

SS

# THE POWERLESS ONES

GLIDING  
IN PEACE  
& WAR



MICHAEL  
CUMMING

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THE  
POWERLESS ONES:

Gliding in Peace & War



FREDERICK MULLER

*First published in Great Britain 1966*  
*by Frederick Muller Ltd.,*  
*Fleet Street, London, E.C.4*

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*Printed and bound in Great Britain by*  
*The Garden City Press Limited*  
*Letchworth, Hertfordshire*

*To Richard*

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## ACKNOWLEDGEMENTS

IT HAS BEEN my good fortune during the preparation of this book to come into contact with a large number of people whose lives have in one way or another become a part of the history of gliding through peace and war. Their unfailing willingness to assist me is characteristic of the comradeship that exists in the gliding world and the extent of their contribution to this book cannot always be measured in terms of sentences, paragraphs and chapters. A telephone enquiry, swiftly answered, may have been of inestimable value at a critical stage of research. Just as important, too, may have been a suggestion, or an idea, born in conversation with someone not always connected with the sport. To all those not included, therefore, I hasten to record my grateful appreciation.

To Brigadier George Chatterton, D.S.O., Retd., appropriately so closely bound up in gliding in peace and war, I am especially indebted for the trouble he has taken in reading through the typescript and writing a Foreword. The various organisations whose co-operation I gratefully acknowledge include the British Gliding Association, London Gliding Club, Midland Gliding Club and Yorkshire Gliding Club; *Fédération Aéronautique Internationale* and *l'Aéro-Club de France*; the Upward Bound Trust, the Glider Pilot Regimental Association and especially the officers and members of the London Branch; the Airways Flying Club for help and facilities; the Boy Scouts Association; and the Royal Aeronautical Society for allowing me the facilities of its fine library. Individuals whose help is greatly appreciated include Major Paul Barnett, M.C., Paul F. Bikle, L. J. Bittlestone, Mrs Anne Burns, L. J. E. Goldfinch, Dudley Hiscox, the late W. B. Klemperer,



## THE POWERLESS ONES: GLIDING IN PEACE AND WAR

E. G. Lamb, Derek Piggott, Kenneth C. Revis, M.B.E., Major A. P. R. Rolt, M.C., Retd., Wing Commander Richard G. Seys, D.F.C., A.F.C., Wing Commander C. W. H. Thomson, Brian Whatley and P. A. Wills, C.B.E. And, of course, Dr Alan E. Slater, whose assistance has touched upon many aspects of the preparation of this book, among them being the supply of some of his own photographs, guidance on early events in the history of the London Gliding Club, together with access to the files of the journal he has edited for so many years, *Sailplane and Gliding*, official organ of the British Gliding Association.

For permission to reproduce the historic photograph of the glider built by the Colditz prisoners I am most grateful to Walter L. Leschander. The illustrations come from a number of sources, credited on an earlier page. The drawings in the opening chapter are by John W. Wood.

I am obliged to *Soaring*, journal of the Soaring Society of America, Inc., for permission to reproduce occasional passages relating to wave flight (an article written for them by Paul Bikle was especially helpful). Additionally, I should like to acknowledge the permission given by Cassell and Co. Ltd., Hodder and Stoughton Ltd., H.M. Stationery Office and Macdonald and Co. (Publishers) Ltd. to reproduce specific passages of copyright material mentioned in the text. Finally, I salute my wife for her understanding and encouragement, and her valiant secretarial assistance.

MICHAEL CUMMING

London, March 1966

## FOREWORD

by

Brigadier George Chatterton, D.S.O., Rtd.  
*Commanding Officer, Glider Pilot Regiment, 1942-5*

MICHAEL CUMMING'S WORK will be more than welcomed by those who know the thrill of sustained unpowered flight, those who want an introduction to a new world and those who find aviation history absorbing. There will be readers, too, who will remember the dramatic part the glider played in the war and be glad to see an account of those stirring times included here.

The glider proved an integral weapon in the Allies' invasion plans and today the men who revealed such high courage over Normandy and other theatres are still active and doing much to further this stimulating means of flight as a popular sport. Founders of the Upward Bound School, they give up their Sunday mornings to train young people, their generosity enabling the complete course to be taken for little more than the cost of a single lesson in a powered craft. A pilot for nearly forty years, I have experienced the wonderful sensation of unpowered flight and feel strongly the need for this exciting sport to be widely publicised. Mr Cumming's admirably informative book does much to bring it to the attention of everybody as well as recording the fine achievements of the pioneers.

G. C.

## FLYING BLIND AT SUTTON BANK

**A**LONG THE A.170, striking out eastwards from Thirsk towards the North Yorkshire moors, there begins the long grinding haul up to Sutton Bank, close on 1,000 ft. above sea level, where the scenic splendours are reputed to be among the finest in Britain. At your feet lies the magnificent green carpet of the Vale of York, with the Pennines rising away in the distance. When the weather is kind, even the peaks of Cumberland are just discernible, too. Only the birds, and the glider folk, enjoy a finer view.

It is appropriate that Sutton Bank is rather more than simply a premier viewpoint and tourist spot; it is also the home of the Yorkshire Gliding Club. Here, throughout the year, except only when snowdrifts isolate the site, enthusiasts gather to take part in a sport that is drawing more and more people into its ranks. And, for a noble sport, the North Riding is an eminently fitting setting.

The site is on an escarpment on the south-western edge of the Hambleton Hills, seven miles east of Thirsk, and the approach road climbs up steeply from a village with the quaint yet geographically precise name of Sutton-Under-Whitestone-Cliffe. It involves negotiating a gradient as severe as one-in-four, although few will argue that the effort, and the risk of a boiling engine, isn't amply compensated by the magnificence of the scenery. From far and wide they come to Sutton Bank, some to view and some to go gliding, for in either case there is a sense of fulfilment and satisfaction that is not easy to surpass.

Motoring up here from the village pub has taken Ken Revis's companion a shade longer than usual this morning because the promise of a warm and sunny day has swelled the traffic of sight-

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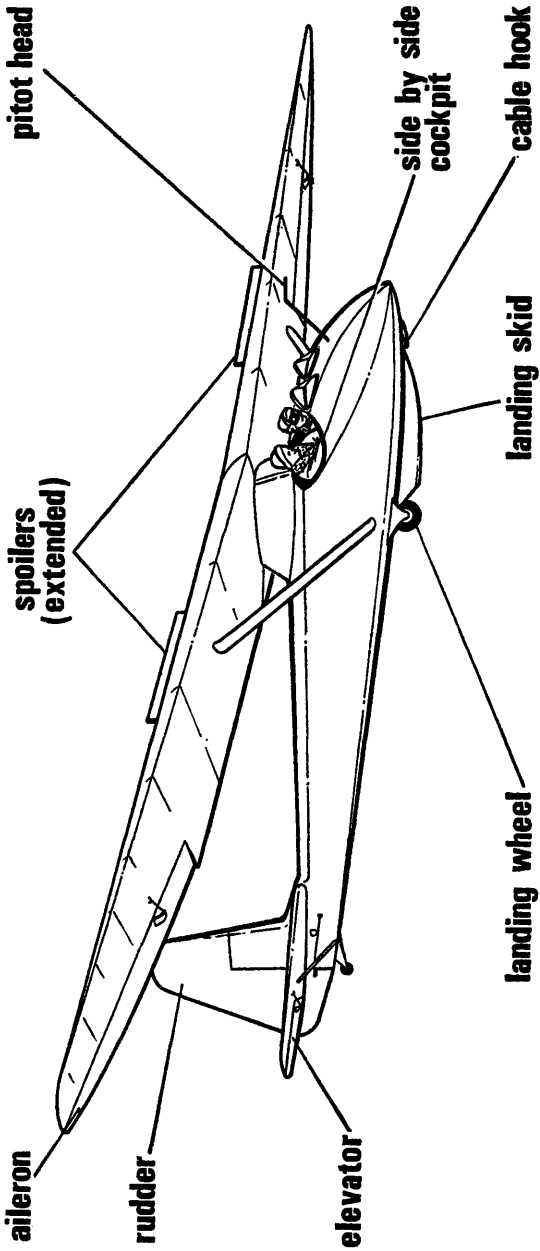
seeing motorists. A former Army Bomb Disposal man, Revis does not come from these parts. He has a job in Oxford and is here on a gliding holiday. His chum is an ex-R.A.F. type who, having seen a poster announcing that the Yorkshire Gliding Club was to run a public gliding course, suggested they should apply. Now these two men, like most of their former classmates, return to Sutton Bank as often as their business and family commitments will allow.

