THE SAILPLANE & GLIDER

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

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

OFFICIAL ORGAN OF THE BRITISH GLIDING ASSOCIATION.

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

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EDITORIAL COMMENTS

No Unfathomable Mystery.

We are particularly impressed with a passage that appears in the publication describing the Hornberg School (referred to elsewhere) and written by one Lieut. Dierich, who runs a gliding group in the near-by town. He says:

"Soaring flight is not a Black Art. Every young, active man who is possessed of self-confidence and a power of quick decision, is capable of becoming a soaring pilot. The astonishing performances of the soaring pilots have given rise in many people to the wish to be able to soar."

Now, all this is precisely what we think. But it does *not* represent the opinion of that school of thought which looks on gliding merely as an introduction to power flying, and real soaring flight as a sort of by-product, useful at times for publicity purposes, and for getting the scientists interested, but with rather too much magic in it for the ordinary gliding propagandist to try to understand himself.

The Youth of Britain.

Now, we have found that the typical Youth of Britain, who is supposed to be so keen on doing short gliding bops, is apt to look on such an activity as faintly ridiculous, and likely to get him laughed at by his friends. But we are convinced that the Youth of Britain would turn up fast enough if he knew there was such a thing as soaring. At present he doesn't know. The only gliding pictures that get into the papers show, either a young lady in the cockpit being instructed *on the ground*, or a glider just being launched, the launching team all making faces at the camera instead of looking where they are going. The pictorial news agencies, as we know by experience, refuse to accept any photograph which shows a glider in the air.

The propaganda that is wanted is news of soaring flight. We agree with the writer of the paragraph quoted. It is that which will attract the "Youth of Britain." When people understand that a glider can *fly*, and not merely

hop, they will want to learn to *fly* it. A new duration record is welcome, as the news of it gets into the press and the public is thereby informed that soaring on gliders is actually possible, a fact they have long since forgotten, though they knew it once. But better still would be a few cross-country flights. And, from all the indications, we have now several pilots who are ready and skilful enough to do such flights as soon as they get the chance. And what they do is not Black Art. It can be perfectly well understood by anyone of ordinary intelligence, who takes the trouble to grasp a few unfamiliar facts.

The glider is a respectable vehicle for getting into the air, not an overgrown toy for bouncing over the ground.

PRICE OF THE SCUD II.

We regret that, in our issue of July 14th, the SCUD II. Advertisement was inserted in its old form, instead of with the special price reduction until July 31st, as advertised in the previous issue. Messrs. E. D. Abbott, Ltd., will be making an announcement in the next issue as to the revised prices for the SCUD II., but attention must be drawn to the fact that it is quite impossible to produce single orders at the special-price offer for such a high quality machine in the future.

HIGH HONOUR.

We congratulate Captain C. H. Latimer-Needham (Chairman of Technical Committee, British Gliding Association), who has been awarded the Diploma of Honour and the medal of the Carnegie Trust of Switzerland, for the rescue of a drowning man from Lake Lugano last year. The incident was described in THE SAILPLANE at the time. The drowning man had already disappeared, and had to be pulled back to the surface.

According to one account we heard, the first sign of anything wrong was the appearance of bubbles rising to the surface of the lake, some way off, and it was suggested that it was owing to his soaring experience (Capt. Latimer-Needham is the first British "C" pilot) that he was able to spot a rising current of air at so great a distance.

ANOTHER GERMAN DURATION RECORD.

Herr Guttsche, head of the glider pilots' school on the Island of Sylt, in the North Sea, was stated in the Press of July 25th to have soared for 16 hours 47 minutes, beating by 14 minutes the previous German record established on June 23rd this year by E. Lorenz at Rossitten.

AND YET ANOTHER.

As we go to Press, news comes from the *Daily Telegraph* correspondent in Berlin of a duration record of 36 hours 35 minutes set up by a German pilot named Kurt Schmidt, who started at 7.35 a.m. on August 3rd and landed at 8 p.m. on Friday night, August 4th. The flight took place near Königsberg, and one end of the beat was stated to be at Patersort. The machine was a GRUNAU BABY.

A TWO-SEATER THERMAL FLIGHT.

By courtesy of The Master of Sempill, we give the following extract from a letter received by him from H.H. Prince Kinsky, President of the Austrian Aero Club, dated July 22nd, 1933:

"It will also interest you that I flew yesterday in Vienna for the first time in a glider. I went up in Kronfeld's AUSTRIA II. with him and myself in it, having dual control gear. We were pulled up by his aeroplane up to about 2,000 feet and then sailed in thermic streams up to 6,000 feet in just half-an-hour—all this just above the Vienna Aerodrome on a warmish but otherwise absolutely calm day—just a very few and quite small white clouds.

"We then sailed over Vienna and only lost, there and back to the Aerodrome, about 3,000 feet in height. I was flying all the time myself in the front seat and I must say it gave me an enormous sensation! We were just one hour in the air which ought to be quite a record in thermic-flying with two men on board!—and gaining 4,000 feet, or three times the height we had when casting off from the aeroplane."

THE DARMSTADT FORTY-FOOTER.

The much-talked-about Darmstadt sailplane of 40 feet span, specially designed by easy manœuvrability in thermal currents, has at last been doing something. A few details were given in THE SAILPLANE for February 17th, 1933 (p. 30-31), but it incorporates in addition some secret features, and a friend of ours, who was in Darmstadt some months ago, was unsuccessful in his attempt to be allowed to see it under construction.

The weight now turns out to be 54 kg. (119 lbs.). The machine has had its thermic baptism, as it recently soared for 1½ hours in thermal currents. According to *Flugsport*, "When aeroplane-towed, alteration of the *Höhenlage* (tail-up or tail-down position) is carried out most easily by trimming of the ailerons. Manœuvrability, due to differential coupled with rudder, is good, exceeding expectation. Landing speed about 30 km. per hour (19 m.p.h." The sailplane was built by the Darmstadt Academic Flying Group, and has been named WINDSPIEL. Formerly it went by the name of D28.

This Darmstadt machine has been a long time in building, and its completion has been eagerly awaited in the gliding world. Like our own SCUD II., it has been designed in accordance with the theory that it is more important to give a sailplane good manœuvrability than to go on increasing its span indefinitely with a view to improving its performance when flying in a straight line. An interesting article, comparing the D28 and the SCUD II., giving numerous comparative figures, appeared in *Flugsport* for January 18th, 1933. In both machines it has been necessary to have the pilot's head under the wing, instead of in front of it as in larger sailplanes. The most conspicuous differences are in the aspect ratio (SCUD 16, DARMSTADT 12.6), wing section at the root (SCUD, Göttingen 652, DARMSTADT, 535), connection of fuselage to wing (struts in the SCUD, a "neck" in the DARMSTADT) and fuselage cross-section (in the SCUD, a square placed on edge; in the DARMSTADT, oval, almost circular). It is pointed out that, in the D28, the attempt to save all possible weight has led to the employment of radically new methods of construction, which, however, have unfortunately proved very expensive in practice.

It is evident that the Germans are taking the greatest interest in the SCUD II., and it is a pity the machine could not have gone over to the now cancelled "Istus" competitions.

NEWS FROM SWITZERLAND.

We hear from our Swiss correspondent that a gliding course for instructor candidates was arranged by the Swiss Aero Club, to take place from July 15th to 23rd. There were theoretical and flying courses. The 30 pupils were divided into several groups, and training took place on the Dubendorf aerodrome with the motor winch, also on the Bachtel Mountain.

The course was unfortunately marred by a fatal accident, when a pilot, launched by a motor winch, forgot to cast off the cable and went into a turn. He was at once pulled into a dive, and the accident happened so unexpectedly that it was impossible to cut the cable in time. The pilot died of his injuries later in hospital.

The *Times* correspondent in Basle, describing what was probably the same accident, gives the pilot's name as Lieutenant Haefeli, a well-known Swiss airman, and says he was testing out a new hauling device. The glider rose to 100 ft. and was then pulled down again. It happened on July 19th.

PATIENT DOING WELL.

On opening the last issue of THE SAILPLANE, we were surprised to find that the end of the paragraph about Mr. Grimston's aeroplane accident had mysteriously disappeared, and our readers were left in ignorance as to his fate. We are glad to assure them that he is still alive, as are also the two occupants of the other aircraft, though they were more seriously hurt than he was. They were rising off the aerodrome, while Mr. Grimston was gliding in to land.

AT THE NEW HORNBERG GLIDING SCHOOL.

Wolf Hirth turning after the take-off on the west slope at Hornberg. In the centre the wood has been cleared to allow of a safe start.

THE "CRESTED WREN'S" TOUR.

