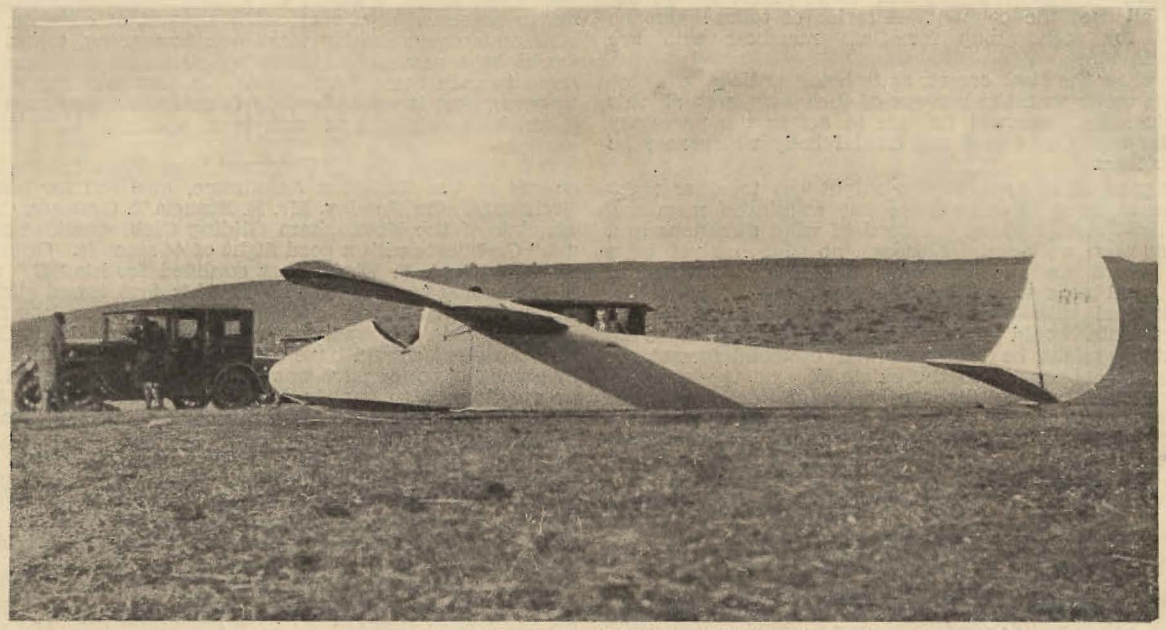
Mar. 27, 1931. Vol. 1. No. 29.

THE SAILPLANE AND GLIDER

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SHAPELINESS.



A side elevation of the R.F.D. sailplane showing its clean lines. The short centre-section is in place in the picture. This gives the machine the same area as, but a bigger span than, the Prufling.

A BEGINNING.

This week we publish a condensed version of the lecture which Captain Entwistle read before The Royal Aeronautical Society and The British Gliding Association on Feb. 26. We would recommend all our readers to apply to the Secretary of the R.Ae.S. at 7, Albemarle Street, W.1, for a copy of the paper when it is printed in the Journal of the Society. It will serve as a very able introduction to that study of Meteorology without a widespread understanding of which we cannot go forward.

Although efforts are being made for the existing Meteorological Organisation to co-operate with, and assist, the Gliding Movement, various matters have yet to receive official sanction and therefore we must not go into any explicit detail in recounting what schemes are being threshed out. We can only hearten those who are waiting by outlining for their information a likely line of development.

First Clubs who are looking for sites, and most of them are still doing that, will want to know from what directions the wind most frequently blows in their district and with what strength. From such information they can tell, instead of guessing as heretofore, which way their site had best face. This information, as Captain Entwistle shows in his paper, is best conveyed by a "wind rose." We therefore hope to be able to publish shortly a series of "wind roses" for four or five districts covering the whole of England. These roses will be for each of the four quarters of the year so that Clubs will have available a large amount of valuable information.

Next Clubs want to know what conditions are going to be like at the week-ends so that the necessary arrangements can be made for soaring or instructional training, or, if necessary, complete cancellation of activity. This will do

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away with the wasteful expenditure of energy when members arrive at the site only to have to disband or spend all the day waiting for things to better.

It seems not unlikely that a special forecast for Clubs will be available for distribution on Friday night. Clubs will have to pay a small fee for this, but one imagines that a number of them would find it worth while.

We incline to the view that such meteorological co-operation would be assisted by the grouping together of Clubs in a common district round a central soaring site. One Hon. Met. Officer could be selected at a meeting of Clubs which could be called by any Club which had three or four members particularly interested in the subject. Surrounding Clubs could be asked to send along delegates. In fact we imagine for example that *The Northern Gliding Association* has all the necessary mechanism for such a step.

This Meteorological Officer could be responsible for the local dissemination of the decisions taken by his group on receipt of the forecast. Further, it seems likely, a number of professional meteorologists will be available for giving lectures all over the country. A series of talks might be arranged for each group for Club members who are interested.

Later when the time comes, as is being anticipated, that Clubs are ready to make surveys of their own ground, this Meteorological Officer will be able to act as the necessary liaison between Clubs and any official body which may be ready to help.

We suggest that such groups might get together right away, or at least if Clubs have any so-minded members, these might start to keep a record of wind directions and speeds at each week-end. Although no Club has yet been able to afford an anemometer, they all have or should have a wind sock which can be made for a few pence. This, coupled with observations made according to the Beaufort scale, would enable very valuable records to be kept. Notes might be taken as well of cloud formations and any indications as to the existence and track of up-currents. The soaring flight of birds affords a valuable indication here.

In fact let us train ourselves to collect data of such value that the day may come when we shall be able to render back to the Meteorologists the assistance they are bringing us now. We must not become accustomed to spoon-feeding.

THE NEW PRESIDENT.

