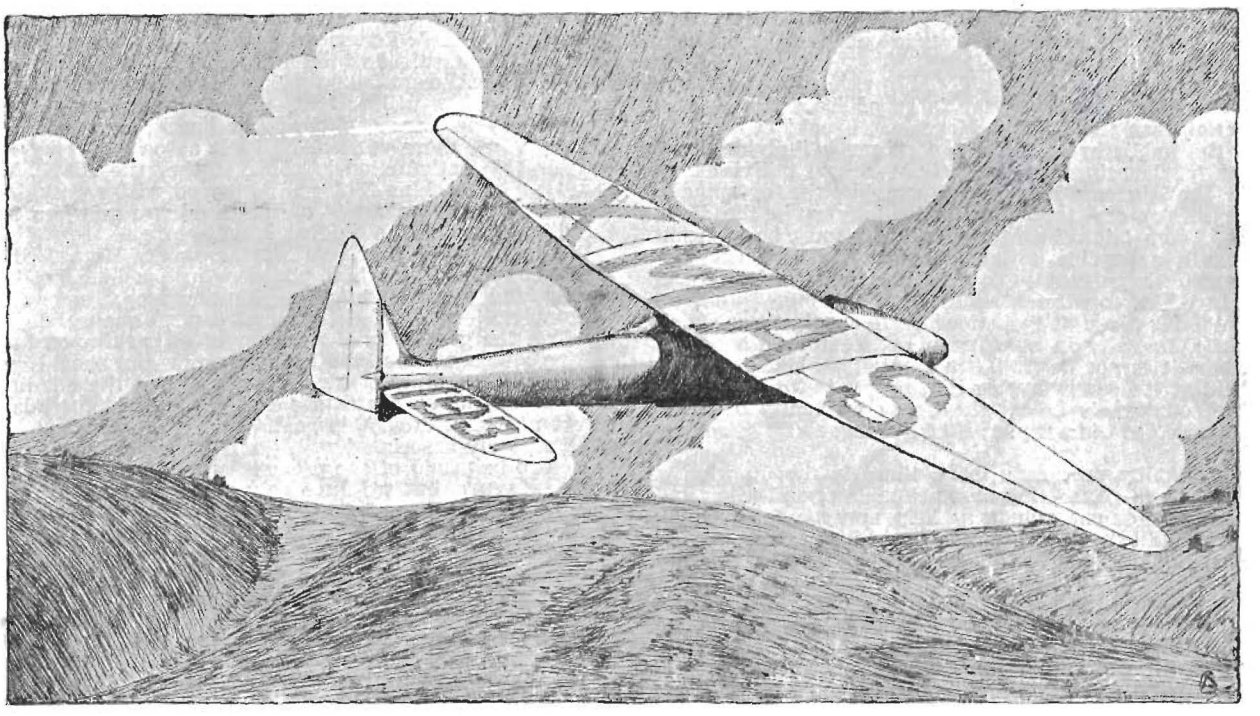
December 18, 1931 Vol. 2. No 12

THE SAILPLANE AND GLIDER

Price 6d.

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

The Season's Greetings



ON SITES AND COMPETITIONS

Recent correspondence in THE SAILPLANE, initiated by Mr. N. S. Norway, has directed attention to the importance attached to the selection of suitable soaring sites in this country, particularly in connection with meetings, such as the International Gliding Meeting held at Balsdean in October. We do not propose to enter here into a controversy regarding the merits or de-merits of the Balsdean or any other site, but the general subject is of such fundamental importance as to deserve the most careful consideration of all who have the cause of the Gliding Movement at heart.

The selection of a suitable site for gliding and soaring flight is usually attended by numerous difficulties. Several Clubs are still without really suitable sites and have to be contented with an indifferent ridge or hill and even, in some cases, to confine their activities to auto-launching from a flat field. Again—and this applies to most Clubs—the one slope available can be used only with winds from a certain direction, and even if this is the direction of the prevailing wind, many days' flying are lost in the course of the year. In not a few cases a suitable site exists in the locality but either the owner's permission to use it is not forthcoming or financial considerations stand in the way of securing it.

But the problem of finding a suitable site for an important meeting is much more complicated. First, there is the point of view put forward by Mr. Norway, which is shared by those—unhappily still in a minority—who want to soar and soar and soar. For these enthusiasts there is one, and only one consideration—that the site should be ideal as a starting point for soaring flights. It may be noted, in passing, that these conditions are not necessarily fulfilled, as Mr. Norway suggested in his first letter, by a steep precipice. Sharp discontinuities such as are associated with a steep cliff, give rise, as Mr. Culver pointed out, to dangerous eddies and do not provide the steady up-flow of air which

is an essential condition for soaring. A ridge with sloping sides is desirable although, it must be admitted, the best results are obtained with a **steep** slope and a **high** ridge.

Secondly there is the question of **wind direction** in relation to the direction of the main slope of the ridge. It may be argued that the soaring slope should face towards the direction of the prevailing wind. A site fulfilling these conditions would certainly give more flying days, on the average, than a slope facing any other direction. But, as Mr. Norway pointed out, the wind on the critical day may not blow from the desired direction. This was well illustrated in the case of the first international gliding meeting held in this country. Itford Hill was chosen for the 1922 contest because the main slope faced south-west —towards the direction of the prevailing wind, although, it may be stated in passing, the Contest Committee had been informed previously that north-east winds were at least as prevalent in that area in October, the month selected for the meeting. Actually, throughout the week, the wind blew from the north or north-east. Fortunately that portion of the South Downs provides good soaring slopes facing north and north-east, and the outstanding results on the last day of the Contest were obtained at Firle Beacon, which formed an excellent soaring site with north-east winds. It cannot be emphasised too strongly that alternative slopes, facing different directions, should be available in the locality selected for important meetings, so that the most suitable site can be selected for a particular day or days.

The next point to be considered is **publicity.** As remarked in these columns in the issue of December 4, it is essential that the Gliding Movement should be kept before the public eye. Clubs can do much individually to foster local enthusiasm in their week-end activities but it is the big meetings which provide the outstanding opportunities of stimulating public interest in the Movement. From this point of view the site must be adjacent, or readily accessible, to large populated areas. One cannot expect huge crowds to travel to some isolated spot, say, in Wales to witness a few days' soaring. But if the exhibition is given at their door, so to speak, there should be little difficulty in securing a satisfactory attendance. Further, it is not desirable that meetings should always be held at the same site but that people in different parts of the country should be given an opportunity of seeing for themselves the progress that is being made in soaring flight.

Last, but by no means least, there is the question of **finance.** A large meeting needs capable organisation and, to whatever extent voluntary help may be forthcoming, considerable expenditure of money is inevitable. As Mr. Gordon England pointed out in his reply to Mr. Norway, we are all apt to disregard this troublesome but vital aspect of the question The British Gliding Association is not yet wealthy enough to be in a position to organise a large meeting regardless of the cost or of whether the receipts will re-imburse the Association. At the present moment every penny, before it is spent, must be carefully considered. Thus the meeting must be held where an adequate return in hard cash will be ensured, not only sufficient to pay the cost of the meeting itself, but also to replenish the depleted coffers of the Association and to provide financial assistance for the Clubs taking part.

It remains, therefore, to co-ordinate these various essential requirements. The B.G.A. Contest Committee is the obvious body to shoulder the task but there is another Committee, or rather, sub-Committee, the services of which have not hitherto been utilised to the fullest possible extent. The Meteorological and Sites sub-Committee of the Technical Committee of the B.G.A. was formed to advise on these and allied problems. This sub-Committee has only met once but there is no reason why it should not assist in this all-important piece of work. The first thing to be done is to obtain particulars of all possible sites throughout the country. It is, for obvious reasons, impracticable for the members of the sub-Committee to visit all the suggested sites personally. It is suggested, therefore, that Clubs and individual members of the Association should forward to the Secretary particulars of any site or sites which they consider suitable from the points of view put forward above, together with any relevant information which they may be able to obtain. The sub-Committee should then consider these sites from their topographical and meteorological aspects and should forward a recommendation regarding selected sites to the Contest Committee. One or more of the sites could then be visited and, after the fullest possible investigation, a selection made.

If the problem were tackled on these lines, it should be possible to meet the various views which were put forward in the course of the recent correspondence on the subject. Let us repeat that each separate aspect of the question is important. A site which fulfils the necessary conditions as regards attendance of visitors and "gate" money is, to all intents and purposes, useless unless there is a good reasonable prospect of obtaining some really good soaring flights. If the latter are assured those enthusiasts to whom the sporting and technical aspects of the meeting alone appeal will not have reason to be dissatisfied.

ON LOOPING.