It is Revis's turn to go up first today and he eases himself into the left-hand position in the cockpit of the two-seater T.21B training glider, built in the Slingsby works at Kirbymoorside only a few miles away, while the instructor beside him helps adjust and secure the crossed straps of the safety harness over his shoulders. A hand cupped around the control stick jutting up from the floor between his knees, and his feet resting on the rudder pedals, Revis begins the pre-flight ritual of cockpit checks.

"Wing up!" he shouts. Willing hands raise the upwind wing clear of the ground.

He moves the stick first fully left and then fully right and there is an answering movement of the ailerons on the trailing edge of the broad wing perched aft above the cockpit. A backwards and a forwards movement of the stick rocks the tailplane elevators up and down. Kicking forward on the rudder pedals alternately, Revis moves the hinged rudder left and right. These two controls, joystick and rudder bar, which he has now confirmed as operating correctly, will be sufficient to make the glider obey his every whim by deflecting the flow of air over the surfaces of the mainplane and tail unit. Once he is airborne and at his proper flying speed, Revis will be able to adjust the flying attitude of his glider by sensitive movements of hand and feet. She will wheel like a gull, gently and gracefully, or swoop like a hungry eagle. The comparison is apt for, as Revis rides in the skies, he may recall that it was by studying the birds that Man first learned how to fly; now, in gliding, Man has himself become a bird.

"Spoilers fully open!" Revis calls out as he pulls the handle to operate the vertical flaps in the wings that will upset the



**SLINGSBY T. 21B**

**WIDELY USED FOR BASIC GLIDING INSTRUCTION**

smooth air flow whenever he wishes, and so steepen the gliding angle. They will be invaluable in landing.

“Fully open!” comes the reply from one of the ground crew standing at the starboard wing-tip. He is watching the spoilers extending out of their housing.

“Spoilers fully closed!” says Revis, returning the control to its normal position. They sink obediently into their resting place.

“Fully closed!” observes the man at the wing-tip. In the cockpit Revis is three-quarters of the way through the routine checks.

There are four normal methods of launching a glider into the sky—elastic-rope catapult, which is known as bungee launching, aerial or car towing and cable-winch. The method at the Yorkshire Gliding Club is the winch, and it is by far the most common system currently in use in Britain.

By now, 1,500 ft. to 2,000 ft. of wire rope will have been laid out across the grass from the winch to the waiting glider. In a moment that cable will be hooked on to the nose of the glider. A man in white overalls, holding what might be a giant’s ping-pong bat in each hand, scans the skies above the site to be sure there is no other glider about to land at this time. He reports that all is clear and one of the ground-hands seizes the launching cable.

“Hook open!” Revis sings out, his fingers curling over the wooden ball on the end of a piece of wire sticking out of the cockpit fascia panel.

“Hook open!” responds the chap with the cable. He pops the ring at the end of the cable into the jaw of the hook.

“Hook closed!” says Revis; this is a further requisite in the familiar pre-flight cockpit drill. It may seem a bore but patient observance of the recognised routine nurtures safe flying.

“Hook closed!” comes the reply.

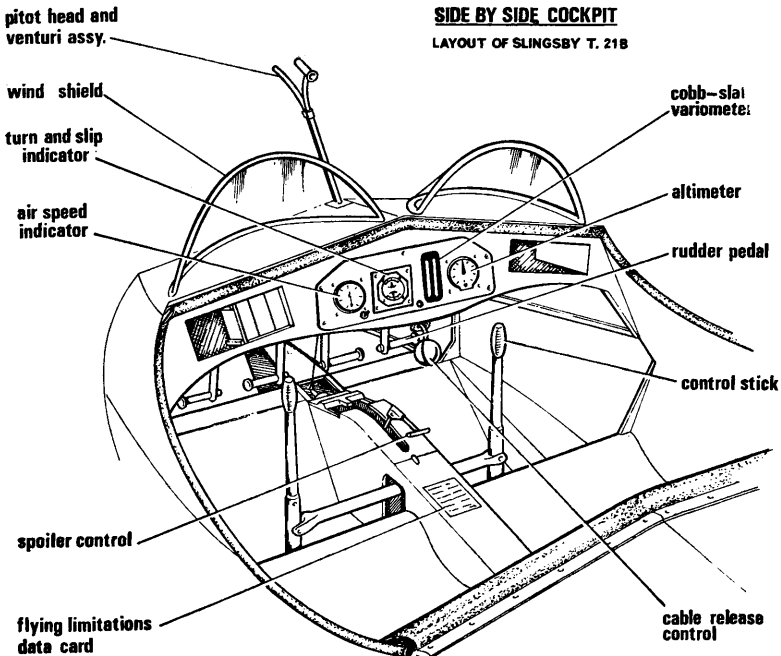
The ground crew gives it a rattle to make sure the connection is firm. The cable slack is taken up by the winchman. It is now up to Revis to say when he is ready to take off.

In the sport of gliding, Ken Revis is probably unique. The special feelings he experiences from powerless flight are his

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alone. The splendid views of the rolling landscape unfolding below don't concern him; the beauty of the clouds, alas, escape him, too. A pity. A great pity. Yet gliding brings him thrills of a different sort as he is gyrating above the Yorkshire moors. He flies by the feel of the wind on his cheeks and the commentary of the instructor at his side. For him the dials in the cockpit to indicate height and speed are superfluous. He doesn't see them; he cannot see them. Ken Revis, gliderman extraordinary, is totally blind. He lost his sight when a string of anti-invasion mines he was trying to render harmless blew up in his face on the West Pier at Brighton in 1943.

The glider is resting on her single wheel and centrally placed skid, facing into the wind, and willing helpers are steadying the wing-tips. The batsman has given the signal for "take up slack" and the winch has pulled the cable slowly till it is tight. The winch operator, sitting inside a protective cage, which will safeguard him in the event of the cable snapping during take-off and



lashing back at him, awaits the launching signal from the white-overalled batsman.

“All out!” cried Revis.

The batsman makes a semicircular motion with the bats above his head and the winchman lets in the clutch of the V-8 engine that drives the drum to haul in the cable at umpteen feet a second and so launch the glider into the sky. Revis hears the distant revving of the winch growing louder and the glider starts to move. There is a strong and even pull, a sensation of gathering speed swiftly and within the length of a cricket pitch the T.21B is already skimming the ground. It starts to rise steeply now as the fast-revolving winch drum draws in the cable and hoists Revis and his instructor higher and higher above the launching site. The wind is beginning to swish and whistle through the mainplane bracing struts, through the hair and across the ears. It is rather like riding in a mountain cable-car. This is surely the true joy of flying—the thrill, perhaps, that the aviation pioneers experienced when they rose into the air in their fragile little open-cockpit planes and felt the wind stinging their faces while reaching speeds never before attained.

“More stick!” urges the man at Revis’s side. There is dual control in the cockpit, so each man has his own stick and rudder bar. Revis has the controls, holding the stick lightly and his feet central and still, although the instructor can take over in an instant should anything happen of which Revis might be unaware or incapable of counteracting efficiently. If he had the blessing of sight his eyes would keep that winch directly in line with the nose. Now, as on every occasion despite his many previous launches, he puts all his trust in the man at his side—P-One, as he will be described in the log-book, Revis himself being P-Two, or Second Pilot. It requires sight of the ground and visual judgment to effect a safe landing if the cable should snap at this most crucial part of the flight. It may never happen, of course, but Revis did encounter this mishap no less than seven times in his first twenty launches. He has come by now to know well that whiplash sound and at once relinquishes his own hold on the



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controls as his instructor assumes charge to take emergency action. Breaks on this scale are not normal and probably result from using an old cable that is ready for replacement.

