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The First Journal devoted to Soaring and Gliding



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The First Journal devoted to Soaring and Gliding

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"FAS EST AB HOSTE DOCERI"

IT IS an unfortunate thing that SAILPLANE should have had to begin again at a time when exigencies of war prevent those British activities the news of which, it is the function of this magazine to chronicle.

Even before the war, however, there was no doubt that Germany led the world in this field of endeavour. Many German achievements in flying design and construction are so far ahead of the pre-war standards of the rest of the world that it appears that for some time to come we must continue where they led.

It isn't possible to " jump " these stages of design or performance very much; each step must be empirical and by trial and error only can real solid progress be made.

But it is surely not necessary for us to begin painfully at the bottom every time. Can we not take advantage of the enemy's experiences in building, design and achievement in order to improve on his performances ?

WISE POLICY

The wise military commander is always examining his enemy's plans, operations and manoeuvres and his equipment when it falls into his hands, to seize upon the new thing; even an old thing in a new guise may often have a surprising influence on the course of a war or a battle.

For that reason, therefore, we have felt justified, in the issues of the new series, in describing German designs, ideas, achievements. But we have also described British performances, ancient news though they now are, and events in Australia, Egypt, Canada, as well as in Czecho-Slovakia and Poland.

We feel that we are not being un-British in this respect, although we would prefer to chronicle exclusively British news. The account which appears in this issue of Ernst Jachtmann's duration record may be thought to be good German propaganda. So it is, but that aspect is overshadowed by what its re-publication in English will teach the tens of thousands of British boys and girls who are now just coming to Soaring, apart from the emulation it will inspire.

SELF-CONFIDENCE

The wide sweep of world activity which seems to be the main subject of our survey, serves also the purpose of informing the newcomers of the pre-war state of Soaring throughout the world. If it breeds in their minds a feeling of their mastery of the world through a mastery of the air, it will have earned a priceless dividend. We, as a race, will need plenty of self-confidence in the years to come. If it helps break down international barriers and encourages international friendship and understanding, that, too, will be a handsome dividend.

OFFICIAL RECOGNITION

But we have a feeling that the winter of our discontent is nearing an end. As we go to Press there are strong and circumstantial rumours in Soaring circles that the R.A.F. are at last to acknowledge Soaring and to take over a well-known club site for a Station where R.A.F. Officers and men may Soar and learn to Soar.

If it goes no further than this it will be a great step forward. Who knows that one day Soaring may be compulsory in the R.A.F. If it ever is, the seal of approval will be set on the ambitions of a gallant and selfless band of pioneering Britons who have struggled for 15 years to get the value of Soaring and Sailflying acknowledged by the powers that be.

But from then on, SAILPLANE will only have space for British news. Speed the day !

Pioneers of British Gliding—2

ANN DOUGLAS

IN AUGUST, 1937, just as the British gliding movement was well set on the way to its pre-war climax, there burst in upon it a new phenomenon which notably accelerated the pace. This was no less a personality than Miss Ann Courtenay Edmonds: young, blonde, caring little about her appearance and not needing to, possessed of unbounded energy with or without proper food or sleep, a born pilot with heart in the clouds but a head for organization, a talent for drawing and painting, an urge to authorship, and a passion for music and raw carrots.

This devotion to the air began at school, perhaps as a form of "escapism" from the type of headmistress who has no use for a high-spirited girl, and at seventeen Ann had learned to fly at a West Country aeroplane club. Soon she had been given free use of a Chilton light aeroplane by the makers, cunning idea was that, wherever Ann landed every male in sight who contemplated buying an aeroplane would say to himself: "If a mere slip of a girl can handle it like that, then mine's a Chilton."

Ann was introduced to gliding at Dunstable on August 16, 1937. She took her "A" certificate on August 17, "B" on the 18th, and "C" on the 19th. On the following December 5, not having turned in till 3 a.m. after winning first prize at a hilarious "Tramps' Ball" at the gliding club, she was up again before sunrise to put in a five-hour flight towards the "Silver C," fortified by one or two sandwiches and the inevitable raw carrot.

Two months later, racing low along the Downs with a following northerly gale, Ann had to squeeze obliquely between the power cables and the slope, shot round the corner into a down-current of 15 feet a second over the Zoo, and in no time found herself aground in that enclosure without having paid at the turnstile. At this the world's Press sat up and took notice, first prize going to the *Children's Newspaper* with:—"Into the placid paddock of the ponies at Whipsnade a glider came settling down and out of the machine stepped a modern goddess."



MRS. ANN DOUGLAS *Photo: A. E. Slate*

In another month our deity was riding the winds in her own Grunau Baby, repeatedly recovering from incipient spins because the students who built it at an aeronautical school had unfortunately given each wing a different incidence.

And now we come to the greatest achievement of all, unofficially known as "Ann's Club."

Early in 1938, backed by three other London Club members who lived nearer Reigate than Dunstable, Ann started a project for developing a site on the North Downs as an alternative soaring ground for the club in south winds. A small party of sailplane owners tried out the site on January 9 and again on March 20, and than came the famous Whitsuntide meeting at the beginning of June, when nine machines put up 73½ hours' flying and 224 miles of cross-countries were done. In addition to organizing the flying, the finances, the guests, the A.A. and the Press, Ann organized her parents (who were made to move their home to Buckland Court near the bottom of the slope), the landowners (who for eight years had resisted all applications for use of the site but couldn't resist Ann), the London Gliding Club (who agreed to sponsor the meeting), and the weather, which duly provided three days of southerly wind with thermals as required.

But the London Club decided after all not to develop the Reigate site, so Ann was faced with the only alternative of starting a club there herself. This she did, and the Surrey Gliding Club was officially opened on November 12, 1938.

Next day the club's first pupil, A. Graham Douglas, owner of the Redhill Flying Club near by, was given his first hops. Two months later he found himself engaged to be married, and two months after that, on April 28, 1939, Miss Edmonds became Mrs. Douglas.

Meanwhile the club prospered exceedingly. Members flocked in, a Colonel brought the Tank Corps, three veteran Imperial Airways pilots came to learn how to fly properly, and private owners from other clubs joined it as a useful alternative site. Effective training methods were developed: because of the sheltered landing ground the winch rarely needed to be moved from one fixed position, and bungy launches were discarded. Then

Ann prepared a "patter" for instructors which standardized the training, so that a pupil was no longer bandied about between so many instructors that none of them knew what stage he had got to.

By the time the war came "Ann's Club" had, in its ten months' existence, overtaken all the old-standing British clubs but one in the number of certificates gained per year—that is, if the Air Defence Cadet camps, which were outside normal club activities, are eliminated from the statistics. These, then, show that in 1939, the London Club leads with 146 and the Surrey Club comes second with 67. Moreover, the Surrey Club takes the lead in the whole country for the proportion of "A" pilots who carried on to the "C" stage—69 per cent.

Although others contributed much to the Club's success, it must be acknowledged that Ann's energy and example—she practically lived on the site—provided the inspiration for this unique achievement.

Early in the war, when the Redhill flying school had moved up north, Ann was arrested while photographing clouds near an aerodrome and marched before the C.O. as a "suspicious person"; it is not known whether the C.O. agreed, as he turned out to be her husband. Soon afterwards the pair of them, who had been taking motion pictures of the Helm Wind clouds from Hartside, were called upon by detectives and told that they had been "seen signalling with lamps across the Vale of Eden." In the summer of 1940 Graham Douglas volunteered for operational duties, so Ann was at a loose end, applied for a job in Air Transport Auxiliary, and was accepted at once as a pilot.

Among Ann's creative works are many oil paintings of sailplanes and clouds, and three books: "Pilots Only," a collection of cartoons about life at a light aeroplane club (1937); "Silent Flight," a delightful story of two young people who joined a gliding club (1939, unfortunately out of print); and "Cloud Reading for Pilots" (1943, reviewed in SAILPLANE last February). And now she is earthbound once more, this time in company with what she describes as a "future glider pilot in the shape of a red-haired baby girl."

A. E. S.

SINGLE-SEATER DURATION RECORDS.

BEGINNING with the first glider flight to qualify for a "C" soaring certificate—if there had been such a thing at that time—the following is a list of international duration records for motorless flight up to the present day:—

October 24, 1911: 11 minutes by Orville Wright in Wright biplane at Kitty Hawk, U.S.A. Of this time, 9 minutes 45 seconds was a soaring flight above the starting-point.

August 30, 1921: 13 minutes by Wolfgang Klemperer (now an American citizen) in "Blaue Maus"; and September 5, 1921: 15 minutes by Artur Martens in "Vampyr." Each of these flights started from the Wasserkuppe, Germany, and consisted chiefly of a gradual descent through weak up-currents.

September 13, 1921: 21 minutes by Friedrich Harth in "Harth-Messerschmitt" at Heidelstein, near Wasserkuppe. As this was over a slope of only 6 degrees, with a total loss of height of only 40 feet, it is claimed to have been done by using gust energy.