The CRESTED WREN is being taken to various sites in turn in the North of England, and we hope to have an account of its doings when it returns south. So far, news has been received that it arrived at Sutton Bank, near Thirsk, on July 23rd. There was little wind that day, save for a quarter-of-an-hour in the evening, when J. P. Dewsbery was able to soar it. On the 25th, conditions were better, and use was made of a new variometer, designed by D. Dent, of the London Gliding Club, and similar to that used by G. E. Collins in his thermal flights at Huish. It registered at times a rising rate of 10 ft. per second. R. G. Robertson flew for an hour and rose 900 ft. J. P. Dewsbery found that the slope-wind alone took him to 700 ft. above the start, and then, by circling under clouds, he was able to climb another 1,000 ft. until he actually entered the clouds. They were of rather feeble cumulus type. Major H. Petre is also in the party, and S. Humphries is joining them later. They may afterwards proceed to Furness or to Cross Fell.

AN INVOLUNTARY DISTANCE FLIGHT.

Mr. Formanek, a well-known Hungarian airman, was performing a test flight on his glider when a terrific storm sprang up. He was carried away by it, and landed two hours later on a Danubian island, 27 miles from his starting point at Buda-Pest. He was then informed that he had set up a new Hungarian record for distance.

The message does not state what kind of a storm it was, but we should guess it to have been a thunderstorm, or, at any, rate, something of the line-squall variety.

The flight bears a close resemblance to one by Max Kegel, which was performed in 1926, and was the first cross-country cloud flight ever achieved by a glider. Kegel was soaring over the Wasserkuppe when he got drawn up into the clouds of an oncoming thunderstorm. By the time he had extricated himself from the storm, he had set up a new world's record for distance. We are away from reference books at the moment, but believe he travelled about 25 miles.

RADIO SETS ON GLIDERS.

During this year's American gliding meeting, according to the *Evening Standard*, a small radio telephone set, no larger than a hand camera, will be used by pilots to report to their companions on the ground or in other gliders the weather conditions they find aloft. The communication set weighs 5 pounds. Ultra-short waves of five to ten metres will be be employed for communication of 10 to 20 miles.

ABYSMAL ORNITHOLOGICAL IGNORANCE.

People who write articles for the Press are expected to know something of the subject about which they write. For some reason this rule does not apply to ornithologists, who are allowed to publish any sort of nonsense about bird flight, and even get paid for it, for all the world as if they knew what they were writing about. Particularly is this true about soaring flight on motionless wings. A writer in *The Times*, in the course of an article on "The Last Home of the Kite," describes it thus:—

"Round and round he goes on widespread, motionless pinions, gliding rather than flying, ascending, falling, swinging round in curves and circles, or sailing across the valley. Where is the secret of this superb poetry of motion? Field-glasses help us to understand. Through them we observe that the Kite's tail is long and deeply forked; the tips of the fork, sometimes on one side and sometimes on the other, move up or down."

It reminds us of a reporter who, describing a Midland gliding meeting two years ago, wrote that the pilot could be seen continuously moving his elevator up and down in an effort to keep the machine aloft.

A writer in *The Times* a year ago (probably the same as the first-mentioned) served up some similar stuff about the soaring flight of seagulls, which he was equally incapable of understanding. Why any bird, having reached the end of the soaring beat, should turn round and fly back again, got him particularly flummoxed. Thus:

"From the cliff-edge it is possible to watch for hours the gulls on the wing, and to try to discover something of the secret of the mechanics of their flight. In their motion, to human view, there is much of the inconsequent lack of purpose which there is in their rest. What impels the birds, we ask, to sail in procession along the cliffs upwind, to turn suddenly and come back down-wind with speed unchanged, on almost motionless wings, on a beat of half-a-mile for half-an-hour together? There is no saying, unless it be some degree of conscious enjoyment in the practice of surpassing skill." ("C" pilots, don't blush!) "One use, at any rate, the thing has for the human spectator—the wholesome exercise of the sense of wonder and a touch of humiliation in remembering certain concomitants of our own boasted 'conquest of the air.'"

Thus does the ornithologist sneer at those who go up into the air to try and solve those mysteries he is content to talk about on the ground. And, when they have found out all he wants to know, he won't even listen.

A NEW BRITISH DURATION RECORD

Photographs taken during Mr. Mole's flight showing him: above, soaring in company with the "Prüfling"; left, with the "Professor," which has gained great height over the Bastion and is off to Ivinghoe; right, soaring directly overhead. Below is the "white light visible in all directions' required by the Air Traffic Regulations, and fixed under the "Wren's" nose in case it should stay up all night.

On Saturday, August 30th, Flight-Lieut. E. L. Mole put up a new British duration record with a flight of 6 hrs. 55 mins. He flew the new WILLOW WREN, designed and constructed by W. L. Manuel.

The record was officially observed, and we believe this is the first *official* duration record in this country since the officially observed flights at the Itford meeting of 1922, though the unofficial British record has been steadily mounting up during the last three years.

Mr. Mole started at 10.43 a.m., by hand-launch from the top of Dunstable Downs. He was officially observed by J. G. Grice, of the London Gliding Club, the Observer appointed by the British Gliding Association. He had obtained a forecast from the Air Ministry of the probability of a continuous west wind, of 25—30 m.p.h., for at least 24 hours, and it was his intention if possible to stay up for that time and thus beat by a good margin the existing official world's record of 21 hrs. 34 mins. set up in December, 1931, by Lieut. Cocke, of U.S.A., in the Hawaii Islands.

At first there was hardly more than sufficient wind to keep the machine up, a condition which makes a good deal more demand on the pilot's staying power than if the wind is strong enough to enable him to hover in one spot. Later, however, the wind got up somewhat, and, for a period round about 1½ hours after the start, the barograph record showed him to have got up to 1,400 feet above the starting-point. Afterwards, for the rest of the flight, the machine kept at a few hundred feet only above the hill-top, and the pilot had to work hard once more, going to and fro along the short beat and turning at each end.

As the afternoon wore on, showers began to build up in various parts of the sky, and, soon after 5 o'clock, one of them approached the Downs directly. Its advanced portion appeared to have no effect on the wind, but, as soon as the darkest part got overhead, the wind dropped suddenly and Mr. Mole was forced to come down. He landed at 5.38 p.m. The sealed barograph was opened in the presence of Capt. C. H. Latimer-Needham and Mr. J. R. Waplington.

Publicity was in the hands of the *Daily Express*, and their representative and that of the *Sunday Express* had an enjoyable day's outing.

By this flight Flight-Lieut. Mole beat his own previous record of 6 hrs. 10 mins. 38 secs. (which, however, was "unofficial"), set up at Ditchling on August 2nd, 1931, on the London Club's PROFESSOR.

In 1922 the longest soaring flight by a British pilot was that of Squadron-Leader Grey, which he achieved on the last day of the Itford meeting (Maneyrol was simultaneously putting up a new world's record).

This remained the British record until January 17th, 1931, when G. M. Buxton soared the PRÜFLING at Dunstable for 1 hr. 52 mins. The wind conditions on that day can be gauged from the fact that a French air liner crashed in landing on Lympne aerodrome in the dusk; it was alleged to have been "caught by a strong gust of wind," hit the top of a fence, been thrown up in the air and then crashed from 30 feet, whereby the fuselage and undercarriage were "considerably smashed." Mr. Buxton landed the PRÜFLING without any such damage.

Next day, Captain Latimer Needham went up in the same PRÜFLING at 9.45 a.m. and soared for a little over 2 hours. This was capped later by Mr. Buxton in the PROFESSOR, which he flew for 2 hrs. 20 mins. on April 5th, and 3 hrs. 1 min. on April 12th.

The first to beat M. Maneyrol's record of 1922 was Major H. Petre, who on May 24th, 1931, flew the PROFESSOR at Dunstable for 3 hrs. 28 mins. 5 secs. The flight was made under difficult conditions, the wind blowing obliquely on to the hill from the south-west. After a few beats between "the Bowl" and "the Bastion," the wind backed further towards south and the remainder of the flight had to be carried out on a very short beat over "the Bowl," though he found this beat could be prolonged by using the thermal effects from the fields on his right whenever the sun shone on them, and occasional passing showers sent up the wind speed so that he could hover for a time and give the rudder a rest.

The next unofficial record was set up on July 18th of the same year, when Mr. Buxton soared the cloudcraft PHANTOM for over 4¼ hrs. His beat extended to the Whipsnade Zoo, and it was there that he had to land when the wind dropped rather suddenly in the evening. Or rather, in a field at the bottom, outside the Zoo grounds (which feat furnished club members with a useful reply to those sniggering members of the laiety who *would* try to be funny about "landing in the lions' den.")

Just over two weeks afterwards, Mr. Mole set up his record of 6 hrs. 10 mins. already mentioned. About a year later he made three attempts on the TERN to set up an official record by carrying a barograph and being officially "observed," hoping thereby to raise the pre-

vious unofficial record and possibly, if conditions were favourable, to beat the existing world's record of over 21 hours. But luck was against him. On the first attempt, which took place at Ingleby Greenhow, the weather was very stormy, and, as it grew dark, the clouds came lower and lower till they finally settled down on the hill, and Mr. Mole had no option but to land, after a flight of 3 hrs. 45 mins., and shelter for the night under the TERN's wings. A few days later an attempt was made at Sutton Bank, also in Yorkshire, but after about four hours the wind failed and he had to land. A final attempt was made "under ideal conditions," but the TERN's fuselage was damaged during the launch by contact with a stump of wood concealed in the heather, and that put a stop to any further attempts for some time.