On Sunday, Nov. 29, as reported in our Club News columns, Mr. C. J. Longmore successfully accomplished a loop at a low altitude in a B.A.C. VII. While we congratulate Mr. Longmore on this achievement we sincerely hope that others will not try to emulate him. Mr. Longmore is an experienced pilot and he knew his machine but while he, and those with whom he is associated, may feel considerable satisfaction in the fact that the B.A.C. VII is a type of machine that can be looped with safety, it is difficult to see how stunts of this kind are going to further the cause of the Gliding Movement.

We may recall that, earlier this year, Herr Bedau, while cloud-flying in a high performance machine, got into a spin and performed an involuntary loop, fortunately without accident. The higher the performance of the machine the greater is the danger of embarking on hair-raising stunts of this kind and since our aim should ever be towards machines of higher performance, there is little to be gained by concentrating on anything which tends to divert attention from this goal.

All who are associated with the Gliding Movement have reason to be proud of the progress which has marked the last few years, but we have only to study that excellent volume, "A History of Aeronautics," by E. C. Vivian and W. Lockwood Marsh to realise how little has yet been accomplished that can be acclaimed as really new. In the description of the early experiments of Professor John J. Montgomery we find an account of stunting in a glider which took place more than twenty-five years ago. We make no apology for reproducing the story as told by Montgomery.

"On one occasion, Maloney, in trying to make a very short turn in rapid flight, pressed very hard on the stirrup which gives a screw-shape to the wings, and made a side somersault. The course of the machine was very much like one turn of a corkscrew. After this movement the machine continued on its regular course. And afterwards Wilkie, not to be outdone by Maloney, told his friends he would do the same, and in a subsequent flight made two side somersaults, one in one direction and the other in an opposite, then made a deep dive and a long glide, and, when about three hundred feet in the air, brought the aeroplane to a sudden stop and settled to the earth. After these antics I decreased the extent of the possible change in the form of wing surface, so as to allow only straight sailing or only long curves in turning."

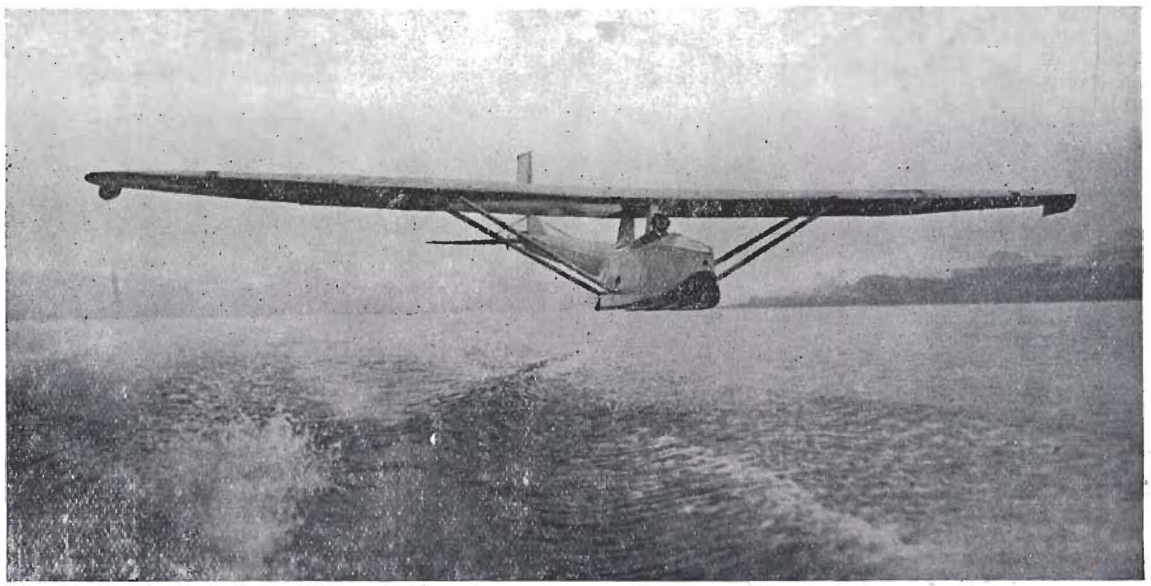
Lest we should be misunderstood, let us at once pay tribute to the design and construction of a glider that can be proved to stand the stresses imposed by the evolution known as a loop. But we do not want to see stunting developed for stunting's sake. We take off our hats to "Moloney" but we do not want any "Wilkies."

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THE B.A.C. VIII MOTORLESS FLYING BOAT

(Photographs and Drawings of the B.A.C. VIII appeared in the Nos. of THE SAILPLANE *of August 14, and November 6, 1931.)*



The B.A.C. VIII taking off from the Welsh Harp.

On Monday, Dec. 7, the B.A.C. VIII two-seater "Bat-Boat" sailplane was demonstrated before the Press and Cinema representatives on the Welsh Harp at Hendon. The sailplane was towed by a "Rytecraft" speedboat, loaned and driven by Mr. J. W. Shillan, of the Dart Motor Boat Co., Ltd.

The "Bat-Boat" was assembled in a field adjoining the lake and was launched shortly before mid-day. About twelve flights were made to enable different Press photographers to secure pictures from the towing motor-boat and from the shore. The pictures secured by them show very clearly the remarkably clean running of the "Bat-Boat" on the water at all speeds, the bow wave being hardly perceptible and spray nil. The wake left behind was smooth and rapidly died out.

The construction of the "Bat-Boat" is simple but robust. The hull consists of a three-ply skin on built-up bulkheads and frames of spruce and three-ply. A distinctive feature of the hull is the method of carrying the tail unit on a long oval section boom, built into the hull proper which terminates at the rear step, some three feet behind the rear spar.

The hull bottom is a continuous water-tight structure from the bow to the rear step, an additional skin being built on to form the main step. This additional external step forms a protection for the water-tight structure against floating driftwood or bottles, or against damage when beaching the boat. The whole of the skin is covered with linen doped on, and then painted and varnished.

The wings and tail units are standard and interchangeable with those of the B.A.C. IV, VI ad VII. Small detachable wing-tip floats are fitted to give stability when the craft is afloat without its crew, or when manœuvring in a cross-wind.

The towing attachments consist of two quick-releases, one on each side of the hull at a point immediately beneath the front spar and about 12 inches above the water line. The towing cable is spliced into a bridle, the two free ends of which terminate in steel rings which slip into the quick-release fittings.

When it is desired to drop the towing cable at the end of the run, the pilot pulls a handle placed conveniently near to hand in the cockpit, and this withdraws a pin simultaneously in each release.

This machine may be fitted with dual control, which makes it eminently suitable for training purposes.

CELLON DOPE

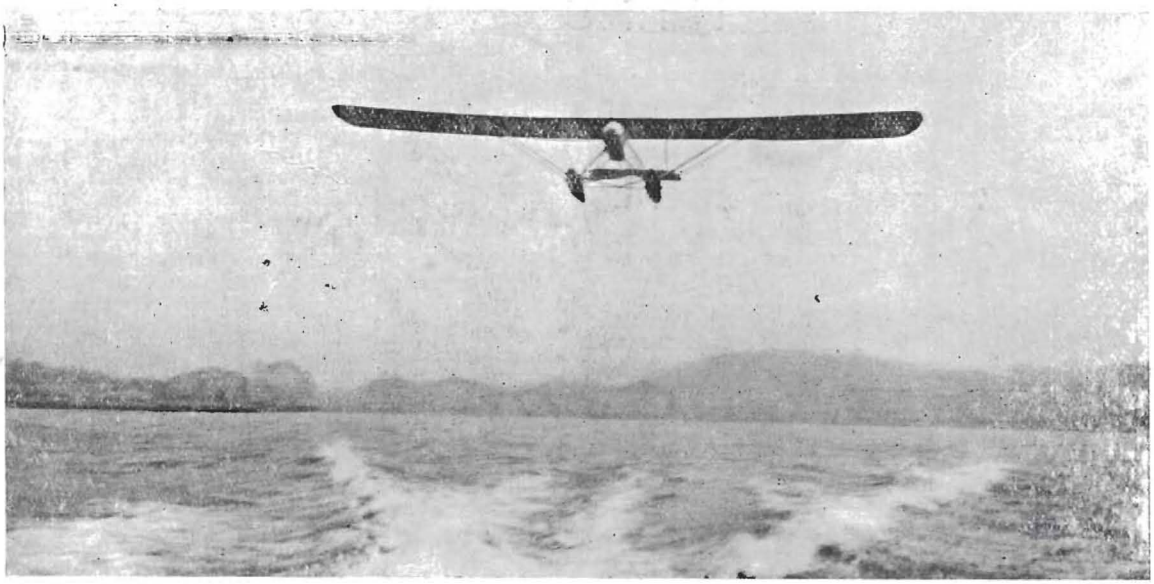
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AN ITALIAN "HYDRO-SAILPLANE"



The "Borghese Water Wing" takes to the air.