Lieut.-Col. F. C. Shelmerdine, our Director of Civil Aviation, has consented to become the President of *The British Gliding Association*. The office has not been filled since the death of the late Air Vice-Marshal Sir Sefton Brancker.

THE FIRST BRITISH AUTO-TOWING SCHOOL.

During the Easter week-end B.A.C. Ltd. have made arrangements to run a course of auto-towing over the soaring ground of the Southern Soarers' Club. Mr. Lowe-Wylde has made a preliminary investigation and has decided that the ground offers excellent possibilities for auto-towing. The site has the further advantage that soaring flight is definitely possible so that pupils can progress from novitiate stage until they actually soar.

For the Easter week-end pupils will be accepted by B.A.C. Ltd. on payment of a fee of three guineas which should cover the gaining of an "A" Certificate, only in the event of a pupil taking more than twenty flights will a further payment be demanded.

Using a soaring site for such work appears to us to be open to the objection that pupils when released might get lifted up and over the steeper sides of the ground with unfortunate results. But as we have yet to see which parts of the ground are to be so used any criticism must wait until we have seen whether such an eventuality is possible.

REACTIONS FROM NOTTINGHAM.

During the twelve months in which the writer has been connected with Gliding and Motorless Flight, he has never met anyone who worked so hard and who was so keen as Mr. Lowe-Wylde and his associates when they gave their demonstration of Towed Flight with a B.A.C. glider and sailplane at Tollerton N.F.S. Aerodrome, on Mar. 21 and 22. One or other of the B.A.C. machines was on the move all the time, either in the air or back from the landing point to the launching point, on both days.

The demonstration was a tremendous education for the representatives of Gliding Clubs who were present from Nottingham, Leicester, Sheffield, Matlock, Warwick, and Staffs. The opinion of practically all those representatives was that, given a motor of sufficient horse-power and a driver possessed of a reasonable amount of common sense, who understood exactly what was happening, towed flight would be a means of instructing *ab initios* sufficiently for them to gain their "A" tickets. It was definitely decided, however, that it would be folly to attempt towed flight with a machine which had not been specially built for the purpose.

On Saturday, Capt. Sheppard, the Pilot Instructor in charge of the Tollerton Aerodrome, qualified for his "A" Certificate. On Sunday, Mr. R. Francis T. Granger, Council Member of the Nottingham Gliding Club, qualified for his "A" Certificate with a good flight of 44 seconds. On Sunday morning Capt. E. W. Stewart qualified for his "B," and it is interesting to note that he had his first towed glide last Sunday, March 15, and obtained his "A" after four flights.

It had been arranged that members from all the Gliding Clubs present should have a flight in turn, but in the late afternoon a power pilot was launched for his second flight in an attempt to qualify for his "A" Certificate. Unfortunately, he misjudged his distance and overshot the aerodrome. The fact that he had difficulty in clearing the boundary hedge caused him to do a pancake landing which broke the back of the fuselage. The howl of disappointment which went up from the gliding fraternity could no doubt be heard for miles around. The only consolation was that it was not a mere glider pilot who had had this misfortune.

In spite of the fact that Mr. Lowe-Wylde must have been very tired, fed-up and far from home after he had packed up the broken fuselage, he very cheerfully gave the gliding enthusiasts present an interesting talk on towed flight and cleared up many points and answered many questions. There is no doubt that Mr. Lowe-Wylde has studied the difficulties and requirements of Gliding Clubs and, bearing these points in mind, has evolved a system whereby the Movement can definitely make progress. He certainly put heart into a large number of enthusiasts who were present and made more concrete the dream of soaring flight for all of us.—W. S. B.

BIRTH.

Abdallah.—On Mar. 13, at Harrow, to Nancy (née Garton), wife of H. A. Abdallah—a son.

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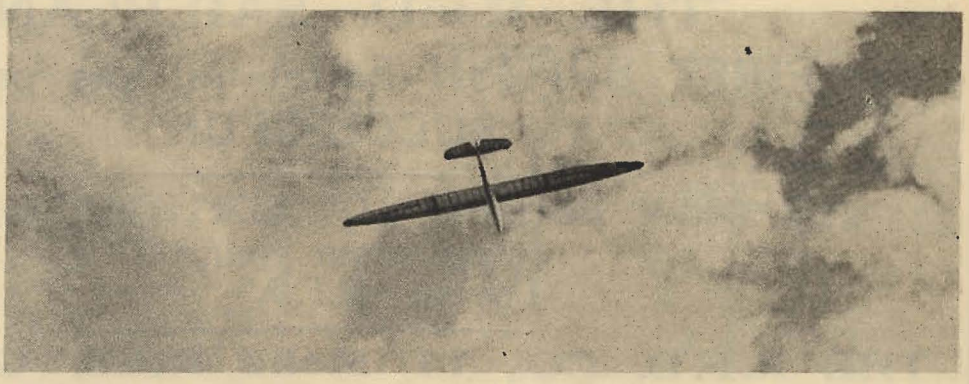
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SAILPLANE TECHNOLOGY.

METEOROLOGY AND MOTORLESS FLIGHT.

By
Captain F. Entwistle, B.Sc.



[*This article has been condensed from the lecture which Captain Entwistle read on Feb. 26 before a joint meeting of The Royal Aeronautical Society and The British Gliding Association.*—Ed.]

The necessary conditions for gliding and soaring flight were first definitely enunciated in 1883 by Lord Rayleigh, who expressed them in the following terms:—

Either (1) the course is not horizontal, or (2) the wind is not horizontal, or (3) the wind is not uniform.

