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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1933

This is the last issue of THE SAILPLANE that will appear in 1932. It is usual, at the close of a year, to review the past twelve months and set out the main lines of progress that have impressed themselves, to point out the errors or follies that might have been avoided and to apportion praise or blame where such are considered to be deserved. We will content ourselves with observing that those associated with the Gliding Movement in this country may congratulate themselves that they have been able, even with difficulty, to carry on throughout a third year, and will defer further comment until the British Gliding Association has presented its Annual Report and the future appears somewhat clearer than it does at present.

In the meantime there is evidence that clubs and individuals in all parts of the country are awakening to the urgent problems which confront the Movement. Our correspondence columns in the present issue bear eloquent testimony to this fact. We have refrained, hitherto, from commenting or expressing views of any kind on these vital matters, desiring rather that opportunity should be given to others who have definite opinions regarding the future of the Movement to ventilate their ideas in the columns of THE SAILPLANE. We would now remind readers that time is short and that the day when the future policy must be determined cannot be far distant. We have done our part, up to the present, in endeavouring to state, as clearly as possible, the main problems which confront the Movement at this critical juncture and to set out the various alternatives that are available.

The future of the Movement rests largely in the hands of the clubs and individuals throughout the country. It does *not* rest solely with the British Gliding Association, although the future controlling body must have a profound effect on the development of the Movement generally.

We would, therefore, urge one and all to awaken to the seriousness of the present moment and to make their contribution to the future of the Gliding Movement. One thing that is definite is that, if there is to be any progress in the future, the Movement must be purged of all interests other than that which is paramount. Self-seekers and those who are endeavouring to use the Gliding Movement to further their own private interests should be shown the door without any ceremony.

With these few remarks we will conclude by wishing all readers of THE SAILPLANE a happy, progressive and prosperous New Year.

TWELFTH RHON SOARING CONTEST 1931.

By Prof. Dr. W. GEORGII.

(Continued from p. 258, No. 22.)

The utilisation of ascending convection currents was heretofore handicapped by the question of frequency. Long-distance flights by the sole use of thermic upwind zones without cloud formation are possible only when thermic up-currents are frequent enough so that the pilot can feel confident of even accidentally finding the most usually invisible upwind zones, which are far from being local conditions. In this respect, Kronfeld's flight on the afternoon of August 5th, from the Wasserkuppe to Arnsberg (Westphalia), a distance of 165 km. (102.5 mi.) is worthy of note.

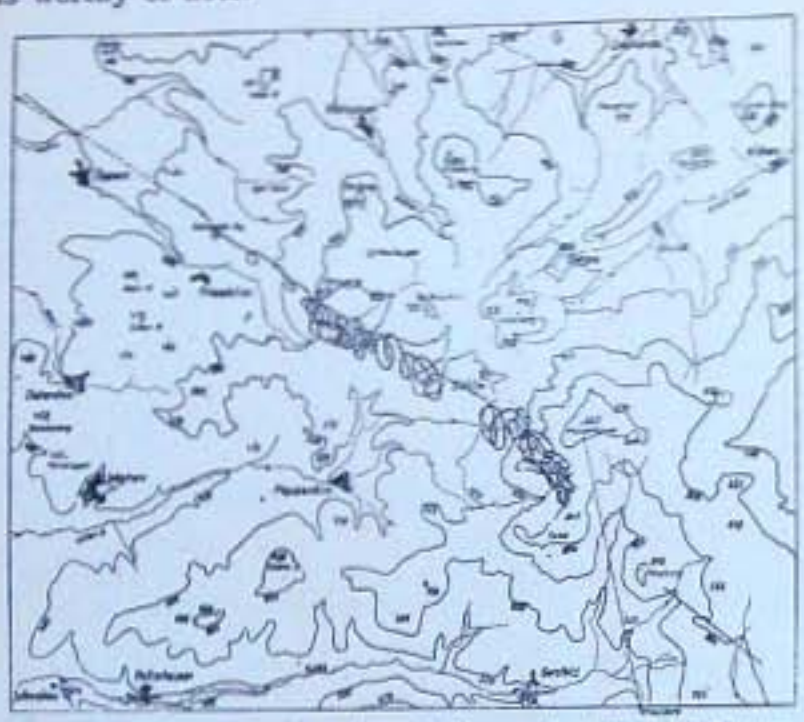


Fig. 6. Plan and elevation of thermal sailing flight by Kronfeld in the "Wien," August 5th, 1931.

On this particular day the atmospheric conditions were somewhat different from those on the other days. The air was dry-unstable up to 1,500 m. (4,920 ft.); from there to 2,000 m. (6,560 ft.) the stratum was neutral—in part, stable. Beginning at 2,000 m. the air became increasingly damp-unstable. The sky was almost cloudless. In the East, far from the Wasserkuppe, perhaps on the Thüringer Wald, a few cumuli could be seen. The escape of the instability of the atmosphere in the ambit of the Wasserkuppe was therefore restricted to the lower dry-unstable strata. It evidently lacked the impulse to release the damp instability of the upper layers. As a result, the convection current was confined to the strata below 1,500 m. The cloud upwind of the layers above 2,000 m. failed to release that day. Since the horizontal wind velocity did not exceed 5 m/s., it was extremely difficult to connect with the ascending convection currents. Only Kronfeld made a serious attempt, and even though the WIEN was superior to others as far as sinking speed is concerned, he had great difficulties in keeping in the slope upcurrent. He flew for over an hour, at times very low, on the slope of the Eube trying to gain altitude. At times it seemed hopeless, but after one hour he was able to get high enough above his starting height to rid himself of the slope and connect with the free ascending convection currents. His subsequent method of flight was again a masterly exhibition of the art of sailing flight and a classical example of thermic sailing, a fitting sequence of his earlier flights—his Himmeldankberg flight in 1928, and his 140 km. (87 mile) flight to Bad Hermsdorf in 1929. A glance at Figure 6 shows how Kronfeld, after leaving the slope of the Wasserkuppe, gained altitude after finding a convection zone. About 10 km. (6.2 miles) away from the slope, he was 600 m. (1,969 ft.) above his starting point. A section of the barogram of this flight (Fig. 7) is the best proof of his skill and resourcefulness. Ascent and descent follow one another with almost wavelike regularity. Rising, he circled in the found upwind zone, descending he endeavoured to locate a new upwind zone, always maintaining his course in the direction of the wind, so as to cover distance at the same time. He stayed aloft over six hours. Towards evening the intensity of the convection currents abated and he landed 165 km. (102.5 miles) away, at Arnsberg (Westphalia).

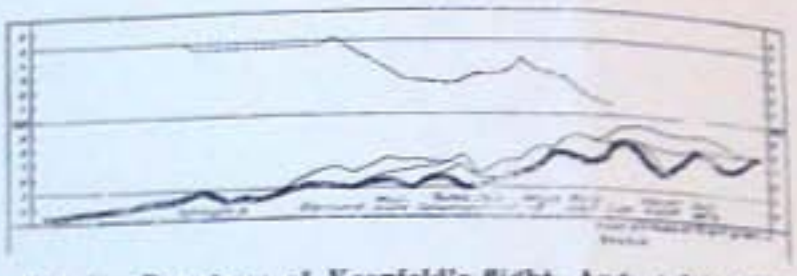


Fig. 7. Barogram of Kronfeld's flight, August 5th, 1931.

Apart from Kronfeld's feat, this flight offered the first important scientific information about the frequency of ascending convection currents. The flight proved that finding convection currents in sailing flight can actually be left to chance, because they apparently are so plentiful if the weather is favourable and the sailplane has enough altitude that a short gliding flight again leads to an effective upwind zone. For the rest, Kronfeld's flight indicates that the dependence of the ascending convection currents on the surface conditions of the ground (fields, woods, meadows, water, etc.) is not general, and may even be of a secondary nature. The systematic sequence of the upcurrents, manifested in the barogram, is not indicative of any marked dependence of the convection current on the surface conditions. It even appears possible that the certainly remarkable wavelike sequence of the upwind zones is not accidental, but rather contingent upon a certain systematic disposition of the vertical rearrangement of the unstable air masses.

Thermic sailing flight finds its greatest development in sub-tropical and tropical countries. It is entirely feasible that in such countries gliding may even attain real practical significance. It is for this reason that the International Committee for the Study of Motorless Flight laid particular stress upon exploration of thermic sailing flight in the tropics, during its October session in London.

The main feature, from the sports standpoint, of the whole contest was, without a doubt, the unique storm flight of July 25th. The sound of the siren notified the contestants of the approach of a storm front. Before its arrival the wind was from the South. Everybody awaited eagerly the shift of the wind to the West. At the instant the wind changed, the first machine started, eleven others following in quick succession within seven minutes. It was a sight never to be forgotten. The singleness of purpose and the cheerful enthusiasm with which even young pilots who had not learned as yet the secrets of storm-front sailing, took off for the heavy clouds amid thunder and flash of lightning, and the subsequent thick sheet of rain, were astonishing. Those not cognisant of the familiarity of the sailing-flight pilot with clouds or wind may have looked upon this start as foolhardy, daring, but the end of the flight proved that the pilot has ample presence of mind to entrust himself to the storm only so far and so long as it is of advantage for him to do so. A great number of the younger flyers were unable to accompany the storm front for more than 30 km. (18.6 miles. Röhm, in the STADT STUTTGART followed for 38 km. (23.6 miles). Hurttig in the MINISTER LEUSCHNER for 40 km. (24.9 miles), while Groenhoff and Hirth stayed with the front from the Rhön to the Elbe

river. The path of the storm of July 25th, 1931, is shown in Figure 8. At 5 o'clock the storm neared the Rhön, and 15 minutes later commenced the start at the Wasserkuppe. At 6 o'clock the storm front crossed the valley of the Werra, passed rapidly over the Northern Thuringian Forest, but clung for a long time to the Southern Thuringian Forest.