(We are indebted to the "Suppo Triestino di Volo a Vela" and the Italian newspaper, "Popolo d'Italia" for the following account of the trials of an Italian "hydro-sailplane." The article was translated by Mlle. Lippens and Lady Winifred Gore.—ED).

What is being done for gliding in Italy? An emphatic reply to this question has been given by recent activities in the Gulf of Trieste. At last we have done something good, and in doing so, we have not copied others, but have had a conception of our own, original and Italian, thus putting ourselves in the advance guard in this field of action.

For some time, a prominent topic of conversation in Trieste has been the "hydro-sailplane" designed and constructed by Cavalry Officer Negretto in collaboration with L. Pinausi of the Aeronautical Works of Monfalcone. In the course of several short trials, in spite of unfavourable atmospheric conditions, this machine has given evidence of the highest efficiency.

On Nov. 5, the perseverance of the constructor was crowned with the most glowing success. Towards 2 p.m. taking advantage of a light westerly breeze, the machine was placed on the water to undergo further trials, and proved a great attraction to a large crowd.

The glider was towed by a motor-boat lent by the well-known sportswoman Baroness de Hutterott, and, after a short run on the calm water opposite the Piazza dell 'Unita, took off in the most graceful manner, reaching, in a short time, an approximate height of 300 feet. It then began to make a soaring flight which lasted 10 minutes. At the end of this time the wind fell and the machine was obliged to descend on the sea, bringing the trials to an end.

During this brief flight, the machine proved itself to be possessed of exceptional qualities of manœuverability and stability; sufficiently so, in fact, to create confidence that at the next trials the Italian gliding record (for land gliders) would be improved upon appreciably.

The machine, named the "Borghese Water Wing" after its constructor, has a span of 60 feet and a thick wing section with tapering wing tips. The cockpit is placed in the centre under the wings. It is a two-seater machine, and has dual control. The floats are constructed of selected wood of special lightness and are covered with three layers of waterproof doped tissue. The design of the machine has been the subject of much experimental work both in the wind tunnel and at the aeronautical works and is the outcome of long study and of many trials.

The machine presents the appearance of a normal aeroplane, with the difference that in spite of its greater resistance, its weight is only a little above 450 lbs.—a matter of the highest importance for soaring. When flying, the machine resembles an enormous albatross.

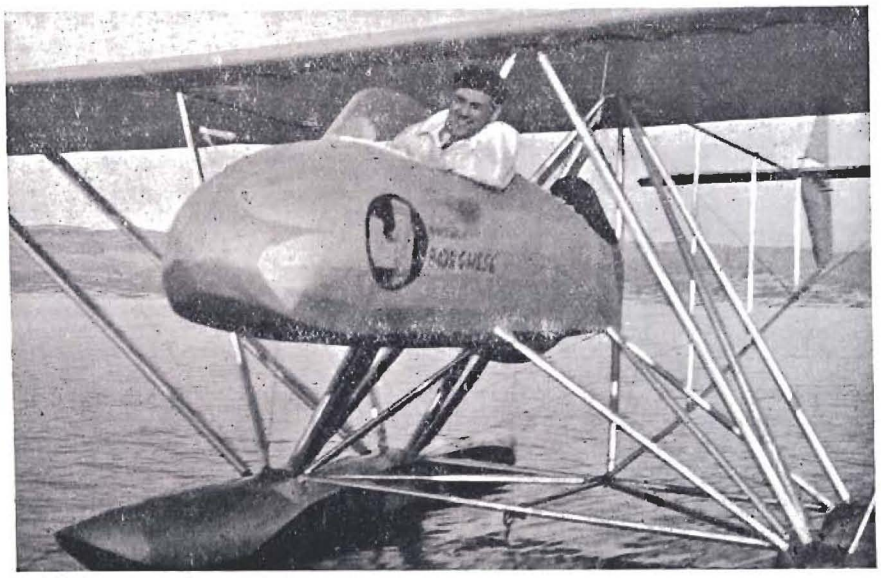
The "Borghese Water Wing" is the first machine of its kind up to the present [presumably in Italy.—ED.] and has advanced considerably the possibility of soaring. In fact, this glider could be used much more easily than land machines, for where a special landing ground and ideal atmospheric conditions are required for the latter the "hydroglider" needs only a fairly good stretch of water. Moreover it has been found that ascending currents normally occur along the sea shore. This fact should certainly prove most interesting to Italian gliding pilots, who have not shown much interest, up to the present, in what is destined to become one of the most beautiful and attractive of sports. Witness, for example, the 300 gliding clubs in Germany, the hundreds of clubs existing in U.S.A., and the large number of gliding groups created in France, England, and Russia.

Recognising the importance of instituting a flying school with the "Borghese Water Wing," some sportsmen have established the Triesteno Gliding Club in conjunction with which there will be a regular school for instructing young people and granting them flying certificates. The directors of this organisation have received the necessary support of the local authorities for the realisation of this purpose, and in the near future a larger hangar will be erected in the valley of Muggia to house the machine and others of the same kind which will be constructed.

It should be remarked that the pupils will receive instruction with great facility and safety, owing to the fact that the machine is dual-controlled. The practical lessons will be accompanied by theoretical instruction under the same rules as those which regulate gliding courses in reference to meteorological phenomena as shown in the field of aerodynamics. Furthermore, adjacent to the school will be erected also a laboratory for the training of mechanics who will specialise in the erection of the machines.

We predict that what has already been accomplished in Trieste will be copied by the sister cities of the sea. The lead which Trieste has given will, if followed, yield the best results, not only for the formation of a sane and necessary airmindedness in the masses, but also for the training of numerous pilots who will one day become, with extreme facility, pilots of power-driven machines, and who will, therefore, give their country the benefit of their experience.

In regard to this, we consider it of interest to record what the Honourable Senator Romeo said at the last sitting of the Senate—"Even to-day, not everybody believes in the influence of gliding as an effectual method of aeronautical propaganda, and for the training of pilots. We are so accustomed to flight under motor-power that we cannot reconcile ourselves to motorless flight. I have had to reconstruct my own ideas on the subject. On the occasion when I saw the most brilliant victories of Italian motors, I maintained that a course of motor-cycling was no help to successful motor-racing. I made a mistake. The practice of to-day has demonstrated that the "aces" of motor racing began with the motor-cycle, just as the captains of ships find that a knowledge of sailing is indispensable for successful navigation. Thus, the best pilots of power-driven aeroplanes will go through their training more quickly and thoroughly by first taking a course of gliding. This ascending scale seems almost necessary to a proper evolution of the difficulties encountered. This is proved by the fact that the countries which have made the most progress in aviation are the countries in which gliding has been most advanced."



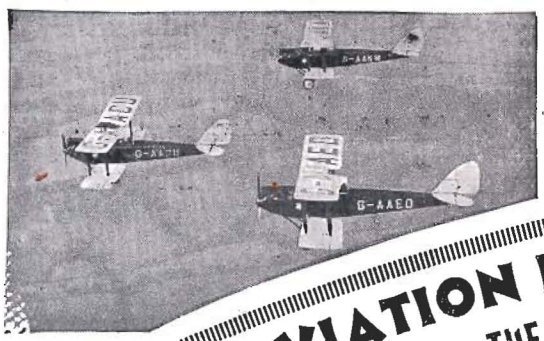
A "Close-up" of the "Borghese Water Wing"

A FEW CORRECTIONS.

In Wolf Hirth's article "One Hundred and Twenty Miles on Thermal Currents" on page 123 of the issue of THE SAILPLANE of Dec. 4, five lines from the end, for "196 miles" read "96 miles."

In the article "For Beginners Only" on page 121, left hand column, 6th line from top, for "the rudder" read "top rudder."

Also in the "News from the Clubs" on page 129 under "Bristol and District Glider Club" for "Bendip Hills" read "Mendip Hills."



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SAILPLANE FLYING—2

By "KENTIGERN."

II—LANDING

The actual landing of a high efficiency glider is similar to that of other types. That is to say, it is flown on to the ground at a low flying-speed, but by no means at the greatest angle of incidence possible. The objections to landing at a higher angle of incidence are that the glider is more likely to balloon in a gust and become stalled and also, with normal construction, the unsprung tail will hit the ground first and may be damaged.

This article will therefore deal mainly with the approach which is the more difficult part.