“More stick!” repeats P-One. They want to gain more height and Revis pulls back the control column in instant obedience. The nose rises more steeply; they are now in excess of 1,000 ft. high and almost at the point where the cable is to be released. The half-expected explosive crack of breaking cable hasn’t come this flight. Despite backward pressure on the stick, the nose of the glider is dropping, indicating that the winch can give no more height. The stick is now eased forward to take the tension off the cable.

“Release now!” says P-One.

Revis’s hand moves instinctively to the release ball in the centre of the fascia. A sharp tug and the nose hook opens to let the cable slip away in preparation for another launch. Glider and cable have parted company at the customary point just short of the winch. If the gliderman had been too slow obeying the command, or the person giving the command had misjudged the time to jettison the cable, the reverse-release safety mechanism would have become operative, and when the glider had passed directly over the winch the hook would have opened automatically to free the cable and so prevent the glider from being drawn down towards the winch.

Free—and he’s on his own!

It is a time of exhilaration now for the man in the left-hand seat of the T.21b. In his hands and at his feet, Ken Revis rejoices in the power of sustained flight in his incredible world of darkness—above a world he cannot see. What is it like, this silent sport? And what is it to him, this rare man of courage with a zest for real living?

To a great extent in lateral flight, once launched, Revis is actually flying by the seat of his pants; so far as movement upwards, downwards and sidwards is concerned he finds his clues in the sound of the wind in his ears and its pressure on his face. A person without sight comes to rely more and more upon

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the senses of sound and feeling, and this is especially true in gliding. Revis demonstrates an acute perception that has developed during his tuition at the Yorkshire Gliding Club. It has not merely been necessary to learn what he must do with the controls and understand their effect on the flying position of his glider; it has been necessary to find a means of readily identifying the effect of the controls by his remaining bodily faculties. In other words, in every flying attitude he must evolve his own individualistic method to compensate for the absence of sight. With no instruments competent to assist him, Ken Revis is flying blinder than blind.

How are we to comprehend the manner by which he potters around in the sky? Well, when you're driving along a country road and your wheels scrape the grass verge, you know the car has kicked up on that side because the switch from a level course has been transmitted via the driving seat to the muscles of your own seat. You counteract this by moving the muscles one way or the other so as to remain upright at the wheel. In the same way, because he has no horizon for reference, Revis knows at once whether one or other of the wing-tips of his glider has begun to rise or fall, however slight this may be, and he will rectify by means of appropriate sideways movement of the joystick. It was always said of a highly experienced pilot in a powered plane that he was "flying by the seat of his pants". Seldom has the expression been so factually accurate as when referring to this blind gliderman.

Noises help him, too. Even in a glider there is rarely such a condition as completely silent flight. True, there is no roar of an aero-engine but the mere passage of the craft through the air, and the flow of air over its surfaces, create sounds that are like music to the dedicated gliding enthusiast. The gentle swish and hum of the wind become like an aural instrument by which Revis may determine any variation from level flight. If the glider should start to dive, the noise will increase, and if it should start to climb, the noise diminish. Thus, by tuning his ears to the sound of the air sweeping over the fabric of the glider,

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Revis is able to judge his flying position with an uncanny ability. When he first began gliding it was more akin to a roller-coaster ride because the tendency was to over-correct. On hearing the murmur of the passing air increase, which was his signal that the nose was dropping, he used to pull back too hard on the stick and in the sudden silence would come the realisation that he had exceeded level flight and was by now starting to climb.

After the information provided by the shifting of his seat and the noise in his ears, which together can keep him flying straight and level, Revis has the wind on his face to guide him in his turns. The glider, when in a turn, skids outwards or slips in towards the centre of the turning circle and the pressure of the wind on his face therefore varies depending on the direction of the turn. So, instead of a turn-and-slip indicator on the fascia panel in his cockpit, or landmarks on the skyline, Revis will read the wind, judging the extent and efficiency of his turns by the rush of the wind on his cheeks. By sound and by feel he thrills in the joy of flight above the hilltops of the North Riding.

Watching these fabric-and-wood craft floating lazily in the sky, one may forget that no glider in creation can sustain flight without some form of assistance. Aircraft have their engines to keep them airborne; gliders draw upon the air itself or, strictly speaking, rising currents of air produced by the topographical nature of the ground below and the clouds that scud around the skies. Man has made constant improvements towards the efficiency of gliders but however brilliantly conceived, gliders must still depend upon nature to be able to perform their greatest feats. A calm, lifeless day may mean a flight limited to just a few minutes and a single circuit of the field. Once, from Sutton Bank, Revis was able to stay up for only  $2\frac{1}{2}$  minutes yet in France gliders have remained in the air for close on  $2\frac{1}{2}$  days.

Sutton Bank normally produces reasonable gliding conditions by virtue of the steep, west-facing ridge on which the site is located. The wind moving in towards the escarpment is deflected upwards like a wave and on this lift the gliders are able to soar to and fro quite happily for worthwhile periods. This may be

fine for the novices, of course, but the experts are far more adventurous; they usually aim to go chasing thermals and be borne in their rising strength like scraps of paper drawn up a chimney on a gentle spiral.

Unless the glider has the benefit of some form of rising air current it must obviously begin to fall; rates of descent and minimum safe flying speeds vary from glider to glider, but come down they must, pulled by gravity, descending a shallow path that may represent something in the region of a 10-ft. loss of height for every 200 ft. of forward flight. The technique of getting away from the launch area and maintaining flight is to dodge from thermal to thermal, gaining altitude in the upward surge of each one and then gliding across to the next in order to repeat the procedure for as long as the thermals will last. It is a technique that has put distances in excess of 600 miles into the world's record books—and that's a long, long way back home by car with the glider packed inside a box-like trailer. Club fliers up for a quick jaunt usually prefer to stay within sight of their own home patch.

"Altimeter reading: 1,500 ft. We're heading south-west towards Topcliffe, this side of the A.1, the R.A.F. camp that supplies us with our met. reports," explains Revis's instructor, adding by way of an invitation: "We've the sky to ourselves. Do a few turns if you like."

Beneath the T.21b lie the patchwork fields of the sprawling Vale of York. To the north there are the Cleveland Hills and beyond them the smoke of Tees-side. Behind, the missile-warning defence installations of Fylingdale and further back still is the coast—Whitby, Robin Hood's Bay and Scarborough. Ahead, the Great North Road slices towards Scotch Corner and on to Darlington. Here in the Vale, during the war, R.A.F. Bomber Command had some of their huge bases from which to range out across the Continent of Europe as dusk descended on the blacked-out countryside.

"O.K. Commencing left-hand orbit."

Revis edges the stick cautiously towards his side of the cockpit

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and senses the extent that the left wing is dipping by the shifting movement in the seat of his pants. There is no change in the note of the air pulsing over the glider, indicating that the nose is still level, but the wind is exerting more pressure on his right cheek than on his left, so he accepts that the glider is starting to skid and he must use the rudder to check it.

“Gently,” P-One calls out. “Easy on the rudder.”

The Sutton Bank clubhouse has slipped away beneath the rising mainplane now and Revis maintains his turn. He has a gentle yet determined touch. He circles again. And again. A dive, and then a climb. Safe and happy, Revis is experiencing a form of excitement that comes to few men. It is encompassed within a knowledge that, despite his handicap, he has mastered the rudiments of an agreeable new pastime, and one that holds so many promises for restful satisfaction away from the tedium of business life.

“We’ll have to watch our height,” warns the voice at his side. “We’ll stay out beyond the ridge and try soaring. The wind is fair so there should be enough lift. Keep her steady and I’ll say when we ought to start turning to take advantage of maximum lift.”