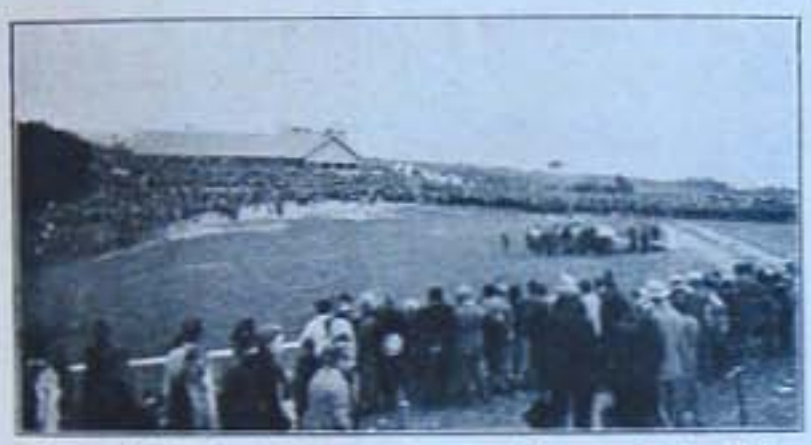
The troubles that beset a pilot who sets out to make a duration record, especially in British weather, and the amount of preparation required, especially if the record is to be "official," are often not realised. Thus it came about that nearly another year elapsed before the present successful attempt.

Among the lessons learned from this latest flight, Mr. Mole said that he thought a bigger site than Dunstable was preferable for such attempts, since one would not be so much at the mercy of sudden lulls in the wind; also, a forecast of a wind almost equal to the air speed of the machine was desirable, as it was far less tiring to hover, or almost hover, at some height, than to have to keep manœuvring to and fro just above a ridge, straining all the time to get the best performance out of the machine for fear it should lose irrevocably its narrow margin of height.

Congratulations must be accorded, not only to Mr. Mole, who flew the machine, but also to Mr. Mannel, its designer and builder.

INAUGURATION OF THE HORNBERG GLIDING SCHOOL

By OTTO FRISCHKNECHT.



Hanna Reitsch about to start on a "Grunau Baby II." at the Hornberg opening ceremony.

The new German gliding school at the Hornberg, about 30 miles east of Stuttgart, has now commenced its activities. The school belongs to the "Württembergischer Luftfahrt-Verband" (W.L.V.), a member of the D.L.V. The flying ground had been purchased at the beginning of the year 1932, and a big hangar of 174 ft. by 118 ft. erected. A second building, measuring 157 ft. by 144 ft., contains about 100 beds for the pupils of the school, sitting-rooms and a large common room. Two roads have been built and a regular 'bus service established.

The Hornberg is well known to all those interested in gliding in this country. It is the final summit of a mountain range, and soaring is possible on three different slopes, the west slope being the best one. The Hornberg is 2,492 ft. above sea-level, i.e., 655 ft. lower than the Wasserkuppe. Here fog is less frequent than in the Rhön. Thermic flights should be easy, as the surrounding country consists mainly of rocky mountains which further the development of warm air currents. The only disadvantage is that in case of a sudden calm the pilot may be forced to land low down in the valley.

The official inauguration of this gliding centre took place on July 12th. It was a rather rainy day, but a steady west wind allowed of some good soaring. The "Hi" primary glider (a nacelled ZÖGLING type, called after Wolf Hirth) succeeded in keeping up easily. At 11 a.m. Wolf Wirth took off in a GRUNAU BABY II. and gave a marvellous show. His start was remarkably low, but he gained height at once during the first turn. And now Wolf Hirth showed all his skill. Never before have I seen a flight like his. He did everything one could imagine: sharp turns, continuous circling as he might do in a thermal chimney, all without losing height, and even aerobatics. He dived down over the spectators' heads, gained height again by the momentum in store, imitated the flight of a nervous beginner and finally looped the loop three times. After him, his pupil, Hanna Reitsch, took off for a flight of four hours, a new Hornberg duration record. At 3.30 p.m. she had to land to have her GRUNAU BABY baptised with five other machines.

Meanwhile people were very busy on the ground. A great number of policemen and auxiliary police was regulating the movements of some 10,000 spectators. Troops of S.A., S.S. and Stahlhelm were moving about the place, a rather uncommon picture for an old glider pilot. It seemed as if active pilots were of subordinate importance. This impression still further increased during the many speeches of influential members of the Government. Only our admired teachers, Wolf Hirth and Prof. Georgii, were speaking in a familiar tone to the young devotees of motorless flight. The latter then baptised the six new machines, which were donations from every part of Germany to the new school. There were two FALKE, two FLIEGE training gliders, one PEGASUS primary glider and the GRUNAU BABY II. Meanwhile some aeroplanes were describing circles and finally a reinforced "Hi" glider, towed from Böblingen aerodrome, near Stuttgart, arrived at the Hornberg and landed after a short glide. The ceremony ended with a parade of the S.A., S.S., Stahlhelm and a hundred members of different gliding clubs who were present.

A first soaring course for advanced pilots and a workshop course for unemployed glider pilots are now being given.

O. F.

Above: general view of the Hornberg showing the buildings and part of the West Slope. Below: the school hangar, which houses 25 to 30 machines.

MORE ABOUT THE HORNBERG.

We have received a copy of a special issue of the local journal, printed for the occasion of the opening of the Hornberg School. A rough sketch of the grounds is given, from which it appears that the place is easily reached from Gmünd, the nearest town, which lies a short distance to the north-west.

A local enthusiast, Josef Schedel, carried out some primitive gliding experiments there shortly before the war. More recently, he got together a gliding group at Gmünd, and built for them in 1927 a ZÖGLING with added fuselage called "Kaltes Feld." It was the only machine the group ever used, and on it, at the Hornberg, Schedel got his "C" in November, 1931.

In an article by Hirth, it is explained that, while elementary training is to be catered for, the school is intended in the first place as an advanced school for performance flying, where he can pass on to the pupils the expert knowledge which only he can impart. It is intended also to develop a type of practice-soaring machine of good performance and as cheap as possible to build, for the special benefit of impecunious groups who cannot afford to buy good machines.

THE AERODYNAMICS OF THE FLIGHT OF FLYING-FISHES

By C. H. LATIMER-NEEDHAM, M.Sc. (Eng.), F.R.Ae.S., F.Z.S.

The flight of the flying-fish seems to be little understood and is regarded by many as one of the mysteries of Nature. Several suggested theories have from time to time been put forward in explanation but these are for for the most part conflicting and often contradictory and, so far as the writer is aware at least, no complete solution has yet been expounded.

However, like so many other apparently strange phenomena, the true explanation is simplicity itself when *all* the factors present are taken into account. The omission of any one contributing factor so masks the problem that it is only by ingenious reasoning that somewhat tentative theories are possible at all. Thus the British Museum Guide* states "The question whether flying-fishes really fly, whether, that is to say, their pectoral fins are moved as organs of flight like the wings of birds and bats, is a subject of much contention."

Earlier Theories of Fish Flight.

Some writers have maintained that flight is accompanied by rapid beating of the fins, whilst others discount this with statements to the effect that the fins are quite still during flight. Others, again, contend that lift is obtained over the crest of each wave, that is by soaring flight, which, however, Hankin† finds unsatisfactory as not being applicable in all cases. "The suggestion," Hankin states, "that flying-fishes get energy by meeting upward currents at the top of each wave obviously does not explain a flight of half-a-mile over a smooth sea where there are no waves . . . as a matter of fact and observation, flying-fishes may fly long distances along the trough of a wave or along the leeward side of a wave at high speed." Such a theory cannot, then, be accepted as the proper solution, although this is not to say that the duration of flights is never prolonged by the presence of rising currents.

Probably the suggestion most nearly true was put forward by Ahlborn, who believed that the flight was merely a prolonged glide with the incidence of the wings gradually increased to compensate for loss of speed until the final stalling back into the water. Hankin discarded this also on the strength of observations which did not appear to disclose a gradual lowering of the tail. It should, however, be recognised that the rate of tail lowering would be much more rapid towards the end of a flight, on account of the variation of lift with the *square* of the speed, so that the earlier lowering might be unnoticeable. Considerable evidence exists to show that the tail is lowered prior to the descent (Jordan, Ahlborn, etc.) and this is corroborated by Hankin with such entries as "Just before plunging, it *somewhat slowly* lowered its tail." (Italics not in original.)

Facts Concerning the Flight of Fishes.

