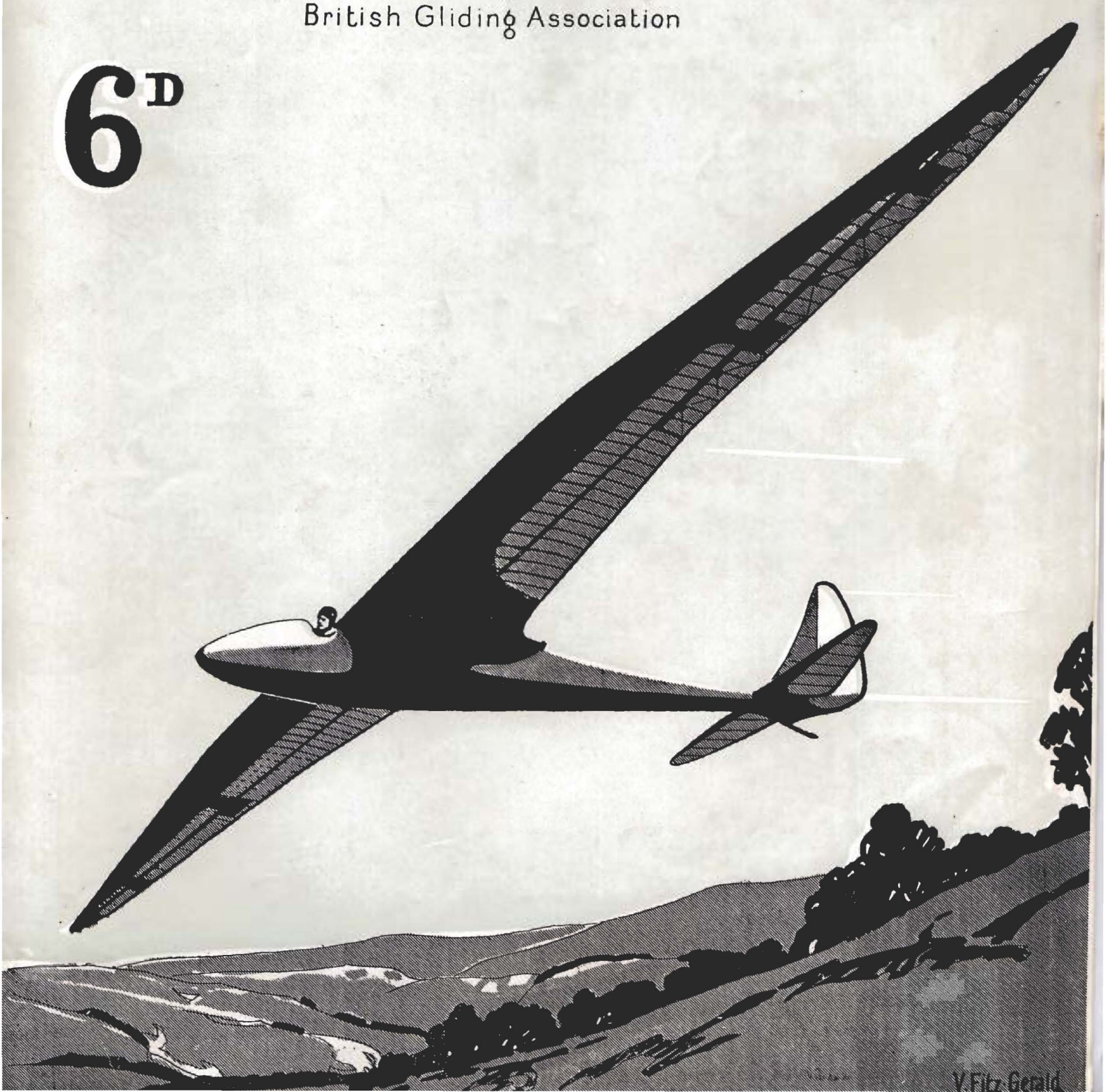
February 17th, 1933. Vol. 4, No. 3.

THE SAILPLANE & GLIDER

Official Organ of the
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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The Offices of the SAILPLANE *viewed from the historic XVIIth Century gateway of Lincoln's Inn.*

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EDITORIAL COMMENTS

Rhön Prospects.

We publish on another page the provisional regulations governing the forthcoming International Soaring Meeting at the Rhön in August. The particulars of the actual events make interesting reading, as they give some idea of what will be expected of the British team and which of various hypothetical combinations of pilots and machines would have the best chance of winning some of the prizes.

There are, of course, prizes for distance and for height, and in both cases it is, for the most part, sheer soaring skill that matters—that elusive something which some men have and some not, be their piloting never so perfect. That is why the precise individual composition of the team is a matter of such importance. The whole of Germany and Austria combined, with all their thousands of glider pilots, have produced barely half a dozen outstanding soaring experts. With the total of British gliding certificates, even the "A's," at less than 400, it is not to be expected that even by next August there will be whole coveys of pilots to choose from, if the British team is to get away with any of the prizes for height or distance, especially the latter.

The pilots who ought to go to the Rhön must be got there somehow. The B.G.A.'s financial contribution will get the machines there and pay their entry fees and so on, but there won't be much left over. We hear the B.G.A. are asking for volunteers to join the contingent and pay their own expenses. Probably enough willing hands will roll up (it will be a disgrace if they don't). But it is the pilots we are worrying about. If for any reason the right men seem unlikely to be able to go, then desperate efforts must be made to see that they do.

Out for Duration.

The duration contests are in rather a different category. Except when the wind is so light that it can scarcely keep a glider up, the ability to pile up a good duration total depends not so much an unusual soaring skill as on

stamina of the pilot or pilots and good ground-organisation on the part of the rest of the team. Especially the ground organisation. Off into the air at cock-crow; later, when the pilot lands, rush him back to the starting point, re-fuel him and push him off again into the blue. Or have another pilot all keyed up, fresh as a daisy, ready to step into the vacant cockpit.

Incidentally, soaring on the south slope of the Wasserkuppe is apt to be a tricky business, owing to its short extent and low height, causing acute aerial congestion. And it is there that the greater part of the duration flying is likely to be done, since it is not suitable as a starting place for cloud flights. We suggest that during the "elimination trials" at Ingleby Greenhow, or wherever they are held, a special point should be made of getting several soarers into the air together so that they may practise the rule of the road. We know from personal experience how upsetting it is to be up with another machine for the first time, especially when one can't make out where it has got to, and mistakes one's own tail, seen out the corner of an eye, for the other fellow's wing.

Carpenters Required.

Then as to repairs. One has read of whole teams who have stopped up all night repairing frantically, and then snatched a paltry forty winks before going through another strenuous day's hauling and retrieving. As a matter of fact, such heroism is usually quite unnecessary. We happened to see, last year, repairs being done to the KREFELD-UERDINGEN, a machine whose name appears elsewhere in this issue as having provided a new recruit for the Caterpillar Club. "The team" were supposed to be building it a new nose down in Abtsroda village, the original one having been put badly out of joint in a minor crash. Actually, only two or at most three were doing all the work; the rest could only stand about and indulge in horse-play and back-chat, and, even if they had tried to help, they would only have been in the way. If such work has to be done at night, those not working might just as well sleep, instead of having to go through all the next day half-dazed.

The lesson is, that the British team should include two or three first-class repairers, rather than a dozen or more of indifferent ones.

When Even the Birds Cannot Do It.

The case of certain types of birds finding it almost impossible to take-off in the absence of wind, mentioned in Capt. Latimer-Needham's article, brings to mind a story of the late W. H. Hudson's, told in his book *The Land's End*. It happened at Sennen Cove, Land's End, and was recounted to him by eye-witnesses.

"A strong wind was blowing straight into the bay," he relates, "and there was a very big sea on. The sea, they told me, presented a singular appearance on account of the enormous waves rolling in; the village people, in fact, were all out watching it. A large number of gannets were busy fishing and were coming further and further in, following the shoal. Then a wonderful thing happened on this day of wonders; the wind which had been blowing a gale fell quite suddenly and was succeeded in a very few minutes by a perfect calm. . . . The change was disastrous to the gannets; in that windless atmosphere in the sheltered bay and with the sea in that state they could not rise. They were seen struggling on the water and carried shorewards by the huge incoming waves; but their fellows flying to and fro above them, intent on their prey, did not see or heed their distress; they continued dashing down into the sea, bird after bird, and every one that hurled itself down remained down, until they were all in the sea, all vainly flapping and struggling to keep out and still being carried nearer and nearer the shore."

The story has a sad end, for the author goes on to relate how the men and boys who were watching them seized sticks and proceeded to slaughter all the birds as they were washed ashore, for no apparent reason whatever.