August 18, 1922: 1 hour 6 minutes by Artur Martens in "Vampyr" at Wasserkuppe. The final 20 minutes was a descent into the valley.

August 19, 1922: 2 hours and 10 seconds by Hentzen in "Vampyr" at the Wasserkuppe, including a final descent into the valley.

August 24, 1922: 3 hours 6 minutes by Hentzen at Wasserkuppe; landing higher than the starting-point.

October 21, 1922: 3 hours 21 minutes by Maneyrol (French) in Peyret tandem monoplane, at Firle Beacon, near Lewes.

January 3, 1923: 7 hours 3 minutes by Thoret (French) in Hanriot aeroplane with engine stopped, at Biskra Oasis, Algeria.

January 23, 1923: 8 hours 5 minutes by Maneyrol at Vauville, France.

January 31, 1923: 8 hours 36 minutes by Barbot in Dewoitine at Vauville.

May 18, 1924: 8 hours 42 minutes by Ferdinand Schulz at Rossitten, East Prussia.

July 26, 1925: 10 hours 28 mimutes by Massaux (Belgian) in Poncelet "Vivette," at Vauville.

October 2, 1925: 12 hours 7 minutes by F. Schulz (German) in "Moritz," at Koktebel, Crimea.

May 3, 1927: 14 hours 7 minutes by F. Schulz in "Westpreussen" at Rossitten.

October 19-20, 1929: 14 hours 43 minutes by Dinort at Rossitten.

December 17-18, 1931: 21 hours 36 minutes by William A. Cocke (U.S.A.) in "Nighthawk," at Nuuanu Pali, Hawaii.

August 3-4, 1933: 36 hours 35 minutes by Kurt Schmidt in "Grunau Baby," at Korschenruhe, East Prussia.

May 27-29, 1937: 40 hours 55 minutes by Ernst Jachtmann, in "Grunau Baby," at Sylt Island. Unofficial, as the pilot had no barograph.

Summer, 1942: 38½ hours by Eric Nessler at Black Mountain, France. Referred to by Jachtmann as being an official record, but no further particulars given.

November 19-21, 1942: 45 hours 28 minutes 51 seconds by Erich Vergens, Germany. According to a published account, he took off at 10 a.m. and was towed to a high altitude, evidently by aeroplane. He cast off the tow cable at 10.49, flew in thick fog, and glided slowly over an 18,000-foot mountain to reach the up-current. He then cruised "in the available air space," making 2,000 turns in all and maintaining an altitude of about 16,400 feet. He remained in the air until 8.18 a.m. on the third day, when the wind dropped.

September 22-24, 1943: 53 hours 52 minutes 50 seconds by Ernst Jachtmann in "Weihe" at Palmnicken, East Prussia.

A. E. S.



A "C. W. 5." Sailplane.

Legal Basis of the Soaring Movement in Poland

ORGANIZATION AND TRAINING

THE soaring and gliding movement in Poland were based, from the legal point of view, on the Polish and International Air Law and, where sport achievement were concerned on the "code sportif" of the F.A.I. and the regulations of I.S.T.U.S. The first Polish rules for gliding and soaring came out in 1932 and were finally compiled and completed in 1937. They were based on the Polish Air Law issued by the Minister of Communication in 1928. These regulations dealt with the following matters concerned with soaring and gliding, rules to which the construction, production, technical control and registration should conform.

Crews: Standard of health, age and knowledge of the air traffic regulations.

Training: The lowest age limit (16 years), medical tests, exams.

Certificates: Certificate A.B.C. and Silver C, also special government licenses for instructors issued to candidates who finished special courses and passed necessary exams.

GLIDING SITES

Ground which was to be used for public gliding sites first had to have the government's approval and had to be registered. This was necessary in order to ensure the safety both of the trainees and the public.

There were three kinds of gliding sites according to the gliders or sail planes used.

Special regulations were issued with regard to towing flights, exhibition flying, acrobatics, flights on powered gliders, etc.

All performance flights were done under the supervision of sport commissionaires appointed by the Polish Aero Club which was a member of the F.A.I. The regulations of this Club were in strict relationship to the sport code of the F.A.I. and to the regulations of the gliding subcommittee of this international governing body for sport aviation where Poland also belonged.

The Polish soaring movement took part in the work of I.S.T.U.S., and a Polish delegate has sat since 1932 on the board of this international committee, which worked for the world soaring movement.

DISTRICT ORGANIZATION

Where the organization of the soaring movement was concerned, the country was divided into 10 districts, and the authorities which stood at the head of each dealt with all matters connected with soaring within this district. According to the regulations of the F.A.I. for all countries which belonged to it, the Polish Aero Club was the chief authoritative body for sport aviation in Poland. It exercised its authority through the Central Polish Gliding Committee ("P.K.S.") to which belonged delegates of each of the 10 gliding districts and 2 delegates of the government. Representatives of scientific research centres in matters of aviation, of medical services and physical training boards were also members of the P.K.S., as well as deputies of large youth organizations active in the gliding movement for ex-Boy Scouts.

MINISTRY OF COMMUNICATION

The Central Polish Gliding Committee suggested the course which the development of the Polish gliding movement was to take.

planned the necessary assistance, took up the matter of State subsidies with the Government, etc.

The gliding movement in Poland, the same as the civil aviation, was under the authority of the Minister for Communication who acted through the Department for Civil Aviation in the Ministry of Communication.

ONE AND A-HALF MILLION MEMBERS

The Polish League for Air Defence played a considerable part in the Polish gliding movement. This powerful organization which had about 1½ million members was able to expend very large sums of money every year on sport aviation and especially on soaring, gliding and research in this line. This League enabled individuals who otherwise could not afford it, and whole youth organizations in poorer districts to take part in sport aviation.

Here is a summary of the conditions of training, training fees, etc. :—

1. The number of schools.
2. Conditions required.
3. Fees.

1. There were 6 large schools suitably equipped for sailing, 10 medium sized and 24 smaller ones for rudimentary training only. Besides, there were 60 provincial clubs which had facilities for primary training, Cat. A.

WORKSHOP PRACTISE

A great stress was laid in all these schools on lectures and theory, (construction, aerodynamics, meteorology), and on practical experience in local workshops which repaired gliders and trainers, even though they did not construct new gliders.

The personnel permanently employed in all training centres and clubs (instructors, maintenance and administrative staff) did not entail unnecessary administrative expenses. In the last year before the war all the 100 centres had a paid staff not exceeding 400 people.

PHYSICAL FITNESS

2. The following conditions were essential: the necessary standard of health and no less than 16 years of age. (In several cases younger boys smuggled themselves in, and, after their real age was discovered, there were many "official" worries.) For students who, after having been trained on gliders, wished to go in for motor flying, the necessary standard of health was much higher. For glider pilots only more or less the same standard of health was required as for ski-ing or cycling. The nationality or sex did not have any bearing on somebody being received as a student. Many foreigners were trained in Poland.

Every student was covered by three kinds of insurance: for £40 if only hospital treatment was required, for £120 if the accident, entailed a temporary disablement, and for £240 if this disablement was of a permanent character and deprived the person of the possibility of working in his profession.

CHEAP

3. The fees were :—
£1 for A, B or C licence.
£2 for Silver C licence.

A training course lasting a fortnight cost 15s.



MRS. M. YOUNGA-MIKULSKA IN HER "S.G. III. BIS."

All training had to be witnessed by an official instructor. In smaller centres first-aid had to be available on the spot, in larger gliding schools a doctor with suitable staff and medical supplies had to be at the gliding field.

SUBSCRIPTIONS

The circulation of *Sailplane and Glider* is limited by its paper quota. This is the reason for the reduction in size, and the thinner and therefore lighter paper. The publishers can dispose of far more copies than can be printed. To be sure of your copy therefore, it is necessary to take out an Annual Subscription of 13/- post free for twelve numbers. Publication date is the 25th of the month dated the succeeding month. Cheques, Money Orders, etc., payable to *Sailplane and Glider*, and crossed.

THE LATEST DURATION RECORD

A new soaring duration record of 53 hours 52 minutes was set up by Ernst Jachtmann in East Prussia last September. The following is an abridgement of the pilot's own account of the flight, published in "Flug-sport" and translated by L. J. Baker, issued by the Ministry of Aircraft Production (RTP 3).