Before proceeding further, it might be as well to marshal the facts known about fish flight so that a proper understanding may be gained. There are several species of flying-fish which live for the most part in tropical or sub-tropical seas and rivers. The largest, of about 1 lb. weight, is roughly 18 inches long with a span of about 2 ft. and a wing-loading of 2 lbs., or so, per sq. ft.

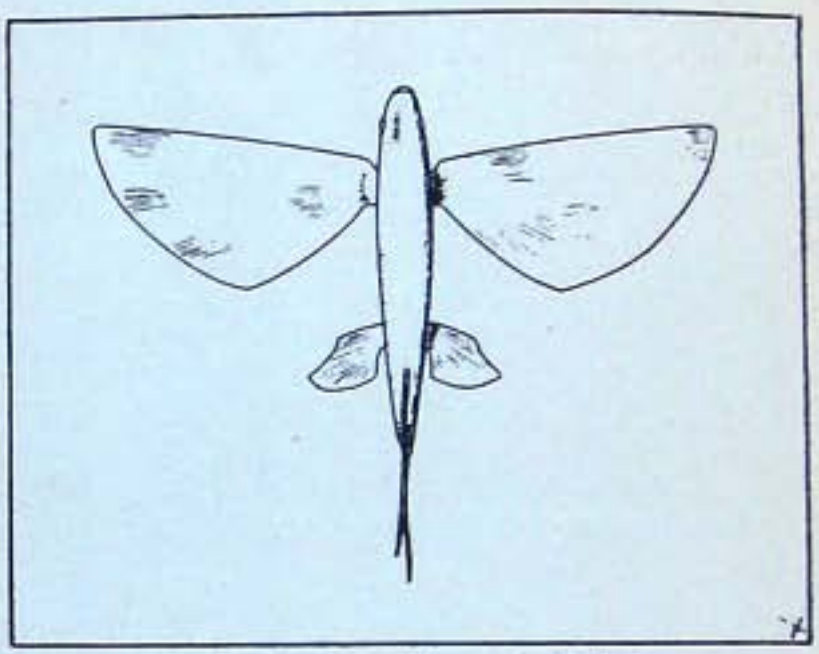


Fig. 1.—Flying-Fish (Exocoetus Spilopterus).

The pectoral fins act as wings and are undoubtedly assisted by the pelvic fins for lifting capacity. The pectoral fins are ribbed on the underside, probably for considerations of strength, the ribs running from the roots outwards. This would appear to be an adverse factor from the aerodynamical standpoint, but it is likely that when the wings are raised above the surface some water is trapped between the ribs which would thus tend to fair off the undersurface. Against this, however, the effect of the extra weight due to the water must be taken into account, although it has been stated that flying-fish can fly only so long as the wings remain wet, which, if correct, would seem to bear out the hypothesis mentioned above.

In considering the possibility of flapping flight, Hankin* states: "The weight of the flying-fish is about eight times as great as that of a bird of similar size . . . (but) the muscles for moving the wings . . . are at least five times smaller than those of a bird, according to measurements given by Moebius." The muscles attached to the pectoral fins are more developed than those of fish incapable of flight, but it seems fairly certain that they are insufficiently powerful for flight purposes, except perhaps as an auxiliary means of providing thrust. The American fresh-water flying-fish (Gastropelecus), which is found in the rivers of Guiana, has a deep sternum, or keel, to which muscles, comprising roughly one-quarter of the total weight, are attached. These muscles compare favourably with those of birds, but the wings are small and the method of propulsion is by beating the water with their wings.

Most of the salt-water species have the lower lobe of the tail fin much enlarged (see Fig. 1) and on rising from

*British Museum (Natural History) Guide to Specimens Illustrating Flight (1913).

†"Animal Flight," E. H. Hankin, M.A., D.Sc.

*"The Evolution of Flying Animals," by C. Hanbury Hankin, M.A., D.Sc.

the surface the tail is always wagged vigorously from side to side with a sculling action.

The duration of flight may be anything up to half-a-minute, whilst the distance covered above water varies between 300 and 2,000 ft., sometimes extending to as much as half-a-mile. Flight generally takes place just above the surface, but on some occasions a height of several feet is obtained. The speed of flight under calm conditions is about 30 to 35 ft. per second.

A factor of great importance, and one that seems to have escaped the notice of most, if not all, investigators concerns the effect of the speed of the wind on flight. Several observers have stated that flying-fishes fly further against the wind than with the wind, and Hankin states: "The flying-fishes either started *head to wind* (italics added) or . . . steered so as to travel in an up-wind direction." Other mentions are made to the effect that better performances are set up under windy conditions than in calm, and especially during the monsoons. Clearly, then, the wind must act as an aid to flight.

True Method of Flight.

The correct solution of fish flight would appear to be as follows: The fish attains its maximum water speed and then emerges into the air *facing wind*. Then its speed through the air, or flying speed, is its maximum water speed *plus* the speed of the wind, and it is thereby enabled to continue in gliding flight until stalling speed is reached. The air speed gradually decreases so that horizontal flight can be maintained only by increasing incidence, i.e., by lowering the tail (see Fig. 2 (a) and (b)) until eventually the tail makes contact with the water.

The flight can be prolonged by wagging the tail strenuously, and in long flights this takes place roughly every three seconds, although it is not always visible to an observer. It will be noticed that once the fish is in the air facing wind, the water, relative to the air (and apart from sea currents) is moving in the direction of flight and, as the fish's flying speed decreases, so the apparent water speed tends to approximate to the fish's speed, so that when the fish lowers its tail into the water there is little or no dragging effect and normal sculling can take place without difficulty. In other words, the fish obtains a much better purchase for its tail sculling than would be available without wind.

It is probable that a little assistance may be obtained by flapping of the wings, *especially in the absence of wind*, but there is not much evidence to support the theory, held by some, that wing flapping is the main method of propulsion.

Some numerical examples may help to clarify the above explanations. Let us assume that the flying-fish has a stalling speed of 20 m.p.h., and is capable of rising from the water at 30 m.p.h. Then, under calm conditions, the length of flight, free from sculling, is determined by the time taken to decrease the velocity through the air by 10 m.p.h. Now suppose a wind is blowing at 20 m.p.h. If the fish emerges facing wind, the initial air speed will be 30 + 20, or 50 m.p.h., and flight can continue through a range decrease of 30 m.p.h. The return to the water would be very gentle if the fish still faces wind, since there would be very little difference between the speed of the fish and of the water, or, in other words, the "ground" speed would be practically nil.

Further, it will be seen that if the fish attempted to emerge down-wind it could not become air-borne under the conditions considered, but, equally interesting, once the fish is in the air it may turn down-wind and accomplish long distances at very high "ground" speed, which agrees with the observations made during stormy weather. Down-wind flights are probably limited to the distance that can be attained by the initial impetus alone, since further tail sculling would be difficult, if not impossible, on account of the big difference between the fish's speed and that of the water, whilst landing also would take place at a high "ground" speed. For this reason it seems likely that there would be a decided preference for up-wind flights.

The method of flight outlined above bears some relationship to "dynamic" soaring flight practised by certain of the larger sea birds and for which wind is an essential factor.

Fig. 2 is reproduced from Hankin's "Animal Flight," and is included here as a further proof of the above theory. It is of interest to note the explanations which accompany the diagrams. The first figure is given as "Flying-fish . . . gliding in unsoarable *air*," whilst the second reads "Flying-fish . . . gliding in soarable *wind*." The italics have been inserted to accentuate the different wind conditions, which are given elsewhere as 19 to 24 m.p.h. for case (b) and calm air for (a).

It has been demonstrated that high speeds of flight are only possible when the wind speed is great and the two positions shown in the figure obviously relate to slow and fast speeds of flight. The alteration of wing camber is also noticeable.

The Dawn of Fish Flight.

If we believe in evolution of life, and it is difficult to do otherwise, it is a simple matter to imagine the commencement of fish flight. For instance, if a fish were to leap out of the water, perhaps in an attempt to escape some approaching danger, and found itself facing into a fairly strong wind, then, by simply extending its fins, some measure of support would immediately be felt, due to the relative velocity of the moving air. It would not be long before the value of such a strategical move was realised by the fish and continued practice, for eluding their enemies, would result in improvement of the technique till the present state had been reached. Reference to the British Museum Natural History Guide for confirmation on this point discloses the following information concerning the habits of flying-fish: "The various species of flying-fish . . . live in shoals in tropical and sub-tropical seas, and are pursued by large fishes such as the Tunny and Albacore."