Glider pilots who are thinking of soaring along the Cornish coast should on no account come down in the sea.

Gustav Lilienthal.

The inability of the South American condor to rise without sufficient runway for getting up speed is made use of in order to trap the bird, and the method has been described by Gustav Lilienthal (brother of the pioneer Otto), whose death has just been reported at the age of 84. (See Obituary Notice in this issue.) The carcase of a horse, or some such object, is used as bait, and is surrounded by a low fence of brushwood at a distance of 15 or 20 feet. The birds, although fine soarers, are unable to get into the air, and can then be lassoed with the greatest ease.

Otto Lilienthal, Gustav's brother, who was killed in 1896, foresaw the modern gliding club. He tried, in fact, to form one himself, but was only met by apathy. "It would be my greatest delight," he said, "if a number of young people would get busy with my apparatus. But I have not yet found one who will willingly interest himself in it. Just imagine: suppose I founded such an association of young people, and I actually succeeded in getting together a good number. What do you think would happen if one of them had an accident with it? The whole responsibility would be laid at my door, and there would be a monstrous scandal."

Fast or Slow?

The problem of combining, in the same machine, slow speed for thermal currents with fast speed for darting from one up-draught to another, still awaits a satisfactory solution. Our article on Recent German Sailplanes, in this issue, shows how in that country they are tackling this dilemma by installing the device of adjustable ailerons. But adjustable ailerons by themselves are bound to be aerodynamically bad either in one position or the other, if not both.

An example of the difficulties a slow-flying machine may get into is found in the account of a flight from Beamsley Beacon to Ilkley, published on another page. At one point the pilot was unable to move fast enough to avoid losing a lot of height in a down-current between the up-draughts. Yet there are days when the HÖLS DER TEUFEL type is the only one that can keep up at all.

Tails Will Not Be Worn.

We must confess to a weakness for the "Manx" school of thought, meaning the views of Mr. L. T. Moore, who returns to the charge in this issue in defence of the tailless type. "Away with this excresence!" said Mr. Moore in his previous article. Would-be disciples of his, however, should, if they follow his advice, remember to make the necessary changes in the wing design.

An early experimenter who neglected to do so was one Horace Vaughan, who in 1909 built a biplane "hang" glider with a biplane tail. Finding that the tail seemed rather heavy, he removed one of the tail planes and found that the machine performed ever so much better without it. So he thought things over a bit and decided that, if the removal of only one tail plane could make all that difference, then by taking away two of them the performance would be improved by exactly twice as much. What could be more logical? So he placed the wings alone on his shoulders, grasped the arm rests, and jumped into space, leaving his tail behind him.

When he had picked himself up from the wreckage, Mr. Vaughan wrote to *Flight* and told them all about it, that journal being then only a few months old. *Flight* actually placed two and a quarter pages at his disposal. He could hardly have got as much space as that nowadays, even out of THE SAILPLANE.

The stability and efficiency of tailless gliders still seem to be regarded with suspicion. Nevertheless, having made some 150 soaring models, of which only the tailless ones were any good, we venture to prophesy that there will come a day when all the best high-performance sailplanes will have no tails at all. To-day, they are under a cloud—figuratively. Then, they will be under a cloud still, but it will be a real cloud—a nice fat, bulging, cross-country one.

A HIGH WIND AT DUNSTABLE—AND HOW TO GET UP INTO IT.



THREE STYLES OF TAKE-OFF: The low (Dewsbery in the "Crested Wren"), the medium (Collins in the "Kassel 20") and the high (Robertson in the "Prüfling."). Which is the best? Remember that the wind was blowing faster than normal gliding speed (see London Club News for Feb. 5th). The answer will be given in our next issue.

ANOTHER GLIDING CATERPILLAR.

To the two glider pilots who have qualified for membership of the Caterpillar Club by saving their lives with parachutes, viz., Rudi Pätz and Robert Kronfeld, must now be added a third. We have received news from a private source that the KREFELD-UERDINGEN II., one of the competitors at the Rhön last year, developed structural failure in the wing while flying recently, and the pilot, Phroer, jumped with his parachute and made a safe landing. The flight took place at Krefeld on the 21st of November last, and the machine had cast off at just over 2,000 ft. after an aeroplane-tow to that height.

The KREFELD-UERDINGEN II. took part in the "practice competition" at the Rhön meeting in July, but was rather unlucky there. Early in the meeting it made a bad landing and smashed up its nose. The team took it down to Abtsroda, at the foot of the Wasserkuppe, where they were staying, and knocked up a new nose after three days' strenuous labour. But after another flight or two it damaged itself again, this time by landing across a sunken cart-track. Its team must be a persevering lot, for we hear that, after this latest crack-up, they have collected all the bits and hope to have them looking like a sailplane once more in time for this year's competitions.

A QUOTATION.

"Let us go to Croydon, the airport of London, and examine a typical three-engined passenger-carrying aeroplane.

"The three engines are running, for the machine is about to take off. The coffin-shaped thing whose sides flap in the wind from the airscrews is the fuselage. The machine shows signs of malnutrition, for its bones are prominent in the form of wires and struts. As the engines are run up, the tail shakes and sneezes and coughs until it seems that the fuselage will be ruptured. Now the machine taxis over the aerodrome, its engines open up with a roar, it labours over the ground, and then, looking a little fatigued, it rises into the air.

"It passes overhead making a noise like a thunderstorm, shivering and quaking, barging its way along with a clumsy ineffectualness which gives it the appearance of flying through treacle.

"When it is out of sight, go to Waterloo Bridge and watch the gulls."

OLIVER STEWART *(Aeolus)*.

[Or go to the —— Gliding Club and watch the sailplanes. But our author was writing in 1926.]

NOTICE TO CONTRIBUTORS.

All MSS. should be either typed or written *very legibly*, and **on one side of the paper only**. The Editor has no time to copy out MSS. which do not comply with these conditions, nor money to pay anyone else to do so. Please use double spacing between the lines, whether typed or written, whether articles or letters to the Editor, and our printers will bless you for your kind thought.

THE SAILPLANE wants particularly to encourage people to write of their **flying experiences**. Have you had anything unusual happen to you which it would benefit others to hear about? Have you recounted a flight to a friend and found others crowding round to listen? If it thrills them, it may thrill our readers, too. More than half the troubles of *ab initios* are due to psychological causes. Drive their diffidence away, and let them know what rewards are in store for those who Keep On Flying. We know for a fact that such articles in the past have proved the strongest encouragement to others. So never mind how short it is: let us have it, and don't be shy.

AND TO PHOTOGRAPHERS.

Interesting photographs of all kinds are welcomed, especially of machines in the air (in which case let us know the pilot's name if possible). We also want a few comprehensive views of slopes used for soaring. Those who make their own prints should try and get good contrast in the lighter detail, such as clouds. Write your name and other details on the back, and let us know if you want it returned.

Remember the Photographic Competition. You may win a prize.

When to send.—The sooner the better. But in any case we like to have everything by Wednesday in the week preceding publication. Very short items, and photographs, can be received on Thursday (first post) at THE SAILPLANE Office, but not at the Editor's private address.

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BIRD FLIGHT. VII

By C. H. LATIMER-NEEDHAM, M.Sc., F.R.Ae.S.

(*Continued from* THE SAILPLANE *Vol. 4, No. 2, p.19.*)

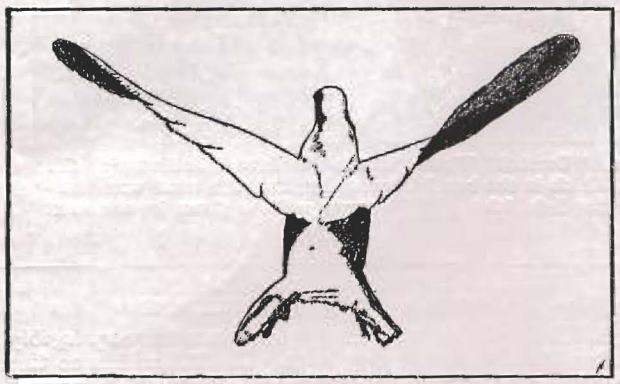


Fig. 16 Start of Flight, Pigeon.

The Commencement of Flight.

Here the conditions are rather different to those of steady flight owing to the absence of sufficient horizontal speed, which prevents the wings from functioning in the manner already outlined. Birds, almost invariably, take-off into wind so as to take full advantage of the velocity of the air, and, when the wind speed is high, it is often possible for normal flapping to start straightaway. Heavily loaded birds run into wind before commencing to flap, or, in the case of waterfowl, paddle along with their webbed feet, whilst certain sea-birds require the impetus of a wave to start flight. The heavier birds have to exert practically all their strength to ascend in a calm, whilst certain of the tropical species have to rely on ascending currents of air for sustentation, and in some cases are not able to get off at all when heavily gorged with food.