The usual method with a secondary glider (PRUFLING, SCUD, HOLS DER TEUFEL and the like) is to fly out of the up-current until the glider loses height and then to fly to and fro, downwind of the desired landing place, until enough height is left to do a straight glide in during which any surplus height may be lost by side-slipping. These machines usually soar in a good breeze which reduces their effective gliding angle, and can turn quickly so that the manœuvre is simple.

With a high efficiency glider whose gliding angle is better, manœuvability less and speed perhaps higher, the judging of this kind of landing is difficult. The only method is to make an approach similar to the one described above and to be well acquainted with methods of increasing the gliding angle such as side-slipping and flat turns. A high wind not only increases the gliding angle above normal but makes it possible, when flying at the normal gliding speed, to decrease the angle slightly by increasing the speed.

There are three effects near the ground which modify the distance covered in a glide: First, when landing into wind; as the glider descends, it comes into air which is being retarded by friction with the earth's surface so that the ground-speed has to be increased to keep the air-speed constant. This causes a loss of height varying with the strength of the wind and the roughness of the ground. Secondly, and conversely, when landing down wind, the air-speed tends to rise as the ground is approached so that the glide is prolonged. Normally down wind landings are made up hill when this effect helps the glider to make the rapid change of direction which is necessary. Thirdly, the drag of a wing is reduced when close to the ground so that the glider will "float."

An uphill slope makes the judgment of the landing easy. With practice, the pilot of an efficient glider develops an eye for contours and conducts a landing by flying about until he is nearly level with the top of the slope of his intended landing ground before he turns towards it.

Thus on a good hill in a good soaring wind the pilot can fly behind the top and, keeping plenty of speed for meeting unexpected eddies, land straight up the reverse slope into wind. It is often possible to make two or three tentative flights over the hill to discover conditions. Sometimes one may lose thirty or forty feet with no increase of air-speed by keeping the nose down to prevent stalling in some form of eddy.

On a smooth-topped hill, when the wind is blowing straight up it, a glider can safely be landed down wind if the wind is not strong enough to give it height to fly behind the hill. For this manœuvre, some integrity of judgment is needed to fly by air-speed and disregard the surprising ground-speed, but the principles are straightforward. The glider is flown straight towards the hill somewhat below the top. Fly with a good margin of speed until rather near the hill and pull up with a gentle sweep so that the glider flies just above the surface of the hill and touches it with full flying speed. The only difference between this type of landing and a landing on flat ground is that the rapidity and change of altitude are greater.

Normally landings should be made exactly in the direction of the wind, but sometimes, for a slightly cross wind landing, a piece of ground can be chosen which slopes towards the wind in such a way that the glider, when landing with its wings parallel to the ground, will be side-slipping enough to neutralise the cross-wind component. Otherwise it is not possible to side-slip into wind when landing with a big span without running the risk of hitting the wing tips on the ground.

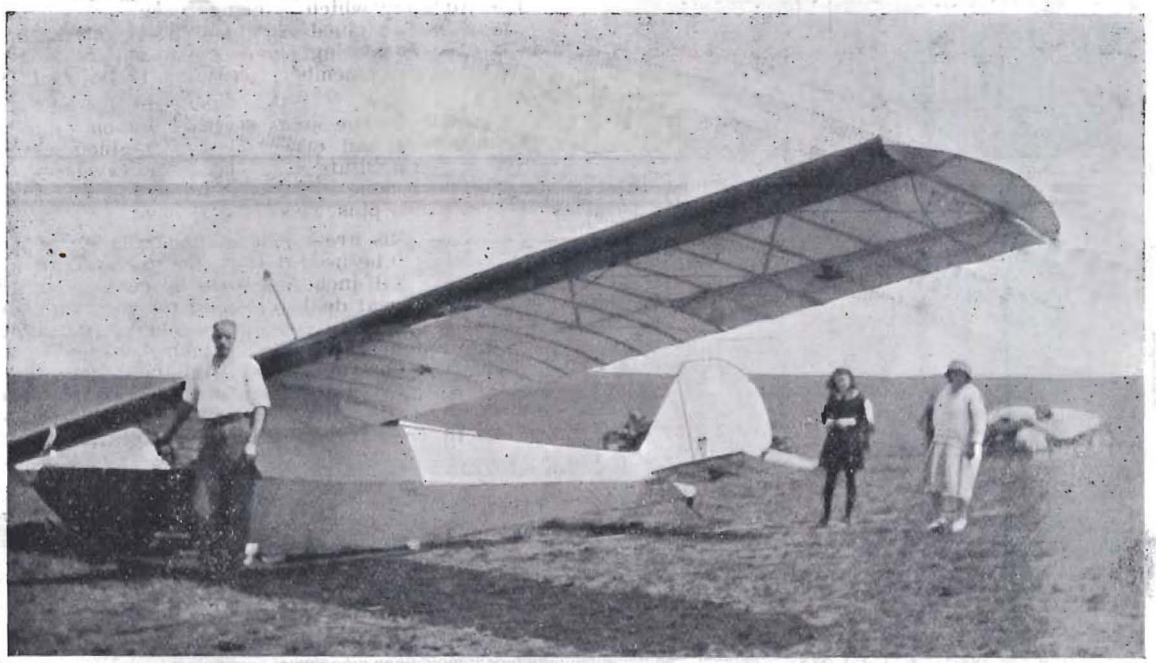
It is possible to lose some surplus speed by flying the glider gently on to the ground so that the friction of the skid slows it up; the stick is held rather forward while sliding. This should only be done when necessary as it bumps the glider more than a normal landing.

Landing is learnt quite quickly with practice and, although difficult landings sometimes occur during cross-country flights, they are, with forethought, usually easy to do.

(To be continued)

SOARING ABOVE THE SKY-SCRAPERS

News reaches us from the U.S.A. that Martin Schempp has soared for 55 minutes over Pittsburgh. Using a Haller-Hawk sailplane he was towed from the aerodrome by a power-plane, cast off at 2,300 feet and then climbed to 3,600 feet. Over the sky-scraper district Schempp found that the thermal up-currents were surprisingly strong—over 10 ft./sec. Unable to find a suitable landing place, the pilot finally came down in the Monogahela River, passing under an iron bridge. The sailplane was towed to the bank by a motor-boat.



Mr. S. W. Vine's latest machine, constructed in South Africa. Details of earlier machines appeared in "The Sailplane" of November 20, 1931.

CLUB CONSTRUCTED MACHINES

BY SEGELFLIEGER

II.—METHODS OF CONSTRUCTION.

At present there are two quite different methods of constructing gliders and sailplanes. The first is, in principle, a copy of the mthods used to construct wooden aeroplanes in this country. The second is the system devised by the large Continental firms, who make a speciality of building sailplanes, and who have had some years' experience.

The first, which we may call the **English**, as opposed to the second or **Continental** method is naturally a mere copy from aeroplane practice, and was followed because at first we knew nothing about the sport of gliding. Ii consists of gluing, the materials being held in place by permanent brass tacks. When the glue is set, the tacks ought to be doing no work at all. If, however, the glue is not properly set, the tacks do all the work, and have been found to tend to crack the materials, on account of the rough handling which the machines receive. Finally the joint comes adrift. If the joint holds, the tacks form only dead weight, a thing which is least desired in a sailplane. In the Continental method, which is described below, no permanent tacks are used.

The dead weight produced by the tacks is often thought to be of no consequence, but this is a wrong conclusion. The members of a Club recently built for themselves two wings for a primary machine. The one they built after the English fashion, and the other according to the Continental method. The difference in weight was found to be 4 lbs. Hence if the whole primary machine had been built the total differences in weight would have been as follows:—

2 Wings. difference in weight 4 lbs. each ...	8 lbs.
Fuselage: difference in weight 2 lbs.	2 lbs.
Tail Unit: difference in weight 2 lbs.	2 lbs.
Total difference in weight ...	12 lbs.

Another experiment was made with a high efficiency machine and the results were as follows:—

2 Wings (30ft. long): difference in weight 8 lbs. each	16 lbs.
Fuselage: difference in weight 7 lbs. each ...	7 lbs.
Tail Unit: difference in weight 1 lb.	1 lb.
Total difference in weight ...	24 lbs.