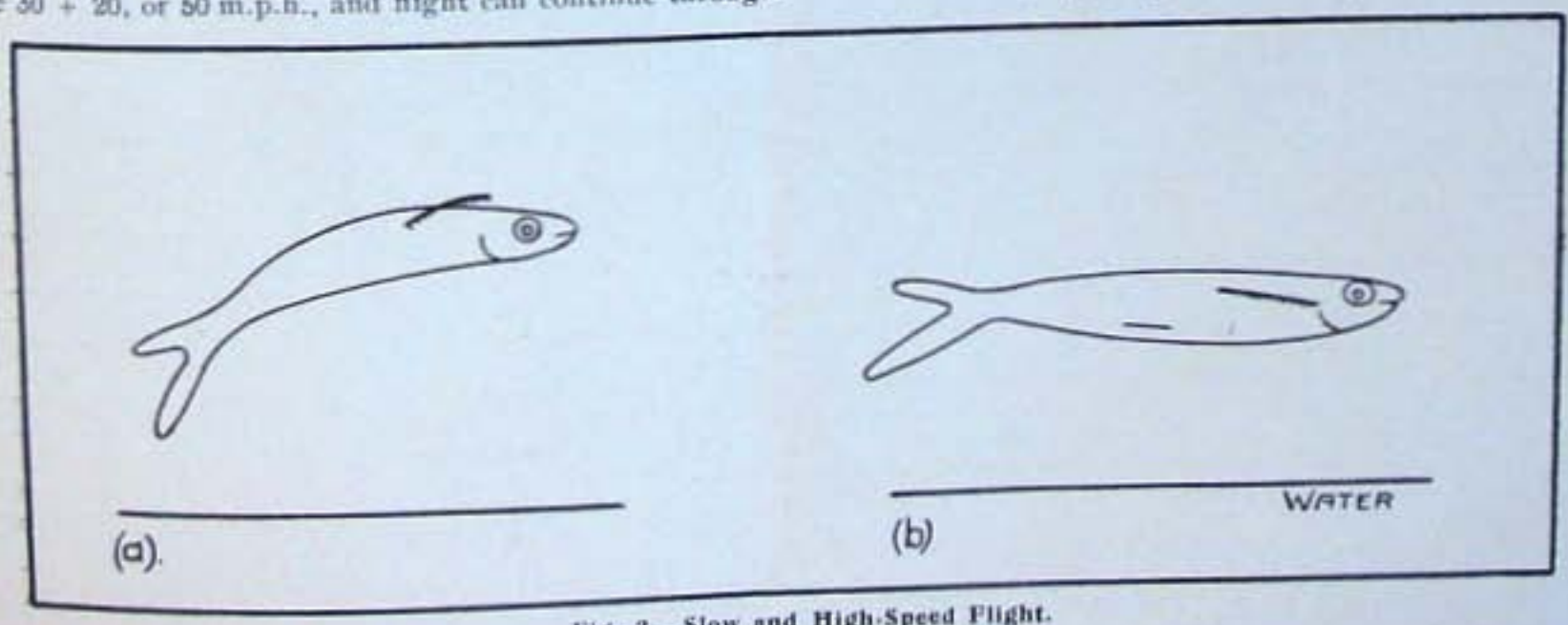


Fig. 2.—Slow and High-Speed Flight.

CROSS-COUNTRY FLIGHTS FROM DUNSTABLE

When the London Gliding Club first settled down on its present site at Dunstable Downs, nearly three years ago, there must have been few, if any, who thought that anything more than slope-soaring (that is, soaring in the up-draught of air caused by the wind blowing against the hill) would ever be achieved on the site.

The lowest height from which anyone could pick up the sort of rising current which would take a sailplane into the clouds, was believed to be about 600 feet, and it was only rarely that one saw a soaring pilot at Dunstable achieve anything approaching such a height.

Yet it was at Dunstable, one of the lowest soaring grounds in use in this country, that the first British cloud flight was performed. This happened about the middle of August, 1931, on a day of stiff wind, from about west or W.S.W., with cumulus clouds showing a tendency to form in lines parallel with the wind direction. Mr. G. M. Buxton took off in the PROFESSOR and rose very rapidly, the wind speed being almost, and at times quite, equal to the speed of the machine. In the course of his flight he found himself over the Zoo, his altimeter showing about 1,000 feet above the starting level, and a "street" of cumulus clouds stretching away up-wind. Watching the altimeter (he had no variometer), he left the ridge and made off to windward under this cloud-street, and found his height gradually increase until, somewhere near Ivinghoe Aston, he was up to 1,500 feet. He then found he was losing height, so he turned and made for the Dunstable Downs again, which were quickly reached with the hearty tail-wind. Shortly afterwards, finding himself again at nearly 1,000 feet and seeing a large cumulus with a dark base, a little way down-wind, Mr. Buxton flew to it in the hope of gaining height, on the principle that the strongest up-current is usually under the thickest part of the cloud, and, as a pilot cannot see a cloud's top when he is underneath it, he can only guess where it is thickest by looking to see where the base is darker than elsewhere. But the PROFESSOR could have got little lift out of this cloud, since he landed it in Luton Hoo Park, six miles away to the east and about 300 feet lower than his starting-point, and this is about the distance which would be reached by a plain glide in such a wind. This flight has often been spoken of as a "cross-country cloud flight to Luton Hoo," but the most spectacular part of the flight was undoubtedly the climb of 500 feet under a cloud street over the flat country to the west.

For a long time after this nothing more than slope-soaring was done, or even attempted. In spite of fairly regular attendance at the club, we only once saw a pilot even turn a complete circle, and that was when Mr. Buxton came out over the hangars one evening, in the PHANTOM, returned to the ridge, and went on soaring in a wind which was still blowing up aloft, though it had died out down below. (Up till the Hnish meeting, the only other circles we ever saw performed *while soaring*, in this country, were one by S. Humphries at Askam last year, and one by G. E. Collins early this year over Whipsnade, scraping the base of a low-lying rain cloud.)

So it came to be generally assumed that great heights could only be attained at Dunstable on very special occasions, and then only on a PROFESSOR. This frame of mind appeared to persist until that amazing day of soaring, October 16th, of last year. On that day, of seven machines which soared, sometimes five at a time, the SCUD II., with Buxton, and the CRESTED WREN, with Dewsbury, distinguished themselves by going up to astonishing heights and quite definitely getting lift out of clouds. The CRESTED WREN, for instance, was flying at about 600 feet above the starting level most of the time, and rose under a passing cloud to 800 feet. This cloud, and many like it, was a large mass, elongated down-wind; not the sort of isolated smallish cumulus which forms at the top of a single typical thermal current. It took some time to pass by.

It would seem that the most useful clouds to use on a site like Dunstable, where a machine usually has a waiting-list ready and impatient to use it, are either large elongated strips or "cloud streets," which enable a pilot to go out up-wind, and return to the Club ground if he is not meeting with success.

The next occasion on record of a machine getting well away from the slope-wind at Dunstable and yet continuing to soar, is that of April 9th, this year, when S. Humphries in the CRESTED WREN, suddenly gaining about 180 feet of height when over the slope, pushed out up-wind for about a mile and gained a further 200 feet, after which, however, he had to turn back owing to rapid loss of height. The clouds on that day were described in the Editorial comments in our issue of April 22th; they were in the form of long strips, not quite parallel to the wind direction, and were present before and after, but not during, the CRESTED WREN'S remarkable feat. There was also a high layer of greyish alto-stratus, a type which usually cuts off so much of the sun's heat as to prevent the formation of cumulus. If, however, the lower air is already in an unstable condition, up-currents have got to form somehow, and, in the absence of specially-heated patches of ground, they will tend to be arranged in a *regular pattern*, as Sir Gilbert Walker has shown. Hence, perhaps, the cloud strips. We enquired of the Air Ministry as to the "lapse rate" on this particular day, but were told that the meteorological aeroplane at Duxford does not function on Sundays.

Two very similar flights to this were made on July 9th, last, simultaneously by S. Humphries in the PROFESSOR and R. G. Robertson in the WILLOW WREN. They left the slope at the same point (the "Bastion") and actually gained 500 feet of height on the way out to Totternhoe, before turning round to come back. We were not there to see the clouds, but one pilot described a "boiling" cloud over his head and the other an "impression of a vague 'front' in the clouds."

Finally we come to two flights described in the London Club notes in this issue. One is that of P. A. Wills, who actually reached Ivinghoe Beacon in the PROFESSOR—the first time it has ever been done—and could even have soared further, if he had not lost the up-current through inadvertence, and thus have visited all the club's former sites in turn.

Then there is the flight of G. E. Collins two days afterwards, when he took the POPPENHAUSEN up some 1,000 feet in a succession of thermal currents. Although this flight began with a launch by winch, it was only after several beats of slope-soaring that the thermal flight was made.

In fact, there are two remarkable features about the flights described in this article: they were *all* made without a variometer, and in every case contact with thermal or cloud currents was made *from* the ordinary slope-winds. For this reason the flight of Mr. Wills is especially noteworthy; having no variometer, his technique was simply to go on trying for Ivinghoe until at last he should strike a succession of thermal currents numerous enough to keep him lifting till he was most of the way there. The clouds could not have helped him. We particularly noticed them. While there were good active-looking cumulus clouds in some parts of the sky, there were flat patches of rather thin strato-cumulus in other parts, and the remarkable thing was that his best lift, so far as we noticed it, seemed to come when there was nothing but strato-cumulus over his head. It seemed as if the atmos-

phere could indulge in vertical movements *either* at cloud level *or* near the ground, but not both at the same time (compare Humphries' flight of April 9th).