The first of these conditions is that of ordinary gliding, the second and third alternatives relate to soaring flight. The second and, from the point of view of present-day soaring, the most important alternative, refers to the case in which there is a sufficiently strong upward component to the wind stream to sustain the machine without loss of height, whereas the third alternative represents the more theoretical case in which the energy for soaring is derived from the fluctuations which occur in a turbulent wind. To the latter case the term "dynamic soaring" has been applied by Lanchester.

THE STRUCTURE OF THE WIND.

The disturbances which prevent the regular flow of wind over the earth's surface may be divided into three categories. First, small-scale disturbances which are the direct result of turbulence and are due to surface friction. Second, intermediate disturbances due to larger obstructions in the path of the wind or to moderate convection. Third, large-scale disturbances due to masses of high ground or to strong convection.

Small-scale Disturbances.

Gustiness.—It is a well-known fact that the wind near the ground is rarely steady, but that it blows in a succession of gusts, and lulls, both speed and direction varying from moment to moment. This "gustiness" is well illustrated in the records from a Dines' pressure tube anemometer, which reveal that the velocity trace is not a straight line as it would be in the case of streamline motion, but that it consists of a succession of short period up-and-down oscillations. The direction trace has a similar character.

It is seen, further, that the range of gustiness increases as the average wind speed increases; the one is, in fact, directly proportional to the other. The range of gustiness also depends on the nature of the surface over which the wind is blowing.

Gusts have been found to retain their individual characters over a period of time and selected individual gusts can be traced by their characteristics from one record to another.

We may picture the air near the ground as full of approximately circular but somewhat flattened eddies rapidly forming and dissipating again, and having axes of revolution in all directions. The eddies owe their origin to friction between the moving air and the surface of the ground. The eddy motion increases as the mean wind increases and varies with the nature of the surface over which the wind is blowing.

Effect of Temperature.—The question now arises as to what happens at some height above the surface of the ground. It follows from a consideration of the cause of formation of eddies that on the average eddy motion will tend to decrease with height, but in order to answer the question more fully, it is necessary to consider the temperature of the air and the manner in which it varies with height above the ground. On the average, temperature falls off with increasing height, the average rate of decrease being 3 deg. F. per 1,000 feet, although the actual rate of decrease or "lapse rate" on a particular day may differ considerably from the average value, particularly in the lower layers near the ground.

There are two extreme cases which it is necessary to consider from the point of view of the present discussion. The first is that in which the thermal structure of the air is said to be "adiabatic." This may be understood by considering a mass of air near the ground which becomes heated above the temperature of its surroundings and rises. As the air rises it becomes cooled by expansion owing to the fact that pressure diminishes with increasing height. If there is no gain or loss of heat from the outside, the air, provided it is not saturated with water vapour, becomes cooled at the rate of 5½ deg. F. per 1,000 feet.

This particular rate of decrease of air temperature with height is called the "dry adiabatic lapse rate." It follows that if the general lapse rate in the lower atmospheric layers is greater than the dry adiabatic, air rising from near the ground will go on rising, for at any height it will be warmer, and therefore lighter than its environment. In such conditions the atmosphere is said to be *unstable*.

The second case is that in which the temperature of the air, instead of decreasing with height, actually increases, forming an "inversion." This is a very stable condition, for any tendency on the part of the air to rise is immediately checked.

The temperature considerations just described have a very important bearing on eddy motion. The more the temperature lapse rate approaches the adiabatic state the more the eddies formed near the ground tend to spread upwards and to grow, while in an inversion they tend to keep near the surface of the ground and to be damped out. It follows that on the average these disturbed conditions extend to a greater height in the day than at night, and also to a greater height in summer than in winter.

Formation of Cloud by Eddy Motion.—Eddies near the ground are made visible to the eye by a trail of smoke, for example, from a factory chimney. In the upper air they frequently give evidence of their existence in the formation of cloud. One type of cloud produced by eddy motion is the familiar strato-cumulus which, in its most typical form, covers the sky either as a continuous sheet or in broken patches, the cloud being arranged in waves or rolls which are evidence of the turbulent motion within and beneath it.

The formation of these clouds is explained by the spreading upwards of the eddies set up near the ground by a wind current blowing over a relatively warm surface. The turbulent mixing of the air in successive horizontal layers results in a temperature lapse rate approaching the adiabatic state. The moisture carried upwards by the eddies condenses, forming a sheet of cloud which extends from the level at which the dew point is reached to the top of the layer affected by the turbulence. The temperature at the top of this layer having been reduced by the eddy mixing, there is, in a well-developed strato-cumulus sheet, a pronounced inversion above the cloud, the air at this level being undisturbed in contrast to the turbulent conditions within and beneath the cloud.

Another example of cloud formed by eddy motion is the ragged broken cloud which forms below rain clouds in bad weather, the moisture being carried upwards in this case by the eddies from the saturated air near the ground. If the wind is strong this cloud appears in large heavy masses.

Intermediate Disturbances.

Topographical.—It was stated in the preceding section that the eddy motion produced in a current of moving air depends on the nature of the surface over which the wind is blowing. Eddies are formed when the wind blows over a level surface such as a stretch of sea or open grass land, but obstacles such as hedges, houses and trees increase the eddying considerably and also the height to which the effects are felt. In the case of a large obstacle such as a house or a hangar much larger eddies are produced than in the case of wind blowing over, say, on open grass land.

In the case of wind blowing over broken ground we can therefore picture the disturbance as consisting of a number of large eddies with smaller eddies moving within them.

As in the case of the smaller eddies alone, the disturbance would be transmitted upwards to a greater height on a day when the temperature lapse rate was larger than it would be on a day when the atmosphere was relatively stable. In the latter case, when conditions are steady, the wind stream tends to follow the contours of the ground.