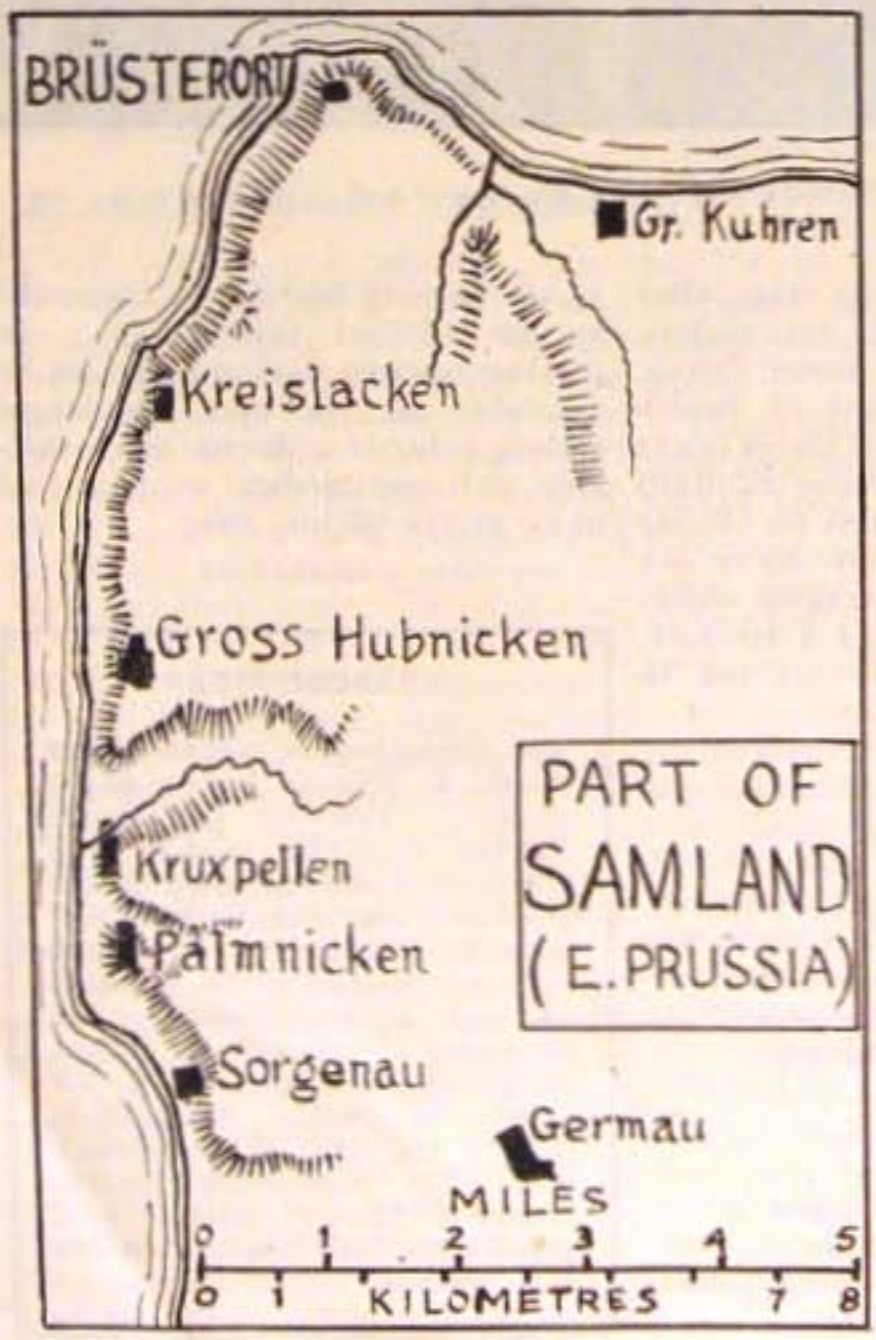
ANYONE who imagines that a pilot who soars for three days and two nights has only to contend with physical discomfort and the inclination to sleep, has overlooked essential factors. During the very hours when the untrained observer can see nothing in particular, I am wide awake and studying what is going on around me. One must never forget that the wind may shift suddenly to another quarter, and all sorts of conclusions can be drawn from the cloud formations. No dust or smoke cloud, no white-crested wave on the sea escapes notice. Every bird is followed in its flight. Even a butterfly or a leaf may provide valuable information.