In conclusion, these various soaring flights *away* from the Dunstable slope-winds raise all manner of questions as to the possibilities of such an apparently modest site, and it is the purpose of this article, not to be didactic, but to stimulate thought, and, particularly, to encourage other clubs to see what they can do. A soaring slope is a jumping-off ground. But the jumps need not always be vertical. They can be horizontal, too.

SOARING OVER BERLIN.

In the *Berliner Illustrierte Zeitung*, of July 16th, is a fine photograph of the CONDOR soaring over Berlin at 1,600 feet. The photograph was taken during a week's soaring meeting recently organised by the D.L.V. (the new German air organisation). Several soaring pilots were aero-towed over Berlin, and, after casting off, tried to find thermal currents. Hirth and Dittmar climbed on occasion to 2,400 metres (nearly 8,000 feet).

There must be few of the world's chief capitals which have not now been soared over.

CORRESPONDENCE

A COMPLAINT.

Sir,—

I am writing to offer you my congratulations on the series of letters entitled "A Glider Pilot's Letters to His Son," published in THE SAILPLANE. These are admirably written and should be of great encouragement to novices like myself.

It is with regret, however, that I have to complain of your obvious neglect of the working youth. The success of the whole movement is dependent on the active support of the youth of the country, and I hope, by stating my own grievances, to draw attention to a matter which deserves your serious consideration.

I am a single young man, and have to work for my living. Being keen on flying, I joined my local club, and have been trained on a primary machine. Now that I am ready to learn soaring, I am compelled to stand still, as, unfortunately, the club does not possess a soaring machine, and I cannot afford to purchase one from the manufacturers. The obvious alternative was to build one, but on enquiry I found that drawings could not be obtained under five guineas. Now to a working youth this is a considerable sum of money, and would probably take about four months to save up. For this sum I admittedly would receive a set of working drawings, but I am still faced with the expenditure of about £20 to £25 for materials.

Now, to come to my first grievance, THE SAILPLANE AND GLIDER has not up to date published a single working design for either a primary machine or sailplane, and yet a weekly paper like *Hobbies* has already published two designs (excellently illustrated) of primary machines.

It is not the slightest use replying that you do not know what type of design to publish. Is it not obvious that the need is for a sailplane of simple construction, reasonably cheap to build, and capable of making really good soaring flights?

Secondly, in the past appeals have been made for articles of a constructional nature and, while these have been promised, they are still forthcoming.

In conclusion, this letter is intended to be constructive, and, while I appreciate that you are working under difficulties, I trust that you can hold out some promise of help along the lines I have indicated.

T. S. MEWES.

[We would welcome (a) a suggestion as to where the money is coming from wherewith to pay the designer for his design, or alternatively (b) an offer from a glider designer to design for us, free of charge, the type of glider described by our correspondent. We would also welcome articles of a constructional nature from those competent to write them, and willing to do so for nothing. Verbal appeals have been made for such articles in the past, but they have not even been promised, let alone forthcoming.—ED.]

FORMATION FLYING IN THERMAL BUMPS.

July 30th (Sunday) was, as readers may remember, a day of typical cumulus formation, with a moderate west wind, at least in the south-east of England. So writes Mr. J. M. Symmons, in calling attention to an interesting description of the resulting "bumps" by *The Times* Aeronautical Correspondent, who on that day accompanied No. 604 (County of Middlesex) Territorial Air Squadron from Hendon to their camp at Tangmere.

"We left Hendon in three flights, having five machines in the leading flight and three in each of the others," writes *The Times* Correspondent, who states that they were all WAPITIS. "This unwieldy squadron took off as a single unit and not only maintained perfect formation throughout the journey, but also made several changes of formation by way of practice.

"As soon as we had climbed to a height of 3,000 feet, and had crossed the Thames on our southerly course, the signal was given for flights to change from their arrow formations to 'line abreast.' Next the machines formed a 'V,' and maintained their positions until we were half way to the coast. Then the order was changed to 'squadron line abreast,' and the flank machines had drawn up level with the leader within 30 seconds, and, dressing by the centre, made a splendid straight line.

"The extent of the 'bumps' could be easily discerned now. A vertical air current could be seen occasionally working its way along the line, raising or lowering one machine after another as the wash of a passing boat may affect the corks marking the line of a fisherman's net."

The same sort of thing is sometimes seen among gliders, when several are soaring together. But we are reminded particularly of an occasion 11 years ago, when we were flying a team of five kites in Richmond Park, tied behind each other at intervals of 150 feet. The lowest kite, about 600 feet high, suddenly began to loop the loop (which, in a kite, means a sideways motion, the plane of the loop being perpendicular to the kite string). When it was more than half-way round, the next kite started the same evolution. So it went on through the team, and by the time the top kite was finishing its loop, all the rest had returned to normal. One could almost *see* the circular eddy, or whatever it was, working its way up through the group.

The entire absence of bumps, and therefore of thermal currents, over the sea, even when they are profuse inland, is well shown by *The Times*' writer's further description:—

"We came out over the sea just west of Worthing less than an hour after taking off, and wheeled westwards, flying over the sea in "V" formation. As we passed Littlehampton the squadron made a fine straight line, clear for the moment of the area of disturbed air. The change from 'V' to 'line abreast' was made again off Bognor Regis. Then we headed over Selsey Bill for the Isle of Wight, passed along its northern shore at a height of 3,000 feet and, just before reaching Cowes, wheeled through a full 180 degrees with every machine in its proper station throughout the turn. Any squadron might have been proud of so good a wheeling movement by so big a formation. When, after reaching Tangmere, the change of direction was repeated, it was not quite so neat because the convectional currents were doing their utmost to upset control."

A RECORD MODEL FLIGHT

A model-flying record which will take some beating has been set up by one Lippmann, of the Dresden Model-flying Union. The air seems to have been in a peculiar state of thermal activity, for two other records were achieved on the same day (April 9th, 1933). One of these was a new German record of 13 mins. 17 secs. for a model starting from the ground. The model, which was owned by Neelmeijer, flew normally for the first 90 seconds, and then dived towards a fir tree. To everyone's surprise it rose above the tree and then started soaring over a sandpit on the other side, the propeller having meanwhile stopped. After eight minutes' flying it had got up to about 650 feet. Up till now it had drifted slowly with a light east wind, but at that height it encountered a west wind, with the result that it drifted back over the aerodrome and finally landed not far from where it originally took off.

But the great flight of the day was yet to come. Cumulus clouds, by the way, were small, and were moving from the west. The members particularly noticed one which formed over the aerodrome and melted away within a few minutes.

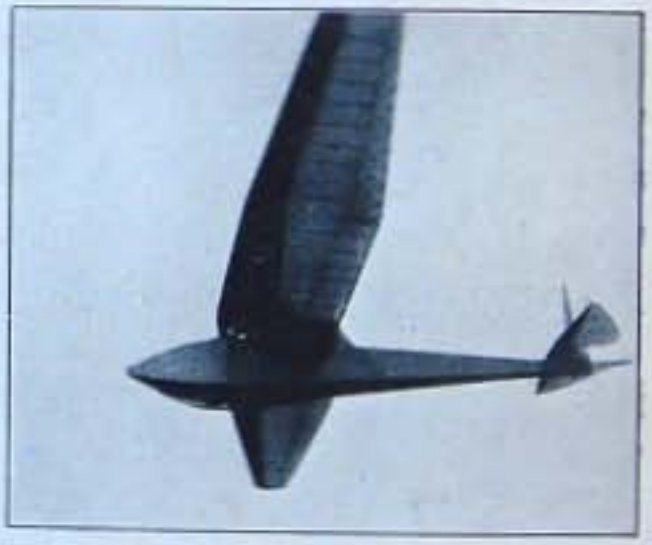
This World's record flight is described by O. Gentsch in *Flugsport*. Lippmann's model was wound up (about 1,000 turns) and started at 11.55 a.m. The first two minutes of flight were normal, and when the propeller stopped, the model was about 80 feet high over a rifle range. It then began to climb in circles. After six minutes the old hand-start record was beaten. At 14 minutes, Neelmeijer's record went west. Still the model climbed, "as if in a chimney with invisible walls." Thirty minutes' flying saw the disappearance of an American record set up in 1931 by Feinberg at Dayton, Ohio. The model was now about 1800 feet up and very difficult to see. At the 40th minute it began to shift slowly northwards, so a troop of cyclists was hastily organised and sent off to keep an eye on it, while another troop of pedestrians went hiking after it on foot. Watches were hurriedly compared, in case anyone should be able to time its landing.

The cyclists spotted it first, still going northwards, over the Rähnitzer Höhe, then, over a pool in a wood, it changed course to the opposite direction and began to come down. At 1.3 p.m. it landed in a tree at Wilschdorf. The owner of the land noted the time of its landing. It had been in the air 1 hour 8 mins. and landed 2,950 metres (2 miles all but 294 yards) from the starting point.