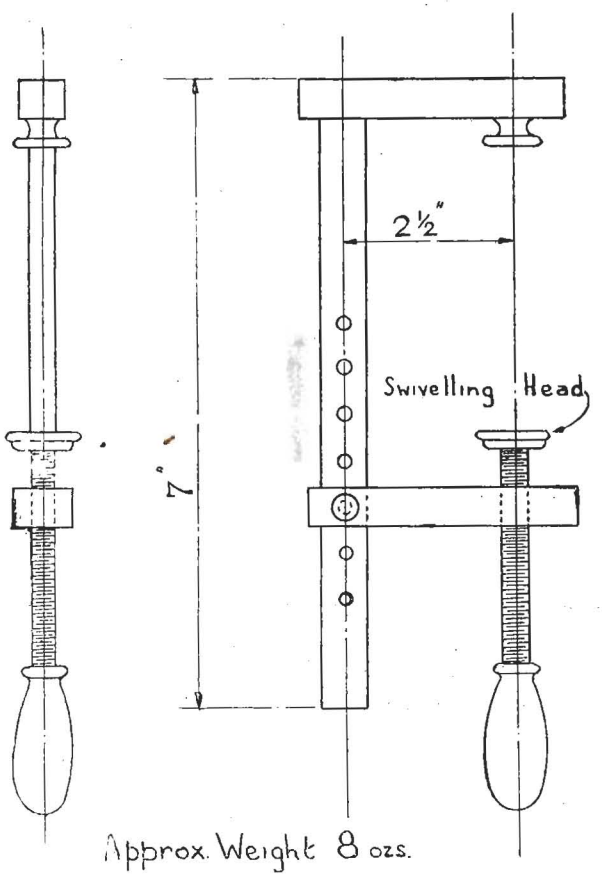


Fig. 1.—Light Cramp.

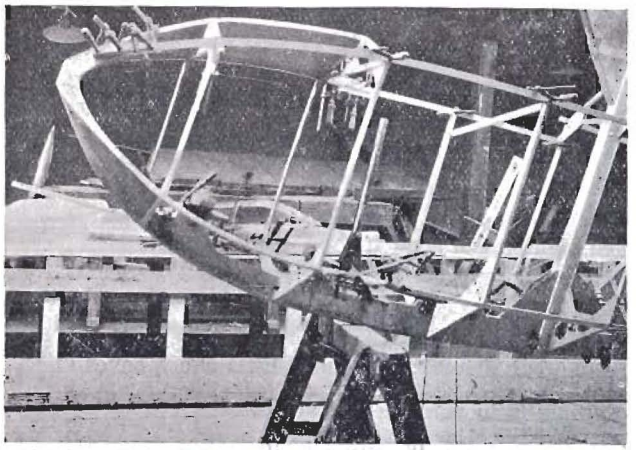


Fig. 2.—This photograph shows how the cramps are used in the building up of a fuselage of an intermediate sailplane. Note how the splice in the top left corner is packed. Also notice how 10 different joints are held in position at once.

This last experiment was made by weighing all brass tacks used, and the result goes to prove the case for the Continental argument. In addition to this, the advocates of the Continental method point out that it makes for extreme ease of repairs.

The Continental method has also many drawbacks, the greatest of which is the fact that it entails a large initial expenditure on cramps since every glued joint must be held in position during the drying of the glue, under pressure, by removable cramps or pins. This is done by: (1) sliding cramps; (2) the use of "tacking strips."

The sliding cramps used are of a special design, being as light as possible, with a maximum tightening power, easy of operation, and a good large jaw. They are now being imported by a Sheffield firm and cost about 15s. a dozen (see Fig. 1).

Any joints which are merely spliced joints are glued, and are then packed each side with odd blocks of wood and cramped up (see Fig. 2). The packing up prevents the wood from being unduly squeezed locally. Cramps are used in all possible places.

Where three-ply has to be glued to wooden beams, such as the three-ply web of the main spars, or the three-ply coverings of the leading edge, strips of old waste three-ply are cut into lengths about an inch wide, and steel pins are driven lightly into them, being spaced about an inch apart.

The three-ply which is going to be attached to the machine is then glued and held in the position required, the tacked strip being placed over and pins driven right through into the member on which the three-ply is being glued.

The effect of the strip of three-ply on top is first to distribute the load evenly over the glued portion, and secondly to facilitate the easy withdrawal of the pins. The latter is done by merely removing the tacked strip into which the pins were first driven.

The steel pins are much cheaper than the brass pins (which have to be used if they are to remain in), and are the ordinary half-inch type used by cabinet makers.

There is a great deal to be said for both methods, and I would be the last to condemn either. But it does seem that the Continental method, which was specially worked out for the construction of sailplanes, answers its purpose very well. Clubs who have adopted it in constructing machines, and above all **in the repairs to their machines**, are loud in its praise, and once having got accustomed to it are not willing to change to another method.

The main point is that any club building its own machines must have a definite method, and must stick to it, so that in the end the members become experts in construction, and turn out really good machines.

It should be added that the greater part of the more successful German clubs build most of their own machines. So much so, that the construction work is considered part of the club's activities, only to be equalled by the actual flying of the machines.

(to be continued)

TOWED FLIGHT MEASUREMENTS

By ROBERT KRONFELD

(Translated from an article in "Flugsport," November 11, 1931)

There are several advantages in auto- and aeroplane-towed flight which show it to be specially suitable for use in the further development and extension of gliding and soaring flight.

Auto-towing can be carried out on the flat ground of the average aerodrome with a minimum of two men (air pilot and car driver); it requires little effort, saves much time, is to a great extent independent of the weather, and everything is in permanent readiness.

The same is true of aeroplane-towing, which furnishes in addition the possibility of seeking out predetermined points in the aerial ocean, or of attaining some desired height; what is more, for any given flying time of the power machine, the ensuing duration of one's own flight can amount to two or three times as much even in the entire absence of up-currents.

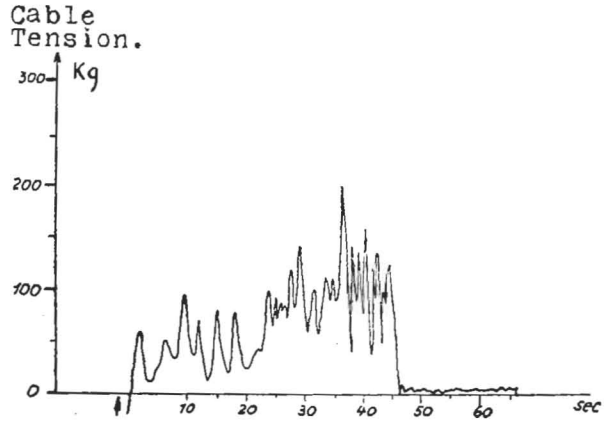
The combination of both kinds of towed flight allows of the possibility of the best flying training, the quality of which, as with other methods of instruction, depends primarily upon the instructor's conscientiousness and upon the way the teaching is planned.

Aeroplane-towing, which enjoys ever-increasing favour in Germany, was developed by Raab, Katzenstein, Espenlaub and Fieseler in the first place as a stunt for flying meetings, and by the R.R.G. for meteorological research as well as more recently for flying training (e.g., the towed-flight course in Darmstadt); also by the Darmstadt Academic Flying Group as a sport for expert soaring pilots.

Auto-towing was studied firstly by Wolf Hirth in America, and by the writer in England, and its significance fully recognised. In Germany it has been promoted and taught, as in Hirth's auto-towing courses at Grunau and my own auto- and aeroplane-towing instructional work and demonstrations in Munster, Essen, Brunswick and Augsburg. Various clubs which lack hilly ground, or are too far away from it, have undertaken trials; some were successful, but others highly risky and involving serious accidents.

Now, up to the present one has been quite unable to get a clear view of the dangers involved, as no kind of basis has been available in the way of technical measurements. Realising this, I have for some time past been carrying out systematic investigations into auto and aeroplane-towed flight and the forces thereby involved, in co-operation with the Aeronautical Institute of the Brunswick Technical School and the German Commercial Flying School.

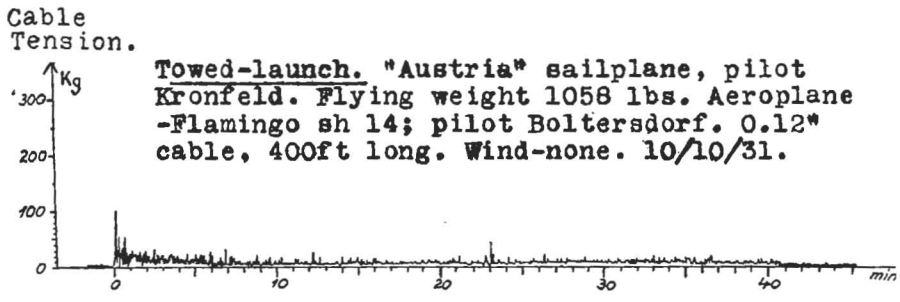
The forces set up in the towed aircraft and the towing vehicle were measured. Measurements were made with high-performance sailplanes with all-up weights of 480, 350, 280 and 240 kg., as well as with a school glider of 160 kg. flying weight. The launch on the skid and on wheels was investigated, both in the central position and in normal flying attitude. The differences between the forces set up in calm, light, gusty and very turbulent winds were established and the suitability of various towing cars tried out. The differing features of a launch from dry and wet ground, with their accompanying risks, were investigated; and, by the application of suitable spring devices to the towing rope, various modes of applying and slackening-off of the forces involved could be studied. Especially important in this connection is the design of the casting-off mechanism, which must function readily in every position, and must also be arranged to allow of the necessary measurements being made during flight. Experiences were gathered as to the disposition of the measuring apparatus.