To start from rest, the wings are first raised and then brought downwards and forwards sharply. The down-stroke is fairly similar to the stroke employed in normal flight, but with the difference that the leading edge is more depressed so as to incline the resultant force well forward and thus produce a large degree of thrust. Fig. 16 is reproduced from a photograph in "The Flight of Birds," and illustrates this point very clearly. The action here may be likened to that of an aeroplane propeller; in fact, the two are identical, and, further, it is noticed how the twist of a wing, causing decreased incidence towards the tip where the speed is greatest, produces the same shape in both cases.

The up-stroke must be accompanied with some drag, which would be a minimum when little or no lifting force is gained, and for this reason the wing is flexed to a great extent and is generally accompanied by opening up of all the main feathers.

As forward speed is gained, the method of flapping gradually changes to the requirements of normal flight whilst the mean wing force changes from directly forwards to just forward of the vertical. In many cases the action of the feathers continues to some extent. The path traced by the wing over the initial period was observed by Pettigrew* to whom Fig. 17 is due, and it will be noticed that it has some similarity to the curve of Fig. 1, as obtained by Marey. The heavy parts of the curve indicate the power strokes.

* *Animal Locomotion*, J. B. Pettigrew, London, 1873.

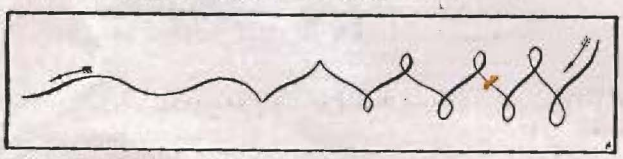


Fig. 17. Path of Wing from Start of Flight (Pettigrew).

Alighting.

The general method of alighting, again always facing the wind, is to incline the body upwards, with the wings fully stretched, so that a large resistance force is set up and so the speed decreases. This position might be controlled by the tail, but it appears that, instead, the wings are held in a forward position and so tend to raise the head. In order to counteract overturning backwards, the tail is fully spread and depressed, and in this way the tail serves the double purpose of retaining stability and at the same time increases the total lift-drag force. (See Fig. 18.)

The wings are set in the position of maximum angle of attack, increased where possible by the aid of the wing-tip slots, and in this manner the speed sinks to the lowest attainable. If the landing has been well judged, the ground, branch, or other place of alightment, is reached just prior to the approach of stalling conditions, but otherwise a few sharp flaps are employed and, the wing being set at so coarse an angle, the force due to flapping is directed upwards and backwards, and so a gentle descent can be made.

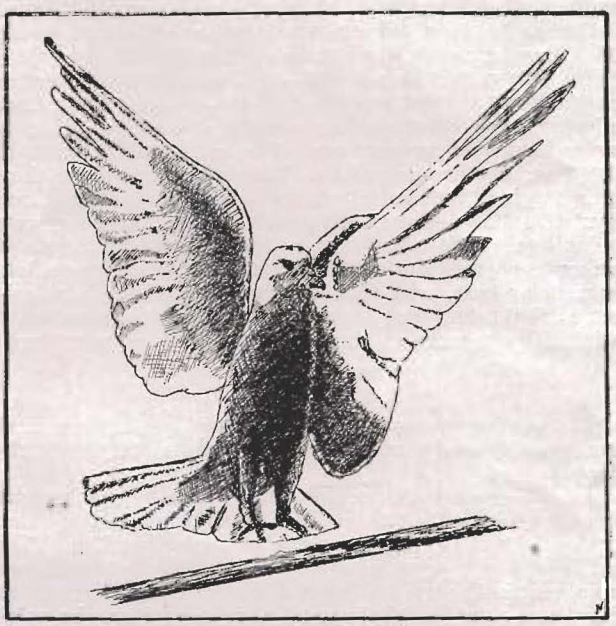


Fig. 18. Pigeon Alighting.

Fig. 18 is a reproduction from a photograph in Headley's *Flight of Birds*, and illustrates this point very distinctly. The action of the wing in the up-stroke is similar to that as described previously for the start of a flight.

It has been noticed that wash-out, or decreased incidence towards the tips, is required in the down-stroke to allow for the greater speed of the outer portion of the wing and for the purpose of giving thrust rather than lift. Similar twisting is also required for the up-stroke to reduce the resistance, and, again, it has been seen that the same twisting effect is essential during the initial stages of flight, in which the wing acts as a propeller.

Examination of a bird's wing reveals this twisting as a permanent feature of the wing-shape, and therefore the above-mentioned requirements are fully satisfied by the natural formation of the wing.

Some of Pettigrew's* remarks on the various actions of He states that "The wing of the bird is not always opened up to the same extent on the up-stroke. The elaborate the wing are very enlightening and are worth recording. arrangements and adaptations for increasing the area of

* *Animal Locomotion*: J. B. Pettigrew.

the wing, and making it impervious to air during the down-stroke, and for decreasing the area and opening up the wing during the up-stroke, although necessary to the flight of the heavy-bodied, short-winged birds, as the Grouse, Partridge, Pheasant, are by no means indispensable to the flight of the long-winged oceanic birds, unless when in the act of rising from the surface; neither do the short-winged, heavy birds require to fold and open up the wing during the up-stroke to the same extent in all cases, less folding and opening being required when the birds . . . have got fairly under weigh.

"All the oceanic birds, even the Albatross, require to fold and flap their wings vigorously when they rise from the surface of the water. When, however, they have acquired a certain degree of momentum, and are travelling at a tolerable horizontal speed, they can in a great measure dispense with the opening-up of the wing during the up-stroke. In this case the wing is wielded in one piece like the insect wing, the bird simply screwing and unscrewing the pinion (Note: Here, as in all his work, Pettigrew refers to the whole wing as the pinion and not to the individual feather) on and off the wind and exercising a restraining influence.

"In the Bat the wing is jointed as in the bird, and folded during the up-stroke. As, however, the bat's wing . . . is covered by a continuous and more or less elastic membrane, it follows that it cannot be opened up to admit of the air passing through it on the up-stroke." Pettigrew then proceeds to explain why flexing of the wing is essential in at least several birds, such as Rooks, Pigeons, Starlings and Sparrows, and illustrates his theory by describing an experiment in which light rods were tied along the leading-edges of a Pigeon's wings which thereby rendered flight impossible. Summing up, he says: "It may be stated, generally, that as flexion *decreases*, the twisting, flail-like motion of the wing at the shoulder *increases*, and vice-versa—the great difference between sailing birds and those that do not sail amounting to this, that in the sailing birds the wing is worked from the shoulder by being alternatively rolled on and off the wind, as in insects; whereas, in birds that do not glide, the spiral movement travels along the arm, as in bats, and manifests itself during flexion and extension in the bending of the joints and in the rotation of the bones of the wings on their axes.

"The spiral conformation of the pinions is best seen in the heavy-bodied birds, as the . . . pheasant and partridge; and here also the concavo-convex form of the wings is most perceptible. In the light-bodied, ample-winged birds the amount of twisting is diminished, and, as a result, the wing is more or less flattened, as in the seagull."

A COMMENT.

Sir,

I have been interested in the articles on Bird Flight by Capt. Latimer-Needham. I take exception to one paragraph, however, though possibly I have not read its correct meaning.

In "Bird Flight III." (p. 260, last paragraph), it is stated "that towards the end of the down stroke the wing incidence changes to negative in order that the resultant force should be directed forward for an increase of speed." Surely a decrease in the angle of attack will give a resultant force which is inclined further aft.

It is, as the author points out, interesting to note that the path-of-flight curve is in fair agreement with the curve of lift. By inserting a horizontal line on the latter representing the weight af the bird, and graphically integrating, one should obtain a curve which is in phase with, and actually represents, the flight path.

J. F. Cuss.

Perhaps this point was not made sufficiently clear. During the first two-thirds of the down-stroke, the wings are held at a large angle of attack (see Fig. 7 and Table I.*) for the creation of lift, but at the expense of forward speed, and, in order to compensate for this and produce acceleration, the wings are then twisted with leading-edge depressed, thus resulting in a slight dive.

Over this period, the wings are set at a small negative angle of attack, roughly −3 deg. The resultant force on a wing is very nearly at right angles to the chord line, and, for a negative angle, may be inclined forward of the vertical. This is accentuated by the diving, or inclined, path of flight, so that the total force, although relatively small, possesses a fairly large forward component, as was shown in Table I. This is further borne out by the lift and thrust curves of Fig. 14† which, incidentally, had not been obtained when the earlier part, referred to by Mr. Cuss, was written.