Revis obeys without hesitation, for he has implicit trust. He knows that the drill now will be to move into that upward thrust of wind, climb hard and then turn to fly along the ridge. If you go too far over, there is the risk of having to do battle with a down-draught. Try as he will, Revis must remain entirely dependent now upon P-One’s commentary of guidance, for there is no other means for him to pinpoint his position or to locate the likely sources of those useful thermal currents.

“We shall reach the ridge in 30 seconds but you’ll be able to feel the lift—NOW!”

Revis pulls back the stick and the glider loses speed.

“40 mph. Dropping to 35 mph. Don’t let her lose much more or we’re liable to stall.” The instructor is calling off the air-speed from the indicator on the fascia panel.

“Levelling out,” answers Revis. It has gone quite quiet but

as he moves the stick gradually forward he hears the sound of the air coursing again over the glider; awareness by sound has overcome his lack of visible horizon.

"There's lift to be had from these clouds, so turn a bit left here. We might as well make the most of the conditions whilst we're up today," P-One is telling him.

Only P-One can sort out possible thermals; P-Two, who must always be under a disadvantage in this respect, will be content to follow P-One's nose until he is actually in the thermal. He knows what to do when that happens—you spiral cheerfully until the lift peters out or you become tired of climbing. In a cloud it's wet and nasty.

The instruments in a training glider are necessarily sparse. There is an altimeter, which works on barometric pressure and records height above the launching site, an airspeed indicator, and a variometer, again based on changes in barometric pressure, which registers the rate of descent or ascent by means of a red and a green blip inside two vertical tubes.

"I thought we'd be lucky," the instructor is saying. "Can you feel the lift?" Revis is aware that the controls are answering easily and as velvet-smooth as a gear-change into top.

The glider is circling beneath a patch of cumulus clouds and the green blip is moving up the tube. They are climbing at 15 ft. per second. Unaware what his instructor has in mind, Revis is soon to experience something new in gliding—first the uncomfortably cold and damp embrace of a cloud at 3,000 ft. (with the instructor temporarily as blind as Revis himself) and then his first taste of aerobatics.

Diving away out of the cloud, Revis wipes the moisture from his face. He is glad to be back in the warm sunshine.

"Would you like a loop?"

Revis can hardly believe his ears.

"Would you like a loop?" He has to believe the man now for he has repeated the question. He gulps hard. Up to now, with a score or more flights already in his log-book, Revis has not been aware that gliders can loop. He has assumed aerobatics

to be the prerogative of the powered planes. A glider looping the loop? P-One must be joking! The man at his side isn't one for kidding him on, though, so if he suggests putting her into a loop Revis is not going to argue about the plausibility of the manoeuvre.

"Yes, please. I certainly would like to loop," he tells P-One.

"Hold the stick gently and keep the rudder bar straight," he explains, "and we'll go through the motions together. You'll get the feel of it."

Beneath the loosely cupped fingers of his right hand, Revis feels the stick being thrust firmly forward in synchronisation as the instructor works his own stick. The nose dips and the tell-tale rush of air builds up in his ears. 50 mph. 60 mph. 70 mph. 80 mph. P-One is rattling off the airspeed and Revis is travelling faster than he has ever gone before in a glider. The noise is becoming louder and louder. The exhilaration is tremendous and there is a smile flickering on his face. He half-hears the instructor shouting out to ask if he is feeling O.K. Then, in a moment, comparative silence; they have figuratively reached the bottom of the hill and now it is time to pull up into the long climb.

The stick is being eased back now and this lessens the noise that had marked the earthwards plunge. The torrent of sound gives way to a new sensation, a feeling of lead in his cheeks, and soon this is spreading so that his whole face has become heavy and listless. He tries to raise his head but decides it is hardly worth the effort. What has happened is that the glider has flattened out and it is the decelerating movement that is having this odd effect upon him and forcing him down into his seat. He doesn't know what to expect, nor can he anticipate the course of the loop from sight of the ground. There is a rush of blood to his head and he is willing himself not to succumb to loss of consciousness. He still has his hand on the stick but his reactions are sluggish and he has to struggle to keep his fingers there at all. He senses the glider is losing speed on the climb and then, quite suddenly, when he realises they must be close to the peak of the vertical climb, the glider flicks over on to its back and he is

hanging in his safety straps. Not for him the sight of the spinning earth; not for him the revolving horizon. The sense of sound replaces that of sight and he finds he can express his simple feelings only in these rather fatuous words to the man who is really flying this looping glider: "Hasn't it gone quiet!"

The solitude is to last no more than one or two seconds. The glider starts to increase speed again and the noise is growing louder and louder. Again there is that feeling of leaden cheeks, brought on by centrifugal force, as the glider flattens out at the bottom of the loop and all is once more quiet in the return to level flight.

"Can you manage another loop?"

"It's fine by me!"

His appetite now thoroughly whetted, Ken Revis loops a second and then a third time within the space of as many minutes. Hand on stick more confidently now, his feet resting more surely on the rudder pedals, he feels every movement repeated on his own controls as his instructor executes these aerobatics. Finally, after a succession of rather more gentle manoeuvres which he negotiates entirely on his own, Revis feels the hands on his watch; he has been up for nearly an hour. It has been the longest flight to date and he has still to set the glider down again at Sutton Bank.

For ease of description, the landing field is divided into up-wind, down-wind and two cross-wind legs and these form the pattern for the landing instructions that Revis receives as he prepares to bring the glider home. It requires fast talking on the part of the instructor and quick reaction from Revis in order to make a correct and unhurried approach and get down in a fairly restricted area. Direction, height and speed are the essential factors and for all this vital information Revis must rely solely on his instructor. Alone he would be truly powerless. He must know these details quickly for the glider will be losing height at the rate of 2 or 3 ft. every second.

"We're on a cross-wind leg, Ken, at 300 ft. well clear of the field, so you must make a gentle 90-degree turn to the left into



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the up-wind leg when I give you the word. Speed: 40 mph. Take your time because we've plenty of height and plenty of room. Slow her a bit. 35 mph. That's better. O.K. Begin turning. Nicely, nicely."

Revis commences his turn.

"Level up. Height: 200 ft. Stick forward. Keep her straight—your approach is fine. Height: 150 ft. Steady. Height: 100 ft. We're going to overshoot—spoilers half open!"

The instructor is talking more rapidly now and still Revis follows his instructions instinctively. If you were flying alongside him you would get the impression that he was a perfectly normal pilot. He displays an air of confidence and looks directly ahead as if sizing up the field. A perfectly normal pilot—only the eyes do not see.

"Spoilers half open!" He confirms that he has set the control in the required position; these will make the glider sink swiftly to overcome the threatened overshoot. It is a smooth, lift-like drop.

"50 ft. Still too high. Spoilers fully open!"

"Spoilers fully open!"

"Easy now, Ken. 10 ft. Hold her off. Hold her off."

The speed has dropped to below 30 mph now and the glider settles into a comfortable landing attitude as Revis nurses the stick. As he does so he feels the instructor's grip beginning to tighten reassuringly to check him if it should look as though the touch-down will be too bouncy. Up to now Revis has had full control of the landing and even at this point, less than 10 ft. from the rough ground of Sutton Bank, he can still set her down with his own hands on the stick and the commentary of his instructor in his ears. A bump, a rebound, and the glider is home, carving a path with her metal skid across the gravel, sand and gorse at the top of the landing field, accompanied by scraping and scrunching noises, before finally she comes to rest and waits for the jeep that will tow her back to the launching site.

Another flight, another log-book entry, for this extraordinary gliderman.

## THE POWERLESS ONES: GLIDING IN PEACE AND WAR

A few years ago, when Ken Revis was the subject of a programme in the BBC TV series *This is Your Life*, Eamonn Andrews described Revis's interest in gliding as being perhaps one of the most amazing among his many activities. It was gliding, in fact, that brought him to the studio for the programme. Unaware that he was to be the celebrity, Ken believed that the TV people merely wanted him to record a commentary for a brief film that had been made some weeks previously to show him undergoing tuition at Yorkshire Gliding Club.