Force-time curves of an Auto-launch.

As an example of the abundant material collected, the force-time curves of an auto-launch and an aeroplane-towed flight are shown in the accompanying diagrams. In both cases the launch was on wheels. For the casting-off during the trials, an easily adjustable "floating" mechanism was found specially useful; it could be applied to the aeroplane as well as the car, and to suit any desired position of the cable.

The results obtained from all these researches will be the subject matter of a special publication. Therein it will be shown how the progress of aviation can be served by the undeniable advantages of this method, in spite of the dangerous forces which can be set up by improper procedure, a feature common to all branches of aviation and not confined to auto-towing. A special section will be devoted to experiences of interest as regards the instructional side, which were collected at the same time. Of significance in this connection is the question of the suitability of auto and aeroplane-towed flight for the preliminary training of power pilots and the lowering of its cost, for a launch with an undercarriage and on an aerodrome reproduces almost similar conditions to those of power flying.



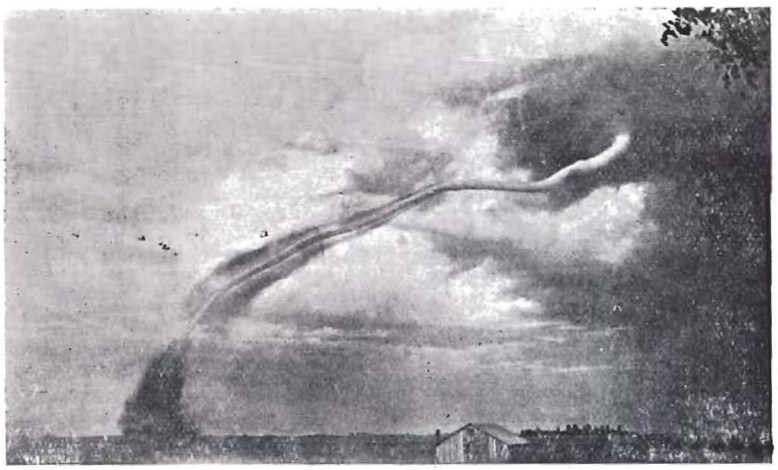
Force-time Curves of an Aeroplane-towed flight.

A LECTURE ON CLOUDS

On Nov. 23, Sir Gilbert Walker, C.S.I., F.R.S., gave a lecture on "**Clouds**" to the Imperial College Gliding Club. The occasion was a joint meeting with the British Gliding Association and the London Gliding Club. Air-Com. J. A. Chamier, C.B., was in the Chair.

Sir Gilbert Walker commenced his lecture by referring to the various sub-divisions of clouds and showed lantern slides illustrating the more commonly occurring types. These included the high altitude **cirro-stratus** cloud which is formed of ice particles and appears as a thin semi-transparent sheet, often covering a considerable part of the sky; **alto-stratus** cloud which is semi-transparent, though not to so great an extent as cirro-stratus, and which is sometimes seen split up in long parallel rolls; the low **stratus** cloud which consists of unbroken sheets and is very ragged and misty at the edges; and **strato-cumulus** which appears as long rolls of cloud and is sometimes broken up at right-angles to the main rolls. **Cumulus** clouds, which are characteristic of warm summer afternoons, indicate, in particular, good conditions for soaring flight.

After referring to the structure of the **cyclone** and the principal cloud formations associated with the different parts of it, the lecturer went on to speak of **thunder clouds** which may be recognised as developing from cumulus clouds by the evidence of streams of upward and outward-spreading currents of air.



Tornado near Jasper, Minnesota, U.S.A.
—By courtesy of the "Illustrated London News."

The upward-moving currents ultimately reach an "inversion" (that is, a region of relatively warm air overlying the cold air) beyond which they cannot pass; they therefore flatten out and form what is known as an "anvil." Under the anvil there are very powerful upward currents. Sir Gilbert suggested that the violence of

(*Continued on page* 140)

TOWING MECHANISM DEVELOPED BY THE AKAFLIEG DARMSTADT

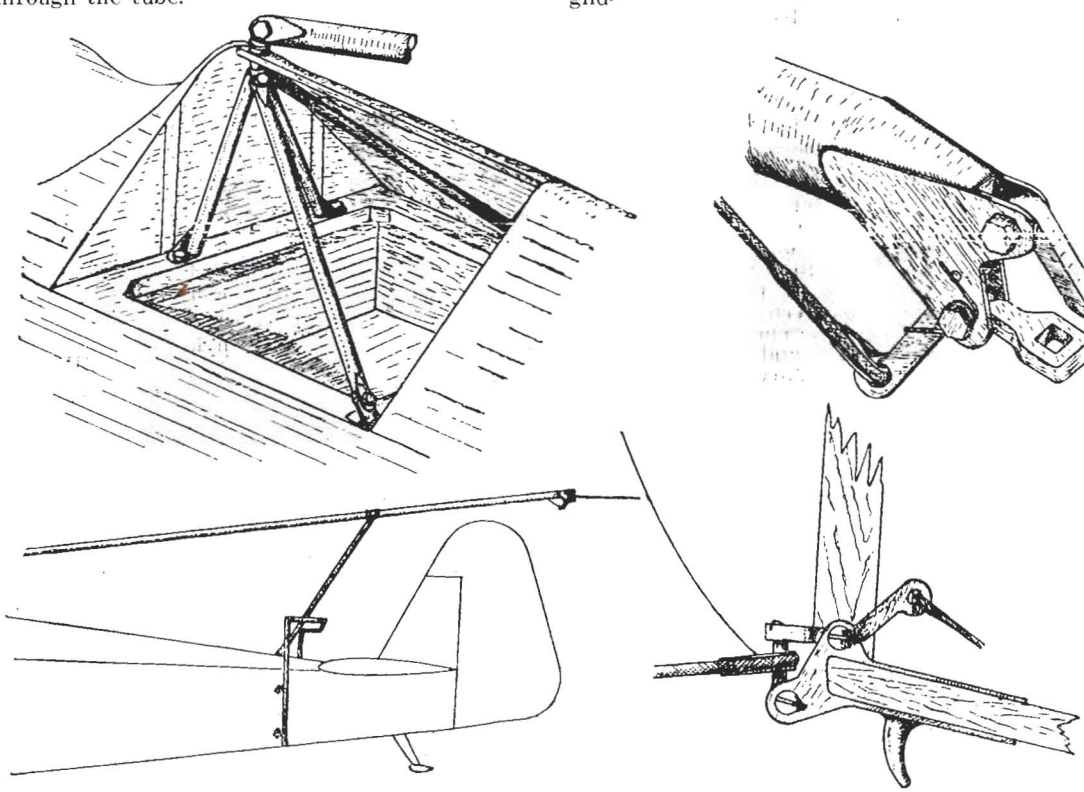
(The following illustrations and details of the towing mechanism developed by the Akaflieg Darmstadt are taken from "Flugsport" No. 24, of November 25, 1931)

Left, above: Attachment frame in the luggage compartment of the Klemm L26Va. The foremost strut is easily removed and the luggage space is then available to its full extent.

Right, above: Release mechanism at the end of the light metal tube fixed above the power machine. The release is effected from the pilot's seat by means of a wire running through the tube.

Left, below: Telescopic strut and supporting frame at the end of the fuselage. The telescopic strut is attached to the fuselage and to the metal tube by a hinge joint. This light supporting frame is secured to the fittings provided for holding the wings during transport; it can be removed by taking out two screws only, and can be stowed comfortably in the luggage space.

Right, below: Fixture of the release mechanism on the glide



these currents can be judged by the size of the hailstones formed in them. Particularly large hailstones, up to 3 inches in diameter, were formed in Central Europe and it has been estimated that, in order to support such a stone, vertical currents of at least 60 m.p.h. are necessary. It is evident that prudent aviators should avoid fully-developed thunderstorms!

Thunderstorms frequently form along the "cold front" of a cyclone which, when well developed, is indicated by a long roll of black cloud, somtimes many miles long, and strong winds sweeping along the ground. These conditions have been utilised successfully for soaring flight.