THERMAL EDDIES FORMED BY HEATING OF GROUND.—There is another way in which disturbances of appreciable size can be produced, and that is by the process of convection, or the ascent of air which has been warmed by contact with the ground. All air pilots are familiar with disturbances of this kind. On a hot day, as the surface of the ground becomes heated, the atmosphere rapidly approaches the unstable adiabatic state and streams of air flow upwards from the ground. A small cumulus cloud forms at the top of each rising current and between the clouds are found regions of descending air or return currents which restore the balance of the circulation.

In the absence of definite measurements it is a little difficult to picture the exact air circulation between the ground and the level of the cumulus clouds. Near the ground there is rarely a definite upward current, the air rising in thin streams which are intermingled with streams of descending air. As a cumulus cloud grows, a powerful upward circulation develops within it and this draws in air from lower levels. The upward current thus reaches its maximum intensity immediately below and within the cloud.

On days of strong surface heating marked contrasts are observed over different kinds of ground. Bare rocky or sandy soil becomes heated much more rapidly than land covered with grass or vegetation, or open water, and marked up-currents may be observed over the one and down-currents over the other. Even over a tarmac road passing through cultivated land a definite up-current may be felt.

SQUALLS PRODUCED BY FLOW OF COLD AIR OVER RELATIVELY WARM SURFACE.—As another example of the formation of relatively large disturbances by convection may be cited the case in which a cold wind current from high latitudes reaches this country after passing over a stretch of relatively warm sea. Owing to surface heating the air becomes unstable up to considerable heights and disturbances in the nature of squalls develop in the wind current, superposed on the smaller eddies which are formed as previously described.

Squalls of the character indicated would usually be marked by a strong upward current in front of the squall and a more gradual descending current behind it, the horizontal dimensions of the upward current being smaller than those of the descending current.

LARGE-SCALE DISTURBANCES.

TOPOGRAPHICAL.—Large-scale disturbances in which upward currents of considerable horizontal dimensions occur form the most important class of disturbance from the point of view of soaring flight. As in the case of intermediate disturbances these large eddies are of two main classes, viz., those caused by topography and those due to convection. Of the first type the most persistent upward currents are found in the case of a definite wind current blowing at right angles to a ridge of hills or mountains, the upward current being strongest just above the crest of the slope on the windward side. The strength of the up-current appears to depend on the slope of the hill rather than on its actual height. A corresponding downward current occurs on the leeward side of the ridge.

The actual wind circulation over the hill depends on a number of factors. If both windward and leeward slopes are gradual and the surface is smooth, a steady non-turbulent wind will blow over the hill without forming any appreciable eddies, giving a gentle upwind on the windward side and a downwind on the leeward side. As the slopes become steeper, a return upward current may be observed close to the hill on its leeward side. This return current is more pronounced in the afternoon if the leeward side faces south, owing to the sun warming the slope. Between the downward current and the return up-current there would frequently be found a shadow area in which there was no marked wind circulation

If the surface of the hill is broken or if the wind is strong and the temperature lapse rate large, *turbulent conditions may be experienced at any point in proximity to the hill.* In the case of a cliff with a steep face the circulation is more complicated than in the case of a ridge with sloping sides, and dangerous eddies may occur, particularly if the direction of the wind is such that the steep side of the cliff faces to leeward. These eddies may extend for a considerable distance to leeward from the cliff.

If the wind is blowing over hilly country parallel to the direction of a main ridge which has spurs running out at right angles to the direction of the wind, eddy effects are produced in the valleys between the spurs.

THUNDERSTORMS.—The thermal conditions which are favourable for large ascending currents are a development from the conditions described under the heading of "Intermediate Disturbances." They are associated with a large temperature lapse rate and, when fully developed, produce thunderstorms. The necessary conditions may be brought about by strong surface heating of the ground on clear days, with light winds in summer, or by the setting in of a relatively cold upper current over a warm surface current. The strong vertical circulation which results leads to the formation of very large cumulus clouds, the rounded heads of which are seen pushing upwards and outwards. When fully developed the top spreads out into a flat-topped anvil-shaped projection.

The strongest upward current occurs in front of the cloud, while within the cloud very turbulent conditions are experienced.

LINE-SQUALLS.—Strong upward currents, extending along a line many miles long, may occur in connection with a line squall. This phenomenon is associated with the "cold fronts" of moving depressions of temperate latitudes, along which the cold current in the rear of the depression is undercutting the warmer air of the "warm sector."

The strongest upward current occurs at the tip of the wedge of advancing cold air and may give rise to the characteristic long roll cloud of a line-squall. If the warm air in front of the cold wedge is sufficiently unstable a large towering cumulus will form, with the possibility of thunderstorms. The actual conditions which accompany the passage of a cold front depend on the physical properties of the air masses in juxtaposition and may vary between a weak convective circulation, with, perhaps, a little rain, and strong vertical currents with thunderstorms and hail. Frequently a descending current occurs behind the front, but this is usually relatively gradual and is spread over a much wider area than the more intense upward current in advance of the front.

VERTICAL CURRENTS ASSOCIATED WITH SEA BREEZES.—Definite but less intense ascending currents may extend along a coast line on a hot day in summer, being associated with the sea breeze which, in favourable conditions, sets in during the morning and reaches its maximum strength in the early afternoon. Evidence of the ascending currents is provided by the line of cumulus cloud which forms over the land parallel to the coast line. Corresponding descending currents frequently occur in such conditions over the sea.

SUMMARY.

I have endeavoured in what precedes to present a broad view of the conditions which may occur in the atmosphere to produce, on a small or a large scale, a vertical component in the motion of the air. We can sum up by saying that conditions may vary from the stable state represented by an inversion of temperature, in which turbulence would be reduced to a minimum and the wind would tend to follow the contours of the ground, to the large and sometimes violent ascending currents associated with line-squalls and thunderstorms. Intermediate between the two extremes there may exist eddies of varying size, according to the strength of the wind and the topography of the country, conditions being more disturbed as the vertical temperature distribution approaches the adiabatic lapse rate.