There seems to be no limit to the nearness to the ground from which a small object can get carried up in a thermal current. A few weeks ago a member of the London Aeroplane Club told us that he had seen a piece of newspaper whisked along by the slip-stream of a propeller, at Stag Lane one hot afternoon, and suddenly go up skywards. It was watched until it disappeared, apparently into a cloud. Whether it had been pushed into a thermal current which was already there, or whether the slip-stream started a thermal current in unstable air which was ripe for forming one, is a matter for speculation.

It has also been found, more than once, that insects which have no power of flight are to be met with several thousand feet up, which rather goes to prove Hirth's theory, that a thermal current consists of a bubble of warm air which has built itself up *in contact with* the ground and then broken loose.

NEWS FROM THE CLUBS.



D. MacClement flying the "Willow Wren" at Dunstable.

BRADFORD AND COUNTY GLIDING CLUB.

Sunday, July 23rd.—The HOL's was rigged on Saturday by a few members, and left pegged down in the hope of a good wind and a better turn-out on the Sunday. The attendance was certainly better, but the wind was only suitable for practice flying. Hastwell and Cox made flights in the HOL's, with the object of practising landing approach. Meantime other members continued on maintenance work.

Saturday, July 29th.—It is a curious fact that good soaring winds and members do not seem to turn up together. To-day there was a splendid west wind right straight up our good slope, but at the Farm there was only Stedman, spending his time galloping to the slope and letting his ears flap in the wind, and alternatively calling down such maledictions on the absent ones that made the air cloudy for yards around. Late in the afternoon four or five ambled slowly into view, and the HOL's was hauled forth for rigging. It is the writer's opinion that there is a great deal of "Teufel" in this gliding business. No sooner were the wings on the HOL's, when down came the rain—bucketsful of it—and when that stopped, so did the wind. The HOL's was, therefore, again pegged down for the night, while Stedman retired to a very dark corner, after the fashion of certain animals when they feel madness approaching!

Sunday, July 30th.—*As usual.* HOL's ready—enough members for a good crew—and NO. . . .! WIND!! As a result, work was resumed on REYNARD, which was finished and is now ready to take the air once more. We are hoping for some soaring during the August holidays, but it will depend on members and wind arriving at the same time. Dare we hope?

LONDON GLIDING CLUB.

Sunday, July 23rd, was definitely hot, so that the ice-cream man from Dunstable sold out promptly, and was last seen watching with wild eyes for fresh supplies which would not come. With dry mouth and damp skin we spent seven hours in hurling six machines off the hill: R.F.D., PRÜFLING, WILLOW WREN, KASSEL 20, HOL's DER TEUFEL and POPPENHAUSEN 2-seater.

Nothing dreadful happened, and nothing was broken. The hill-side winch and the Dodge kept on boiling quietly, and relays of benevolent children and grown-ups among the spectators hauled (and sweated) away at the machines

at the hill-top until exhaustion set in; whereupon other grown-ups and children took their place. Lovely girls grasped the anchor-men's ankles.

At first the results were little better than a straight glide toward the Bowl and back; but, as the sun worked round to the west until it beat upon the face of the hill, a handy little breeze sprang up, clearly thermal in origin, and persisted until sunset, whereafter a flat calm. The WILLOW WREN soared heartily three times, McClement making obvious use of little scattered "chimneys" of lift. The POPPENHAUSEN, even with 26 stone of freight, steadily held her height all the way down to the Bowl, but was then defeated by her majestic turning-circle. It was all very charming and peaceful; so much so, that one passenger seemed a trifle disappointed, inasmuch as the dual joystick in his cockpit had scarcely moved from beginning to end. He had imagined that a pilot invariably worked for his living, instead of so idly leaving so much to the machine's good sense.

It was just like old times to see Hiscox back from Huish, with the HOL's still intact, and to see the famous Professor Collins fresh from his Thermal Triumphs (bless his old heart). He now wears a green jersey and a fierce expression, both of which put the fear of the Lord into the poor old POPPENHAUSEN, causing her to behave rather like a one-place scout. A B.G.A. dignitary flew the R.F.D., the Editor flew the KASSEL 20, etc., etc., etc. It was altogether a nice day, with gratifying revenue and much Innocent Enjoyment.

Wednesday, July 26th.—At first a dead calm; later a slight drift of air down the hill. Yates did two "forty-fives" towards his "B."

Saturday, July 29th.—A day of Great Stuff. At 10.43 a.m., E. L. Mole went up in the WILLOW WREN, equipped with food and drink for 24 hours and an Air Ministry forecast of wind for a like duration. Wind about W., but somewhat fickle both in strength and direction. It must have been fickle in lapse rate, too, since a variety of machines went up to keep him company, and some funny comparative height effects were seen.

The PRÜFLING was flown by Dessoutter, then Richardson, then again Dessoutter. Richardson, having lost height after the launch, recovered it with a spectacular charge at the Bowl. We happened to be passing in the Whipsnade bus, and looked round anxiously for the Emergency Door. His flight then became higher and tamer.

The DAGLING (prefix WALKER-DOVE-MANUEL) had the time of its life. Jones soared it for half an hour. Then J. C. Dent flew it twice. The second time he took it to a height probably never before reached by any DAGLING at Dunstable. From a distance it looked suspiciously like double the height of the hill (above its base). He says it was done by flying the machine nearly stalled. Perhaps that is why, in making a turn low down near the Bowl, the DAGLING refused to stop turning and made as if to deposit itself down-wind on the road beyond. However, it completed the 360 degrees with enough way on to get back over the crest into the up-current. Once during this flight, the pilot found the WILLOW WREN flying straight at him *at the same level;* it was only when they got near enough to be in air of similar lifting properties that performance told and the WREN passed harmlessly overhead.

We now come to the PROFESSOR. P. A. Wills flew it in masterly fashion. He flew like a pilot possessed of not only a variometer but passing skill in the use thereof. But variometer had he none. The Bastion again showed its volcanic properties in providing sudden bursts of unexpected lift. We watched the PROFESSOR almost overhead, outlined against a particular wisp of cloud, remain motionless against this background, and yet shrink and shrink like Alice in Wonderland until it was half or a third of its former size. Twice it was seen at great heights, making its way over flat country towards Ivinghoe Beacon, and twice it turned back towards Whipsnade, losing height rapidly but just able to regain the hill. Then for a whole hour it vanished completely from the sky. Anxious enquiries were made, but nobody had seen it go, either horizontally or vertically. The only obvious solution was that the pilot had done it once too often, gone too far, failed to regain the Whipsnade up-current, and was perhaps even now being eaten by some of the resident carnivora.

But in the middle of tea he turned up, minus the PROFESSOR, which he said, with profuse apologies, he had deposited at Ivinghoe Beacon! And the apologies were for not having flown it back again. He explained that he had been dropping notes overboard, asking finder to tell us where he was, and, in looking to see where they fell, he had inadvertantly got blown back over the top of the west slope of Ivinghoe into the down-current behind, and had to land in a hurry on the inside of the cup.

The distance from the launching place was 3½ miles in a straight line, and 3 miles up-wind from the "jumping-off" spot where the pilot left the Dunstable Downs behind. He says he had no doubt about reaching Ivinghoe, once he decided he was far enough out to make a dash for it; he had height enough and to spare, though some of it was lost in a down-draught on aproaching Ivinghoe's north slope, the wind being W.S.W. at the time.

While the discussion raged, as to whether the PROFESSOR could be flown home or should be brought back by road (the latter was decided on), we were all distressed to see Mole in the WILLOW WREN dropping down below the hill-top and gliding in to land. A rain storm had approached and stolen the wind away, and the sock hung lifeless at the mast.

He landed at 5.38 (having been up 6 hrs. 55 mins. But it was a new British record, at any rate, and the *Daily Express* hurried up to congratulate him, followed by the rest of us. Mole, having had tea, hurried off to the nearest telephone to ring up the Air Ministry. We may be sure that their 24-hour "forecast" was among the matters discussed.

The wind got up a little once more in the evening, and Hiscox managed to soar the HOL'S DER TEUFEL for half an hour, but the wind then dropped before an approaching thunderstorm, and Bolton could only fly the machine down. The returned PROFESSOR also had a try, but likewise could only fly down.

The thunderstorm arrived on the scene just as we were putting the machine away in the twilight. It was a beautiful specimen of a "front." The "roll cloud" was there, too, stretching right across the sky, though rather broken up in parts; just as it came over, the wind went round from S.W. to N.W., and, a minute afterwards, down came the rain. All according to text-book.

Sunday, July 31st.—Richardson sat in the PROFESSOR; the launching rope was extended, whereupon one side of it broke, near the pulling team, and flew back at the PROFESSOR, splitting a bit of its plywood nose. Richardson still sat in the PROFESSOR, the bungy was again extended, and again it broke, chewing up more plywood and

AN APPROACHING "FRONT."