Brian Hartness, Revis's first instructor, appeared in the programme, and he called Revis a natural-born pilot, who had taken to gliding like a duck to water. It was a just tribute on a night of surprises. Hartness brought Revis a surprise message, too—honorary membership of the Yorkshire Gliding Club, bestowed upon him by the club committee, and no doubt intended as a gesture in return for the spirit of comradeship, determination and good humour he has taken with him into the club.

Ken Revis reckons that he contributes to gliding about three-quarters out of each launching he undertakes, about half of the actual flying and about a quarter of the landing. He finds in gliding an exhilaration and a stimulation without equal in any other pastime he has attempted to enjoy. He accepts the limitations imposed by his loss of sight, for accept them he must, yet he is spurred on by them to get the most out of this sport. Revis himself lays down only one condition—he must fly in an open cockpit, otherwise there would be no sensations and he would not enjoy it. Without the wind in his face and the sound of the air he would surely be quite lost.

Since he was a schoolboy, Ken Revis has had a keen interest in aviation. He knew all the planes and might have entered the R.A.F. instead of the Army but for the fact that he switched jobs a few months before the outbreak of war; he had, in fact, already received a thorough medical check as a prelude to joining the R.A.F. Volunteer Reserve at Woodley airfield in Berkshire but then came a worthwhile new job in Lincolnshire

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which he felt he must take to further his career as a civil engineer. One wonders how different his life would have been had he joined the R.A.F. and not gone into khaki and worn the gold and red Bomb Disposal badge on his battle-dress sleeve.

Ken Revis has driven sports cars at 100 mph. He has ridden horses and flown light aeroplanes. He has taken up water ski-ing. It is significant that in gliding Revis finds a comradeship and a serenity tinged with excitement that he has found in no other sport.

## *The Dawn of Gliding*

As do the birds fly, so can Man . . .

That sentiment has excited men throughout the centuries, cajoling them into the air, fearlessly, yet often bringing tragedy to their endeavours. Birdmen they were, literally, yet how could they know the bird's-feather wings strapped to their bodies could not support them? These early would-be aviators leaped from towers and castle walls; surprisingly, some of them lived to see another day.

Towards the close of the fifteenth century, Leonardo da Vinci was thinking hard and working hard on a flying machine. He was a man of vision, so much so that close on 350 years were to pass before anyone really made any headway with heavier-than-air craft. Henson and Stringfellow brought out their steam-driven aerial machines towards the end of the first half of the nineteenth century. And then, marvellously, Sir George Cayley built a man-carrying glider, developed from his earlier flying models. It really worked; hailed nowadays as the father of British aeronautics, Cayley succeeded where so many had failed. He had made the first manned airplane.

From the 1850s, Man made encouraging progress in the wider fields of aviation. Soon the gliders were giving way to powered flight as the pioneers tasted the excitement of controlling the paths of the craft that they produced. As do the birds fly, so could Man. There came, then, a re-awakening in gliders and gliding. The glider became not so much an instrument essential to the study of power-assisted flying as a means of flight in its own right.

The gliding era was here . . .

*BLUE MOUSE ON THE WASSERKUPPE*

IT IS A surprising fact that when the younger of the Wright Brothers astonished everyone by staying up in a glider for no less than 9 minutes 45 seconds, which was considerably longer than anyone else had managed up to that time, Louis Blériot in his 20-hp monoplane had already flown the English Channel and America had produced the first flying-boat.

To a German mechanical engineer, Otto Lilienthal, goes much of the credit for constructing practicable gliders. He studied the way the birds fly and based the craft he built upon the shape of their wings, using cotton fabric over a framework of willow rods for his mainplane. Lilienthal taught himself to glide down from a hill against the wind. Suspended by his arms, his forearms passing through padded tubes and his hands gripping a cross-bar, he would control the flying attitude of his craft entirely by dexterously shifting the centre of gravity of his body. By the time he met his death, gliding in the country of his birth, he had earned his place in aeronautical history with more than two thousand safe glides over distances of up to 800 ft. It was summer, 1896.

Lilienthal's experiments intrigued the brothers Wilbur and Orville Wright in the United States, for his exploits were deservedly world news, and his death increased their determination to do everything in their power to master flight. They assembled all the facts then known about flying, and investigated every feasible theory, and then set about building their first glider. It was a biplane on which the pilot would stretch himself out horizontally between the upper and lower wings instead of adopting the upright posture of others who had been striving earlier to conquer flight with a single mainplane. In 1900 the

Wright Brothers' glider was ready to be tried out on the Kill Devil sandhills at Kitty Hawk on the Atlantic coast of North Carolina. The biggest innovation: movable control surfaces for adjusting the balance of the glider that were actuated by the pilot pulling lengths of wire. It was no longer a matter of the pilot having to keep altering his own body position to waggle the wings; he stayed still now and made the wings waggle themselves.

Control was the essence of the Wright Brothers' experimental work, of course. They achieved a measure of control over the glider in the early flights at Kitty Hawk, one or other of them remaining airborne for as long as a minute on occasions, but the real aim was to harness power to their craft and so attain the ultimate in control—powered flight. It is now in history books how the engineering brothers added a 15-hp petrol engine driving two propellers, and on 17 December 1903, with Orville in the pilot's position and Wilbur starting him off, there came the world's first flight by a power-driven, heavier-than-air machine. A 120-ft. journey lasting 12 seconds, and a new era in aviation was thus born.

And the glider?

It was seven years before the Wright Brothers came back to the true glider, primarily in order to learn more about the forces of nature that would sustain flight, and once more they based themselves at Kitty Hawk where the strong, steady breezes suggested ideal conditions for this further study. Orville Wright carried out a series of flights there in the latter part of 1911, launching into a wind that often exceeded 40 mph, and he had varied fortunes. Sometimes he would be forced down in a minute or two; at other times he was up for as long as five minutes. Once the limit was extended to a shade over seven minutes, and on one occasion, when the rising currents were especially favourable, he managed to float above the sandhills for 9 minutes 45 seconds. He had done then what no one else had ever done.

Despite the Wright Brothers' work on gliders in the early

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part of this century, culminating as it did in that historic flight of almost ten minutes, it was above all the age of the powered plane. Gliders and gliding were slipping away into the dim background; it was almost as if their usefulness was outgrown. In motor-propelled aircraft, even before the outbreak of the First World War, aviators in Europe were setting up all sorts of records, attaining a height in excess of 20,000 ft. on one occasion and covering a distance of more than 130 miles on another flight or, to be precise,  $134\frac{1}{2}$  miles without touch-down in 4 hours 17 minutes 53 seconds. The compulsions of war brought further tremendous developments; sturdy fighting planes were soon darting through the skies at over 150 mph, performing stomach-twisting aerobatics and climbing as high as 30,000 ft. It seemed no one had much time for the humble glider, which was, after all, Man's flying cradle.

With the world at peace again, Alcock and Brown conquered the Atlantic, and the main cities of Europe were soon being linked by regular air services. Britain's fliers blazed their fantastic air trails across the face of the earth, reaching India and even Australia. It is odd, though, that despite all these milestones in aviation history Orville Wright's  $9\frac{3}{4}$  minutes aloft at Kitty Hawk still remained the pinnacle of gliding achievement. But those  $9\frac{3}{4}$  minutes—pathetic and laughable by present-day standards—up there in his glider above the North Carolina sandhills, that day in 1911, was a world record that was to stand for ten years, ten momentous years in power-flight history, until the arrival on the scene of a new band of pioneers like Wolfgang Klemperer at a hilltop in Germany called the Wasserkuppe.

In the Central German province of Hesse, land of folklore and fairy-tales where villagers in holiday mood danced in their picturesque costumes beneath the spreading beech-trees, there lies to the north-east of Frankfurt-am-Main the Rhön-Gebirge, a group of hills some 55 miles long and 30 miles wide. The route out of Frankfurt passes through Hanau, birthplace of the Brothers Grimm, and on to the episcopal see of Fulda, gateway to the

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Rhön—and to a gliding paradise. At one spot, topped by gentle, grassy slopes, the Rhön-Gebirge reach 3,115 ft. The highest summit of all Hesse, it is bare of trees and free of obstructions, ideal for ski-ing in winter and gliding in summer, and its name is the Grosse Wasserkuppe.