Another "cold front" phenomenon is the **tornado** which is rarely experienced in this country but is very common in America. The sky near a tornado is marked by tremendous turbulence. From the main cloud a long, black, swaying, tubular cloud projects and occasionally reaches the ground. The path of this cloud is marked by a well-defined track of destruction, about 250 yards wide. The path is so well defined that houses may be cut in two, one half being demolished while the other half is left undamaged. Objects may be carried 10 miles through the air.

Sir Gilbert concluded his lecture with a brief description of research work which he had carried out at the Imperial College with Mr. Phillips, a student, on the formation of certain cloud types artificially.

CORRESPONDENCE.

Home-Made Air-Speed Indicator.

Sir,—In your issue for November 20, you ask, on behalf of a reader, for information on how to construct an air-speed indicator.

Two home-made air-speed indicators are described in "Gliding and Sailplaning,"* by Stamer and Lippisch. An indicator of the type fitted as standard to Moth biplanes ought to be easily constructed. Of course it would have to be made of lighter gauge wire so as to be made more sensitive. Revolving cups, or a model propellor, can also be mounted on the driving spindle of a car or motor-cycle speedometer head.

D. HISCOX.

Another Point for a Beginner.

Sir,—The treatment by "A Beginner" of the case of a glider stalled while banking is so exhaustive that I hesitate to suggest another factor in the situation which even he hasn't mentioned, and that is, that the wind blows faster at increasing heights. This produces a strong overturning tendency in a glider which is banked away from the wind (i.e., with its windward wing uppermost) when near the ground. Consequently I should have thought the best thing to do is to slam on, not bottom, but top rudder, to try to get back into wind and so reduce this overturning tendency.

The experienced pilot to whom he refers has, when I have seen him, done his turns **into** wind, with the windward wing scraping the ground. The increasing-wind-with-height law then operates to reduce his bank, not to increase it. On three occasions I have seen the leeward wing hit the ground when a glider has been turned slightly off-wind, and each time the rest of the glider has been at once lifted by the wind and caused to do a "Cartwheel," during which the nose, and then the opposite wing, have hit the ground forcibly with loud splintering noises.—A. E. SLATER.

* Obtainable from the B.G.A., 44a Dover Street, W.1., price 5s. 6d. post free.

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A Year's Subscription to

"THE SAILPLANE"

NEWS FROM THE CLUBS

(Club News will always be welcome, but owing to the limited space available, contributions should be confined to items of outstanding interest and irrelevant matter should be excluded. News items should reach the Editor not later than the first post on the Monday preceding the date of publication.)

SOUTHERN COUNTIES SOARING CLUB.

Mr. Yorke Bramble obtained his "A" certificate on Sunday, Nov. 29. On the same day Mr. C. J. Longmore looped the B.A.C. VII at a low altitude. He was towed off by the Bentley driven by Mrs. S. M. Green and, on reaching a height of 400 feet, released the towing cable, turned towards the valley on his right-hand and put the machine into a steep dive for approximately 200 feet, in which time he reached a speed of about 100 m.p.h. He then performed the loop and straightened out at about 50 feet above the height at which he came out of the dive.

Sunday, December 13, 1931.

In a negligible wind of about 3 mi./hr., the TWIN succeeded in soaring for 52 seconds. From the launch it was turned along the ridge, holding its height for 200-300 yards until getting out of the limited and feeble up-current.

Further flying was prevented by trouble with the Trojan but three new members were given their initial flights with promising results.

THE ACCRINGTON AND DISTRICT GLIDING CLUB.

This Club has been in existence for about a year and has taken ten "A" and one "B" certificates. The longest duration flight is one of 6 minutes, made in a B.A.C. III presented to the Club by its President, Mr. Sharples.

As the ground does not possess a long slope all tuition is given on the level and members are then launched from the side of a steep hill for their qualifying flights.

In place of a launching crew we use a Rover 8 engine mounted on skids with a cable drum attached to the drive. Reverse gear enables us to stretch two ropes to double extension and a safety rope, coupled to the ends of the elastic ropes and to a peg driven in the ground, prevents any danger to the pilot in the case of mechanical failure. The engine is also used for transporting the glider to the site selected.—J.M.B.

CENTRAL SCOTLAND AIR YACHTING CLUB.

During the past fortnight much activity has been shown in the Stirling Club. They have acquired a flat in the Stirling Ice Company's building at Old Bridge, Stirling, and have equipped this as a very efficient constructional workshop.

The floor space is approximately sixty-eight by forty-eight feet, giving ample accommodation for four fully-rigged machines. Electric lighting has been installed and suitable benches for the building of wings, etc., have been erected.

A general meeting of the Members was held at the new quarters on the evening of Nov. 25, when the constructional programme for the winter was arranged. This includes the building of an additional primary machine, a dual-control sailplane trailer, field bogey, "mock-up" and model aircraft.—J.W.G.

BRADFORD AND DISTRICT GLIDING CLUB.

On Saturday, Nov. 21, the Club DIXON was flown on Baildon Moor. Several new members were given primary instruction at the bottom of the hill after which the more advanced people practised "S" turns from the top. The following day the REYNARD was taken to Wharfedale and rigged. Mr. Verity took off from the hill top, with a slight tail wind. The machine beat all speed records down the hill and eventually vanished in the gathering fog. After waiting anxiously for sounds reminiscent of someone crushing a match-box, a cheerful hail floated out of the fog; all was well.

Sunday, Nov. 19 saw us in Wharfedale again. As there was no wind to speak of the opportunity was taken to give the new members primary instruction. Our second lady member was given her first flips, with promising results. Twenty-three launches were made in two hours by a crew of 13, including instructor and pilot.—J.W.S.

(*Continued on page* 141)

BOOK REVIEWS

"THE AIR ANNUAL, 1931—1932."

(Gale and Polden, Ltd., Aldershot, 21s. net.)

To attempt to give in one volume not only a complete review of the British Aircraft Movement, but also an indication of its purpose and position within the Empire, calls for a careful arrangement of the information at hand, since there is no space for side issues if the main purpose is to be adequately covered. In "The Air Annual" this difficulty has been fully appraised, each section being written by an expert so that the pages are used to their best value.

Our immediate interest centres in Capt. Needham's article, a concise history of Gliding and a statement of its possibilities, which is useful reading for all enthusiasts and will crystallise their thoughts on the Movement. It is a pity that no illustrations of the several British sailplanes are inserted in this section.

An excellent comparison of modern transport methods is given in the first chapter and this makes clear the interdependence of the old systems with the new air travel. The article on the "Progress of Light Aeroplanes" gives an opinion which is close to the spirit of Gliding, in the statement that "the basic idea of the inexpensive and cheap to run light aeroplane has rather been lost sight of." This will be welcomed by those who realise that through such an avenue will the Gliding Movement take its true place in Aviation.

Again, in Major Turner's review of "Flying Club Progress" comes the questioning of the craze for high performance in light aeroplanes, while the section on "Structural Strength" deals with an underrated and re-assuring aspect of British design. A useful account of the stalling and spinning of aircraft is found under the heading "Safety and Control" and this should be studied by all glider pilots, as the full understanding of these characteristics of flying would do much to eliminate their dangers.

The arrangement of illustrations throughout the book could be improved by better grouping and setting in chapters which refer to the various types, but apart from this small matter the treatment and scope of subjects are well handled. The book is worthy of a place in the libraries of all Gliding enthusiasts as there are chapters which are invaluable to the budding pilot. The wide and expert experience gathered under its covers gives just that correct perspective of British Aviation which the Club Member requires.—F.P.

THE LONDON GLIDING CLUB HANDBOOK

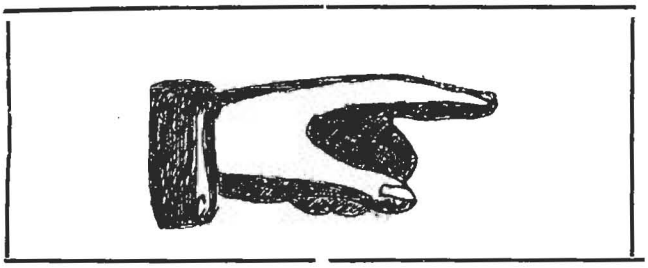
Once a Club is well established and flourishing there is no surer way of attracting new members than by publishing an effective handbook setting out its activities and the various ways in which it caters for its supporters. The handbook of the London Gliding Club should go a long way towards increasing the Club's membership. The subject matter has been well chosen and is admirably arranged; at the same time the book has not been overburdened with information. From a short account of the Club's formation and progress, the reader passes on to some useful information regarding what it will cost him to glide, followed by reasons why he should take up gliding and, finally, he finds an interesting description of how he would climb the ladder from an "A," through a "B," to a "C" certificate, emerging as a fully-fledged soaring pilot.