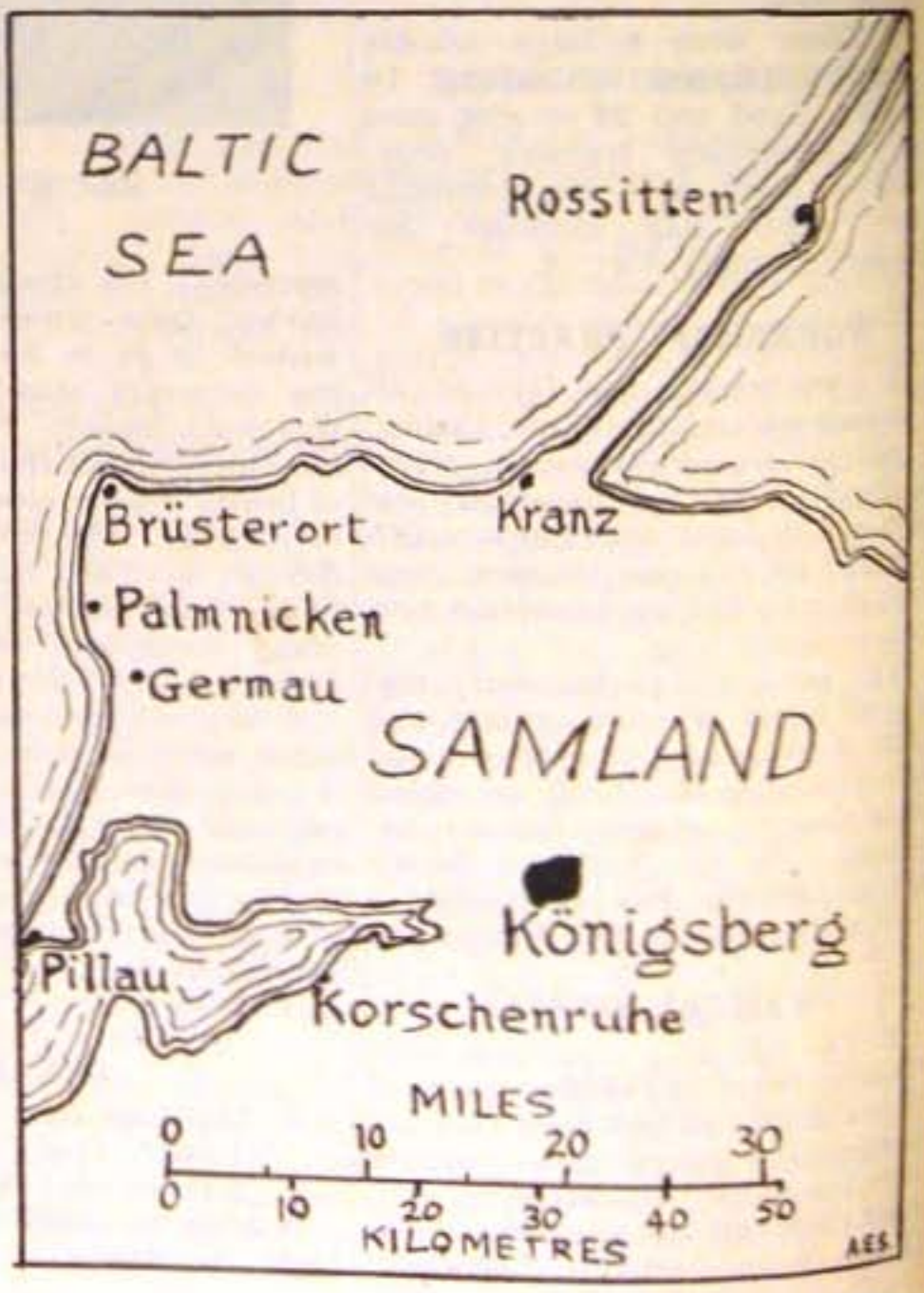
FITTED WITH SEARCHLIGHT

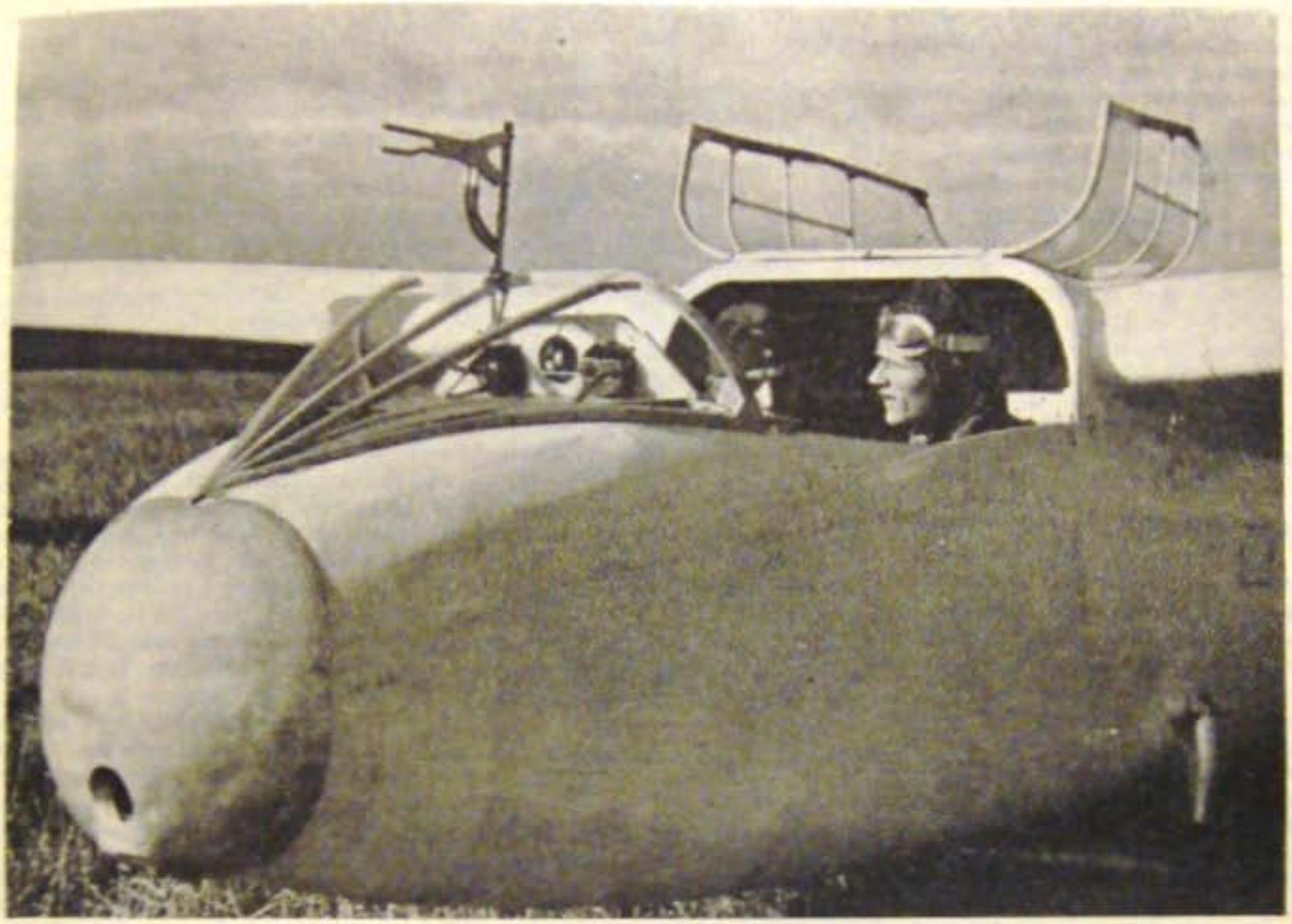
I had taken into account all the lessons of previous endurance flights. In the nose of the fuselage a powerful searchlight was fitted, to enable me to land outside the illuminated landing ground or to explore the edge of the slope while soaring. It was movably mounted, and the lever fitted to the handle of the dive-brake, so that, if the nose were turned sideways during a slip, it could still be made to illuminate the landing point. The switch was on the control column. All other useful loads such as thermos flasks, batteries for wireless, and provisions, were lodged at the centre of gravity. Provisions were pulled out of the fuselage interior by a cord. I put small quantities of food in small containers ready for immediate use. Through long tubes, two thermos flasks fitted horizontally in the wing poured coffee into a cup conveniently close at hand.

OFFICIAL ENCOURAGEMENT

When everything was ready I decided to wait in Berlin for a favourable spell of weather. At 3.30 on the night of September 21, 1943, the Staaken meteorological station informed me that the long-expected depression was approaching, so I was flown to Konigsberg in two hours by the Lufthansa and in another three-quarters of an hour had reached my launching point. The wind, however, was very gusty, and according to the latest forecast was not expected to veer to the north-east until a few days later. So the start was delayed until the 22nd, when I took off at 10.26 a.m. from the Brusterort airfield by







ERNST JACHTMANN (nearest Camera) on the occasion of a previous record in a two-seater.

winch tow to 300 m. (1,000 ft.). The wind was still very gusty, so I made for a strip of coast near Palmnicken, where the wind was more favourable. In a few hours the wind had veered to north-east as forecast. Some comrades brought out Grunau sailplanes, so that a gay slope-soaring party was soon in full swing.

ILLUMINATED WIND SLEEVES

Two wind sleeves, each illuminated at night by a car headlamp which revolved with the sleeve, had been fixed up; one in the middle of the slope and the other at the northern end where the coast turns at right angles to the east, so that I could change over to the north coast by day or night if the wind veered further round. I spent my leisure by day in studying the slope current, which varied considerably, due to gaps and other variations in the coastal cliff. An emergency landing place had been provided, and was to be indicated in good time by moving one of the wind sleeves.

GULL-SENSE

Observation of gulls in flight afforded me valuable information for my flying technique during rain squalls at night. At times the slope current allowed me to reach the lowest cloud fringe. From this position I could see, far below, gulls skimming along close to the beach, and wondered whether my "Weihe" could make better use of the up-current there. A few hours later, while soaring close to the edge of the slope, watching preparations for the night flight, I suddenly discovered the gulls high above me. I flew towards them to investigate the up-current there, but only gained insignificant height; moreover, I noticed that at times they flapped their wings and seemed rather excited. During my 40-hour flight at Syit in 1937, the gulls had sensed long beforehand the up-currents of the squalls and flown towards them. This time, after flying towards an impending squall of rain, the gulls rose up like a lift and vanished from sight. I investigated the squall and, also rising to a great height, found myself all of a sudden enveloped in mist, so I applied dive-brakes till the ground reappeared.

LISTEN TO THE RAIN

By variation in the rattling of the raindrops on my hood, I was able to judge accurately whether the squall was coming nearer or moving away. The fact that I knew I could actually follow the course of a rain squall eased my nerves considerably during the two nights, because it was essential to avoid the squall in order to prevent an additional strain on the machine and ward off the danger of losing visibility by getting into the mist and finding myself in the leeward eddy behind the slope.

The continual lowering of the clouds forced me to bring the machine down close above the coast, and to fly up and down it at a constant speed of 120 to 130 km. (75 to 80 miles) an hour. Between 3 and 4 o'clock a violent thunderstorm broke over me, and at times I was completely blinded by lightning. Frequently the outline of the coast was obliterated by

scudding clouds, and in error I flew towards lights in buildings behind the slope, only becoming aware of the mistake by sudden loss of height. In regaining the safety of the up-current my searchlight was of great use.

FRIENDLY GULLS

Waiting for dawn to break seemed endless, and I welcomed with joy my faithful friends the gulls who, in the pale grey of the morning, were already busy streaking along the coast. The wind was veering to the N.W., and I crossed to the north slope, but after two hours it changed back to W.S.W., and I returned to the west slope.

MY GOODNESS—MY DINNER

Suddenly I became aware of a "Kranich" without rear hood, close behind me, with an enormous parcel dangling from it. But the cord was too short, and in response to a note they returned with a huge cord. After several attempts at contact I tried flying at the cord with the right wing, then pushing the rudder over so that the cord slid into the angle between wing and fuselage. Flying Officer Wittenberg then pulled up the cord until I caught the parcel. Unfortunately the wind dragged it away from me again, greatly to the joy of the fishermen's children, who thought the "flying uncle" had thrown out the parcel for their benefit, and disappeared with it into the bushes as fast as their legs would carry them.

My two thermos flasks, containing 10 cups of-coffee each, had run dry in the first night, so that my liberal supply of rations literally stuck to my jaws. Apparently the coffee had been forced out of the small vent pipe which was bent upwards, as a result of the shaking due to the great bumpiness. My tongue began to smart. I did not dare eat apples for fear of the after-effects, so I contented myself with chewing small bits and then spitting them out.

SHARP SQUALLS

During the second night there were sharp squalls, which were measured at 45 to 50 m.p.h. on the ground and must have been considerably greater at the height where I was flying. It rained incessantly and I was anxious about the fabric, which was only glued on. As the clouds descended and the sea mist spread, I was unable to fly near the illuminated landing ground. All that was left was a narrow stony strip, reduced by the rising tide to a width of half a wing span. The part free from stones, marked by five red lamps, was too short to be suitable for a safe landing, so all I could do was to hold out. At an earlier stage the meteorologist had advised me not to continue, but, as agreed beforehand, the responsibility of continuing the flight was left to me. My eyes had gradually become so accustomed to the dark that I was able to recognize the surf, though I could only guess at the position of the slope. But I made a re-assuring discovery. The sea mist, welling up directly in front of the coast, was swept upwards by the ascending current when it reached the coast. A tunnel was thus formed in which I was again able to tear up and down within a hair's breadth of the coast at 75 to 80 m.p.h.

CLUB NEWS

F/L ROGER DIXON, formerly Instructor at the Cadet Camps at the London Gliding Club, writes to make a correction: never, he says, has he ascended to such heights—even when flying near thunder clouds—as being in charge of a Glider School. Early in 1942 he has a Flight-Commander, with F. T. Gardiner (Cambridge University Gliding Club) as Chief Instructor, and John Saffery (London and Yorks Clubs) was the C.O. After holding the position for 18 months the C.M.B. stopped him flying and he eventually reached Coastal Command, where he endeavoured to make life bright in the Operations Rooms.