After 9 o'clock at night the storm gradually disappeared. Groenhoff and Hirth kept together in the van of the front as far as Erfurt, where they became separated, Hirth flew over Weimar-Apolda toward the valley of the Saale near Halle, where he landed after 8 o'clock at night at Schloss Friedeburg, having covered a distance of 175 km. (108.7 miles). Groenhoff left Erfurt for the North-East, and landed at 9 o'clock at Meitzendorf, a suburb of Magdeburg, after covering a distance of 220 km. (136.7 miles).

The altitude-time curves of this flight (Fig. 9) are extremely illuminating. After his start from the Wasserkuppe, Groenhoff quickly reached an altitude of 500 m. (1,640 ft.), but just as quickly lost it again in the lee of the Wasserkuppe. The same thing happened on the Hohe Rhön. A gain on the windward side of this mountain massif is followed by an extraordinarily pronounced drop in the lee of the Hohe Rhön. This downwind zone, which apparently weakened the front considerably, also was the cause of the premature landing of several flyers. Hirth's altitude-time curve is very similar, and likewise shows the effect of the terrain on the flight path. The two flyers did not reach the actual front until at the Geba, where both attained an enormous rate of climb. Groenhoff was carried from 900 m. (2,950 ft.) to 2,500 m. (8,200 ft.) in incredibly short time, his rate of climb reaching 7.9 m./s. (25.9 ft./sec.) at times. Hirth's altitude curve is identically the same, after having found the front a little later. For the next two hours the altitude-time curve of both showed the same typical, uniform course of other front sailing flights. Groenhoff's subsequent lap over Querfurt towards the Eastern foothills of the Harz was perfectly

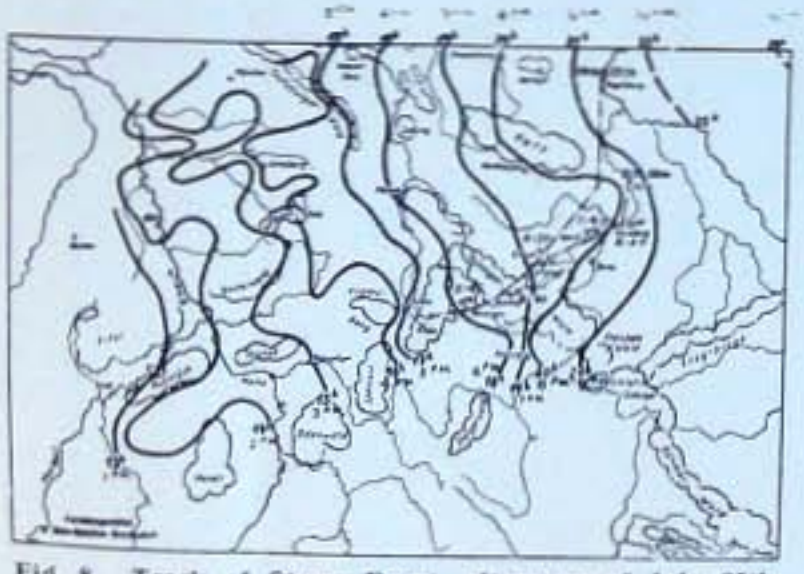


Fig. 8. Track of Storm Front, afternoon of July 25th, 1931.

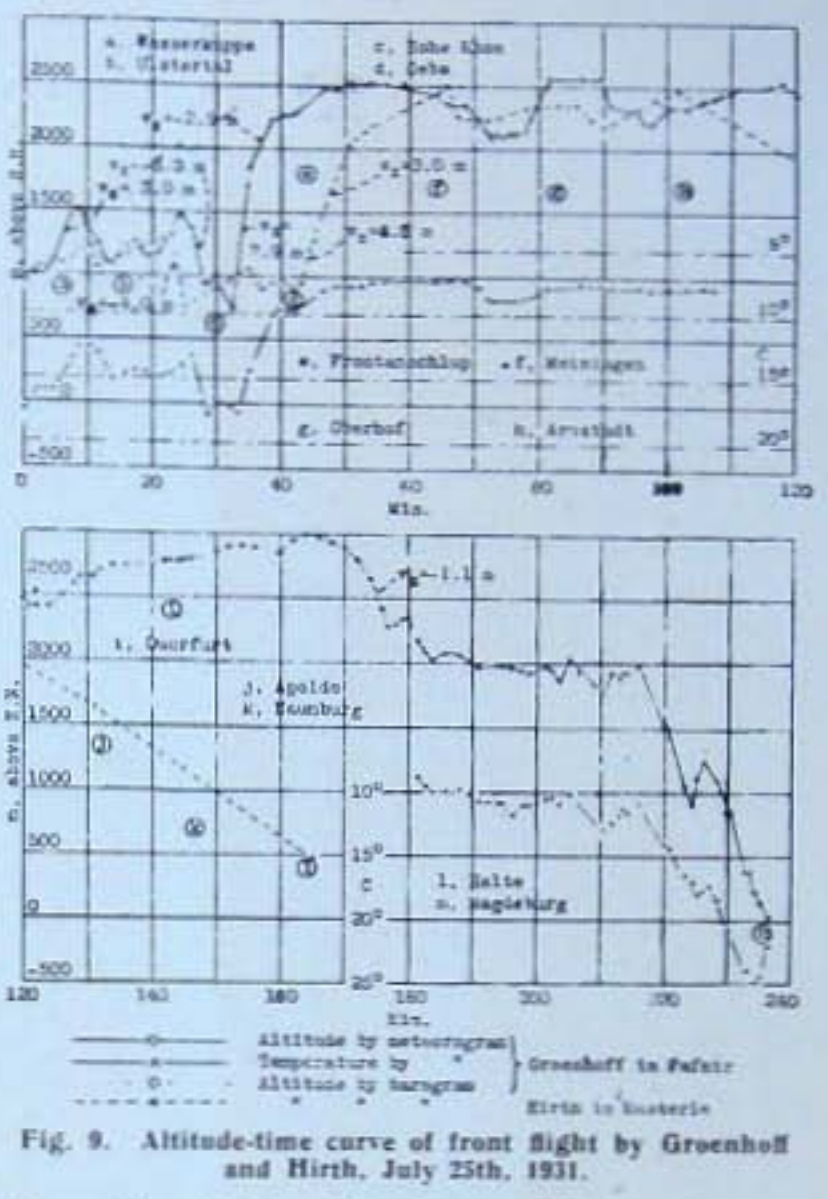


Fig. 9. Altitude-time curve of front flight by Groenhoff and Hirth, July 25th, 1931.

calm and devoid of any disturbances. Hirth, on the other hand, evidently encountered less propitious upwinds. After passing Arnstadt, near Erfurt, he gradually but consistently lost altitude till he landed at Halle. Groenhoff's last hour was beset with unexpected difficulties. After losing 1,000 m. (3280 ft.) in height toward the end of the third hour, his course appeared extremely agitated. Evidently he encountered more turbulent air masses interspersed with strong down currents which set up critical stresses in parts of his plane. Moreover, since it was quite dark after 9 o'clock, and he did not feel justified in taking the risks involved in a storm flight in the dark, he effected a landing.

Groenhoff made two such flights in the same year, but rather than being easy victories, they were the results of a successful battle of human skill, endurance, and unshakable composure matched against the unrelenting powers of the elements, in a hailstorm over Munich and in storm squalls over Magdeburg, at times bordering on the limits of human endurance.

(Continued on p. 276, col. 2.)

BIRD FLIGHT. IV

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

Analysis of Forces on Wings in Flapping Flight.

It is now possible to complete the analysis of the forces developed by the wings in flapping flight, by finding the angle of attack of the wing, together with the absolute velocity along the path, at all instants. A set of assumed aerofoil characteristic curves has been prepared (Fig. 9) from which the lift and drag coefficients have been obtained from the various incidences.