MAGNITUDE AND EXTENT OF VERTICAL CURRENTS.

Data regarding the magnitude and extent of vertical currents are very scarce. The normal method of obtaining information regarding wind currents is by sending up a small rubber balloon filled with hydrogen to rise at a predetermined rate.

The magnitudes of vertical currents measured by the pilot balloon method are not of a very high order. This result is to be expected since only mean values through a given layer are obtained. Of 305 upward currents observed at the lower levels in a particular year 45 per cent. were less than 5 ft./sec. 42 per cent. were 5 to 10 ft./sec. and 13 per cent. were greater than 10 ft./sec. Of the descending currents observed, 62 per cent. were less than 5 ft./sec. and only 4 per cent. greater than 10 ft./sec. The highest frequency of ascending currents was found below 1,500 ft., the frequency decreasing with height. The maximum frequency of descending currents was found between 1,500 and 3,500 ft.

Individual cases of special interest have been noted occasionally. An outstanding example is that of an ascending current of 27 ft./sec. observed between 1,500 and 2,000 ft. at Larkhill in unstable polar air in April 1921.

With regard to the more intense vertical currents which are associated with thunderstorms and line-squalls, an estimate of the magnitude of the ascending current can be obtained from a consideration of the strength of current required to hold up a hailstone of known diameter in the air during its formation. Thus a hailstone .5 in. diameter indicates an up-current of 53 ft./sec., whereas one of 3 in. diameter indicates 132 ft./sec. Records show that on June 12, 1919. at Branxholme, nr. Teviothead, size of hailstones were 2.3 inches approximate, indicating a vertical current 120 ft./sec. Similar cases occurred at Tunbridge Wells in 1922 and Plumstead in 1925.

Information regarding large vertical currents has occasionally been obtained from pilots who have been caught in thunderstorms or line-squalls. Two outstanding examples come from America. In the first the vertical air current in which the aircraft was caught was of the order of 125 ft./min. The second example occurred during the flight of an air mail pilot from Dallas, Texas, to Kansas City, when the upward velocity was 133 ft./sec.

APPLICATIONS TO GLIDING AND SOARING FLIGHT.

In choosing a permanent gliding ground considerations will be governed by the ultimate use which is to be made of the site; if it is to be used for training purposes only, requirements will differ from those in regard to a site which is to be used as the starting point for soaring flights. For the latter the ideal site is a ridge of high ground with smooth slopes facing in as many directions as possible. The actual elevation of the ground is of secondary importance to the question of slope.

A hill 500 to 700 feet high, or even less, will produce definite up-currents suitable for soaring provided the slope is sufficiently steep. As it is usually difficult to find a site with the right kind of slopes facing in different directions, attention should be given to the frequencies of winds from different directions over the area under consideration, and the main slope should be selected to face the direction of the prevailing wind. Further, as the question of wind speed is of importance, both from the point of view of training and also from that of flying in different types of gliders, the question of the frequencies of different wind speeds from each direction is almost as important as that of the frequencies of different directions. In fact, in a particular case, it might be found desirable to select a slope which did not face towards the prevailing wind direction.

Frequencies of different wind directions and speeds are available for a large number of places in this country. The most convenient way to summarise the information is by means of a "wind rose." ("Wind roses" will shortly be made available for gliding centres throughout the country.)

The ideal slope for gliding purposes is one of which the length is straight or slightly concave. A narrow hill having a steep cliff-like side to the leeward of the direction which is to be used should be avoided owing to the eddies which may be set up in such a case. If the topography of the reverse side of the hill is of this nature, the top of the hill should be of sufficient width to permit landings without entering the dangerous eddy area. This consideration is obviously of fundamental importance in choosing a site for training purposes.

TOWED GLIDING.

Experiments in gliding flight have been made recently in which, by using a motor-car to tow a glider across a level aerodrome, sufficient forward speed is gained to provide the lift necessary for the glider to rise to an appreciable height in the air. The information available at present suggests that the up-currents which occur near the ground are not sufficiently steady or continuous to permit of their being utilised for soaring flight after the initial elevation of the glider. I should not like to say that it is impossible that the glider could remain aloft on certain isolated occasions, but the requisite conditions do not occur with sufficient regularity to make this kind of towed gliding a practicable means to soaring flight. It seems likely, therefore, that the scope of towed gliding will be limited mainly to use for training purposes.

LONG-DISTANCE SOARING.

The considerations in the earlier part of this paper suggest at least four possible ways by which long-distance soaring flights may be accomplished. Conditions frequently favour the use of two or more of the suggested methods in conjunction.

(i) Utilising the up-currents along an extensive ridge of high ground perpendicular to the direction of the wind. As such ground is rarely continuous in a form suitable for providing uninterrupted ascending currents, the course for a long flight must be chosen so that sufficient height can be gained initially and maintained throughout the flight to negotiate the areas of down-current, eddies and shadow which may occur between the areas of definite up-currents. In selecting a permanent gliding site, the possibility of using the ground as the starting point for long flights of this kind should be taken into consideration.

(ii) Utilising the upward currents under a cumulus cloud to attain sufficient height to glide to the next cloud, then, after rising, to the next and so on, the initial lift being obtained from the up-currents produced by the hill which forms the home gliding centre. Suitable conditions for this type of flight occur, for example, in a north-westerly wind current following the passage of a cold front.

[*Here one should point out that in* 1922 *Captain Entwistle referred in print to the possibility of cloud soaring.*—ED.]

(iii) Utilising the upward current along a coast-line during a sea breeze in summer. The south coast of England is probably the most suitable for this purpose, partly because it is less irregular than the other coasts, partly because the sea breeze frequently reinforces the existing south-westerly circulation and so provides more definite soaring conditions, and partly because along a considerable length of the coast there is high ground which reinforces the upward current.