Fred Gardiner is now flying Beaufighters. C. C. R. Ruffle (London Club), who has put in a tremendous amount of work for military gliding since 1940, is still at the same game, or was recently, and is Flight-Commander of a tug flight. Sergeant C. C. Turner, formerly ace flyer of the Channel Gliding Club, who entered for the cross-channel gliding contest in 1931, is still at the same station as Ruffle, on the C.G.I. Staff. Bill Wilbur (London Club) is now head cameraman of the R.A.F. Film Unit now in Italy.

Robert Kronfeld (Chief Instructor and Manager of the Oxford University and City Gliding Club in pre-war days) is still making use of his special knowledge and now has the A.F.C.

H Booth (Derbyshire and Lancashire Club) is in charge of N.I. 184 squadron elementary gliding school of the A.T.C., and is at present training instructors for other sites in the area.

GLIDING CERTIFICATES

THE following Gliding Certificates have been issued by The Royal Aero Club during the past month :—

	"A" Certificates (16)	*Gliding School*	*Date taken*
1752	Albert Edgeington Honor ..	A.T.C. H.Q., H.I., Lisburn	4. 3.43
1753	Jack L. O. Mitchell	C.121 E.G.S., Halton ..	20. 2.44
1754	George Percy Lockey	C.123 E.G.S., Bray ..	13. 2.44
1755	Neil Heywood	M.41 E.G.S., Bretford ..	16. 1.44
1756	Francis Leslie Fitzwilliam Davidson	C.121 E.G.S., Halton ..	12. 2.44
1757	Douglas Heyhurst	N.E.23 E.G.S., Yeadon ..	30.10.43
1758	Stanley Cyril Stokoe	C.122 E.G.S., Harrow ..	3.10.43
1759	Ernest Arthur Black	L.144, Hounslow	27. 2.44
1760	John Lawrence	Ditto	27. 2.44
1761	David James George	C.121 E.G.S., Halton ..	12. 2.44
1762	Geoffrey Walter Thirlby ..	M.44 E.G.S., Rearsby ..	25. 7.43
1763	Andrew George Field	M.45 E.G.S., Meir	13. 2.44
1764	Francis William Merchant ..	Ditto	13. 2.44
1765	Eric Phillip Potter	Ditto	13. 2.44
1766	Clarence Geoffrey Salt ..	Ditto	13. 2.44
1767	John Nixon Wiley	N.E.26 E.G.S., Greatham ..	18.12.43
	"B" Certificates (5)		
1752	Albert Edgeington Honor ..	A.T.C. H.Q., N.I., Lisburn..	4. 3.43
1709	Sydney Richard Webb ..	M.41 E.G.S., Bretford ..	30. 1.44
1755	Neil Heywood	Ditto	30. 1.44
1733	Leonard Mann	C.123 E.G.S., Bray ..	25. 3.44
1767	John Nixon Wiley	N.E.26 E.G.S., Greatham ..	27.12.43
	"C" Certificate (1)		
1767	John Nixon Wiley	N.E.26 E.G.S., Greatham ..	9. 1.44

A BEGINNER ON THE *WASSERKUPPE.*

By AIR-COMMODORE J. A. CHAMIER, C.B., C.M.G., D.S.O., O.B.E.

IN 1930, anxious to learn something of gliding and soaring progress in Germany, I offered myself as a pupil to the State-aided school on the Wasserkuppe.

A sum which seemed ridiculous in English coinage was named, and I embarked on one of the most interesting experiences of my aviation life.

The Wasserkuppe is an ideal gliding site. Early flights could be made over the south slopes which faded into flat ground. A westerly wind blew up a 10-mile long tunnel between 2 ranges of hills which converged on to a very steep cliff.

There were about 40 pupils at the school divided into teams of 8—all German except myself. Most were young and all had got their A and B gliding certificates. They were surprised to find that I had done no gliding and told me that this was an advanced course for hillside soaring, cloud contact if possible, and finishing with aerotows in a nearby aerodrome in the plains.

However, the school authorities apparently knew their stuff. After one slide I was taken off to the west slope with the rest of my team.

There was a light wind just soarable: if we failed to maintain height a landing had to be made on a "flat" about 100 feet below the crest—otherwise the flight would have to be carried on down the valley for miles.

When my turn came the pupils had all failed to soar and had landed on the flat, but I had had opportunity to observe the area of soarable air. It was also clear that one would have to fly almost on the stall to have a chance to soar.

After the somewhat startling experience of being shot out over a precipice I turned into the "lift" and gently pulled up the machine to find out which control faded first when approaching the stall. I was pleased to find the rudder fade out first and I flew the rest of the time with the rudder barely in action.

I had no difficulty in gaining height, when my pleasure was interrupted by cheers and yells. I gathered that I was being shouted down so landed just above my take-off point.



Everyone seemed very pleased. Herr Stamer, the chief instructor, told the party that it was "a marvellous performance only possible for an experienced 'Motor flyer'"; imitation would surely result in a stall. The landing was a perfect 3-pointer "which would not have broken an egg"—but quite the wrong type to imitate as if the tail touched first it would certainly break off.

So we passed day after day. It was grand work but hard work. Mostly the wind was light and from the south so that every flight finished in the plain and the pupils had to man-handle the machine back to the top of the hill. No winch was provided or any other mechanical assistance: to my suggestion that they should hire a horse the answer was "3 days of this would kill a horse."

If a pupil damaged a plane, the whole crew worked like niggers through the night to have it ready by next day. Sleeping quarters were bunk houses and the food was rough with much black bread and little meat. But it was a healthy life.

I was lucky enough to see a "Bank Holiday" meeting during my stay. Several sailplane pilots turned up and performed variously, but I was most interested in the people. A large crowd of holiday-makers spent their day on the slopes watching the gliders or flying their own model gliders. They scorned elastic driven models and I did not see a single one during my stay.

At this meeting I did my first cross-country in a "Professor" sailplane. Trying to reach another range of hills I found myself losing height too fast and returned to my "lift." A second try at higher speed to cross the down flow quicker was clearly worse, so back I went to the soarable air.

But I had lost so much height that I thought I would have to land; however, a few feet above the ground I struck an updraft which I could feel waggling my wings and I was able to creep up and circle again in my "lift." A third try was successful with the aid of up currents from sunny ploughland and an up draught from from a small secondary hill feature.

The finish of this flight was interesting. Aiming to land near a high road for ease of returning I got a lift off the hot tarred surface which carried me on for over a mile at about twice the height of the telegraph posts.

After a pleasant fortnight those of us who were selected went on to aero towing in the plains. I found this needed a lot of concentration while on tow, but it was good fun. This aerodrome disclosed the weakness of glider taught pupils, namely, a difficulty in getting into an aerodrome 1,000 yards long; they had not learned to tail-wag or slideslip to lose height. On the other hand I saw several step confidently into a midget aeroplane and fly it first time solo—a great tribute to the value of the glider. We had a small amount of cloud flying but conditions were generally poor. On my last day the tug pilot landed in great excitement, saying that a cold front was coming and I was apparently rated as the only suitable pupil. Just as I was being strapped in with my parachute the stormy cloud mass forked by lightning passed overhead and burst in a violent hailstorm which tore the canvas from the wings.

So ended my one chance to get my silver wings.

THE "SILVER C" AND "GOLD C" CERTIFICATES—*Continued.*

By A. E. SLATER

CONDITIONS

The original conditions for acquiring the "Silver C" differ in some details from those announced by the British Gliding Association in *The Sailplane and Glider* for August 1938. Originally altitude could be measured from the lowest point reached after the launch to the subsequent highest point, in cases where the pilot lost height after casting off the cable or launching rope; but the B.G.A. conditions only allow of measurement from the cast-off point. The altitude could be done in a separate flight or else combined with either the duration or distance flight, but now the duration must always be separate and must, in addition, end within 1,000 yards of the take-off. Barographs, formerly needed only for distance and altitude, must now also be carried for duration. And a former condition, now apparently abolished, was that the altitude loss during the distance flight must not exceed 1% of the total distance.

Application for the "Silver C" certificate and badge has to be made through the B.G.A. to the International Commission for the Study of Motorless Flight, a body formed in 1930 with headquarters in Darmstadt. It has therefore not been possible to apply since the war began; otherwise the British Empire figure, which includes H. Winter, of Johannesburg, would be further increased by the inclusion of a few Australian pilots, and the U.S.A. would have had at least 37 "Silver C's" up to a year ago.

NO MORE GERMAN "SILVER C's"

The question of future arrangements for granting and recording "Silver C" certificates will be affected by a decision in 1942 by General Christiansen, head of the organization in control of German gliding, to abolish the International "Silver C," forbid any German to wear the badge, and substitute a purely German "Grand Badge for Soaring Pilots." Such action can only be explained by the General's ignorance of the propaganda value, from his point of view, of present "Silver C" statistics, and is an example of what happens when a national gliding movement gets itself controlled by a pompous figurehead with no genuine interest in the activities which provide him with his importance.

THE "GOLD C"

The "Gold C" certificate became available as from January 1, 1938, the corresponding badge being the three gulls of the "C" surrounded by a gold wreath. The three qualifying conditions are:—

(1) Possession of the "Silver C";

(2) A distance flight of 300 kilometres (186.42 miles);

(3) A climb of 3,000 metres (9,843 feet).