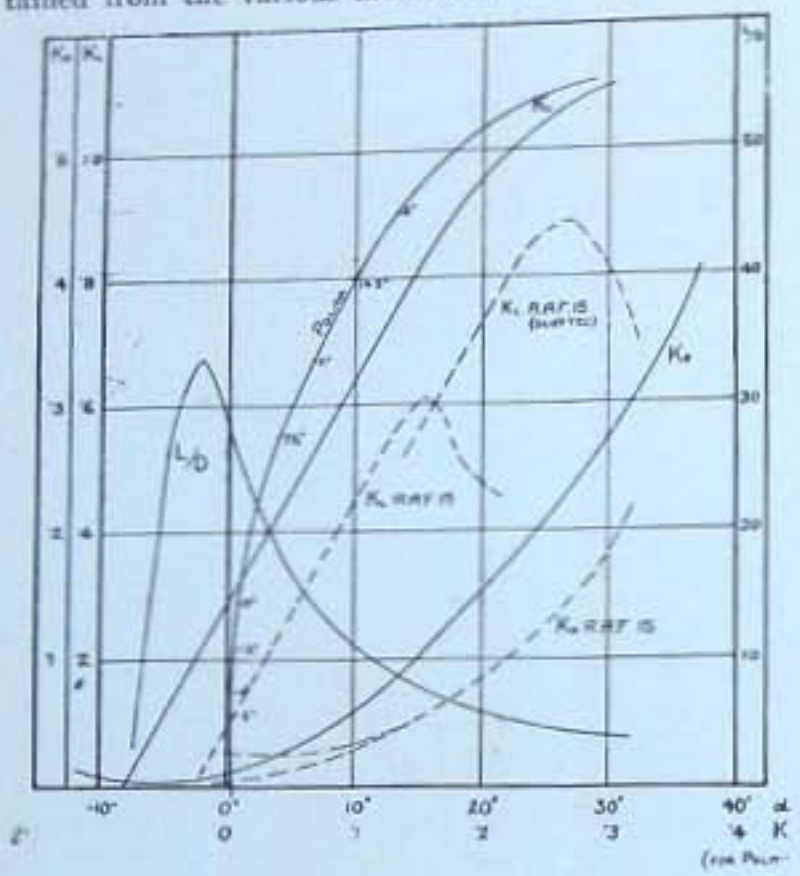


Fig. 9. Assumed Aerodynamic Characteristics of Bird's Wing.

It is realised that the section of a bird's wing changes along the whole length, but Fig. 9 has been taken as representing the mean value of the coefficients. On the same diagram have been added the curves for the well-known R.A.F. 15 section, both slotted and unslotted, for comparison.

Actually the central part of the Buzzard's wing is slotted by means of the alula, or wrist slot, and therefore the curves given may approximate fairly closely to the true conditions. The inner parts of all birds' wings are unslotted, but as very large angles of attack are seldom realised, owing to the deflection of the softer feathers forming this part of the wing, the lower parts of the curves may again hold good. The outer third of the wing is multi-slotted, at least in the case of the Buzzard and many other species, and a higher maximum lift coefficient may well be obtainable, although the actual shape of the lift curve is not likely to be altered to any appreciable extent, and, moreover, it will be shown later that the slotting of wing-tips is not for the purpose of increasing lift during flapping, as high incidences are not found over this part of the wing. Instead the slots make possible the requisite amount of thrust during the down-stroke and minimise the drag on the return stroke.

The forces for each position of the wing, normal and parallel to the flight path, and the total reaction can be obtained from the general formula:

$$F = 0.00237\ K\ A\ V^2 \text{ in lbs.,}$$

where K = Coefficient of Force (from Fig. 9)

A = Area of wing, or part being considered, in sq. ft.,

and V = Velocity of wing, relative to air, in ft./sec.

The stroke has been divided into ten parts, giving equal time intervals. More accurate results would have been obtained by taking a greater number of parts, but for the purpose of this work the number taken is considered sufficient. The value of A, the wing area, cannot be taken as constant, owing to the upward and forward movements of the wing about the shoulder, which tend to reduce the projection of the wing in the horizontal plane, and therefore values must be found for which the necessary corrections have been made.

Horizontal Projection of Wing.

In estimating the forces of sustentation and propulsion, it is necessary to take into account the obliquity of the wings to the horizontal, or the dihedral angle, since it is very obvious that when the wings are at the top, and again at the bottom of the stroke, the forces acting must be inclined inwards in the former, and outwards in the latter case. The sideways components of each wing force neutralise one another and are, of course, of no value for support or forward thrust. Lift only is affected by this factor, the drag forces remaining unchanged.

And again, when the wing is forward or backward of the normal lateral axis, a slight decrease in drag may

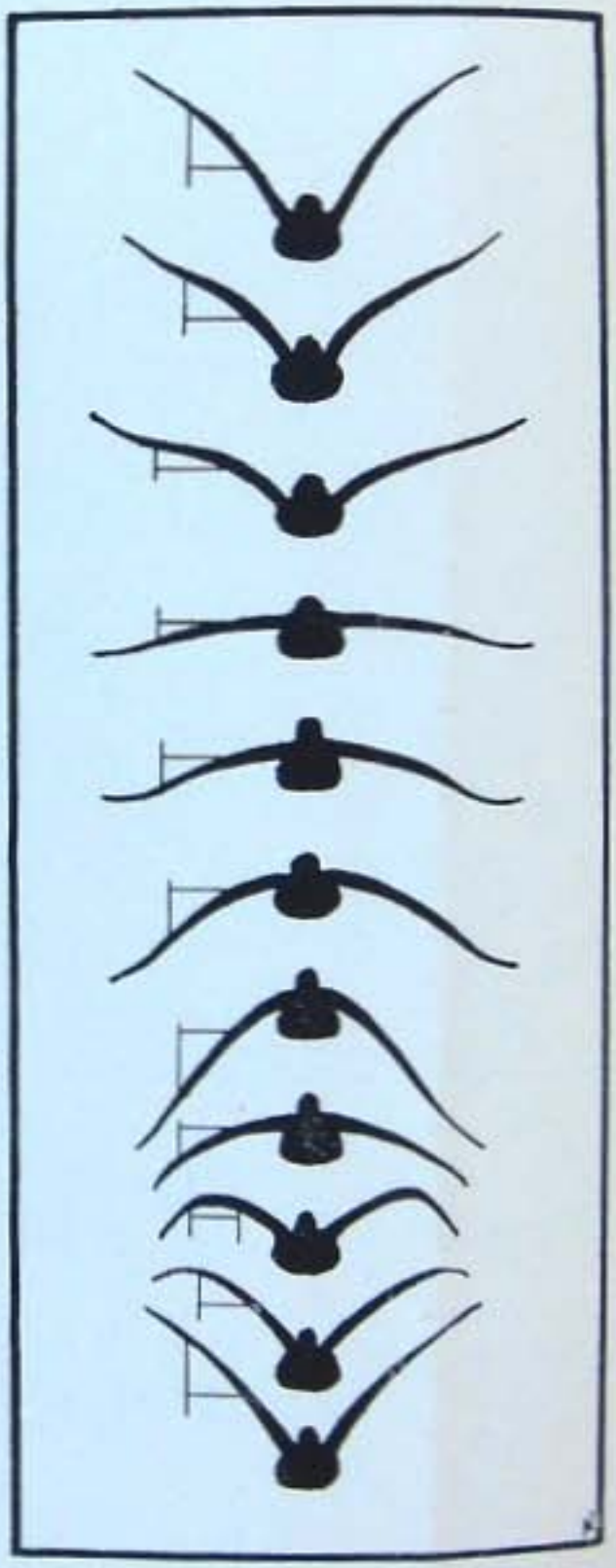


Fig. 10. Front view of Flapping Flight Attitudes.

TABLE I. ANALYSIS OF FORCES ON BUZZARD'S WING IN FLAPPING FLIGHT.

Point	V ft./sec. (Absolute)	V^2	Path Angle to Horizontal L_1 (Degrees)	Wing Incidence to Horizontal L_2 (Degrees)	True Wing Incidence $L = L_1 + L_2$ (Degrees)	Horizontal Projection Factor	Projected Area of Wing (sq. ft.)	Kr.	$R = 0.00237 K_R A V^2$ (lbs.)	Vertical Component (lbs.)	Horizontal Component (lbs.)
1	47·5	2260	0	+7·5	+7·5	0·72	0·883	0·566	2·67	2·65	—0·212
2	43·76	1915	+4	+14	+18·0	·80	·98	·918	4·07	4·06	—·2416
3	38·6	1490	+10	+4·5	+14·5	·90	1·1	·811	3·15	3·06	+·189
4	30·45	926	+19	—21	—3·0	·76	·931	·178	0·363	0·346	+·102
5	35·0	1225	+29·5	—29·5	0	·745	·913	·304	0·805	0·716	+·363
6	13·35	178	+20	—27	—7·0	·705	·864	·036	0·0131	0·012	+·0041
7	21·65	470	—3	—5	—8·0	·666	·816	·0955	0·005	0·005	—·0002
8	24·63	605	—27	+25	—2·0	·60	·735	·217	0·228	0·202	—·1092
9	38·6	1500	—25	+36	+11·0	·64	·784	·68	1·89	1·646	—·972
10	43·0	1850	—13	+13	0	·666	·816	·292	1·044	1·005	—·2504

result, together with a decrease in lift, due, not to the horizontally projected area being reduced, but to the reduction of span. For the sake of simplicity, it has been assumed that the wing area for both lift and drag forces throughout the stroke are in proportion to the horizontal projection as viewed from the front.

Fig. 10, which is based on Fig. 8, has been prepared for this purpose, and depicts the various positions adopted in flapping flight when viewed from the front. The middle third, at present under consideration, has been marked out and the horizontal projection obtained. (Column 7 of Table 1.) In passing it is of interest to note that *a bird is never able to make full use of its maximum span and wing area in flapping flight* for the reasons set out above, but the smaller the movements in front and behind, above and below the normal lateral axis, the more nearly are the ideal conditions approached in this respect.