From a series of wind-tunnel tests with wings of various birds, the no-lift angle at mid-span has been found to be in the neighbourhood of −10 deg., so that an angle of −3 deg. is, in reality, several degrees above that of no lift. I hope this clears up the point mentioned.

C. H. L.-N.

*pp. 260 and 269, Vol. III.
†p. 4, Vol. IV.

GLIDING ON THE NEWS-REEL.

During Herr Hirth's recent visit to Dunstable, British Movietone descended upon the scene, and the result was subsequently on view at the Shaftesbury News Theatre in the West End. Probably much of the film had been cut, as it showed for barely two minutes; but a lecturette on "Thermals" was included (it was probably all Greek to the film audience), and the CRESTED WREN did a ground-hop. A fine soaring flight by the KASSEL 20 had been cut, except for the final creep round the brow of the hill (the public doesn't know that we can soar as well as glide, and no doubt would have thought that part of the film a fake).

The KASSEL then swooped down low at the camera. We hear that the cameraman was thrilled to the marrow by this manœuvre, but that his assistant could barely be restrained from deserting his post with a cry of "It's out of control, it's out of control!"

The audience at the "Shaftesbury" seemed to think so, too. "So that," they said to themselves, "is Gliding."

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RECENT GERMAN SAILPLANES

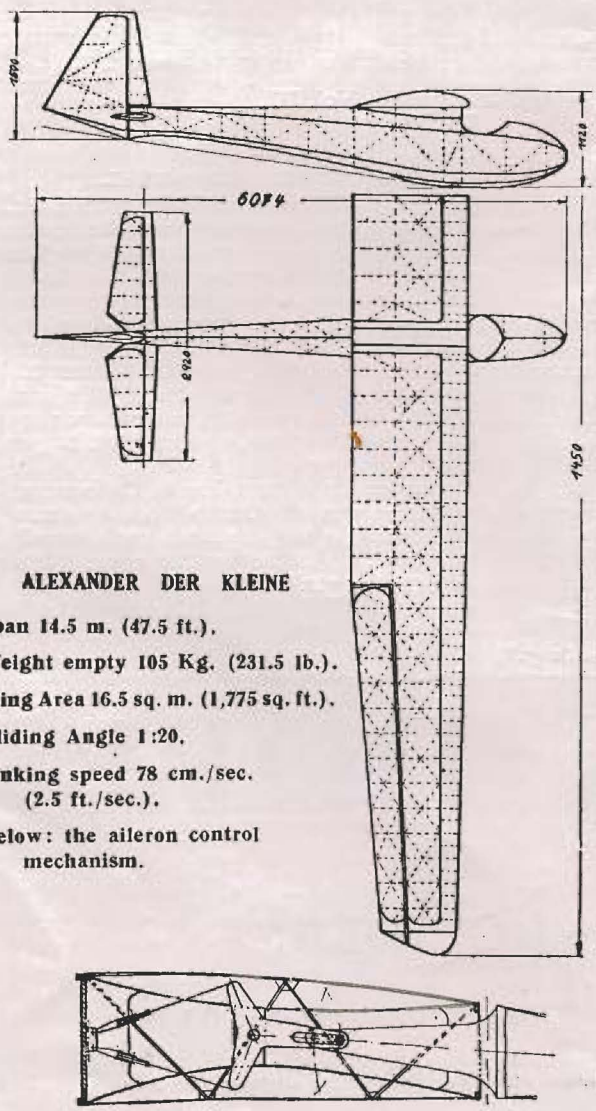
Further details of some of the new sailplane types which appeared in the last Rhön competitions, as well as of some which did not, have been published in recent issues of *Flugsport*, and a few of these particulars may be of interest.

The price of the RHÖNALDER is now given as 1,560 RM. (£78 at par). Peter Riedel, who flew it in the competitions, has been loud in his praise, especially of its manœuvrability—this notwithstanding its large span of 58 ft. A sinking speed of 0.73 m. (2 ft. 5 ins.) per second is guaranteed, with a gliding angle of 1 in 20; this would give it a flying speed of about 32 miles per hour. The wing is single-spar; it is in two portions and is fixed to the fuselage with three bolts. The ailerons are differential, and the elevator of pendulum type, placed rather high to avoid small obstructions on the ground.

The new production model of the ALEXANDER DER KLEINE embodies slight improvements on the original design. The wing-tips are no longer square-cut, but partly rounded as in the PRÜFLING. The wings and body have been strengthened here and there; on the original model some weight could be saved by allowing for the fact that landings at Rossitten are usually made on soft sand, and that gliders can be man-handled there with less strain on their structures than at most other grounds. So the new model weighs 105 kg. (231½ lbs.) empty, as against the 98 kgs. (215 lbs.) of the original (of which 132 lbs. was wings and 84 lbs. body and tail). Its wing-loading is given as 11 kg. per sq. metre (2.25 lb. per sq. foot), the gliding angle 1 in 20, and sinking rate 78 cm. (nearly 2 ft. 7 ins.) per second. As this gives a speed of about 34 m.p.h. it is rather surprising to find the machine described as a "typical light-wind soarer."



An improved "Alexander" (span 52 ft. 6 ins.) in its trailer, passing through Gersfeld (Rhön).



ALEXANDER DER KLEINE

Span 14.5 m. (47.5 ft.).

Weight empty 105 Kg. (231.5 lb.).

Wing Area 16.5 sq. m. (1,775 sq. ft.).

Gliding Angle 1:20.

Sinking speed 78 cm./sec. (2.5 ft./sec.).

Below: the aileron control mechanism.

The wing-section of the ALEXANDER is Göttingen 505 with slight modifications, and was chosen to enable the wings to be as lightly built as possible. This section allows of two-spar construction with rather a high rear spar; the torsional stresses are low, and weight can be saved on the plywood of the leading edge, particularly if the grain is laid diagonally. The thick rear spar also enables the ailerons to be worked entirely from inside the wing, without projecting horns to spoil the air flow.

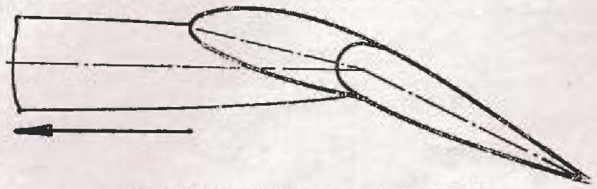
At its first trials in 1931, the ALEXANDER was soared by Oberlt. Dinort (test pilot at Rossitten and sometime holder of the unofficial duration record) for 11½ hours in a wind which varied between 4½ and 35 m.p.h. The original machine cost about 450 RM. in materials and 1,400 working hours, though these figures would, of course, be reduced in subsequent production. Recently a London Club member has enquired as to the present price of the machine or its parts, but without result.

The ASKANIA, designed by Dipl.-Ing. K. Pernthaler for the Anhalt gliding group, was referred to in THE SAILPLANE for August 12th (p. 162) on account of its adjustable ailerons, whose position (with the stick central) can be raised or lowered during flight. It is interesting to note that, in addition, these ailerons are differential, and that when they are in the high position the amount of the differential action is much reduced.

The CONDOR, described in the same issue of THE SAILPLANE (p. 164-166), likewise has adjustable ailerons, and it is interesting to note that, with the ailerons displaced downwards, the machine flies more slowly and has been found to climb better. With the ailerons in their "normal" position, the cruising speed is about 55 km. (34 miles) an hour, with a gliding angle of 1 in 18. The wing-section is modified Göttingen 652 in the inner part, and the machine's appearance will be remembered from its similarity to the FAFNIR.

This idea of adjustable ailerons seems to be getting popular, for it is also incorporated in the D 28, the new Darmstadt thermal-soaring machine of small span, which was not ready in time for the competitions. This machine, by the way, has its wing all in one piece, undivided. The section is Göttingen 535. It is single-spar, and the torsion-resisting leading edge was built first and thoroughly tested before the rest of the wing was added to it. The leading-edge is stated to be able to stand up to a dive of 180 km. (112 miles) an hour. The D28 has a curious

rudder, in that the "fixed fin" is not really fixed at all, but turns through an angle equal to half that of the displacement of the rudder proper, thus greatly adding to the aerodynamic efficiency of the outfit. The machine weighs 50 kg. (110 lbs.) without instruments; the fuselage alone is 17 kg.



Rudder of the Darmstadt "D 28."