(iv) Utilising the upward current in advance of a cold front. This method has been used successfully by Herr Kronfeld in Germany. Flights of considerable duration should be practicable by this means.

It should be pointed out that this country is eminently suitable for soaring flights, both circumscribed and of long duration. The topography of the country is almost ideal for the purpose, with its long stretches of downs and, in certain parts, its mountain ranges. The weather is such that the necessary meteorological conditions for soaring flight occur frequently. There are long stretches of coast-line along which the sea breeze prevails on warm summer afternoons. Further, the meteorological situation is such that cold fronts frequently pass across the country from west to east and thence to the Continent. *A long-distance flight starting at a selected point in the south of England and crossing the Channel to the Continent should be feasible by this means.*

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(AS SUPPLIED TO THE LONDON GLIDING CLUB)

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By

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CORRESPONDENCE.

Mr. Lowe-Wylde Takes Up the Cudgels.

Sir,—It is always very regrettable to see people rush into print and state their considered opinions on subjects with which they are not entirely "*au fait*," but when they go so far as to admit their incomplete knowledge of a subject, it seems all the more incomprehensible why they compromise themselves at all.

Your correspondent of the Ilkley Club—Mr. N. C. Hodgson—is of course entirely wrong in his second paragraph:—The B.G.A. have *not* prohibited Auto-Towing! Unfortunately the circular memo. issued by the B.G.A. was worded so ambiguously that hardly anyone realised that The British Aircraft Co. (now B.A.C. Ltd.) had been engaged in the development and demonstration of Auto-Towing for and on behalf of the B.G.A.; and that the recent meetings throughout the country had been specifically arranged by the B.G.A. and B.A.C. Ltd., with the kindly and valuable assistance of Colonel The Master of Sempill and his fellow-directors of N.F.S. for the education and edification of the whole Gliding Movement.

At the same time, it is strange that club people have allowed themselves to be misled considering the great pains of the B.G.A. to inform every club of the dates of the demonstrations and the invitations issued to all interested. Obviously, no authoritative body would deliberately go to such lengths to invite people to go and witness anything they intended to veto.

In Mr. Hodgson's third paragraph he first states that he considers Auto-Towing dangerous, then goes on to confess that he has not seen much of it and is therefore not qualified to give an opinion. Comment on this is unnecessary!

With reference to his point that capable instructors are necessary I would definitely state that if by the efforts of one capable person gliding instruction can be imparted more quickly, cheaply and safely, then on the latter score alone no excuse exists for not having such an individual.

Two experienced instructors are definitely not necessary unless more than one machine at a time is being operated.

As you yourself point out, Sir, the recent lamentable fatal accident was not due to Auto-Towing, but to a mechanical catapulting system.

I consider it high time that this entirely erroneous prejudice against Auto-Towing (based on the idea that catapult launching is safer) was finally disposed of. The whole idea behind the diversity of launching methods is that of obtaining longer glides. Given machines and pilots of equal capabilities, the length of a glide definitely depends upon the height of the start in the case of hill work, or the amount of power imparted to the machine in the case of level ground operation. The term "Power" involves factors of time and distance.

To obtain a long glide by means of a catapult launch of any description, the same amount of power has to be crammed into a distance of about fifty yards as Auto-Towing demands in a distance of about four hundred yards.

Even in a dead calm, an auto-towed glide only demands an acceleration to 35 m.p.h. No car likely to be used for such a job on an aerodrome will accomplish this in less than ten seconds. The catapult has to reach this speed in about 0.4 seconds.

Our two auto-tow demonstration machines have now made, between them, over 900 flights, involving a flying time of something like 15 hours. There have been three mishaps involving structural damage other than bent axles and they have all been caused by power pilots of experience, who stalled. Stalling has nothing to do with the method of launching!

Finally, may I point out that during his recent visit to England, Herr Lippisch witnessed and actually experienced Auto-Towing. He was so impressed that he announced his intention of trying to get it adopted in Germany.

(Signed) C. H. LOWE-WYLDE.

From Oxford.

Sir,—Please accept my congratulations on the constructive and vigorous policy of your paper. It is good to read that "the B.G.A. is so impressed with the possibilities . . . . of auto-towing," even if that impression has been formed *after* some of the Clubs have had considerable experience. If the B.G.A. is to encourage Gliding, which I believe is one of its objects, it will have to have a more active and progressive policy than it has shown in the matter of towing. The desire to avoid accidents is a proper one, and one which we should all share, but to achieve that end by a ban on towing, is akin to refusing to cross the road in case of getting killed. Exactly how a permit will avoid an accident has not yet been explained.

Mr. Norman Hodgson apparently regards man as being made for the law and not the law for man. He is "inclined to think that Auto-towing is more dangerous than the catapult-launching method." What *facts* incline him that way? Has he had Experience, or has he heard that several pilots have been killed in *airplane* towing. I have yet to hear anyone who has tried auto-towing describe it as dangerous. Admittedly it can be made dangerous, so can crossing the road. With reasonable care and a car speed up to 35 m.p.h. a serious accident is highly improbable. After trying both methods I am confident that Auto-towing is far the safer.

Would it not be better for the B.G.A. to *lead* the way rather than see what the Clubs are doing and tell them they must *not*. If the ban could be enforced, which is improbable, how will that help the Gliding Movement? What reason have the B.G.A. to think they are the only persons who know anything about towing. I would suggest that they find out *from the Clubs* what are the best and safest ways of towing and then issue the information to all the Clubs so that if any of them wish to try it they will have the benefit of the experience of others. Is not that the function of a central association?

I am hoping that this season the B.G.A. will get further North than Brighton.

(Signed) E. WALPOLE.

From Captain Lander's Father.