To this region, close to Bavaria, students of aviation came in the pre-First World War days to test their theories of motorless flight. It offered great promise because ranges of hills were known to produce rising currents of air in windy conditions (wasn't that, after all, the Wright way to glide?) and the Rhön-Gebirge were especially encouraging on account of the comparative freedom from obstacles likely to hamper these exploratory flying hops. Confident though they were about the successful outcome of their endeavours whilst Europe still relaxed in peace, it is unlikely that those students could have imagined the importance of the role that the Wasserkuppe would eventually play in the growth of the sport of gliding. It didn't really materialise as a cradle of gliding, in fact, until Germany was beginning to pick up the threads of normal life again after the Armistice. For it was only then that gliding really came into its own.

It was not only a cheap way to sample the joys of flying, but also the only way open to the Germans. The Treaty of Versailles, which the Allied and Associated Powers and Germany signed on 28 June 1919, imposed rigid limitations on her fighting forces, specifically prohibiting all naval and military air forces under Part V, Articles 198–202, and establishing an Inter-Allied Commission of Control to implement the ban. However, whilst the air clauses in the treaty barred the building or importing of powered machines, they left the way clear for a resumption of work on powerless craft. As it happened, this was a rewarding loophole.

There was so much to be done in other countries to develop powered flight that no one bothered unduly about gliding. In Germany, though, within a short space of time, designers and Treaty-grounded pilots were busying themselves with gliders of various shapes and sizes and concentrating their flying activities



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on the Wasserkuppe. Clubs sprang up in the big towns as the enthusiasm spread and soon the *Südwestgruppe des Deutschen Luftfahrer-Verbandes* and the *Verband der Modell-und-Gleitflug-Vereine* were organising competitions under the patronage of the *Wissenschaftliche Gesellschaft für Luftfahrt*. An exciting new sport was blossoming for a nation of flying enthusiasts whose wings had been clipped under the terms laid down for a lasting peace.

To the first of these Rhön meetings, held in the summer of 1920, came Wolfgang Klemperer, 27-year-old ex-Austrian Air Force pilot, whose home was in Dresden. He had studied at the Dresden Technical Institute and was now a qualified mechanical engineer at *Aachen Aerodynamische Institut*. Enthralled with the prospects of flying again, Klemperer had roughed out in his spare moments a design for a cantilever monoplane glider with conventional elevator, ailerons and rudder controls.

The next move was to prepare detailed drawings and then, joined by aeronautical students from *Aachen Flugwissenschaftliche Vereinigung* under the stewardship of Dr Paul Stock, Klemperer set about building his wood-and-fabric dreambird. It had squared-off wings and tailplane and a bold, broad tail fin. Klemperer decided on curved skids beneath the wings instead of wheels, and he concealed the skid struts within streamlined trouser-like fairings. The wings and fuselage were covered with black muslin. He called the glider *The Black Devil*. The name came partly from the colour of its muslin skin, the only fabric available to the construction team, and partly from the legendary Black Devil in the form of a wolf that has an historical association with the cathedral of Aachen, burial place of the Emperor Charlemagne.

Design and construction had been pushed forward simultaneously because there was barely time to complete the glider in time to make the contests. From the engineering point of view, *The Black Devil* was ahead of the field. Some of the gliders were the product of men with power-plane experience, like Klemperer, some of artisans and others students; others were the result of fantastic ideas. The heroic labours of the Aachen group were

rewarded, however, for *The Black Devil* was a great hit on the Wasserkuppe. In this ultra-light craft, with a modest aspect ratio, Klemperer hovered for almost  $2\frac{1}{4}$  minutes to win the duration flying prize. He won the distance prize, too. But he was still a long way off the best performance of the Wright Brothers.

By now, catapult take-off with rubber shock-cord on the windward slope was proven and accepted as a practical method of becoming airborne but the necessity for systematic pilot training in the handling of gliders was also brought home by various accidents. Imagination was stirred and the continued encouragement of soaring flight trials by staging annual contests was assured. *The Black Devil* had shown the way; soaring in a slopewind was not only possible but exhilarating.

In the following year, 1921, Klemperer returned with the Aachen group to the Wasserkuppe, eager to taste fresh triumphs, although this time the faithful *Black Devil* was to be used mainly for the training of new pilots and he himself had a fresh mount on which to pin their flying hopes. It was a much lighter craft and more refined, though outwardly very similar. The fabric this time was light blue and the fuselage nose resembled the head of a mouse, so the students called her *Blue Mouse*. The wings spanned 30 ft. and the area was 172 sq. ft. The weight was a mere 125 lbs. Appropriately, *Blue Mouse* would soon be nibbling at success that would eventually surpass that of *The Black Devil*.

Understandably, the endurance standards set by the competition organisers that year were not particularly ambitious. For example, a minimum of only five minutes was required to be considered for a prize in the duration flight category. And in the category for the greatest total duration of flight achieved by a single pilot, each flight exceeding 15 seconds would qualify to be reckoned in the final tally. Yet, considering the infancy of the sport, these qualifications were none the less realistic. There was much to be learned still about building and flying a glider.

Forty-five gliders were expected for the competitions, some of them monoplanes like *Blue Mouse* and some biplanes, their spans ranging from about 15 to 50 ft. Some were of frail appear-

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ance with thin wings and a forest of struts and bracing wires. Others were solid-looking craft like *Blue Mouse* with thick wings but no struts or wires to spoil their lines. They represented aero clubs, scientific organisations, technical colleges and manufacturing concerns from many parts of Germany. Late-comers swelled the entry list. Far exceeding the 1920 field, there was now assembled on the Wasserkuppe the largest gathering of gliders the world had ever seen. Observers travelled from abroad to discover how Germany was progressing with the study of powerless flight. The British aircraft builder Handley Page was among them; Anthony Fokker was there, too. It was an occasion of pride mixed with a certain amount of hesitancy and curiosity.

Many new ideas were tried out, one of them being trial flights by Koller of the Munich group in a glider without a vertical tail fin (on the strength of the argument that birds seem to get along quite nicely without one!), and precarious direction control triggered off by split wing-tip brakes. There was also a tailless glider brought along by the Weltensegler group and an entry that had variable incidence control of the wings instead of the now conventional elevator and ailerons.

Refreshing breezes swept over the hilltop those early August days, cooling the site, although the heat was oppressive in the valley. The camp resembled an ants' nest with everyone hard at work, reported the German aviation journal *Flugsport*. The glidermen were beginning to set up their tents; already the sleeping quarters in the permanent camp buildings were almost full. The most important occasion of the gliding year was soon to commence on the Wasserkuppe. These competitions had a significance that no one could possibly foresee.

There might well have been jubilation at the start of the contests but an echo of the past served to sound a note of caution about Man's still limited experience of free flight. It so happened that the week the competitions opened was the twenty-fifth anniversary of the death of Germany's great gliding pioneer Otto Lilienthal. It was also the first anniversary of the death of one of the contestants in the Rhön gathering of the previous year.

Silently, heads bowed, up there on the Wasserkuppe, men stood in tribute as a memorial was unveiled to those who had given their lives in the cause of aviation.

The warning was timely for, alas, gliding claimed yet another victim before this 1921 meeting had ended. The pilot received fatal injuries when his craft nose-dived; he had been in the air for just over a minute.

As it happened, even a single minute aloft over the Rhön-Gebirge, with a happier conclusion, would have been a noteworthy performance. Despite long periods of pre-contest practising, sometimes spread over as much as a month, no one succeeded in appreciably improving upon the five-minute period the organisers had set down as the minimum qualifying time in the duration category. Aboard *Blue Mouse*, Klemperer negotiated a full circle to remain aloft for  $5\frac{1}{2}$  minutes, which was the best performance to date, but Martens, flying the *Hannover Technische Hochschule Akademische Fliegergruppe* entry, managed to pip him by  $2\frac{1}{4}$  seconds. It could hardly have been a closer result. In the end the judges decided against awarding any prize in this section of the contests.