Talking of thermal soaring, a machine which was on view at the Wasserkuppe, but has not yet been described in print, was the FLIEGE, said to have been designed by Herr Bedau for aero-towing and thermic flights over the plains around Berlin. It had a nacelle with open fuselage, like Hol's, but made entirely of metal tubing. The span was large, and the wings tapered from the root almost to a point at the tip. It did a few slow test flights, and its appearance suggested that perhaps it is meant for hovering in small "thermals" such as seagulls fly in.

An interesting development of the FALKE was built for the Wasserkuppe Flying School early in the year, but did not take part in the competitions. This is the SUPERFALKE, which, except for a bigger wing-span, is much the same as the original FALKE and, in fact, weighs no more. The additional length of wing-tip is so light as not to impair the manœuvrability; the change in incidence from root to tip is as in the FALKE, and the ailerons have been found to answer in stalled flight at 30-35 km. (19-22 miles) per hour. Its span is 17 m. (56 ft.), area 19 sq. m., weight empty 145 kg. (319 lbs.) and gliding angle about 1 in 22. On its first soaring flight on April 3rd, Peter Riedel kept it aloft for 8 hours 49 mins.; a failing wind then prevented him from achieving a new Rhön record. Next morning he went off in it with a good wind, made cloud contact and rose 3,300 feet above the mountain-top. He then toured the district and returned to the starting-point just in time for lunch. But since then nothing much has been heard of the SUPERFALKE and no further examples appear to have been built. A. E. S.

TAILLESS SAILPLANES

[*In our issue of December 9th last, Mr. L. T. Moore put forward the case for the tailless sailplane. Some of the points raised in his article were criticised by Capt. Latimer Needham in a letter published on January 20th. Below we print Mr. Moore's reply, the first point discussed being whether, in a non-swept-back tailless machine, the raising of the trailing-edge flaps causes an increase (Mr. Moore) or a decrease (Capt. Needham) of the angle of attack of the wing.*]

In discussing the advantages to be gained by sweep-back, the consideration of the air reaction on the wing-tip elevators-cum-ailerons as being a reaction component of that on the wing-tips as a whole—an isolated force as it were—was purely a theoretical consideration to simplify the explanation of sweep-back effect.

The basic section has, of course, to have stationary C.P. characteristics. Depression of the wing-tip elevators has the effect (1) of changing the wing-tip section to one of higher camber—and incidentally with a decided discontinuity of profile, and (2) of presenting the *new* section at a higher incidence. As a general rule, the stationary C.P. is more forward on the chord than is the C.P. of its more highly cambered brethren even in the c.p.f. position. Depression of the elevators thus increases the lift of the outer span sections, but acts behind the C.G. Raising the elevators was considered extended to the point of reversing camber and lift at the outer span, with "inverted force" again acting behind the C.G.

That stationary C.P. sections on which trailing-edge flaps can be set over a range of positive or negative angles without altering appreciably the C.P. position are to be found is evident in the "positive control" types which have been successfully designed.

Actually this wing-tip elevator control is too inefficient and impracticable for the non-swept-back wing of the "positive control" type such as developed by Dr. Kuppers, but can be employed on the swept-back type where the wings are twisted even to a point of reversed lift at the tips. It would appear that, as the whole of the wing surface could not be presented at its maximum K2 when landing, a higher landing speed is unavoidable.

The C.G., whether on the chord line or below, should lie (on a vertical projection) ahead of the C.G. where wing twist is employed, and the twist be increased accordingly to balance. This can be shown to enhance the stability and, incorporated in the scale models one has made, has appeared to be the most deciding factor in obtaining longtidudinal stability.

Unfortunately, very few data on wing sections having a stationary C.P. are available, but a few are not too far behind the best sections generally employed, while the chance of reducing weight in a tailless type may over-compensate for this.

Herr Lippisch, in a recent lecture to some learned German society, stated that, having exploited all known types of tailless aircraft, he had eventually returned to the original swept-back plan form as being the best. He further stated that, with an aspect ratio of 8 and the employment of wing-tip rudders, he had obtained a performance equivalent to that of a sailplane with an aspect ratio of 20! If our designers will not chop off tails altogether, is there anything against fixing the rudders at the wing-tips? The R.R.G. two-seater OBS, I believe, has this arrangement, or at any rate en-cap brakes. [They are auxiliary rudders for assisting the action of the main rudder on the tail. We will shortly be publishing an article on the OBS.—ED.] For instance, why not chop off about a foot and a half of either wing-tip of, say, the SCUD and fit en-caps to get the same performance with something even more minute? Or a better performance for the same span?

And then bird flight: is a bird's tail essential in soaring flight? I have seen various soaring birds such as the kite hawk, and birds such as rooks, soaring with tail feathers removed, whereas in flapping flight they have appeared distinctly clumsy. In soaring flight a minute forward or backward carriage of the extended wings relative to the body would give ample fore-and-aft control, and retraction of one wing the necessary lateral control, but in flapping flight, where the wings move through a very considerable arc fore and aft, one imagines that a tail is then essential for easy flight. May it be that tails are provided for the latter condition (of flapping flight)?

One heard from Hirth at our Christmas Camp that tailless ZÖGLINGS are now in use at the Wasserkuppe. So the story that only Groenhoff could fly the type is a myth. Germany is exploiting something new. Why should we be behind again? L. T. MOORE.

DOINGS IN FRANCE.

To Diminish Friction.—The Gliding Section of the Limoges Aero Club, who, like many other French clubs, use a winch for launching, have been bothered by the excessive friction between the cable and the wet ground, in addition to that of the glider's skid. They have therefore tried a scheme of fixing a series of low wheels in position to hold up the cable, and by this means have secured a quicker and better take-off.

A Gliding Family.—M. Sardou is President of the Provencale Gliding Association, who fly on the coast near Marseilles. He glides, his brother glides, the brother's wife glides, one of his sisters and her husband both glide, and another sister also glides. They all glide. What a chance for conjugating the verb "to glide"!

But is there a single family in this country who can show such a record?

GUSTAV LILIENTHAL: 1849-1933.

"There is one man in Germany who does not forget Lilienthal, and that is his brother Gustav. If to-day you should arrive by aeroplane at the Berlin airport you will find in one of the side hangars a grey-haired man working on a gigantic bird, and when you tell him that you have arrived by the regular Air Service he will shake his head. 'That is nothing,' he will say, 'nothing at all; that is only brute force. The engine drags you through the air. Also what soarers do to-day is nothing. They fly, it is true, with their stiff, stark wings a hundred miles across country and rise to a height of ten thousand feet, but it is all nothing. Look here, you must be able to beat your wings like my bird; then you will fly with ease, like the birds do.'

"Then the old man will resume work on his apparatus. He will turn a crank, and great wings will rise up groaning. At one spot a spar may crack and a cloud of dust whirl up.

"Reverently we must listen to the tale of how he and his brother searched and strove and flew. And if he then speaks of his own work in the days when he trod the path which we now know to be a false one despite the many grains of truth with which it is strewn, we dare not contradict the man who swore to be faithful to an idea, and cannot now free himself from it."

So wrote Kronfeld last year.

But the great wings of that artificial bird have groaned their last, for news comes from Berlin that the old inventor has died of heart failure while at work on his machine.

The death of Gustav Lilienthal breaks a link with the past history of aviation. He was not so well known to fame as his brother Otto, who crashed to his death in 1896 after making some hundreds, perhaps thousands, of successful glides in various "hang" type gliders of his own invention—he was, in fact, the first successful glider, and is often looked on as the father of aviation as it is practised to-day.

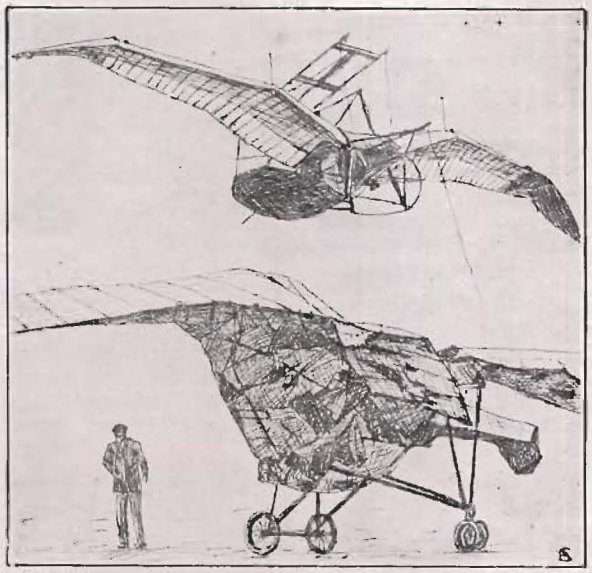
Otto Lilienthal was born in May, 1848. Gustav's age is variously given as 83 and 84. The two brothers became interested in the problem of flight while still of school age, through watching the storks soaring over their home in Pomerania. In 1864 they started experimentally with a flapping-wing apparatus, going out unseen at sunrise for fear of ridicule. They ran hard against the wind, beating the wings furiously with their arms, but could not get off the ground.