This letter appeared in *The Daily Telegraph* for Mar. 19:—

To the Editor of *The Daily Telegraph*.

Sir,—Capt. T. E. Lander, who was killed on the 8th inst., was my son. I attended the inquest, which was held on the 12th inst., and shall be grateful if you will allow me to state that the evidence showed most clearly that there was nothing wrong with *The Scud* glider, which had been most successfully flown for over an hour on a previous occasion, and that no blame whatever attached to anyone who helped with the launching.

The accident was due to a miscalculation by my son of the probable result of launching this particularly light machine (less than half the weight of the Prufling that he was accustomed to) with an engine of more than twice the power of the one he had previously used.

I am convinced that if *The Scud* had been launched by man-power in the usual way, or if my son's heavier Prufling had been launched with the more powerful motor, no accident would have occurred.

Those who were helping had not had nearly as much experience of flying as my son; they did as he directed, and I am certain that, if he had recovered consciousness after the crash, he would have said that if anyone could be blamed for making the experiment it was himself alone.

I think it right to ask your permission to publish this statement in the interest of gliding as a scientific sport, and in fairness to the designer of *The Scud* glider and to Capt. Lander's friends who were helping him with the experiment.

I would also like to take this opportunity of expressing my appreciation of the exceeding care taken by the coroner to inquire into every detail which might throw light on the cause of the accident.—Yours, etc.,

T. E LANDER.

Auchtyfardle, Lesmahagow, Mar. 18.

NEWS FROM THE CLUBS.

THE BEDFORD GLIDING AND FLYING CLUB.

New members still continue to roll in, and we hope it will not be long before some extra machines can be procured. In the meantime, the "Dagling" is doing its full share of work, and in spite of the increasing attendance, the methodical system of training enables everyone to have a full share of glides.

Last week-end, although the weather was pleasantly summerlike, the absolute lack of wind or breeze made it difficult to get the machine off. However, the opportunity was taken to run all the beginners through and get them well used to the feel of being launched.

Everyone is looking forward to the Easter Holidays, when we intend, weather permitting, to put in every available second on the training ground.—A. W. H.

THE CHANNEL GLIDING CLUB.

Three visits have been made during the past week to the new site at Etching Hill, near Lyminge (previously reported in error by my brother-scribe as Itchen Hill). Conditions on Mar. 18 were none too good and nothing of a serious nature was attempted. Three new members were launched on their first flights and all showed promise in subsequent flips of quickly mastering the use of the controls.

Mar. 21 found the Clerk of the Weather in a kinder mood. A breeze of about the required strength blew straight up the slope and several flights in the region of 30 seconds were made. Mr. F. G. Whitnall qualified for his "A" Certificate with a splendid glide that carried him well down the slope. Mr. Whitnall was much in evidence on this day. He has perfected a very simple but at the same time a highly efficient quick-release for the tail of the machine.

This was tried out on Mar. 21 and justified the hopes of the designer. The device is bolted to the frame of the glider and is released by the pilot at will. I will not attempt to describe it at the moment as we hope to be able to forward to THE SAILPLANE a photograph which will give a clearer description of the mechanism than words will do. Sufficient to say that it is "the goods."

Conditions on Mar. 22 were fairly decent but not up to the standard

of the previous day. A good muster of members turned out and excellent flying was enjoyed. An all-round improvement in efficiency was noticeable and it will not be long before several members are following the example set by Mr. Whitnall. Repairs to the Zogling, which was damaged a week or two ago, have been commenced, and it is hoped to have this in service very shortly.—L. H. H.

THE HUDDERSFIELD GLIDING CLUB.

The Huddersfield Gliding Club has secured a new flying ground. It is situated near the Flouch Inn, which is to be found about eleven miles out of Huddersfield, through Newmill, on the main Sheffield Road.

Although the new terrain is not large enough for an "A" test, it is considerably better than the field the Club had been using at Bradley Bar. The field at Flouch is 340 yards long, and the slope faces west.

On Mar. 15 two important tests were made. The new ground was tested, and satisfaction was expressed with it; and the Club's Zogling was tried out after it had been extensively rebuilt by Mr. C. F. Brooke. The machine was wrecked when it was flown in a high and gusty wind some weeks ago, but Mr. Brooke has made a capital job of the rebuilding.

On Mar. 22 the Club began training at Flouch, under ideal weather conditions. The wind varied from ten to twenty-five miles an hour. Amongst the thirty-five flights made during the day there were some very good ones, and several pilots who started from the top of the slope had to put the machine down just inside the wall at the bottom. Mr. C. F. Brooke was instructor for the day.

One member made a very heavy landing, and the rudder-bar snapped in the middle. The Constructional Section effected a temporary repair, and flying was continued after only a short delay. When the new rudder-bar is put in it is intended to encase the middle portion in copper tubing to give it additional strength.

The Flouch ground is much higher above sea-level than the one at Bradley Bar. Consequently the air is rarer, and the members found the machine correspondingly less buoyant in flight.

A bogie was used for the first time for conveying the machine from the bottom of the field to the top. This had been made by the Constructional Section, and after each flight it was waiting at the bottom of the field for the machine to be lifted on to it. A Lea-Francis car was backed down the hill, glider and bogie were hitched up, and the members then found it very pleasant to watch the car tow the Zogling back to the starting point instead of themselves having to lug it there.

One member fitted a wind speed indicator he had made to the nose of the skid, but no pilot was proficient enough to have time to look to see what it was registering!

Training will probably be carried on at Flouch for some time—until the member acquire "air sense" and familiarity with the controls.—Zoo.

THE HULL EXPERIMENTAL GLIDING CLUB.

A new gliding Club which has recently been formed is The Hull Experimental Gliding Club, with headquarters at 288, Cottingham Road, in that City. The Secretary is Mr. S. Ellis. A good gliding site should be available at Spout Hill. Construction on an interesting type of primary trainer is starting in the Club's workshop at Hessle.