As in the "Silver C," sealed barographs must be carried on each flight, to be opened only by a competent official, and two witnesses of the landing must sign a statement of its time and place.

PHILIP WILLS

Up to March 11, 1939, twenty-five "Gold C" certificates had been granted. Britain secured high place with No. 3, gained by Philip Wills. Eric Nessler (France) obtained No. 4, and Hermann Winter (South Africa) No. 24; the remaining 22 were Germans, headed by Heini Dittmar, winner of the International Contest of 1937. Since the war, however, four American pilots—Robert Stanley, Chester Decker, John Robinson and Lewin Barringer—have passed the "Gold C" qualifying tests.



"HE USED TO BE A SAILPLANE PILOT!"

BLIND CLOUD FLYING

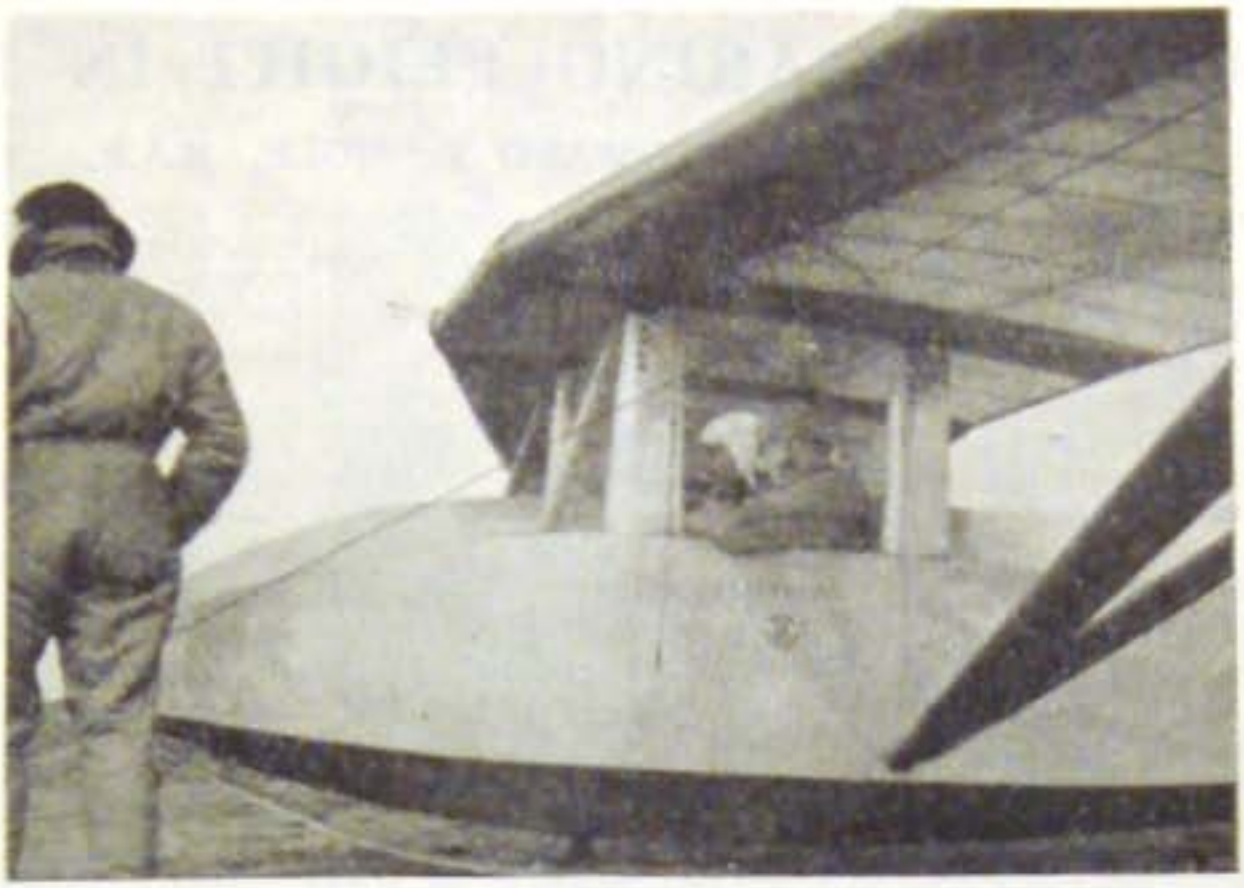
Apart from the abolition of the duration test, considered such a piece of wizardry in the past but now as a test of endurance rather than skill, the institution of the "Gold C" has been criticised for the lack of enterprise shown by merely multiplying the "Silver C" conditions by three. Mr. Wills, for instance, has suggested that the altitude test should include a specified amount of blind flying in clouds; presumably the evidence would have to be provided by a recording hygrometer. For the distance test we would suggest an out-and-return, or at least a goal flight, of suitably difficult standard. Have readers any further suggestions? It would be as well to have the subject aired now.

SOARING AN END IN ITSELF

Many people may feel that the British contribution to world progress in soaring flight, though creditable in the past, could well be increased in the future so as to produce a better showing of Silver and Gold "C" certificates. But, in the writer's opinion, past experience has shown that activity designed to "get Youth into the air" is not enough. Far more credit is reflected on less youthful but more influential organizers by the propaganda value of 10,000 "A" certificates than by the 1,000 "C's" or 100 "Silver C's" which are all that could be expected to accrue from the same effort and expense devoted to soaring. It is only by regarding soaring flight as an end in itself that progress in its art and science is likely to be achieved.

A.E.S.

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The two-seater Falcon II about to be launched at the Long Mynd during the Instructor's Course, September, 1943, piloted by Mr. Espin Hardwick, one of the founders of the Midland Gliding Club, with F/Lt. Garner-Hayward, Staff Officer to Midland Command as passenger. (Hardwick is nearest the camera.) The back view is of Mr. Eric Taylor, Silver "C," now acting as instructor to School M47 at the Caup Hill site.



The opening ceremony of an A.T.C. School near Birmingham, where the crowd has just been addressed by Mr. W. W. Wakefield, M.P., late Director of the Air Training Corps. The machine is a "Petrel," owned and flown on that occasion by F/Lt. J. V. Rushton (he was acting as Chief Gliding Instructor for the Midland Command, but has now relinquished this post).

The date is September 1942, and the School was the first to get going with cadet training in the Midland Command.

ARE WE APPROACHING THE ERA OF THE ALL PLASTIC AIRCRAFT?—IV.

By W. R. SCOTT, A.M. Inst. B.E., A.M.R.Ae.S.

I HAVE dealt with the various thermo setting plastics in the past three articles, including casein, and the following thermo setting plastics are of an entirely different group, namely phenol formaldehyde and urea formaldehyde. Both these resins have their own particular characteristics, although it will be seen that they have many points in common, the chief of which is the fact that they are thermo setting, namely that after heat and pressure have been applied to the material and it has solidified, it has then hardened for the last time. The later application of heat, or even heat and pressure will not soften or remould the once cured article. Nor can it be dissolved, as in the case of the thermo plastic materials and made into solution for the purpose of cementing and producing pre-fabricated articles.

PHENOL FORMALDEHYDE

This has, for some past, been referred to as "Bakelite." Bakelite is the trade name, used by the pioneers in this type of material. Its history shows us, that as long as 1872, Bayer refers to experiments in phenolic resin, followed by further discoveries by Emil Fischer and Kleeberg. These were followed by Luft in 1901. It was not until 1905 that the patent process of Story's was made commercial. During the period of 1908 to 1912, Dr. Leo Hendrik Baekeland did much work on various lines of research connected with phenol formaldehyde resins, drawing public attention to the immense possibilities and to him the majority of the credit was given for the discoveries in this field of research—hence the name "Bakelite," which has ever since become a household word.

BAKELITE

Although to-day, there are many grades of phenol formaldehyde products, none have ever become so well known by their trade name as in the case of Bakelite, as the majority of people refer to any plastic substance as Bakelite. It is here that I wish to make this point clear that Bakelite is not the name of a material, but the trade name adopted by the pioneers in phenol formaldehyde resin and its products.

Phenol formaldehyde resin is a brownish yellow brittle substance, not unlike resin. It is produced by the boiling together under reflux, phenol with formalin in the approximate proportions of 1 mol. to about 0.8 mol. in the presence of an acid catalyst, after which it is distilled under vacuum, resulting in a liquid resin, which solidifies on cooling, and is known as first stage resin.

FILLERS

As the resin in this stage has extremely poor mechanical properties, even when moulded, it is usually mixed with various fillers, such as wood flour, wood pulp, asbestos, mica, rag and graphite. Each of these various fillers play a very big part indeed, in the final physical properties of the moulding. The first stage resin is in the case of wood flour filling, roughly ground and mixed with an equal weight of filler and a small quantity of hexamethylenetetramine, stearic acid or metallic stearate, which acts as a catalyst, also a small quantity of waxy substance, which serves as a lubricant and does not mix properly, but rather inclines to cover the outside of the resin-impregnated particles. Pigments and dyes and approximately 4 to 5 per cent. of a plasticer, such as furfural are also added at this stage, and the whole dough-like mass is thoroughly rolled and ground to powder, at which stage it is ready for moulding.