The total wing area of the Buzzard is 3.5 sq. ft., and dividing the span into three equal sections gives areas of roughly 1.225 sq. ft. for the inner and middle sections, and the remainder, or 1.05 sq. ft., for the outer third. The wing-tip portion being smaller than the inner sections on account of the taper, which in the case of the Buzzard is not very great. The horizontal projection factor of the middle third is then multiplied by the area, as found, to give the effective area shown in column 8 of the table.

Absolute Velocity of Wing.

The absolute velocity of the wing may be found by measuring the distances between adjacent wing positions on Fig. 7. If one of these measurements is denoted by x and the horizontal distance travelled by the body during the same period by *l*, then wing velocity will be x/*l* x 30 ft./sec. The table, given below, can now be prepared, and from it the total wing forces, together with the vertical and horizontal components, are found.

The vertical and horizontal forces are, by Fig. 11:

$$V = K_1 \cos \beta + K_d \sin \beta, \text{ and}$$
$$H = K_1 \sin \beta - K_d \cos \beta,$$

or they may be obtained graphically from a series of diagrams.

The last two columns have been added up and divided by ten to give the average vertical and horizontal forces for the middle third of the wing, the figures being 1.37 lbs. and —0.113 lbs. respectively.

The Buzzard weighs about 2.5 lbs. and, if ½ lb. is allowed for the weight of the apparatus carried, the total is brought up to 3 lbs., so that roughly 1.63 lbs. is left to be carried by the other two-thirds.

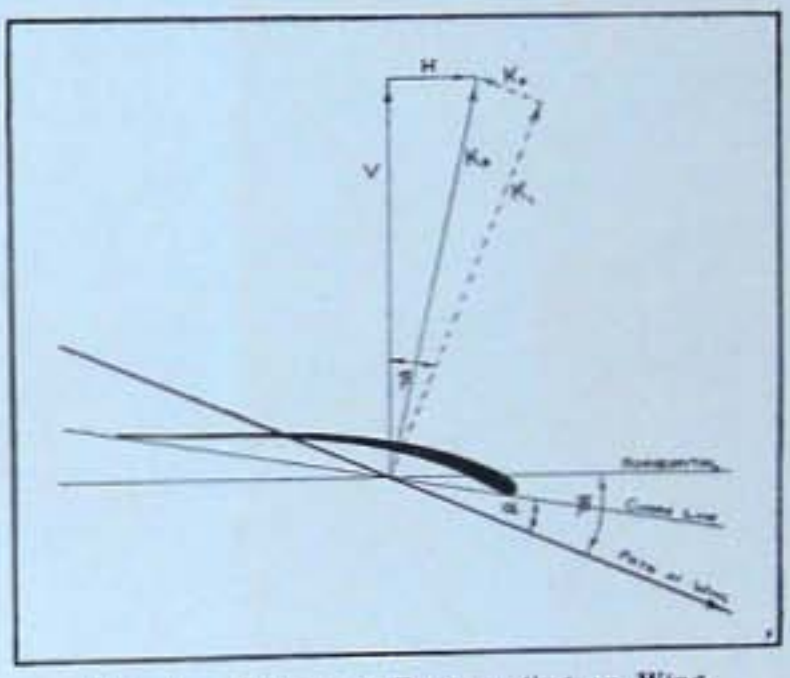


Fig. 11. Diagram of Forces acting on Wing.

Inner Third of Wing.

Without knowing the exact amount of twist, and thus the wing angles for the inner and outer thirds of the wing under flying conditions, it is impossible to analyse the forces produced by these parts with any great degree of accuracy. The path traced by the inner third can be obtained by interpolation, and hence the velocity, but for the outer part this becomes more difficult owing to the twist of the wing about the elbow and wrist, chiefly the latter, and twisting of individual feathers at the tip.

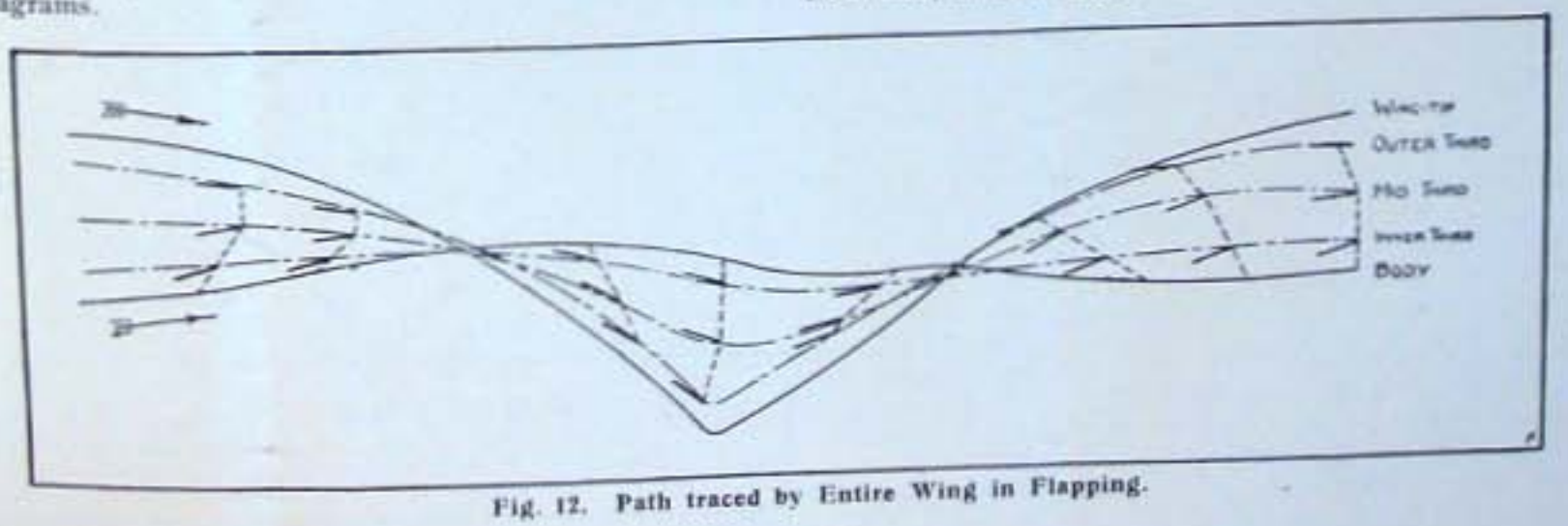


Fig. 12. Path traced by Entire Wing in Flapping.

The velocity of the inner third section will be roughly equal to that of the body, plus one-third of the difference between the velocity of the middle third (Col. 2, Table 1) and that of the body, or $V_i = V_b + 1/3 (V_m - V_b)$ $= 2/3\ V_b + 1/3\ V_m$. The variation in velocity is not so great as that of the middle third, varying only within about 5 ft./sec. above and below the body speed.

The curve for the inner portion has been constructed (see Fig. 12), to which have been added wing angles in estimated positions to allow for the twist of the wing. These have been obtained by adding 10 degrees to the middle third angles, but with some adjustments on account of the inevitable deflection of the feathers. A second table was then prepared, similar to Table 1, from which were found the average vertical and horizontal forces, 1.2 lbs. and 0.15 lbs. (drag) respectively. From this it appears that the lift derived from the inner and central portions of the wing are substantially equal, whilst the drag of the inner part appears to be a little in excess of that for the centre.

BIRD'S EARS AS VARIOMETERS.

Recently Captain Needham asked whether it is "feasible that the ears of soaring birds are sufficiently sensitive to detect changes of altitude." I have often thought that this must be the method by which birds find thermal currents, although "Kentigern" has stated his belief that birds have no special soaring sense, but fly by experience and the use of their senses. It is well known that the human ear can act as a crude variometer; anyone descending rapidly in an areoplane will get a most unpleasant sensation in the ears which can only be relieved by swallowing. The same sensation can often be felt in a railway tunnel when a train suddenly dashes by on the other line, or quite frequently while travelling by tube.

It occurred to me early this year to investigate what the human ear can do in this line, so I took my barometer for a few trips on the London tubes (this being cheaper than hiring an aeroplane) and noted results. It was found that any *gradual* changes of pressure gave rise to no sensations at all; it was only the sudden jumps to which the ears responded; furthermore, that a jump of anything under 0.04 inch produced no effect; it was only when pressure suddenly rose by from 0.04 to 0.06 inches that the sensation resulted. Particularly good results were got by sitting right at the back of the train; whenever we entered a station there would be a sharp rise in pressure as soon as the train stopped; evidently the body of air which had been chasing us along the tunnel had to pile itself up against the rear of the train, which was still in the tunnel mouth and so prevented this air from getting past quickly into the station.

It was also found that a sudden fall in pressure could be felt, but the minimum value for this lay between 0.06 and 0.10 inch, and moreover the sensation was quite different. Instead of the bursting feeling that one gets with rising pressure, the sensation was rather vague and was felt further forward, and it passed off at once unless the barometer continued to fall.