In 1867 they actually glided, but after a few trials Otto, who was a born experimenter, decided that the necessary scientific knowledge was lacking, and settled down to many years of patient investigation of the properties of birds' wings and other aerofoils. Gustav appears to have found all this rather boring, and there seems no evidence that he took much interest in his brother's doings when the latter at last achieved success with his gliders.

But after Otto's death, and the development of motor-assisted flight, Gustav appears to have come to the conclusion that his brother's ideal of learning to fly like the birds had been unjustifiably set aside; hence his resumption of aeronautical experiments in his later years, though he was really an architect by profession.

The "gigantic bird" described by Kronfeld is shown in the accompanying sketch. A correspondent of *Flight*, who had it demonstrated to him by the inventor two years ago, described it as "made from paper, string, fabric and bent bamboo, while an ancient motor moves the wings up and down."

In 1923 Herr Lilienthal published a book: "Vom Gleitflug zum Segelflug" ("From Gliding Flight to Soaring Flight": C. J. E. Volkmann, Berlin-Charlottenburg, Mk. 2.50). In it, he develops the idea that true flying will be attained by studying the properties of birds' wings. He did much research work on the subject, which is described, and especially interesting is his investigation into the air circulation on the *under* side of the wing, particularly the reverse eddy under the leading edge.



Below: G. Lilienthal's full-size Ornithopter. Above: an earlier model (span 52 ft., weight with pilot 805 lbs.).

Gustav Lilienthal speaks contemptuously of present-day powered aviation as based, not on the bird at all, but on the beetle, who uses one pair of wings for sustentation and the other as a propeller to push himself along. "Käferflug," he calls it, and points out that biologically it is one of the most primitive forms of flight in existence. (Is that why we talk of "beetling" round an aerodrome?)

"The path which we now know to be false," says Kronfeld. I am not so sure. Civilisation is yet young, and the urge to experiment is undying. A. E. S.

THE SAILPLANE MAIL.

We hope to collect further information about the First International Sailplane Mail announced in our last issue.

Meanwhile, anyone interested will find Maribor marked as "Marburg" on the map (South of Vienna—not the German University town). From Marburg a high ridge runs westward for thirty miles, with a southerly slope overlooking the river. The ridge then turns north-westerly for about fifteen miles, into Austrian territory, giving a south-west slope; after which it becomes irregular. It is to be hoped that this will be a real Soaring Mail, and not a mere aerial slip-coach towed behind an aeroplane. Probably it is reckoned that south or south-west winds will be sufficiently frequent to allow of a fair degree of regularity. The inaugurating pilot, who is President of the Maribor Flying Club, is an old pupil of Kronfeld's.

Kronfeld himself is now taking a hand in mail-gliding. On January 27th he flew from Vienna to Semmering with a bag of mails. Semmering is the name of a mountain 50 miles S.W. of Vienna. The machine was the AUSTRIA II., and, as it started from the Aspern aerodrome, the flight evidently began with an aero-tow.

(STOP PRESS: He was aero-towed the whole way.)

Fatal Accident in Austria.—The Austrian gliding pioneer Erwin Rieger was killed on January 16th when the glider KÄRNTNERLAND, built by Rieger and his brother, came into collision with a tree near Treffen, Carinthia.

INTERNATIONAL AFFAIRS

SOARING AND THE F.A.I.

The Fédération Aéranautique Internationale has for the past year had its own Soaring Flight Commission, which works in close co-operation with the ISTUS; in fact, the personnel of the two bodies overlaps considerably. At the recent Extraordinary Meeting of the F.A.I. in Paris on January 9th, several important decisions were taken on the recommendation of this Commission, working in full accord with the ISTUS.

(1) For sailplanes, only four kinds of records will in future be recognised as "diploma records," viz., distance in a straight line; duration with return to starting-point; height above starting-point, and distance with return to starting-point. Speed in closed circuit is abolished. (When a certain Indian potentate recently visited a British gliding club, his first question on seeing all the machines in their hangar was: "What sort of a speed can you get out of these things?")

(2) As regards the required margin of excess over previously existing height and distance records in soaring flight, this has now been reduced. In future a distance record need only be exceeded by 5 per cent., instead of by 10 per cent. as heretofore, and a height record by 100 metres (328 ft.) instead of 200.

(3) A brevet has now been introduced for glider pilots who have passed the "C" test, which corresponds to the F.A.I.'s long-established brevet for aeroplane pilots.

(4) In accordance with the new statues of the F.A.I. a member of the Soaring Flight Commission will have the right to take part in a consultative capacity in the decisions of the International Sporting Commission of the F.A.I. This is a most important body, and the decision is to be welcomed.

Especially interesting is the announcement that the F.A.I. has been discussing the possibility of the inclusion of Soaring Flight in the Olympic Games, and it was resolved that the F.A.I. should consult the International Olympic Committee through its Soaring Flight Commission. On the question of whether the Soaring Flight contests should be held in hilly or flat country (presumably with aero-towed starts), the majority were in favour of mountainous regions, as is already the case with the Olympic Winter Sports.

THE "ISTUS" MEETING.

The provisional regulations for the International Soaring Meeting at the Rhön next August have now been published; and, though the document is too long to be reproduced here in full, we can give a general *résumé* of its contents.

As already stated in our last issue, the date of the meeting is August 13th to 20th; the place, Wasserkuppe summit in the Rhön Mountains (nearest town Fulda, on the main Cassel-Frankfurt line), and the Rhön-Rossitten Gesellschaft is in charge of the arrangements. Applications for entry (fee 25 m.) can be received at its Frankfurt office between May 1st and July 1st (noon), and late entries at double fee up till July 23rd. Each country is allowed a maximum of three machines and a team of 15, including six pilots. Another machine can be substituted for one entered, providing it complies with the conditions, before the meeting begins.

The Competition is open to sailplanes which fulfil the same conditions as those required for the ordinary Rhön meeting. Launching is by the usual bungy, except in non-soaring weather, when towed starts will be allowed (presumably by aeroplane).

Certificates of airworthiness must accompany applications for entry, and drawings and photographs are required later by the Technical Committee. Competitors must provide their own barographs. A parachute is recommended. Tests take place on August 10th at the Wasserkuppe, and a test flight of at least a minute is required of machines which have not yet demonstrated their airworthiness in actual flight.

Only "C" pilots may fly in the competitions, and they must have done at least an hour's soaring in the same or a similar machine. Three pilots are allowed to each sailplane, and they can take turns in flying it. Anyone who wants to go off on a cross-country flight must produce evidence of having done five soaring flights totalling 30 minutes, or more than two minutes each, in the last three years (corresponding to the German "Official C") without having damaged the machine. They must either insure against accidents or give a written undertaking to bear the cost of having one.

Now for the actual Competition events. These events are divided into two classes, as are also the pilots taking part in them, as follows:—

Class A. Pilots in this class must, by the beginning of the meeting, have already done a soaring flight of either 50 km. distance, or 1,000 m. height above starting point, or five hours' unbroken duration.

Class B. Any pilot can fly in this class; but he cannot fly in both classes. Transfer from one class to another is allowed during the Meeting, but, in that case, when adding up totals for performances in any particular class, only flights done in that class will be taken into account.

In both classes the best performance in a single event gets two points; the second best, one point; except in Event (1), in which case four points are awarded, but only if the said record is not again beaten during the meeting.

Events.—(1) Setting up a new Rhön record (duration, distance or height).

(2) Greatest distance in a straight line, duration or height (but distance and duration in separate flights).

(3) Best total of heights attained by one aircraft, only heights above starting point of 300 m. (Class A) or 100 m. (Class B) being reckoned.

(4) Best total of distance flights by one aircraft, reckoning only flights of over 25 km. in Class A and 15 km. in Class B.

(5) Best total duration by one aircraft. Minimum 60 minutes in Class A and 20 minutes in Class B. Pilots can be changed.

The winners of the ISTUS Competition will be those in each class who gain the greatest number of points.

The R.R.G. will be responsible for the organisation, meteorological services, and measurement observations.

The Technical Committee will be made up of the Technical Committee of the ordinary Rhön meeting together with representatives from countries affiliated to the ISTUS. The Sports Committee will also include representatives from all countries, but they may not belong to groups taking part in the Competition. There is to be a Prize Committee of seven or less, nominated by the President.