The two main ingredients namely phenol and formalin, are produced roughly as follows:—

Phenol, from carbolic acid, is a by-product of coal distillation. Formaldehyde is obtained by the catalytic oxidation of menthyl alcohol, the formaldehyde being in the form of a gas, which will dissolve in a solution of water and menthyl alcohol up to 40 per cent., the resulting mixture is known as formalin.

IMPREGNATED PAPER

Phenol resin dissolves readily in industrial methylated spirits and is thus used for the impregnating of sheets of fabric paper, etc., and in particular for the coating of veneers for making the waterproof aircraft plywood, although sometimes the solution of resin is first sprayed on to an extremely thin Japanese paper. These thin sheets of paper are then laid between the veneers and the whole put between the platens of an hydraulic press and heat and pressure applied. Under this condition, the phenol resin melts, impregnating the pores of the wood and the whole setting as a homogeneous mass. Joints thus made, if properly cured, are quite impossible to split. Moisture or water has no detrimental effect on the strength of the joint, nor does the phenol resin dissolve in methylated spirits, or any other solvent, after it is once cured. It is in this form that to-day a great deal of research is being carried out, to establish satisfactory methods of forming large sections of aircraft components by a moulding or semi-moulding process. Although timber is used, such components really come under the heading of plastic, as the wood or fabric serves no more than a filler in many ways.

(To be continued.)

IMPORTANT NOTICE.

If you do not receive your next one or two subsequent numbers of Sailplane, it will in all probability be due to the present state of emergency. Should publication be delayed too long, it may be decided to re-date the issue as for the date of actual publication. In which case Subscribers will be credited with those months and their subscriptions extended.

AUSTRALIAN GLIDING ASSOCIATION

N.S.W. SYDNEY SOARING CLUB

Mr. Harry Ryan has forwarded the following report dated 29/12/43. "We flew the 'Kite 11' on Sunday, 26th December, 1943, at Box Hill. Conditions were dull at early morning but grew very promising later. Unfortunately we made a late getaway, having so many odd jobs to do to car, trailer, etc.; arrived at site around 11 a.m. and found Doc Heydon, Martin Warner, Merv Waghorn and guests waiting. Doc drew first flight and made first-class launch to 1,000 feet. Time, 4 minutes from cast off. As we are at present still timing from cast off, I suggest that you add average of 2 to 3 minutes to our times to bring them into line. Then followed M. Warner, 1,000 feet, 10 minutes; H. Ryan, 900 feet, 3 minutes (launch too slow); M. Waghorn, 1,000 feet, 9 minutes; P. Neary, 850 feet, 3 minutes; F. Whitlock, 1,000 feet, 4 minutes; J. Watt, 1,000 feet, 3 minutes; Doc Heydon, 1,300 feet, 15 minutes; M. Warner, 1,600 feet, 4 minutes (rose from 600 feet); H. Ryan, 1,300 feet, 7 minutes; M. Waghorn, 3,000 feet, 40 minutes; P. Neary, 1,100 feet, 6 minutes. A distinct change came across after my flight, and Waghorn found lift all over the sky and had to dodge it to come down. Pat Neary failed to connect, and J. Watt was about to follow when someone noticed that junction of tail boom and fuselage was loose; probably so when I and W. Haase looped, as there have been no heavy landings for some time. Flying in 'Kite' now suspended for overhaul, and it is difficult to get someone with enough spare time to do it, but much good work has now been done on the 'Gull' and may be in the air again very soon."

VICTORIA

THE GLIDING CLUB OF VICTORIA

FLYING GROUND ACCIDENT

BEVERIDGE, 27/11/43. N. Hyde was taking off in the "Merlin" two-seater (solo) into a north wind when the left wing struck one of the shock cord crew, Reg. Pollard, rendering him unconscious for about 30 minutes with lacerated scalp and severe concussion. He has not yet been able to return to work on account of the injuries causing a condition of double vision, but he has almost completely recovered.

The leading edge of "Merlin" wing was damaged, but the pilot was unaware that anything had happened until he looked back and saw someone being carried down the side of the hill; all he could remember was a "bit of a bump," like the machine riding over a stone while taking off.

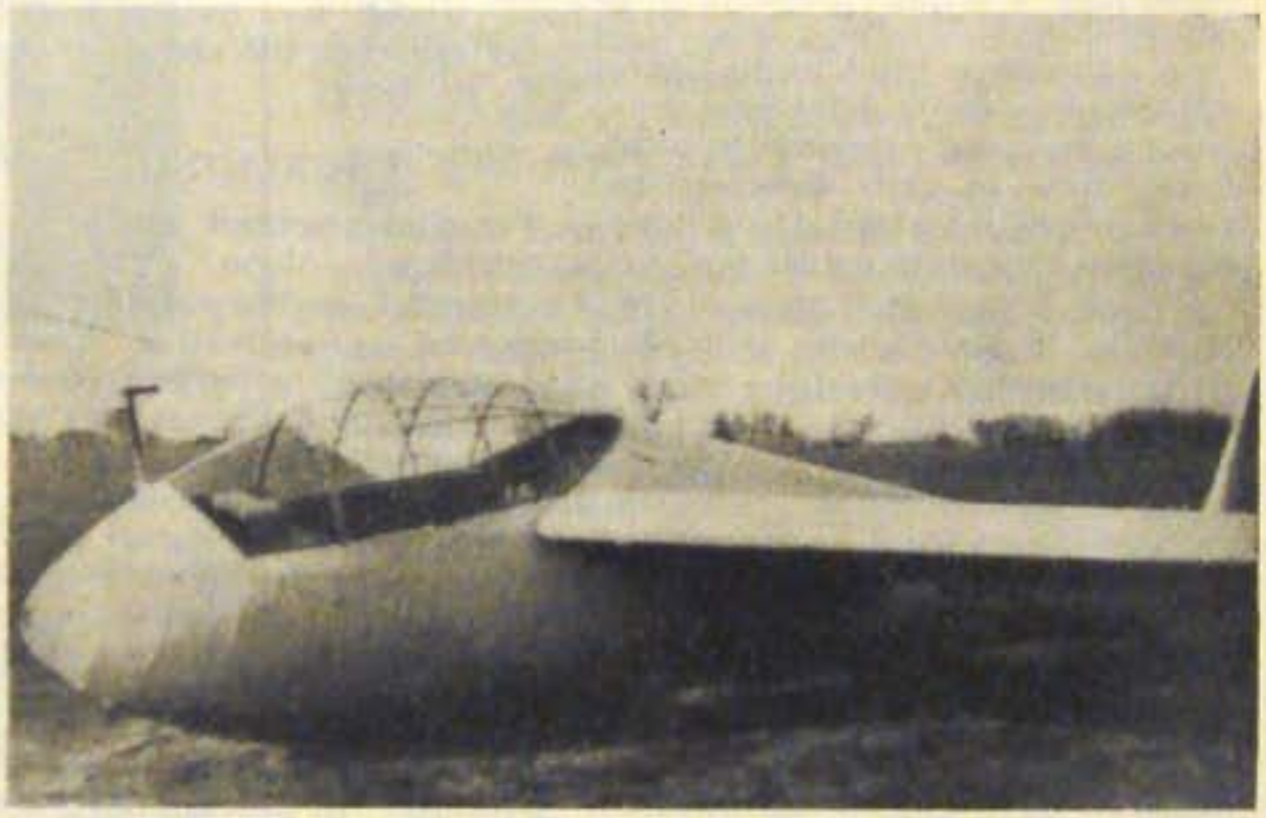
THERMAL SOARING, 25/12/43. R. Roberts reached 2,000 feet, duration 20 minutes, in the "Grunau" from winch launch to 1,000 feet at Beveridge. On the next launch in the same machine, C. Lambeth reached cloud base at 4,200 feet from winch launch to 1,000 feet for duration of 1 hour 1 minute. He decided not to enter the cloud on account of the "Grunau" not being fitted with blind flying instruments.

"GRUNAU" DAMAGED, 16/1/44. K. Davies, flying the "Grunau" in a light south wind, hit the left wing on a fence post near the east end of the higher south slope, leaving about 4 feet of the wing on the fence, but otherwise landing safely about 200 feet further on the east side of crater. Repairs are now in progress at Dowling's workshop at Fawkner. The fuselage and tailplane are being reconditioned at H. Bartram's place 29, Station Street, Fairfield.

"KADET" REPAIRS. Overhaul and repairs to the "Kadet" are almost complete following damage to skid and keel behind the main bulkhead (C. Lambeth, 27/12/42).

"HAWK" SOLD. The "Hawk" primary, which was badly damaged on 24/10/43, has been sold to the Northcote A.T.C. No. 14 Squadron. Delivery was made on 9/1/44, and the "Eagle" primary was taken to Mordialloc from Fawkner.