The "bursting" sensation is usually attributed to the stretching of the ear-drum, caused by the difference in barometric pressure between the free atmosphere on one side of it and a space called the "middle ear" on the other side. Air can pass to the middle ear from the throat through the "Eustachian tube," but this tube is normally closed, and can only be opened by such actions as swallowing. The human ear-drum is kept taut by being pulled inwards by a muscle, the "tensor tympani," situated in the middle ear. Thus any increase of pressure from outside would stretch the drum still more. As there are nerves in its surface, it is these no doubt which give rise to the discomfort. But a diminution of pressure would cause a stretching, not of the drum, but of the "tensor tympani" muscle, and possibly this accounts for the difference in the sensations in the two cases. The ear-drum is not, however, tight all over. A small section of it, the "pars flaccida," is thinner than the rest and quite flabby. I would suggest that this accounts for the necessity of there being a change in pressure of at least 0.04 in. before any sensation is felt. Such a small change could be compensated by a change in volume by one part in 750 of the internal air, and this could probably be effected by a bulging in or out of the "pars flaccida." The latter has an area of 3 or 4 sq. mm. The volume of the middle ear is perhaps 700 cu.mm. as a rough average; it communicates, however, with another small air space, and through it with many little air cavities in the surrounding bone. These vary to the greatest possible extent in different individuals, so it is possible that the minimum change of pressure which can be felt varies greatly in different persons, and that one could render oneself more sensitive by getting a surgeon to hollow out the bone (though it would come cheaper to buy a variometer).

A proper variometer should, of course, show the *rate* of change of pressure. An aeroplane gliding down has a sinking rate of perhaps 10 ft. per second, and this can certainly be felt in the ears, though it takes several seconds for the sensation to appear. But I have never heard of a sailplane pilot feeling it, with his fall of only 2 or 3 feet per second. A rise of 0.04 in. corresponds to a drop of 40 ft. in height, so a pilot's ears should soon tell him if he had got into a really strong down-draught. But there would be a "lag" if he had just been coming up in a thermal current, for I found that, after a gradual fall in pressure of 0.16 in. from King's Cross to Angel, a sudden rise of 0.08 in. on entering Angel Station could not be felt in the ears at all.

It would be interesting if other readers would care to try out their aural powers in a tube train. They should, however, be warned of three things:—

(1) Keep the barometer in the same altitude throughout; it may give different readings according as whether it is held horizontal or vertical.

(2) Do not buy chocolate out of the slot machines; you will have to keep on swallowing as long as the taste remains, and this will open your Eustachian tubes and spoil the experiment.

(3) Choose a slack time of day—say 9 to 10 p.m., otherwise your fellow-passengers, when they see you continually tapping your barometer, may respond by similarly tapping their own foreheads and looking meaningly at each other.

How does all this apply to birds? They also possess ear-drums and "middle ears"; what is more their bones contain a lot of air, and it is thus probable that the volume of air in communication with their middle ear is much greater proportionately than with us. Curiously enough, a bird's ear-drum (according to Richard Owen) is kept tight by being bulged outwards, not inwards; the "tensor tympani" muscle acts upon a tiny bone which pushes out the drum. So that, with a bird, it is climbing and not diving which should cause the drum to stretch.

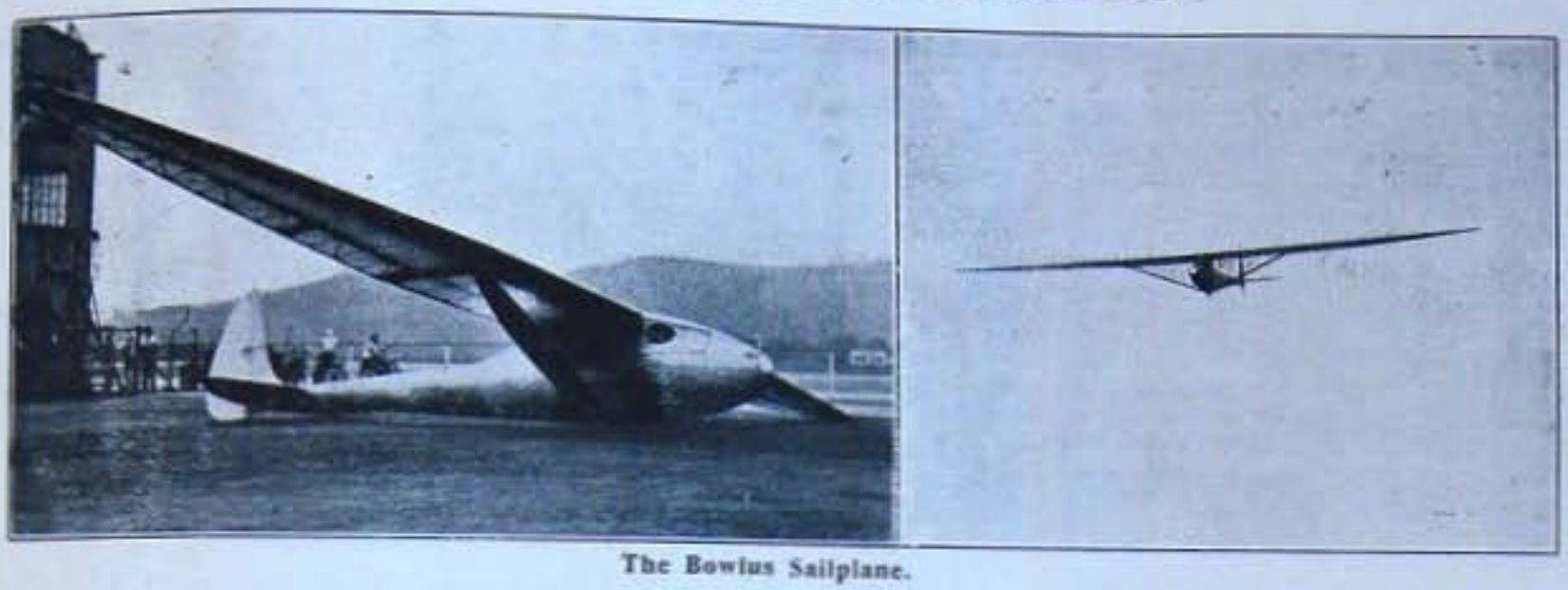
There is nothing improbable about a bird's ear-drum serving two quite different purposes at the same time. It is Nature's habit, when she wants to develop a new function, not to invent a fresh organ for the purpose, but to take something that is already there and adapt it. An example of this is the various ways in which she has produced wings, devising them out of quite different structures respectively in the bird, the bat and the insect.

May I suggest to Commander R. R. Graham, who once wrote asking us to send him soaring birds' carcasses, that he might investigate their ears as well as their wings, to discover in what way, if any, those of the genuine soaring birds differ from the mere flappers and gliders.

A. E. SLATER.

Don't forget the B.G.A. Dance on January 11th (see page 276)

NEWS FROM OVERSEAS



The Bowlus Sailplane.

U.S.A.

Mr. William Hawley Bowlus, an American soaring pilot and aeronautical engineer of Los Angeles, California, recently designed and built a high performance soaring plane. (Mr. Bowlus is well known as the builder of Col. Lindberg's "Spirit of St. Louis.")

The data on this sailplane are as follows: Wing span, 60 ft.; wing area, 198 sq. ft.; weight empty, 285 lbs.; wing loading, 2.2 lbs. per sq. ft.; aspect ratio 18:1; flying speed, 30 m.p.h.; sinking speed, 2 ft./sec.

Some of the special features of the Bowlus sailplane, which is undoubtedly the finest one ever built in U.S.A., are: Single struts with a lift profile; the axle of the single landing wheel at the same time acts as a fitting for the struts. The wing with plywood leading edge back to the main spar is in two sections. The ailerons have a 2:1 differential. The elevators are quite sensitive, however, can be geared down for airplane towing. A cabin cowling similar to the German sailplanes FAFNIR and MUSTERLE is used. The machine is equipped with a complete set of instruments, including an "Askania" variometer. All the fittings are made of heat treated chrom molybdenum steel and are cadmium plated. The assembly by three men only takes ten minutes. Nine hours of soaring flight along the seashore near Los Angeles have already been made by Mr. Bowlus and the sailplane showed an unusual manœuverability with the actual performance fully coming up to the expectation.

A LETTER FROM TASMANIA.

SIR,—Your appeal for information from club secretaries has reached as far South as this little island.

I thought perhaps it would be of interest to your readers to know that we are trying to do our share of motorless flying.

The Tasmanian Glider Club has been operating since September 6th, 1929. Nine months' flying with one primary glider enabled us to do nearly 800 glides; we turned out four pilots who gained the "B" certificate, and over a dozen passed the "A."

One member is now flying in England, and gained his "B" and "C" after doing about six flights on a strange machine. I refer to Mr. Norman Cave, who joined one of the Southern clubs in England.

Our club has done no flying for 16 months owing to the loss of our machine and hangar which was wrecked by a small cyclone, but I am glad to report that once again we are in the air. The loss of our equipment hit the club very hard, as finances were at zero. We have been able to retain at least a dozen real glider enthusiasts, who have done their best to keep the sport alive.

The new glider was built by members of the club, who raked up any spare cash, which went to buy the necessary new material to put with the bits which were salvaged from the wreckage.

The DRAG-AN-FLY II. is a primary which weighs 182 lbs., and with the nacelle attached 198 lbs.

DRAG-AN-FLY II. came through her test flights with flying colours, and 30 flights were made the first day out flying her as a primary glider. The ten members who had flights showed very little effect of their enforced holiday.