The "Hol's der Teufel" soaring in a west wind at Dunstable, and a thunderstorm "front" (mentioned in London Club notes) approaching from the north-west.

some bits of bulkhead to flavour, and putting the rudder out of action. Richardson now got out of the PROFESSOR, and the machine was trundled ignominiously home along the ground.

An aerial distinction for the British Gliding Association: S. Whidborne, ex-treasurer of the B.G.A. and present acting treasurer, obtained his "C" with a flight of six-and-a-half minutes on the DAGLING (the one with the long prefix).

J. C. Dent soared the PRÜFLING; Morland took passengers on the POPPENHAUSEN, and soared on two flights out of five; and Manuel flew his WILLOW WREN for several minutes and gained a "forty-five" towards his "B" (he has been unable to do it before, owing to lack of a C. of A. and unwillingness to pass tests on anyone else's machine).

Tuesday, August 2nd.—More thermal work! Dual instruction was being given by Collins in the POPPENHAUSEN, soaring along the ridge in a light north-west wind, and apparently getting a good deal of thermal lift here and there. On one of these flights, when his pupil had about had his money's worth, Collins decided to lose height by flying round south of the bastion, where there should have been a down-current. Instead, on coming round over the power cables, the old POPPENHAUSEN got a hearty thermal heave, and up it went, Collins circling round and round as he drifted back over the hill. The POPPENHAUSEN now went touring about the landscape, picking up one thermal current after another—how many, nobody seems quite sure. But in one of them he turned 10 circles and got up to a height which he judged, from previous experience, to be about 1,000 feet above the hill-top, or some 1,500 feet above the low flat country to the west where he was then flying. The flight lasted 1 hr. 50 mins., starting at 2.30 p.m.

Wednesday, August 3rd.—More instruction. And somebody flew the WALKER-DOVE-MANUEL-R.F.D. into the hill, using the stalled-turn method of doing so. (We don't know how many people intend to take a hand in its repair, but we hereby give notice that any further additions to its name will be charged for by the inch.—ED.)

OFFICIAL NOTICES

Gliding and Soaring Competition.

The Council of the British Gliding Association has decided to hold a two-day Competition on October 7th and 8th. It is hoped that a site at Malvern will be available, but a definite decision will be given as soon as possible.

The Competition has been arranged in the hope that better weather conditions will obtain than those existing at Huish.

Council Meeting.

The next Council Meeting will be held on September 4th, at 6.30 p.m., at 7, Albermarle Street, W.

Special Facilities for August.

The London Gliding Club will be open continuously from July 29th to August 20th. G. E. Collins will instruct on week days. Arrangements have been made for dual control instruction in the two-seater, using the new winch launch on adjoining land when there is no soaring wind. Members *must* make up their own groups so as to be sure of a team, and to facilitate catering, and should inform the club steward which days they are joining. He can book up the four bunks in the Club House to the first comers, or members can pitch their own tents.

HAPPY MEMORIES.

Otto Frischknecht, of St. Gallen, Switzerland, who is at present a member of the flying and working group at Reutlingen, Germany, writes in the course of a letter as follows:—

"It's rather time for me to come over to England again. . . . The happy week-ends at Dunstable are still alive in my memory, and I am interested always in the doings of my friends of the London Gliding Club."

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who scan Ordnance Survey maps in search of soaring sites will have to bear a whole lot of new possibilities in mind.

Then there is the puzzle of Cross Fell, where, admittedly, the air moves in a mysterious way, but we are confident that the solution will some day be found. And we particularly like the way the Furness Club, having a little time on their hands, did not fetch out a pack of cards or turn on the gramophone, but sat and watched the clouds form and disperse over their soaring ground. A year ago, not a single club in the country would have behaved in such a way.

In fact, there is a new spirit in the air. It has all come about in the last few months. Everywhere people are talking of thermal currents, watching the clouds, studying the weather, forgetting their primary machines and building sailplanes. Flights such as those of Mr. Collins are receiving unexampled publicity. Everything points to a great national revival of interest in motorless flying. But if that revival comes, it will be due to the efforts of those whose chief concern has been, not to go down to history as The-Man-Who-Made-the-Youth-of-Britain-Air-minded, but to learn to fly better, longer, higher and farther than they have ever flown before.

THE FUTURE OF "THE SAILPLANE AND GILDER."

THE SAILPLANE AND GLIDER will in future appear monthly, instead of fortnightly as hitherto. It will be published on the 1st of each month, and matter for publication should reach the Editor by the 22nd of the month previous.

This change has been made necessary by the fact that THE SAILPLANE AND GLIDER has been produced at a loss, the present rate of loss being such that the British Gliding Association is not in a position to continue to make it good. This loss is almost entirely due to a falling-off in advertisement revenue. Every effort has been made to remedy this, but under present conditions there is no prospect of any change for the better.

The position is, then, that THE SAILPLANE AND GLIDER must cease publication unless its subscribers are prepared to share among themselves the entire cost of its production. We propose to make an effort to keep the paper going by issuing it monthly and increasing its price, the annual subscription being, however, considerably reduced. The luxury of an outer cover will have to be dispensed with, but the present number of 12 pages given over to the text will be increased as far as finances allow. The monthly Competition will have to be suspended, but senders of articles, etc., will receive free extra copies of the issues in which their contributions appear.

The new subscription rates will be: for one year, 10/- post free; for half-year, 5/6 post free; for single issues, 1/- post free. The unexpired portions of current subscriptions will be taken into account at the new rates. THE SAILPLANE AND GLIDER will not in future be on sale at bookstalls, but the paper may still be ordered through bookstalls and newsagents.

FEATURES IN NEXT ISSUE.

Our next issue will include (space permitting) the following:

A full report of the 1933 Rhön Competitions in Germany, including photographs, descriptions of new types taking part for the first time, and a list of all the machines present.

An account of the annual meeting at Elmira, New York State, organised by the Soaring Society of America. (Illustrated.)

An article on gliding in Holland. (Illustrated.)

A more detailed account of Kurt Schmidt's recent record duration flight of over 36 hours.

A summary of recent articles in the German aviation press on flying by muscle-power, in connection with the prize recently offered for such flight.

Most of the above have been crowded out of the present issue through lack of space.

It is also hoped to include further articles on clouds, as far as space and time permit, in the forthcoming issues.

A MEETING AT SUTTON BANK

A Gliding Meeting is being held on the 7th and 8th October at the Sutton Bank site, near Thirsk, Yorkshire. A photograph and map of the site will be found on page 184.

The object of this meeting is to hold contests for the "Wakefield" and other trophies, which did not take place at Huish owing to weather and other unsuitable circumstances. Subject to confirmation by the Contest Committee of the B.G.A., it has been decided to offer the Wakefield Cup for the greatest distance, De Haviland Cup for greatest altitude, M.H. Volk Cup for longest duration flight, Manio Cup for an out-and-return flight, and cash prizes to the value of at least £20.

At the local inn a large room is to be available for those who bring their own bedding. Accommodation can also be got at near-by towns such as Thirsk and Helmsley.

A barn is available for machines in a dismantled condition, and there is a sheltered yard in which to rig them.

The Secretary of the British Gliding Association (19, Berkeley Street, W.1) would be glad to hear as soon as possible from those who contemplate entering machines for this Meeting.

THE "ZEPHYR" IN THE PENNINES.

Mr. E. T. W. Addyman, of the Aircraft Club, Harrogate, has carried out an exploration of the Northern Pennines with his sailplane ZEPHYR, with a view to finding good soaring sites. A good one was found at Tailbrigg, three miles S.E. of Kirkby Stephen, with a good road all the way up it and over the top into Swaledale. A mile or two south of this, sites were found at Fair Hill, Great Bell, and Mallerstang Edge.

The party also went to Hartside, arriving soon after Mr. Dewsbery and Mr. Buxton had left (see article in this issue), but here, unfortunately, the ZEPHYR got blown over on to its back while being carried by the usual crowd of willing but inexperienced helpers. The rudder and one elevator were broken.

The Pennines were explored from Mallerstang to Cumrew Fell, and the ZEPHYR is reported to have made 55 flights. The main trouble with these Pennine sites was found to be that, as often as not, they are enveloped in cloud, especially Hartside and Cross Fell.

The machine was later exhibited at Penrith and at Keswick in the Lake District, and on August 23rd, Mr. Addyman took it up on the slopes of Skiddaw. From there he took off and, after sailing gracefully at a great height, descended safely to the valley near Keswick. This is claimed to be the first Lakeland flight in a glider. Last year, however, Mr. G. M. Buxton soared in the FALCON from Askam-in-Furness (which may not be strictly within the Lake District) to the north end of Coniston Lake (a distance of 13 miles, which was, until the other day when G. E. Collins beat it, the record for a British pilot).

THE "ZEPHYR" ON TOUR.

Preparing for a flight from Skiddaw, whose highest point is seen on the left.

Photo by G. P. Abraham.