As a production the handbook would be difficult to beat. It is exceptionally well printed and includes nine excellent illustrations.

THE NORTH KENT GLIDING CLUB HANDBOOK.

The North Kent Gliding Club is to be congratulated on its Official Handbook which is attractively designed and printed. The booklet contains a foreword by The Master of Sempill, and messages from Mr. Gordon England and Mr. Lowe Wylde. The contents show that the Club is being run with vigour and enterprise, even if it still appears to be under-financed. The publication of this handbook will no doubt tend to correct any error in that direction if the members appreciate the valuable hints contained in the messages of Mr. England and Mr. Lowe Wylde. The concise articles and information are well calculated to give the ab initio enquirer into gliding just that information that he requires before joining the Club.

S.W.



A "SAILPLANE" COMPETITION

Commencing January 1, 1932, a year's subscription to THE SAILPLANE will be presented for the best photograph received during any one month, illustrating any feature of the Gliding Movement such as the activities of Clubs, etc.

Photographs, which must be original, should be addressed, "The Editor of THE SAILPLANE, British Gliding Association, 44a Dover Street, London, W.1." Envelopes should be marked "Competition" in the top left-hand corner. The competitor's name and address, and Club (if any) should be written on the back of the photograph. Descriptive matter, which should be brief, should be written on the back of the photograph or on a separate sheet of paper.

The Editor reserves the right to publish any photograph submitted whether a winning photograph or otherwise. The Editor's decision on all matters will be final.

Advance Notice.

GLIDER AND SAILPLANE CONSTRUCTION

By C. H. LOWE WYLDE.

Mr. Lowe Wylde's field of fire grows wider and wider. He is now writing a book. He has taken as his text his new machine, the B.A.C. IX, which he is marketing on the easiest possible terms, preferring to supply the clubs with the component parts rather than with the finished sailplane.

The first part of the book is of general interest to any amateur constructor. It covers the use and care of tools; wood and metal joints; all materials; methods of alignment and assembly; and a mass of useful data, such as metric and English conversion tables, and sizes, strengths and weights of many components.

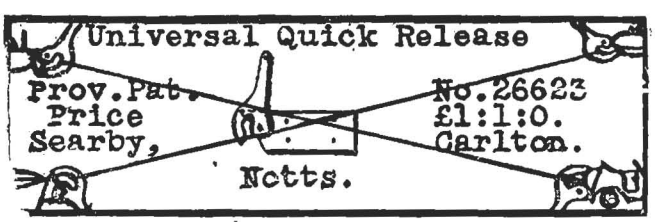
The second half professedly applies to the building of the B.A.C. IX. But, even so, a large proportion of it is still of general interest. For instance, it will be edifying to see what defence Mr. Lowe Wylde puts up for a cantilever wing in a machine which is intended for ordinary handling on the ground by ordinary unimaginative Club members.

The whole lay-out of the machine is ingenious, simple and rugged, and he explains everything, including the differential ailerons and the graded elevator control. Plywood covering is used throughout. The total number of parts is kept to a rigid minimum, with interchangeability wherever possible.

It is obvious that every genuine gliding man must read the book, however learned he may be. It is bound to appear soon; Mr. Lowe Wylde never hangs fire. We hope that he will also make time to try the machine out on a good site, showing what it will do under all reasonable conditions. So far, his one public demonstration was made difficult and obscure, though all the more gallant, by dense fog.—S.H.

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LONDON GLIDING CLUB.

After a long spell of fog, foul winds and rain, only relieved by auto-launching, we have had a sunny day with a S.W. breeze blowing obliquely up the hill.

DAGLING.—Hedges obtained a generous "A" on his first flight from the hill-top; 90° right and 180° left, 44 secs. Smith, who comes by road from Derby, just missed his "B" through no fault of his own; he flew a perfect course but found no lift. Many "B" pilots had a refresher flight, and admitted afterwards that they needed it. In some cases the need was self-evident.

PRUFLING.—Several "B" pilots were given their first flight from the top in this machine. Among them Doctor Slater was outstanding, with a perfectly-judged and Zeppelin-like flight which finished in a remote valley. Another first flight was given some emotion by the right pedal fouling a patch inside the nose of the machine. The pilot cavorted round the sky, started on several absent-minded loops, missed various obstacles, and landed intact at the appointed spot. Other more experienced pilots flew without incident.

HOLS DER TEUFEL.—The owners repeatedly used this machine. Owing to its low minimum speed, its drift in the beam wind was occasionally amazing. Bolton made a stout effort to soar, but failed to reach the up-currents in the projecting Bowl at the northern end of the ridge.

Cloudcraft PHANTOM.—Michelson soared her slowly along the lip of the ridge and round the Bowl, nearly touching his shadow all the way. He then lost height in turning, and on the way back brushed the hill-side. The port wing-tip was badly distorted, but he managed to lift her round and out, and landed normally. This was the only casualty of the day.

KASSEL 20.—It seems almost fantastic that, when the pound was worth twenty shillings, this machine only cost £50 at works. One of our best pilots soared her for half-an-hour in spite of the awkward wind-direction. He reported that she is extraordinarily sweet on the controls, is an ideal machine for intermediate training, and in performance lies two-thirds of the way from PRUFLING toward PROFESSOR. One of the owners made a dignified descent with handsome turns and landing.

The whole of the credit for putting through so much work on a short winter's day belongs to the instructor in charge, who did not award himself a single flight. An equally public-spirited party worked on the inside of the club house all day and half the night. Their brick fireplace is positively Elizabethan.

Sunday, December 13, 1931.

Steady breeze, S.W., i.e., again blowing obliquely up the hill, resulting in 4 "B's" and 3 ab initio "C's," the latter fulfilling a prophecy in a recent letter published in THE SAILPLANE. Five machines used as last week, with PROFESSOR substituted for PHANTOM.

On Saturday, Hedges flew a "45" towards his "B," and painted in the clubhouse until midnight; on Sunday he continued painting and also finished off his "B," incorporating therein a 360° turn. Smith, of Derby, finished off his "B" equally conscientiously. Both these members are ab initio. Other "B's" were finished by Desoutter in DAGLING and by Grimstone in PRUFLING, Grimstone landing on top of the ridge after dark.

Humphries flew an unintended "C" of eleven minutes in PRUFLING; Hiscox used his HOLS for a 6½-minute "C"; Lee gave his "C" in PRUFLING, 13 minutes. These three members are ab initio.

D. F. Dent soared his KASSEL 20 for half an hour, methodically testing its behaviour. Marcus Manton soared the machine twice, putting it through some deliberately tight turns. Buxton soared it once, landing it downwind precisely at the launching-point on the hill-top, having worked off surplus height by a down-wind side-slip. Flights like this stimulate the general standard.

Symmonds and Moreland soared PROFESSOR indefinitely, and Manton and our other Smith gave HOLS a good run.

Practically all the soaring flights during the day were ended deliberately. One of the new "C" pilots simply thought that he had had quite enough and descended by pushing the air-speed indicator off the clock, after resisting the almost overwhelming temptation to land on the top 150 feet below. In other words, considering the direction and mildness of the wind, the conditions were amazingly good. Probably the reason lay in the wind's abnormal steadiness, which enabled a pilot to beat up and down an exact course with his mind undisturbed by bumps and consequent emotion.

One sympathises deeply with at least four experienced members who were prevented by early darkness from having a cut at their "C."

Graham Manton called on us. In June he was practising for his "A." He has since joined the R.A.F. and has now finished with the Avro Lynx after 86 hours flying, thus showing the difference between gliding at one's own expense and power-flying under Government auspices.

S.H.

OFFICIAL NOTICES

DIARY OF FORTHCOMING EVENTS

Monday, Dec. 21, at 6.30 p.m.—Council Meeting, British Gliding Association.

THE IMPERIAL COLLEGE GLIDING CLUB.

The following Lectures will be held jointly with The British Gliding Association, in Room 15, The City and Guilds (Eng.) College, Exhibition Road, South Kensington, at 6 o'clock. Visitors will be welcome.

Thursday, Jan. 28.—Mr. C. H. Barnes, "Indoor Flying Models." Chairman—Professor F. T. Hill. (Joint Lecture with T.M.A.C.).

Wednesday, Feb. 10.—Mr. F. Entwistle, B.Sc., "Some Aspects of Meteorology in Relation to Gliding and Soaring Flight." Chairman—Col. H. T. Tizard, C.B. (Joint Lecture with City and Guilds Engineering Soc.).

Monday, Feb. 29.—Mr. C. H. Jackson, "Flying Boats on Commercial Air Routes." Chairman—Capt. G. T. R. Hill.

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