This machine is to be known as "The Radlock Trainer." It has been designed to have a better performance than other similar types to avoid the expense of an intermediate type. Provision is being made for the attachment of a nacelle. As can be seen from the line drawing the layout has been simplified in an effort to make erection and dismounting less troublesome.

Dimensions.—Span 38 ft., Chord 4 ft. 6 in., Length 17 ft., Height 7 ft., Wing area 171 sq. ft., Weight empty 182 lbs.

THE MANCHESTER R.Ae.S. GLIDING SECTION.

On Mar. 17 a strong contingent of members replied to the kind invitation of the Bolton Gliding Club and attended a most interesting lecture on Gliding and Soaring, by the famous German expert, Herr Magersuppe.

At the conclusion of the lecture silent films, depicting "A Day with the Scarboro' Gliding Club," and also "A Visit to the Wasserkuppe," were greatly enjoyed, and, incidentally, proved what great strides had already been made in the art of gliding, and, more particularly, the real thing, soaring and sailplaning.

The Bolton G.C. are to be congratulated for arranging for a demonstration by Herr Magersuppe, of his sailplanes, on Mar. 28-29, at their flying fields near Harwood, Bolton, Lancashire. It is also probable that the two-seater Poppenhausen will be available for joy-rides.

Many machines have been promised for the demonstration, and all interested should endeavour to come as early as possible on those days.—G. M.

THE NOTTINGHAM GLIDING CLUB.

At the Club's first Annual General Meeting, held on Mar. 20, the Draw took place, and the following are the numbers of the winning tickets:—4470, 1882, 4130, 2156, 4241, 3936, 3175, 1451, 3039, 3028, 3985, 2185, 4219, 4720, 4214, 2026, 1441, 4248, 4789, 4304, 3599, 4781, 1697, 3639, 4156, 1892, 4038, 3602, 1368, 4230, 1672, 4533. Prizes have been sent direct to the winners.

Will those Clubs who were kind enough to sell some books of tickets in this Draw convey our Club's sincere thanks to those who purchased tickets?

The following members were elected or re-elected to the Council:—President: Major S. A. Currin. Vice-President: Lord Belper. Chairman: Mr. L. H. Button. Hon. Secretary: Mr. L. Burbidge. Treasurer: Mr. J. E. Leaton. Council: Messrs. C. W. Baker, G. D. Blackmore, W. S. Bullivant, F. Granger, M. H. Lee, H. A. Searby.

The activities of the Club were reviewed for the past twelve months, and it was surprising what a terrific amount of work had been done and progress made during that period, four demonstrations and two lectures, all of which had furthered the Movement and gained new members.

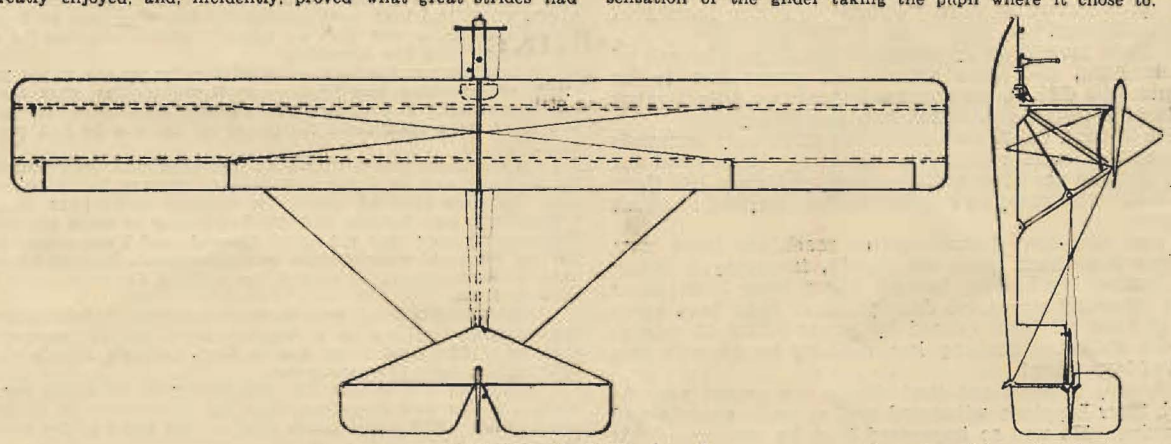
It was pointed out that arrangements are being made for a big demonstration of Sailplaning and Gliding to take place on the outskirts of the City, at the end of June. We are hoping that a large number of Clubs in the Midlands will participate in this demonstration. Competitions will be arranged. Details will be announced at a later date.

There was a very good muster of members during last week-end, Mar. 21 and 22, to see the demonstration of auto-towing given by Mr. Lowe-Wylde. This is reported elsewhere.

Our members were very pleased to have the opportunity of meeting members from neighbouring Clubs and it is hoped that we shall see more of them in the future.

THE WILTSHIRE LIGHT AEROPLANE AND GLIDER CLUB.

The W.L.A. and G.C. accomplished 19 glides on Mar. 14 on the primary training site at Easton Hill, kindly lent by Mr. Simper. The longest flight was 14 seconds and greatest altitude 30 ft. The sun was glorious and wind light. Most of the members were experiencing the delights of real control to direct their glider as distinct from the sensation of the glider taking the pupil where it chose to.



The "Radlock Trainer."

Captain W. L. D. Gundy visited the Club at work, with Mrs. Gundy and friends. He participated in the sport. He is probably the only Mayor (Devizes) in this country to have done so and we anticipate his valued assistance as our President as well as an influx of members from the Devizes area.

A further visit from a keen glider visitor from Germany added much interest to a glorious afternoon's sport.—C. T. C.

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