Entrants must pay their own expenses, but accommodation for themselves and their machines is free.

(N.B. The above particulars are taken from the official German announcement, as the English version supplied to us contains several mistranslations.)

THE ISTUS SECOND ANNUAL REPORT.

The second Annual Report of the International Commission for Motorless Flight has now been issued. In the first paragraphs the international character of the gliding and soaring movement is stressed: "It has thrown bridges across the deep chasms which during the last decades have separated the nations. But in sailing flight it is not merely a question of friendly contest involving physical effort; there is involved a contest in the realm of the spirit, where there is no victor and vanquished, but everybody gains an advantage from the success of a competitor, and generous acknowledgment of another's achievement serves only as a spur to further effort."

The report does not deal in detail with the progress of motorless flight in the various countries, but only with questions involving co-operation of the various national organisations and the activity of the Istus as such.

Auto-towing was studied by Wolf Hirth, who had had experience of it in several countries (his report was published in English in THE SAILPLANE, Vol. III., Nos. 1

and 2). This method of training has been developed by Mr. Lowe-Wylde in England, while in France (Rouen) and Belgium (Ghent), launching with a windless has been successfully in use. R. Kronfeld, assisted by various German official bodies, has investigated scientifically the stresses set up in towed aircraft.

Aeroplane-towing of Gliders has been developed especially by the Rhön-Rossitten Gesellschaft, who have inaugurated regular courses of instruction in this method of flying. Concerning its use in other countries, special mention is made of the work of Abrial and Remy in using aero-towed starts for making soaring flights over Paris and its surroundings.

Aerobatics, parachute descents, and simultaneous towing of several gliders are coming more and more into favour as spectacles at air displays. It is recommended that the Istus should issue regulations on this subject before any other official bodies take it upon themselves to interfere.

The work done in common by the countries belonging to the Istus was, in the past year, chiefly limited to mutual visits and written interchange of ideas, though German instructors have visited Holland and Switzerland to conduct courses.

The efforts of the Istus to hold an annual international soaring competition were described in our last issue. As none was held last year, a scientific conference was organised instead, at Gersfeld after the Rhön meeting, and with very successful results.

Prof. Métral of Paris and Prof. Theodorides of Athens have been elected to the Scientific Committee, and Herr Fiala of Fernbrugg to the Technical Committee; these gentlemen enjoy an international reputation in their respective spheres.

The Istus has strengthened its international position during the past year. Spain has now applied for membership.



Mr. Brown (second day "ab initio") flying the London Club's "Dagling."

CORRESPONDENCE

THE NYBORG SAILPLANE.

Sir,

On looking through THE SAILPLANE for the past year, I notice two letters appearing in the issue of the 17th of May, 1932, commenting upon the Nyborg sailplane, and I am afraid that these letters rather tend to give the readers of THE SAILPLANE the impression that the sailplane is the product of a lively imagination combined with a woeful insufficiency of knowledge. Unfortunately, my time was fully occupied with experimental work on the machine itself at this period, and the matter afterwards escaped my memory; however, the experiments performed in the interim enable me the better to reply to these letters now.

Air Commodore J. A. Chamier states that:—

(1) The stalling speed of the sailplane is approximately 50 m.p.h.

(2) The acceleration necessary at take off is unpleasantly high.

(3) The landing speed is dangerous.

(4) The sailplane can only soar with high vertical currents.

The following facts are apparent from the work already done:—

(1) The machine will rise from the ground at an air speed of 32—36 m.p.h.

(2) The acceleration at take-off is no higher than, if as much as, that required for the more conventional type of sailplane.

(3) Even practically an unskilled pilot has experienced no difficulty in landing this machine at a ground speed of 40 m.p.h., and, while this may appear a "high" speed for some machines, the term must be regarded as purely relative. Personally, I would prefer to be in a Rolls-Royce doing 50 m.p.h rather than in an Austin Seven at 30 m.p.h. in the event of a head-on crash.

Regarding point 4, I can only say that, as the gliding angle appears to be very small, I do not think that Air Commodore Chamier is any more correct on this point than on the others, and I am afraid that he has assumed that such a radical departure from the orthodox must, inevitably, be wrong.

Mr. Scott Hall has, apparently, not fully appreciated the point in question.

While, naturally, agreeing that the landing speed is a function of the wing loading and lift co-efficient, I would point out that, by depressing the inside ailerons, both the lift and drag coefficients are increased with consequent decrease in necessary speed, thus enabling the use of the ailerons as brakes without the necessity of altering the longitudinal axis of the body.

While at Dunstable last year, I remember telling Mr. Scott Hall that the wing loading was 8 lbs. per sq. ft., actually it is 8.6 lbs. per sq. ft., but as the machine lifts from the ground at, say, 35 m.p.h., it gives a lift coefficient of 1.4 as against .65, the figure he assumes.

I cannot imagine from what source Mr. Scott Hall obtained the interesting information that "the centre of gravity of the aircraft is well behind the centre of pressure of the wings," as, to the best of my knowledge, there is 25 per cent. of the wing area in front of and 75 per cent. behind the centre of gravity.

It would also be interesting to know upon what grounds your correspondent condemns the aerodynamic design of the fuselage unless, of course, he is working on assumptions similar to those which gave him the lift coefficient.

With regard to the instability in yaw at low speeds over the ground, I have had no trouble from this source apart from the first few trials, either before or after the fitting of a larger rudder fin, and the yawing had nothing to do with the form of this rudder.

It seems unfortunate that Mr. Scott Hall should take it upon himself to criticise a new sailplane design without obtaining sufficient information. In a matter of this nature involving as it does entirely new and unorthodox principles, I am, naturally, extremely careful not to make any statement or claim which cannot be backed up with actual proof, and I shall be very pleased to demonstrate the truth of my statements to these two correspondents or to anyone sufficiently interested to come to Worcester and see the sailplane's performance in actual practice.

T. G. NYBORG.

TUITION.

LIVE AND LEARN AT PHILLIPS & POWIS SCHOOL OF FLYING, Reading Aerodrome. Comfortable residential accommodation at economical rates. The very highest standard of instruction by late instructors of the R.A.F. Take a 15s. trial lesson at the country's most up-to-date school.

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NEWS FROM THE CLUBS.



Mr. Lawson gliding the "Radlock" trainer at 400 ft. over flat country, after an auto-towed start.

BRADFORD AND COUNTY GLIDING CLUB.

In response to many kind enquiries, may I say that R. F. Stedman, who has suffered a severe attack of pneumonia, has just turned on the road to recovery. His condition is still somewhat critical, but by the time this report is published we hope he will be convalescing rapidly. We thank inquirers for their kindly solicitation.

In anticipation of the prosperous year which so many friends have wished us, there is considerable activity in the constructional section under the direction of H. Holdsworth. REYNARD I. is being repaired and rebuilt by Roy Watson, and the HOLS is progressing favourably, the tailplane, elevators and rudder being completed and numerous ribs and metal fittings made. Stedman's two-seater is also coming on, all the ribs and rudder being finished, though work on this is, of course, held up by his illness. When the present constructional programme is finished, in three months time, we shall have quite a good range of machines as a foundation for future development. Primaries: REYNARD I., REYNARD II. and ZÖGLING. Secondaries: DICKSON INTERMEDIATE (nacelled). Soaring Practice: HOL'S DER TEUFEL, and privately owned HOLDSWORTH SAILPLANE and STEDMAN 2-SEATER.

A member says he has been unable to obtain confirmation of the rumour that there is a Gliding Club near London—somewhere near the Zoo.

Sunday, Jan. 29th.—Wind E.S.E., 10 m.p.h. The thawing snow on the plateau and the hillside made difficult the work of primary training, but we struggled on, a mere handful of us, through occasional showers of stinging sleet, till, with numbed hands and sodden feet, we gave in to the blast and made our retreat to the farmwife's kitchen and her toast bewitchin'. Oh, heck! tra-la-la. This gliding's a treat.

Easter Training Camp, April 14th to 18th, inclusive.

The main object of the Camp is the attainment of the Royal Aero Club's "A" and "B" Glider Pilot's Certificates. There will also be more advanced machines for the use of members who have already passed the above tests and are qualified to receive soaring instruction.

In view of the increase of the Club's membership, it has been regretfully decided that the former practice of offering flying facilities and instruction to non-members attending Camp, must be discontinued this year. Visitors are, however, invited to attend and will be very welcome whether members of other clubs or not.



The "Radlock" trainer (Hull Club) and its designer, Mr. J. E. Raddings.