The machine has been flown only four times with the nacelle attached, under very unfavourable conditions, but from observations, it alters the gliding angle to a fair degree, and, of course, we are hoping for great things in the near future. Our first long flight with the nacelle went close to putting us out of action, when the pilot turned rather late, hit the top of a hawthron hedge and slid out of view of the spectators. When we arrived on the scene in fear and trembling (this is, as far as I was concerned because of my being instructor in charge) we found the pilot had broken the rules of the game and left his seat, so as to pull the glider out of its undignified position, much to the disgust of the Press photographer who had rushed up.

Dame Fortune must have been smiling on us that day because the only damage was one elevator horn split and a couple of holes in our new nacelle. Repairs were completed in less than an hour, and flying resumed.

This club does not belong to any association, but runs its own affairs with as little red tape as possible. Also, we don't get THE SAILPLANE free, because it costs one shilling per copy here; even then we don't write to the editor and go crook about the number of photos, etc. Fill it full of photos and the dope on real flying and perhaps those extra subscribers will show up!

I shall be pleased to send you reports of our progress from time to time, as well as photos.

Wishing you and the journal every success.

CHARLES E. DIXON,
Hon. Secretary, Tasmanian Glider Club.

[Letters of this kind from distant countries are very welcome, and we can assure Mr. Dixon that readers in England will be delighted to see periodical progress reports from his club and photographs in THE SAILPLANE.—ED.]

CORRESPONDENCE

THE PRIMARY v. THE TWO SEATER AS A TRAINING MACHINE.

Sir,—(1) I regret I have misunderstood Mr. Culver's first letter and saw an argument where argument there was none. I regret still more that the discussion I have raised should promptly thinly veiled sarcasm and uncalled-for innuendo from certain quarters instead of fair and sensible treatment of a subject which, approached in the right spirit, would prove of some help and value.

The trend of the letter led me to think, and still does, that as the London Gliding Club had attained success by means of shock-cord and solo primaries no other method of training could be better or worthy of consideration.

(2) Re instructors. I don't think there is any advantage to be gained by pursuing this point. It is just a matter of a difference of opinion, though I would welcome an opportunity to discuss this in detail with Mr. Culver at a future date.

(3) The term "black-out" as applied to gliding is not a myth. The word has been adopted to describe the feeling of complete helplessness, mentally and physically, of an *ab initio* subjected to his first launches. The pupil who does not sit tight, frozen to the controls, with the glider in sole command of his first attempts is in the minority. More crashes have occured to primaries through the pupil's inability to feel and appreciate what is happening during the first few seconds of a launch than from any other cause. This can readily be understood, for he is being hurled into an element of which he has had no previous experience.

(4) I take it that the greater part of Mr. Culver's gliding experience has been obtained at Tottenhoe. On such a site of this I willingly admit landings are rendered as easy as on Middleton Sands, where the Preston Club trains pupils up to the "B" stage. But how many *ab initios* would succeed in landing even a primary without damage on a site comprised for the most part of small fields. Obviously, this requires skill and judgment, obtained only by constant and protracted flying experience. With a dual machine the pupil has the enormous benefit of the instructor's experience, and acts immediately upon same. No time is wasted and, better still, crashes are reduced to a minimum.

(5) The answer to this point can be readily found in my letter of October 28th. I perceive nothing in Mr. Culver's explanation which refutes anything I have said relative to the one important reason why the L.G.C. has been so successful.

(6) The statement contained in this point is extremely dogmatical. As instruction by means of dual control two-seaters has yet to be fully tried out by Clubs in a comprehensive way, I fail to see by what authority Mr. Culver can so definitely and conclusively state that his method must be best.

(7) Mr. Culver mentions crashes at the Rhön competitions this year. Surely he does not suggest that because machines were smashed by bad piloting elsewhere that is reasonable explanation or excuse for crashes in this country. I recently read a report of the Wasser-Ruppe meeting, in which it states "flyers had not enough experience to fly performance machines, and the result was that many a promising looking craft was crashed during the first few days." I am not suggesting the impossible—that a good pilot will never crash or damage a machine—that would be absurd. But my point is that pilots, both *ab initio* and experienced, correctly trained in the difficult art of landing will make landing damage the exception rather than the rule. When I wrote of Askam I treated the subject of landing crashes generally. I mentioned no one individual, and sought to make no comparison of Mr. Buxton, who holds a place in my esteem as a very fine pilot. Rather was I arguing that the damage sustained by landings which required a certain degree of skill would have been happier on a more open site. On Mr. Culver's own admission this is particularly true of the pilot of the KASSEL 20, who, he states, was least experienced.

Regarding the two-seater. This is outside the matter relating to the correspondence, but I am curious to know why, after it was found that the "timber around the skid was rotten, presumably on account of the fact that the machine had been stored for a very long time," it was still pronounced airworthy and allowed to fly? If one part of the machine was found rotten, obviously the discovery called for an extensive examination and "opening up." As a matter of fact, I heard an experienced pilot with no little knowledge of construction say he would not care to fly the machine in its condition as he did not deem it safe. But this by the way.

(8) Mr. Culver's admission that it is quicker to train by the dual method constitutes in my opinion a repudiation of his first letter. If economy and efficiency are the main essentials in club training of glider pilots then how can one economise and train more efficiently than by the quickest method? It is the slowness of training with the shock-cord, crashes and expense created by this system and the work involved that has killed many clubs and depleted not a few existing clubs of members. I contend that if all clubs two or three years ago had been able to use dual two-seaters for training, hundreds of hours of soaring flight would have been done throughout the country. The money expended on repairs and replacements of crashed primaries would have purchased efficient secondary and performance machines. It is beside the point to make mention of isolated instances of members who have accomplished "so much" in "so many" flights. The whole ground must be viewed from a general aspect and the capabilities of the average member taken as a basis.

To conclude. Engagement in this correspondence was intended as valuable argument and discussion on a subject worthy of careful thought and consideration. When it is deemed necessary to indulge in personalities either because one has so little to say, because one wants to make a "noise," or endeavour to be funny at someone else's expense, then the term "bickering" is most aptly employed by the anonymous writer whose pseudonym "Poor Boob" is so well chosen.

L. E. FALLA.

THE POWER GLIDER.

Sir,—I was much surprised to read the letters published in the last two issues, regarding what has now been termed a "Power Glider."

May I ask why this subject should be given space in THE SAILPLANE, which states that it is the only journal in the world devoted solely to motorless flight?

Then again, why should the B.G.A. have to devote its time to discuss light aeroplanes, and endeavour to obtain permission for gliding clubs to become "Extra" light aero clubs? The original rules of the B.G.A. have a clause in the objects stating that a "glider is any heavier than air machine which does not depend upon an engine for sustaining flight." Exit the "Power Glider."

Any gliding club which takes up such a suggestion will cease to be a gliding club, but will be a competitor of the light aeroplane clubs, and as such it is only right they should come under Air Ministry regulations.

By increasing costs, as such a machine is sure to do (note Mr. Lowe Wylde's figures) the Movement would get less support, instead of increasing it. The achievements of the London Gliding Club can be emulated by the Provincial clubs, providing they have the grit to stick to their original policy.

It is unfortunate that the people in the Movement who are anxious to achieve something in as little time as possible, should be the people to shout loudest in THE SAILPLANE from time to time. Much more publicity is given to auto-towing, etc., than is really warranted by the percentage of the Movement which gives it their sup-

port. Herr Kronfeld's advice to "Hasten slowly" has apparently been lost. At the Conference of Gliding Clubs last year, it was clearly shown that many clubs had tried auto-towing, and this had been found to be unsuitable for training, but was recommended for advanced members to obtain more flying time.

May I appeal to what Mr. Sharpe terms "the more idealistic of our soaring enthusiasts" to make their opinions known throughout the Movement, and prevent the motor-assisted enthusiasts from dissolving the Movement, as was done after the meeting at Firle Beacon in 1922.

As quoted in the *Efficiency Magazine* for this month, "Far-off fields look green, but some people only see the bare patches and cow-muck in their own fields," instead of completing what they originally set out to do.

In conclusion, I sincerely hope that the Technical Committee of the B.G.A. will pass the suggestion of motor-assisted gliders over to the Royal Aero Club, where it rightly belongs.

ALFRED P. MILLER.

THE SITUATION IN SCOTLAND.

Sir,—As with many clubs in England, I am afraid the Scottish Gliding Clubs are now pretty well on their last legs. The industrial situation has, perforce, affected the degree of enthusiasm of the Movement's principal supporters up here.

A few months ago I sent the Secretary of the B.G.A. some notes on the doleful situation of various clubs in Scotland, and further news I am sending to you in this instance, as one sees from THE SAILPLANE of December 9th, that the general situation is getting worse.

It is significant that, in the opinion of three clubs in the Glasgow area, succour would seem to lie in the motor-assisted glider, and these opinions sustain Mr. Norman H. Sharpe's words to the effect that the Movement is badly in need of the wider support which the introduction of motor-assisted flight would bring.

Had general conditions become better instead of worse within the last year, the Falkirk Aviation Club and the Central Scotland Air Yachting Club would both have been far ahead with the construction of motor-assisted gliders. I have no doubt there have been other people in the same situation.

Were the Air Ministry to give any kind of encouragement to the development of motor-assisted gliding, it is probable that it would be the means of putting at least these two clubs back on the map again.