In spite of the time that had to be spent on manhandling the gliders back to the starting point after each launch, some of the contestants made several flights each day. The series gained greater distinction, however, by virtue of the number of individual flights than by their actual duration. For instance, Pelzner (*Nordbayerischer Luftfahrt-Verband E. V. Nürnberg*) made 62 flights of 15 seconds or over in his biplane and easily led the field in the total duration category with a sum of 38 minutes 51 seconds. Another of the more experienced pilots, Koller (*Bayerische Aero Club, München*), made 25 flights in his high-wing craft, lasting 31 minutes 36 seconds to hold second place, and Klemperer finished third with his 15 flights, totalling 23 minutes 21 seconds. Significantly, the winning order is reversed if the average flight times are worked out—Klemperer then leads with a 93-second average for each flight, Koller comes second with an average of 75 seconds and Pelzner (with more than twice as

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many launches as Koller and more than four times as many as Klemperer) trails in third position with an average flight-time of 37 seconds. There was clearly no indication here that the 1921 Rhön gliding season would see anything outstanding by way of duration flying. It looked very much as though the Wright Brothers would still be leading the world.

Inevitably, because of their eagerness, the glidermen on the Wasserkuppe had hoped for a lot more than flights lasting scarcely in excess of five minutes. They badly wanted to go home with glowing accounts of brilliant new records. Had their much-vaunted progress begun dragging to a halt? One lesson had been learned at any rate—gliding was an unpredictable sport.

Those free of other commitments stayed on at the Wasserkuppe after the end of the series of competitions. The weather was still fine and the winds blowing across the hills promised a continuance of the favourable gliding conditions. The vacation not yet over, Klemperer and the Aachen students remained there with eternal hope—and *Blue Mouse*. The Munich group and those from Hannover also stayed. Rousing choruses sped the evenings along as they sang to the accompaniment of banjos and accordions beneath the stars that danced over the hilltop camp. The daylight hours were for serious gliding but the nights were for pleasant relaxation.

In the early afternoon of 30 August, *Blue Mouse* was prepared for flight. In a wind of somewhere between 25 and 30 mph, Klemperer's eight-man ground crew hustled the sturdy craft down to the launching slope, nose into the wind, and took up their positions. It was a familiar procedure. Klemperer, a shortish figure in a tight-buttoned jacket and plus-fours, wearing a cap and motor-cycle goggles, settled in his cockpit seat. Two of the team held the wing-tips and the remaining six split into two parties to grip the elastic launching rope that was anchored around the heels of the landing skids.

The method now was for these six men to walk forwards and outwards until the rubber under tension became stretched to its limit. At a word from Klemperer, the men holding the

wing-tips would let go and the rope teams would start running down the slope as the glider slithered across the grass, flattening a pair of parallel tracks through the buttercups with her skids, before shooting off the hillside as if fired by catapult. The crowd heard Klemperer's word of command and a second later *Blue Mouse* was sailing through the air at a height of between 30 and 40 ft. The watches indicated 1.50 pm. Klemperer couldn't know it, of course, but *Blue Mouse* had just started a flight into the aviation history books.

Klemperer had a special technique now which he began to put into operation. During the earlier flying, he had realised that *Blue Mouse* could not match the glide ratio of perhaps the greatest rival, Hannover group's ingenious and technologically advanced Vampyr, which was then making its *début*, so he had been concentrating on the exploration of slopewinds strong enough to stay aloft in soaring flight. Vampyr's fuselage and forward wing structure were made of plywood and this was the first stab at higher than conventional aspect ratio—10 : 1. Its performance was convincing in a year when long, stretched-out glides seemed to be the fashion.

Imagine the excitement whenever anyone succeeded in finding, among the air currents of the Rhön-Gebirge, an unseen hand to support his glider for even half a minute so that he might hover proudly over the Wasserkuppe, drawing upon the skills born of experience to defeat the pull of gravity. There was a thrill in the uncertainty of pioneer gliding, for almost every launch carried the hopes of a prospective record-breaking duration flight. The eyes of the spectators, watching these aeronautical antics in the hot sun, darted between glider and pocket-watch in incredulous observance of Man pitting his scant knowledge against the mysteries of Nature. A minute? Bravo, bravo! Look—two minutes! A sigh. A groan of disappointment. Oh, he's down. Perhaps he'll do better with his next launch.

It was against this background of hopeful enthusiasm that *Blue Mouse* rose from the green slopes of the Wasserkuppe, just down the hill from the camp site, on that afternoon of 30 August.

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Swaying in the face of the west-north-westerly wind, Klemperer coaxed his joystick gently to test the reaction from rising currents being deflected off the undulating ground. He sought to secure the maximum advantage from every gust that struck his face. The aim was to gain height swiftly now, foot by foot or even inch by inch if need be, for the higher he climbed the further he could glide and the longer would be the time before the eventual landing.

Still hovering at the end of the first minute and conscious of the peering groups of spectators, Klemperer made a slow 90-degree turn to his left and edged forwards alongside the Pferdskopf Plateau; he was scarcely higher than his point of launch and still no more than 300 or 400 yds. distant from this spot. So often in the past weeks he had accomplished this, yet flown no further because he had lost the struggle for continued lift. The sun glinted on the windows of the camp buildings and on the bodies of the motor-cars. Out he flew, over the valley in the direction of Sieblos a couple of miles away to the north-west, only to find the lift was gone. It looked as though that pattern would be repeated this afternoon with a disheartening drop and a sweeping turn to the left to bring him back to the Wasserkuppe.

But no, *Blue Mouse* wasn't returning yet . . .

Experience was beginning to tell, and yielding confidence with the realisation that he was getting the feel of the glider and that the controls were answering perfectly. So far as the people on the ground were aware, he might have been flying a powered aircraft, such was his command of his stocky and distinctive craft. Stocky—yes, but light as a feather it seemed up there on the slopewind. Flying across the wind he managed to gain fresh height and after half a mile, aware that his tactics were producing renewed lift from the wind striking the hill, he turned to retrace his steps. To the watching crowds on the Wasserkuppe, who saw the outline of Klemperer's head and shoulders sticking out of the cockpit just aft of *Blue Mouse's* sharply sloping nose, this seemed a laborious process yet it was the formula for successful soaring. He banked again, this time

away from the launching site and after a 180-degree turn he was once more cruising on a course parallel with the original path although further out over the valley. Klemperer was hardly a mile from the Wasserkuppe but he had stayed up for more than three minutes.

With justifiable confidence that came from a further gain of height, he now began easing *Blue Mouse* into a right-hand turn directly into the wind, following the road to the village of Tränkhof. Five minutes! Still climbing and by now at an altitude of 200 to 250 ft. above that of his starting point, Klemperer was fast approaching the duration flight record for the competitions that had just ended. Six minutes! He'd done it—and gained about 300 ft. into the bargain!

Sensing that there was no more lift to be readily acquired, Klemperer now veered across the wind and made towards Heckenhöfchen. A family was waving frantically from their farmstead; the gliderman smiled to himself and raised a gloved hand in salute. High over the western fringes of the village of Heckenhöfchen, *Blue Mouse* gleefully executed a figure of eight against a backcloth of blue skies peeping from behind fleecy clouds. South again now towards Schwarzerden, borne on the wind south-west of the curious crowds on the Wasserkuppe, and there was mounting tension. How long could he go on with this extraordinary performance? It was a cross-country flight without parallel and already a national record for duration gliding. Seven minutes! Eight minutes! Nine minutes! Executing a series of curving manoeuvres between Schwarzerden and Güntersberg conforming roughly to a letter "W", Klemperer tried to regain some of the height lost on his southward glide and at the same time spot likely landing places in case he was forced to abandon his flight. That he was largely unlucky in gaining altitude was not too disappointing for he had now overtaken Orville Wright's world duration record of 9 minutes 45 seconds. Cattle gazed up balefully at the strange shape in the sky. Aproned housewives watched from the open windows of



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half-timbered houses. As the village clocks pealed out 2 pm, Klemperer was already the idol of the gliding fraternity.