Arrangements have been made for visitors to the Camp to be accommodated at Dobrudden Farm, which is situated on the flying ground. The charges are very reasonable, and accommodation can be provided either with or without full board, according to visitors' requirements. Intending visitors should book accommodation without delay by writing to Mrs. N. Kershaw, Dobrudden Farm, Baildon, or telephoning Shipley 1015. The Club recommends the accommodation at Dobrudden Farm with every confidence. Members and visitors are requested to bring their own wines, if required.

HULL EXPERIMENTAL GLIDING CLUB.

This club continues to make good progress, and the majority of its members regularly take the air at week-ends. The method of tuition is auto-towing, using the aerodrome of the Hull Aero Club at Hedon.

LONDON GLIDING CLUB.

Sunday, January 29th.—East winds again. Brown was given his second day's elementary stuff, flying with great steadiness in the ancient DAGLING until finally he was a bit too steady and stalled it 10 ft. up. After which, as no one seemed sure whether the DAGLING's wings were, or were not, even more wobbly than before, the machine was put to bed to await an "exploratory operation." The WATSON-DAGLING was then auto-launched with various pilots, Hiscox kiting her up in fine HOL'S DER TEUFEL style. At last a burst tyre put a stop to the day's fun.

Our usual Club Note writer, having happily recovered from a nasty bout of 'flu, will now take over.

On Saturday, February 4th, in a viciously strong S.W. wind, Collins soared the KASSEL 20, and Robertson and Richardson flew the PRÜFLING down.

Sunday's wind was a stinger, ding-buster or pseudo-hurricane; more properly, a "Full-Morland." A blind-flying instructor at Heston, having emerged over Hyde Park, estimated the wind speed at those heights to be 90 m.p.h.

Flying started at Dunstable, with Mole soaring with a passenger in the KASSEL 2-seater; ground-speed steadily zero, air-speed steadily 50 m.p.h., machine unsteadily retaining its structural integrity. Collins then did some rather horrifying evolutions in the KASSEL 20, but stuck it for about a quarter of an hour. Dewsbery took the CRESTED WREN up for 22 minutes. He bashed his head three times on the leading-edge, and a heavy aneroid slung round his neck clouted him on the ear; yet from the ground he appeared to be steadier than the other machines. Collins had another soar, three-quarters of an hour; Thomas soared more briefly, coming down when he had had more than enough. Mole soared the PRÜFLING, all controls flicking; Robertson, Morland and Williams flew her down, landing here and there after some very fine scenic-railway effects.

Dewsbery spat on his hands and gave ten (10) consecutive passenger flights in KASSEL 2-seater with eight perfect first-guess hill-top landings. Lengths of flights, from 5 to 25 minutes. At 420 ft. above the hill, by aneroid, the machine was stationary at 43 m.p.h. air speed. The

passenger's cockpit was a rather miserable place to be in. The mere sight of the dual joy-stick furiously working made one feel rather giddy, and the general motion, even of that heavy machine perfectly piloted, was altogether loathsome. As one passenger so aptly put it: "No, I didn't get the wind up, but I was certainly filled with apprehension the whole time." He is now having another hard think before starting to build his own machine; he had not previously realised the magnitude of the stresses on a rough day. It certainly is a bit sickening, when you are sitting unoccupied and helpless, to see the two-seater's massive wing-tips twittering in the crashing bumps. And you have further food for thought when, in a bump, you get a mouthful of dirt from the skid!

The technique of the hill-top landings was something new on our site. Go out from the ridge, lose your surplus height, turn cross-wind, drift with 45 m.p.h. sideways ground-speed, turn into wind over the launching-point, and land with ground-speed zero.

After the tenth flight darkness had fallen. Dewsbery then consented to have tea. Thus is the standard of flying pushed up to thoroughly uncomfortable levels. Heaven send some gentle springtime zephyrs, so that some of us poor old geysers can take our air without blenching.

FROM BEAMSLEY TO ILKLEY IN THE "BAT."

An official Club report has already appeared in THE SAILPLANE of the Ilkley Club's recent soaring successes. These soaring feats, though trivial compared with those of the Barrow meeting, are of great interest to those people who have built, or are building, their own machines.

The BAT is a privately owned HOLS, built with the help of members and others in the Ilkley Gliding Club.

The Ilkley Club are convinced that it is as good a machine as can be found for the first soaring flights, as its slow speed and very lightly loaded wings make it capable of soaring in light winds, when there are no heavy gusts to confuse the young pilot.

The Ilkley Club have proved that it can also be used to make short cross-country flights. Piloted by Mr. H. S. Crabtree, it flew recently from the Beacon to Ilkley by way of Langbar, Nestfield and Middleton.

Luckily, only one patch of down current was flown through, just before the houses of Middleton were reached; and the pilot quickly realised that if he had had a slightly faster machine he would not have lost all the height which he did in this patch. But the height lost just before Middleton was reached, was compensated for by height gained at Nestfield, and also by height gained over the houses of Middleton itself.

The pilot had decided to turn up valley when he saw how rapidly he was losing height, but as he was about to turn he felt up-winds from the houses below, and this alone decided him to go on. All across Middleton he received good lift, and when he had passed over these houses, he was, if anything, a little higher than when he started to fly across them.

The machine, according to the pilot, behaved beautifully, and flew in such absolute silence, that often he could hear dogs barking, and cars climbing the hills below him.

Such flights are valuable, as they prove that pilots can also be good constructors, and need not be completely dependent on ready-made machines.

I believe that some of the leading English manufacturers of Sailplanes are now following the German principle of selling plans and metal parts.

Let us hope that at next year's competitions we shall see many more home-made and home-flown machines.

"SEGELFLIEGER."

OFFICIAL NOTICE

ANNUAL GENERAL MEETING.

The Annual General Meeting of the British Gliding Association will be held in the Library of the Royal Aeronautical Society, 7, Albemarle Street, W.1, on Monday, February 20th, at 7.30 p.m.

BLUE PRINTS.

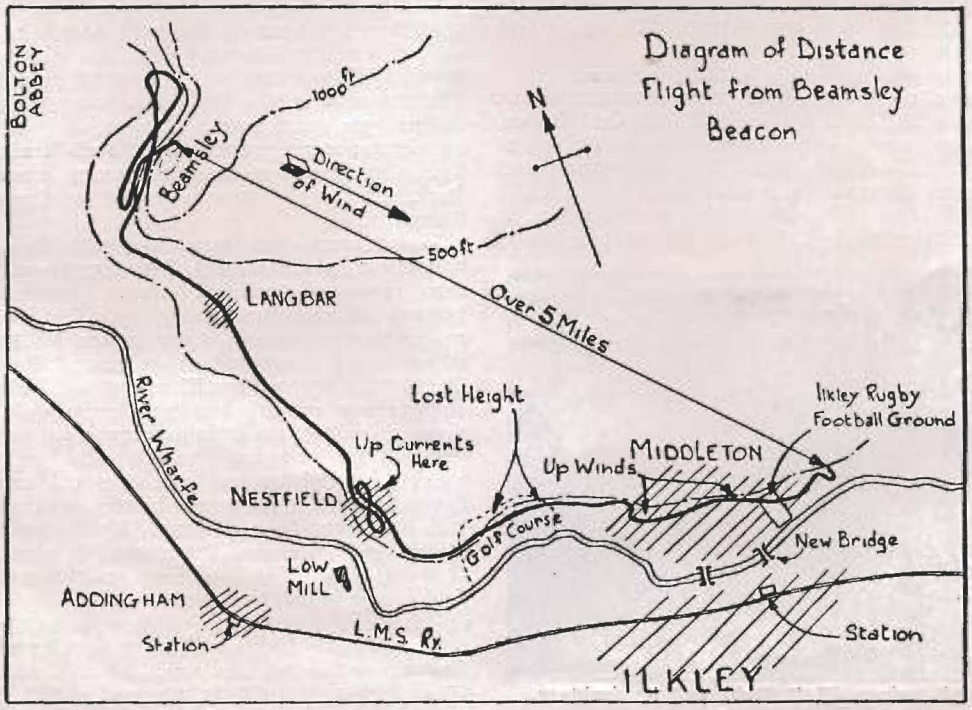
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by Robert Kronfeld.

The most interesting and informative book on the subject that has yet appeared in English. In addition to detailed accounts of famous flights, including those by the author, it contains chapters on elementary schooling; high performance flights; distance, cloud and thunderstorm soaring; auto- and aero-towing; and the design and construction of high efficiency sailplanes. A book that will appeal alike to beginners and to the advanced. 21/9 post free.

Sailplanes

By C. H. Latimer Needham.

A comprehensive treatise dealing with the design, construction and pilotage of Sailplanes. Indispensable to everyone who intends to take up gliding seriously. 15/9 post free.

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