Mr. Sharpe continues by suggesting that the B.G.A. should exercise control of M.A.G.'s and should appoint competent local inspectors and instructors wherever possible. In the case of the Glasgow area, I cannot foresee much difficulty, as I expect inexpensive inspection arrangements could be made through the personnel of the Scottish Flying Club at Renfrew.

It is a matter of deep concern to the many enthusiasts in Scotland that gliding clubs have suffered so severely. One of the initial difficulties with most of them has been alleged damage to shootings. Now that this bogey has faded away we find that potential supporters have done likewise, and it is felt that the only way of resuscitating support is by the production of something new. There is no doubt in the minds of the few of us who have discussed the matter that, if regulations governing the use of the M.A.G. were made simple and inexpensive to clubs, Scotland would probably offer a substantial share towards the continuity of the B.G.A. and THE SAILPLANE.

E. S. H. GODFREY,
Hon. President, Central Scotland Air Yachting Club.

A NORTHERNER'S VIEWS.

Sir,—Your leader, Vol. 3, No. 21, of THE SAILPLANE pleased me immensely; now we are at grips with the things which really matter and the problems facing the motorless flying movement, not only in this country but the world over.

By inviting expression of opinion you have at once removed an obstruction to progress. Moreover, you have set your readers a task solving these problems; you have created a new enthusiasm in many quarters. Yet your greatest thrust lies in having put the critics "ON THE SPOT," and I feel that those who fail to respond to your call should for ever hold their peace.

In my humble opinion, the B.G.A. has justified its existence if for no other reason than having made the present controversy possible.

In the first place, its founders can be justly proud of having introduced a cheap form of aviation for the masses, enabled the British public to witness remarkably fine performances and feats of airmanship with motorless aircraft, and through the medium of THE SAILPLANE gain first-hand knowledge of the subject.

No group, body or movement had previously made such an effort.

True, various schemes for the encouragement of civil aviation have been tried, boosted and subsidised, yet no scheme had previously catered for the masses in a popular manner.

The motor 'bus of the air has been with us for some time, but who wants a 'bus to play with? The limousine and two-seater coupé have demonstrated their possibilities, yet who can afford to fly one for business or pleasure?

Heavy oil fuel may yet solve the problem of running costs and remove the present impediment.

The motor cycle of the air is now upon us; why not make use of it?

The B.G.A. gave us the use of the scooter and cycle of the air (the glider and sailplane), and many of us now appreciate the charms of "Wind Riding."

Some people would have us believe that motorless flying is a sport comparable with yachting, horse racing, polo, fox hunting, shooting, motor racing, etc.; in short, a sport only for those well blessed with this world's goods. Such sports are fascinating; that they are expensive all will agree, and the majority will never give a serious thought to actually taking an active part in them.

I fail to see how sailplaning is going to be so very expensive providing one has been effectively and efficiently coached, particularly if he happens to be handy with tolls.

Then WHY prohibit the artisan from the sport of sailplaning? Why keep telling him he has no business to entertain the idea unless he is prepared to spend £200 per year, and a lot of other frightful things?

I contend that the system of training has in most cases been responsible for the above conclusions, coupled with the really bad management or clubs' organisation. It is *not* the fault of the B.G.A.

The past three years have proved that a cheap and effective form of aviation training will receive the support of thousands in this country. Only by receiving such support will the B.G.A. as we now know it be able to continue its activities.

It matters little whether such facilities be provided by syndicates or clubs so long as the training is carried out on efficient lines, offers a reasonable return for fees paid, with prospects of some real sport when one is qualified.

Clubs which have failed to cater for their members have had but a short existence. It is up to the club committees

to make the best use of the various methods of training now available and select the system best suited to their locality. Those clubs fortunately situated near good soaring terrain will have no difficulty in catering for the soaring members and private owners; they will draw upon the whole country for recruits, not in the RAW, but ready trained up to the "C" stage.

Yet such clubs may be unable to train their own members and ensure a steady stream of pupils passing through their books, simply because there is all the difference in the world between the sites suitable for training and sites suitable for soaring.

Not until the pupil has absolute confidence in his ability; confidence born of experience in the air, should he be allowed to go near a soaring site. The old pioneers did it of necessity; they knew no better way. Yet I cannot understand why clubs are so reluctant to adopt the excellent and proved methods available to-day. Surely it is better to go through the preliminaries with a trusted and tried instructor aboard than to be launched off a gradient into the great alone.

The shock cord method of training from the raw is obsolete! At its best it needs the ideal site, which is seldom to be found within reach of the masses. And to be successful we must "teach 'em by the thousand," give 'em the shock cord when they have some little experience, then take 'em on to the soaring site and see "how they run."

The most successful clubs in the country, so we are told, started with a staff of instructors, all of whom had power experience. They secured a splendid site, they quickly trained some *ab initios* fit for instructors, and the club is going strong. Its older members are looking for further fields to conquer.

But to progress to the "C" stage through the medium of such a club is still, in my opinion, too slow and costly. They give each member a good start, they never let him go sick, but they cannot cater for thousands.

That is the greatest argument in favour of the Lowe-Wylde system of training. He has stated the case for auto-towing and this hybrid form of training so ably that I need not labour on the point here.

Now what have the Provincial clubs to offer under the shock cord system of training?

It is no use blinking eyes to facts: possibly six minutes in the air during the first two years of membership is the average time for the remaining few members of a club, the organisers of which think that they have done really well. Then how can we expect to win recruits to motorless flying?

It is easy to say that is the fault of the pupil, that had he been *made* of the right stuff he would have shown better progress! *Remember* that he very often never gets the opportunity, some other courageous fellow has smashed up the outfit or given such a ghastly display of acrobatics (which he never sees himself) that the rest of the group soon give up in despair.

Hence the present position of the Gliding Movement is due entirely to the slow and very unsatisfactory methods employed for training.

Yet I have sufficient confidence in the charms of "Wind Riding" to predict that the Movement has everything to gain by fostering this hybrid method of training; from such a system will emanate the very best pilots, and even the power men will be attracted to soaring as a recreation.

Now what of the Aces? Let them group themselves into sections according to the money they have to burn. They might organise on the lines suggested by Lebert Humphries, or even form a British Soarers' Club with options on sites all over the country. The annual subscription might even be one hundred guineas, yet that would not matter to the "Lone Eagle" who loves to soar alone over his mountain fastnesses at a minimum of expense; he would soar when he could afford it, and in the meantime it costs him next to nothing.

But for heaven's sake don't stop him by making it illegal for him to do so, otherwise he becomes an outlaw.

IMPORTANT NOTICE.

THE SAILPLANE AND GLIDER is published on the 2nd and 4th Fridays in each month.

Club News and Copy intended for a particular issue must reach the Editor not later than the first post on Thursday morning of the week preceding publication.

Subscriptions and renewals should in future be sent to THE SAILPLANE AND GLIDER, 43, Chancery Lane, London, W.C.2.

Copy and instructions for advertisements are required at least ten days prior to date of publication of the issue for which they are intended.

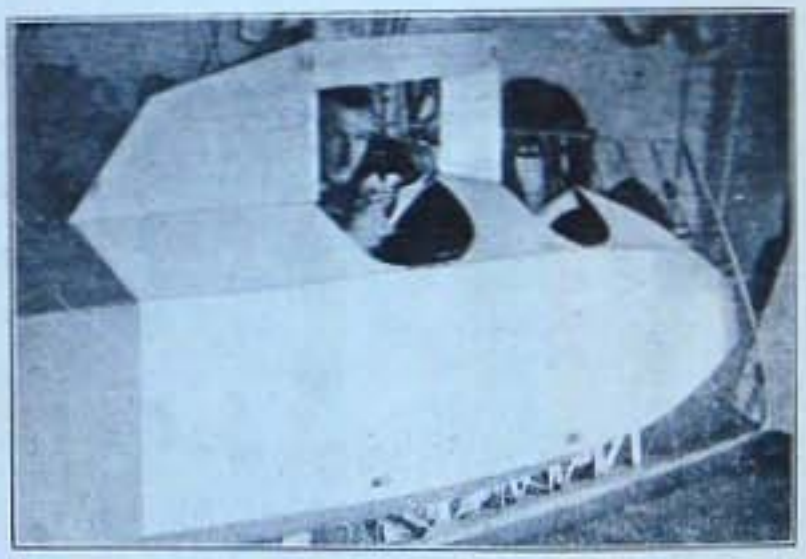
If the Movement is to succeed the public must see more soaring, and better and more effective means of getting there.

Money will roll in return for quick and sound training.

That is the opinion of

A NORTHERNER.

(Further correspondence is unavoidably held over.—ED.)



Channel Gliding Club, R.A.C. IV., in process of conversion to a two-seater under the direction of Corporal Manuel, the Club Instructor.

A SAILPLANE COMPETITION.

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

Photographs, which must be original, should be addressed, "The Editor of THE SAILPLANE, 43, Chancery Lane, London, W.C.2." Envelopes should be marked "Competition" in the top left-hand corner. The competitors name and address and club (if any) should be written on the back of the photograph. Descriptive matter, which should be brief should be written on the back of the photograph or on a separate sheet of paper.

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

NEWS FROM THE CLUBS.