Annual Report and Balance Sheet, 1943. Copies now available



POLISH SAILPLANE "ORLIK" (EAGLE). DESIGNED BY A. KOCJAN.

To illustrate article on Page 4

THE GLIDING CLUB OF VICTORIA

Founded 27th September, 1929. Incorporated 19th August, 1936. Extract from 8th Annual Report, Season 1943.

MEMBERSHIP

Membership showed an increase, there being 79 members at the start of the year, and 97 at the close of the year.

FLYING

Flying was carried out on 39 days, and the total number of launchings made during 1943, both club and privately owned machines, amounted to 444 for 67 hours 16 minutes in the air. The following is a resume of the flying done in each machine :—

" Grunau," Club owned. Flown on 18 days : 41 launchings for total of 44 hours 42 minutes in the air.

" Hawk," Club owned. Flown on 6 days : 44 launchings for total of 1 hour 34½ minutes in the air.

" Merlin," Club operated. Flown on 24 days : 339 launchings for 18 hours 45 minutes in the air.

"H.17," privately owned (Messrs Davies & Bartram). Flown on 8 days : 20 launchings for 2 hours 14½ minutes in the air.

n addition a total of 15 hours 42¼ minutes dual instruction was given to trainees, bringing the total flying time of club members to 82 hours 59¼ minutes. The following pilots flew during 1943 :—

" Grunau " : K. Davies, H. Bartram, R. Duckworth, N. Hyde, R. Roberts, C. Lambeth.

" Hawk " : B. Hearn, L. Dowling, Ed. Smith, Ray. Smith, C. Trescowthick.

" H. 17 " : K. Davies, H. Bartram, C. Lambeth, N. Hyde, R. Roberts.

" Merlin " : R. Dowling, F. Alexander, R. Hyde, R. McConnell, R. Pollard, J. Stafford, J. Titterington.

The Club was successful in raising the *Australian Duration Record* with a flight of 9 hours 51 minutes in the " Grunau " on 20/11/43, and the pilot, Charlie Lambeth, is to be congratulated on his fine effort. He also made an outstanding thermal flight to 4,200 feet in the " Grunau " at Beveridge on Christmas Day, and was in the air for 1 hour 1 minute.

NIGHT FLIGHT

Other good efforts were flights of 5 hours 17 minutes on 28/11/43 by Norman Hyde, and 4 hours 25 minutes by Harry Bartram on 16/5/43, and 3 hours by C. Lambeth on 16/5/43. N. Hyde also made a night flight of 55 minutes on 15/5/43. On 5/12/43 a *Victorian Record for 2-seater machines* was set up, Chas. Lambeth and Rob. Dowling remaining aloft in the " Merlin " 2-seater for 1 hour 5 minutes.

The two-seater " Merlin," which was built by a syndicate of Club menbers, comprising Messrs. Hyde, Lambeth, K. Hearn, Fraser, Woller, R. Dowling, L. Dowling, was first flown at Easter Camp April 23-25, and was taken to Mordialloc on June 27.

On July 9th an arrangement was entered into with the " Merlin " syndicate regarding the use by the Club of this machine. The basis of the agreement is that trainees pay 10/- per hour to the syndicate and are charged 9d. per flight by the Club. Qualified pilots flying solo, with passengers or with trainees, pay the syndicate 7/6 per hour whilst for qualified pilots flying together the charge to each is 5/- per hour.

LAUNCHING

The Club's second winch, using a 23 h.p. " Moon " 6 cylinder Continental engine and including improved auto-elevating spreader and 30 inch diameter flanged drum and other innovations, was completed on 27/6/43 and has proved very useful. Acknowledgment to the firm of C. L. De Jersey & Sons, Engineers, North Melbourne, is due for practical assistance on the design and construction of this winch. On 5/9/43 a Dodge Towing Car was purchased for £15 to replace the old one which has been " wrecked " to provide parts for a third winch ; construction of this winch is now well under way.

Motor cycle retrieving of winch wire was carried out for the first time in the Club during the year, and Charlie Trescowthick, with his " 250 cc." N.S.U., is to be thanked for his excellent work in this regard.

Launching charges to private owners were fixed at 1/6 per launch for Club members and 2/- to others.

CRASHERY

On 8/8/43, during training operations, the " Merlin " was landed heavily as a result of the winch running out of petrol when the machine was in a climbing position close to the ground. The leading edge ply was cracked and the rudder pedals were torn from their mountings. The trainee was R. Smith and the instructor N. Hyde.

On 24/10/43 the " Hawk " was spun into the ground at Mordialloc by a trainee, Ray Smith, on his fifth solo flight and badly damaged, the pilot suffering fatal injuries. The machine was sold to the No. 14 Squadron A.T.C. on 31/12/43.

On 27/11/43 N. Hyde was taking off in the " Merlin " and the wing struck Reg. Pollard, one of the shock cord crew, rendering him unconscious for about 30 minutes. He has been away from work since on account of injuries causing a condition of double vision, but he is recovering. The leading edge of the " Merlin " was damaged

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GLIDING AND SOARING FLIGHT IN EGYPT

(Continued from page 12)

The flying display was held next morning and was honoured by the presence of H. E. Mohammed Taher Pasha, president of the Royal Aero Club of Egypt, through whose generosity the " Turul " had been loaned to me. Amongst various aerobatics I achieved another forward loop, but later realized that this manoeuvre was entirely wasted on the crowd. Indeed, it appeared that the majority did not differentiate between the foward loop and the normal ones, and were quire unimpressed by the feat! Inverted flying also seemed a waste of effort, because the crowd did not appreciate when the glider was upside down or the right way up.

Unfortunately, aerobatics are essential to hold the interest of an audience. Thermal soaring, though the essence of true gliding sport, consists merely of continuous circling. The onlookers cannot share the pilot's thrill in finding and mastering invisible air currents, and it is necessary to degrade the noble art of soaring into an acrobatic circus act in order to appeal to the public imagination. Probably the most suitable display would be achieved by a simple series of loops and " stalled turns " with a short spin added for excitement and finishing with a low glide around the enclosure, just above the heads of the crowd, to demonstrate effectively the silence and grace of a sailplane in flight.





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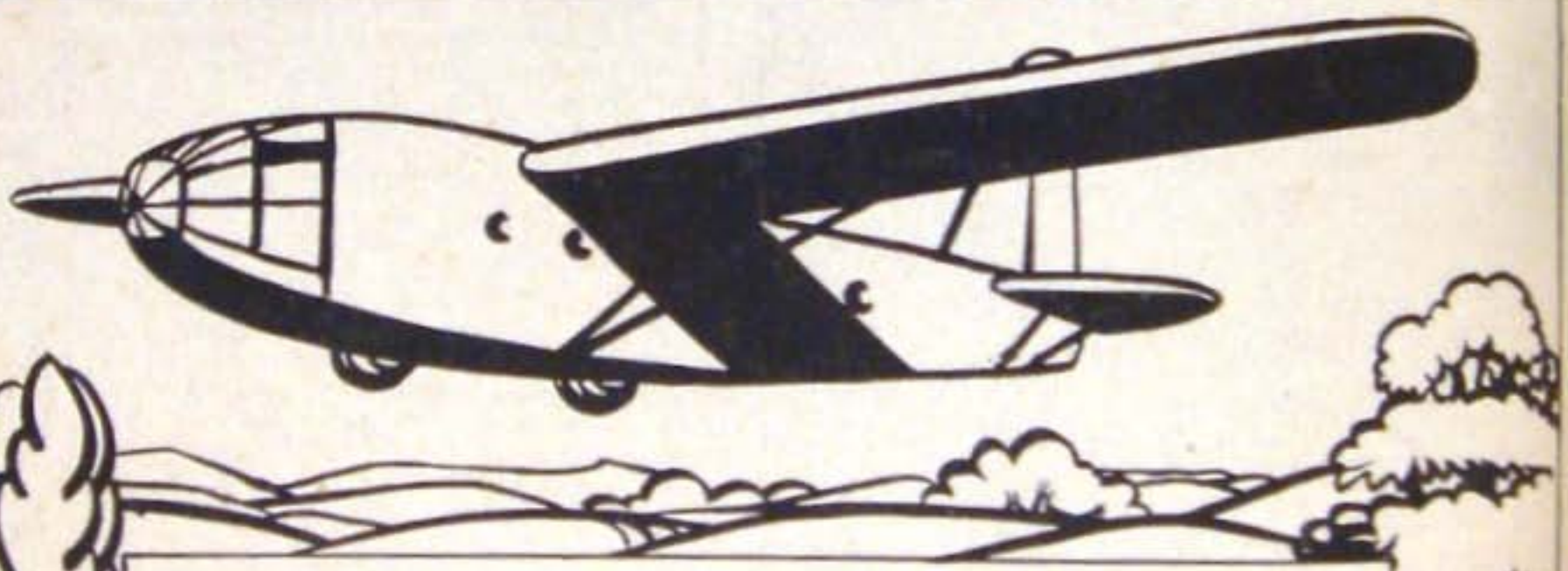




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