Gliding at Dobrudden Flying Ground, Baildon, Yorks.

BRADFORD AND COUNTY GLIDING CLUB.

Sunday, December 4th.

The weather to-day was as perfect as that of a June day. True, it was frosty and the ducks walked on most of their pond, but the sun shone brilliantly in a clear sky, and in a faint "snow dust" cloud, many miles away, a "sun dog" sparkled just over the horizon.

By ten o'clock a few of us were emptying our hangars and three-quarters of an hour later a flight of three machines was lined up with crews for inspection.

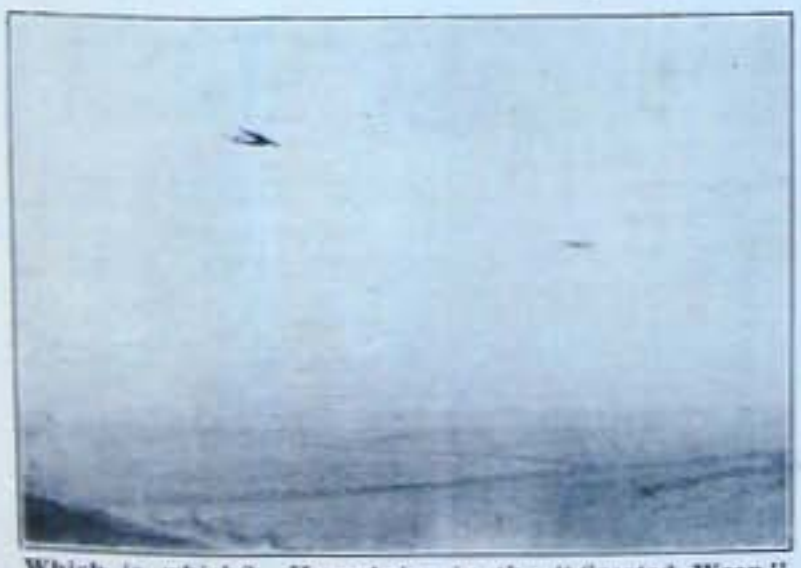
There is an enthusiasm about fine weather which is reminiscent of our last Whitsuntide camp, or those few fine days at Askam at the end of August. Everybody arrived early, looking as though he really enjoyed getting up early on Sunday morning. Overcoats were discarded; in fact, shirt sleeves and gym. shoes were seen during the day, and our photographers were more than usually busy.

By the time we had "bogied" REYNARD Primary, DICKSON Intermediate, and the HOLDSWORTH Sailplane to the plateau we realised that the westerly wind was too slight to be of much assistance to us and that perhaps our high speed section were in for a good day.

Verity gave REYNARD a test flight, taking 54 secs. to travel a quarter of a mile with one of his perfectly straight, flickless "floats" which are very suggestive of balloon jumping.

Advantage was taken of the calm to give slides to our novices, and Jowett progressed so favourably that he was passed out of this stage to the lower slopes. Cox and Hastwell approached a little nearer the "B" stage with 49 and 50 secs. respectively. All this was mere tobogganning though, as the wind had now gone completely. Sharpe, Tillett and Stedman continued with a little practice on DICKSON with flights of 70, 56, and 76 secs.

Holdworth's sailplane was given two short test flights on the flat, and it was found that some slight adjustments were necessary. Altogether a good day, meriting two eggs apiece for tea.



Which is which? Humphries in the "Crested Wren" (40 ft. span) and a model (2 ft. span) soaring together at Dunstable.

[Photo by Dr. A. E. Slater.

Sunday, December 11th.

A nasty day, in decided contrast to last Sunday. The wonder is that a dozen of us thought fit to turn out. Wind E., 20 m.p.h., biting and stinging mercilessly.

DICKSON Intermediate and the HOLDSWORTH Sailplane were rigged with difficulty. At about 1.30 we launched Holdsworth on a short east slope in a fitful, gusty wind. He came off beautifully, but a strong gust made him "buck" and then left him standing about 20 ft. up. Fortunately the fall that followed the stall was on soft ground, and he did no more than crack his skid.

By now even we "Hardy Northmen" were beaten by cold, so we packed up and went home.

Our HOLS is coming on, and Stedman's two-seater is taking shape—they should be ready for our next camp.

NEWCASTLE GLIDING CLUB.

Since our last camp at Mootlaw, Northumberland, at which, as a result of its great success, considerable enthusiasm was aroused, activities have been retarded by adverse weather conditions—too little wind—too much wind—and more or less continual rain being the order of the week-ends.

Saturday, December 3rd.—Wind W.S.W. 15 m.p.h. Preliminary "flips" in the trainer were given to visitors, in the anticipation of making them air-minded, while Sinclair and Batty again succumed to the thrills of this device.

Hick made several flights in the CAMCRAFT, and finished up with two flights in the moonlight.

Saturday, December 10th.—We took delivery this week of the intermediate machine which the "Sailplane Group" of this Club have purchased from the Huddersfield Club.

This machine is similar to the SCUD I., and was built in the constructional section of the Huddersfield Club. It nas a wing span of 30 ft.

The afternoon was devoted to carefully inspecting and assembling the machine ready for test flights, which, due to heavy rain and impending darkness, it was impossible to carry out the same day.

Sunday, December 11th.—Wind E. 5 m.p.h. Further inspection of new machine and preliminary ground flips. In spite of the wind being in the worst possible direction for our training site, we managed to get a few flights,

sufficient to find that the machine was quite easy to fly, and seemed to be well under control, without being unduly sensitive.

We are now looking forward to some good flying in this machine, at Mootlaw, after a few more preliminary tests at Killingworth.

CO-OPERATION IN THE NORTH.

On Saturday, December 10th, a meeting was held at the King's Arms Hotel, Lancaster, for the purpose of discussing a project in which gliding clubs in Lancashire and Yorkshire have evinced great interest and enthusiasm, namely—a scheme of co-operation of Northern clubs to carry out gliding and soaring on a central site.

The idea was met generally with approbation, and in consequence an executive committee comprising two members from each club is being formed for the purpose of preliminary organisation.

The following clubs have already sent representation of their interest in a scheme which unquestionably will do much to further the Gliding Movement in the North :—

Accrington Gliding Club, The Furness Gliding Club, Ilkley and District Gliding Club, Manchester Gliding Branch of the Aeronautical Society, and Preston and District Glider Club.

Any enquiries should be addressed to the Organisation Hon. Secretary (pro. tem.), "Lendor," Lawrence Road, Penwortham Hill, Preston.

AN APPEAL FROM THE DORSET CLUB.

To the Treasurers,
Affiliated Clubs of the British
Gliding Association.

Gentlemen,

There is no fear of the British Gliding Association passing into the limbo of lost causes if we, its supporters, act so that is shall not so travel

Provisionally, the game is in the hands of Affiliated Club treasurers, in that they can "get together" for the common good.

I recommend that the treasurer of each Club in the Movement obtains, during the quarter commencing 1st January, 1933, the sum of 1s. weekly from wingers, the sums collected to rank as part-payment of the premium due in respect of the B.G.A. policy, that essential cover.

May I look forward to your replies?

Yours faithfully,

R. L. ROLFE,
Hon. Treasurer, Dorset Gliding Club.

OFFICIAL NOTICES

DIARY OF FORTHCOMING EVENTS.

Monday, January 23rd, 1933, at 6.30 p.m., in the Library of the Royal Aeronautical Society, Albemarle Street, W.1.—Council meeting, British Gliding Association.

B.G.A. DANCE.

A Reception and Dance in aid of B.G.A. funds will be held at the Portman Rooms, Baker Street, W.1, on Wednesday, January 11th, 1933, 9 p.m. to 2 a.m.

Miss Amy Johnson (Mrs. J. A. Mollison), who is one of the Vice-Presidents of the B.G.A., will be the guest of honour.

Mr. and Mrs. Mollison will receive the guests.

Tickets (10s. double) may be obtained from the British Gliding Association, 19, Berkeley Street, London, W.1.

(Continued from p. 267.)

The enthusiasm with which the twelve flyers started for the storm flight is yet another forcible argument for the great value of engineless flight as part of a general flight-training schedule. And we are particularly justified in repeating a statement voiced over two years ago. Precisely the storm flight of July 25th proved our contention that "the present-day methods of sailing flight attracts a young generation which, instead of being apprehensive of an approaching storm, actually welcomes the arrival of the storm front and knows how to utilise its powerful energy. This generation of flyers accumulates a larger amount of special knowledge and experience than many an aeroplane pilot after years of flying practice."

Progress in sailing flight has been commendable, a fact, however, which in itself is no longer a surprise. It has been the same at every other Rhön contest. But it does prove the clear-sighted development of German sailing flight in the right direction. Sportsmanship of the pilot, scientific research, methodical training, large-scale expansion of flying activities toward one single purpose have aided in the retention of the unique position which German gliding activities command in the world of aeronautics. And in this respect we wish to emphasise the performances of the three masters of sailing flight—Groenhoff, Kronfeld and Hirth, who have contributed much toward this world position.

Left: Collins soaring the "Kassel 20" for the first time since its repair (which he carried out himself). Right: Landing on top of the hill at Dunstable. In the foreground of the first picture can be seen the "cabane" and landing wires of the "Dagling."

(Photo by Dr. A. E. Slater.

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