Klemperer had covered a distance of about three miles in the ten minutes he had been airborne, gaining an unprecedented amount of height in the process, but it was not until he had left Schwarzerden behind and turned briefly across the wind and changed course again to glide south-east on the wind towards Gersfeld, the leading resort of the area, that he really began gathering speed. Over his shoulder, spurring him homewards, the darkening sky threatened a nearing thunderstorm; he must try to reach the town and find cover for his flimsy ship. Passing right over Schachen, Klemperer looked over the cockpit sides to see upturned faces and gesticulating arms. Wonderful, wonderful. This was real flying!

Weaving to left and right, he played the controls in desperation to keep airborne. The danger now was the likelihood of losing so much speed that he might stall and spin to the ground. He had to maintain that delicate balance between minimum loss of height and minimum reduction in airspeed.

Twelve minutes! He was lost to the spectators on the Wasserkuppe but anxious villagers along his route kept him in constant view, running along the streets to find the best vantage points, waving to him and urging him on as if this was some desperate and exciting race. He sensed how Orville Wright must have felt ten years before at Kitty Hawk.

He knew he was losing the struggle to stay in the air. Seconds only were left, for the trees and fields were rushing up. A dip in the ground. Trees. A pity he couldn't have chosen a somewhat flat region for his return to earth. He wouldn't be too far from civilisation now—that was a blessing! A bump and a bounce and *Blue Mouse* was sliding across a grassy incline on the trousered skids. His landing place was behind the Waldhausen nursery on the northern outskirts of the town of Gersfeld. The momentous flight of Wolfgang Klemperer in the Aachen glider had lasted 13 minutes 3 seconds and covered more than six miles, the last three taking as many minutes.

In a moment he was surrounded by admiring crowds that seemed to materialise from nowhere. They shook him by the hand and slapped him on the back. Young farm-hands wanted to sit in the cockpit and work the controls. They fussed over *Blue Mouse* like a pet and wanted to know how it kept in the air for so long without any engine. They bombarded Klemperer with questions about his flight, and he posed beside *Blue Mouse* for souvenir snapshots. Rightly, he was soon the toast of Germany. The organiser of an air show in Omaha, Nebraska, even cabled an invitation to Klemperer to travel immediately to America on an expenses-paid trip to demonstrate the glider in flight at the pageant. Unfortunately, there wasn't time.

If Klemperer had chosen to cling closer to the hillside in the early part of his flight there is little doubt that he would have been able to stay up longer than his 13 minutes 3 seconds. In point of fact, the sight of the squall approaching from the west-north-west prompted him to be certain of landing with sufficient time for the glider to be dismantled and carted away to shelter from the rain. The decision to make the swift run towards Gersfeld in the closing moments of the epic journey was made for this reason. It was a wise course of action, for they managed to get *Blue Mouse* under a roof only just in time to beat the deluge.

And the future? The British aviation journal *Flight* described Klemperer's achievement as being altogether one of the most interesting flights ever made by Man, adding that it was "an indication of what, with a little practice, we may hope to do in the way of powerless flight". *Flugsport* almost held its breath—"What the next days will bring one hardly dares to say", exclaimed this journal.

There was no doubting that this flight of *Blue Mouse* was the long-awaited breakthrough in gliding. The pilots were fast picking up knowledge of the conditions that support gliders, and learning how to control their craft sufficiently well to get the most out of aerial waves. Some said that gliding was nine-tenths the skill of the pilot and one-tenth the design of the glider. Certainly performances improved from that date without drastic



Britain's Slingsby T-51 Dart won the 1965 *OSTIV* prize for the best Standard Class glider. Superb handling qualities and exceptional performance have made the elegant Dart an international favourite



Ken Revis, blind as a result of a wartime explosion, prepares for flight at Yorkshire Gliding Club, Sutton Bank

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alterations to the gliders. Refinements such as higher aspect ratio, elimination of external landing gear, full cockpit enclosure and smooth overall streamlining, which would bring startling improvements in sailplane performances in later years, were still a long way off.

Even so, Klemperer's triumph was short-lived. Within a week another pilot, Martens, stayed in the air over the Wasserkuppe for 15 minutes 40 seconds. And a few days later this world duration record was raised to 21 minutes. In no other country was there such feverish activity in gliding.

By the time the next year's contests came round on the Wasserkuppe, Martens had succeeded in remaining airborne for 1 hour 6 minutes. The initial seconds of duration gliding had given way to minutes; now the minutes were giving way to hours. There was so much to be seen at the camp, too, even though some of the craft, like Budig's beautifully made twin-boom biplane, stayed firmly on the ground. Prince Heinrich, brother of the Kaiser, was a spectator and he was interested in learning all he could about the technical details of the assembled gliders. Fokker brought along a two-seater biplane from which the passenger took the first motion pictures in motorless flight. These were great days, indeed. There were flights that exceeded two hours, and then came one lasting 3 hours 10 minutes in a later version of the Vampyr in the slope-wind over the north-west escarpment to the enthusiastic applause of the many spectators. It was still only 1922 but Man's wildest hopes were fast being fulfilled.

The Aachen team now concentrated on new designs. One was the sleek, gull-winged Rheinland which, unfortunately, was plagued by elevator flutter; the other was a two-seater, side-by-side very daring Canard type with slotted ailerons and an arrangement to bank the front wing instead of rudder action, although this proved too sluggish. But they did not produce quite the impact of *The Black Devil* and *Blue Mouse*.

Wolfgang Klemperer turned his attention towards powered aircraft when the Versailles Treaty restrictions on aviation in

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Germany were relaxed, and in 1923 he designed the first light aeroplane to fly in Germany, powered by a motor-cycle engine and following the basic glider form. Moving from Aachen, he became Chief Research Engineer for *Luftschiffbau Zeppelin* at Friedrichshafen on the Bodensee, and in 1924 he sailed for America to become Manager of Research for the Goodyear-Zeppelin Corporation in Akron, Ohio, a post he held until 1936. From then up to his death in March 1965 he was with the Douglas Aircraft Company in Santa Monica, California.

Klemperer still managed to find time for gliding, though, and in 1929 he made the first distance flight in a sailplane in the United States. And his two children, both born over there, followed his interests and became keen glider pilots in their teens. Germany's loss was America's gain.

Klemperer took his knowledge and he took his belongings. One possession he couldn't take was his record-breaking glider. *Blue Mouse*, pride of the Wasserkuppe, had become a tangible piece of gliding history. She stayed behind in the country where she was created, this proud little glider, much admired and much loved—a valued relic of the hot summer days in the early 1920s when Man first learned the art of soaring flight.

## 1921—1930

Well, the Germans certainly started something on the grassy slopes of the Wasserkuppe.

There were twin results: firstly, they asserted themselves as the leading gliding nation and, secondly, they gave a wonderful fillip to the new-found sport. In Germany the movement spread northwards and soon there was another gliding centre growing up at Rossitten on the Baltic. In a year or two the sport had overgrown frontiers and by the mid-1920s the whole of Europe was bursting with enthusiasm to go gliding. Germany was a Mecca. And their top glidermen went out like excited disciples to spread the gospel.

France started gliding. So did Poland. And Russia, too, showed her prowess at a centre set up at the Crimea. America, not to be outdone, rekindled the Wright Brothers' fire and bustled around the Kitty Hawk sandhills with renewed vigour.

The gliders themselves settled down into a basic shape of fuselage, monoplane wings and tail unit. The development work evolved more upon the principles of flight than upon design of the craft. The glidermen of the late 1920s studied meteorology, which they found helped them to fly higher and further than had seemed feasible when without the benefit of motive power. They found power in the thermals as an extension of hill current soaring. There was much to be learned in the new sport of gliding.

In Britain, several clubs were formed and interest was growing fast. Some were sluggish, when the early flush of excitement started to wane, but on the lovely Dunstable Downs, as the 'twenties slipped into the 'thirties, there was born one of the strongest gliding clubs of all . . .

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THEY WERE THE vultures of the scrap-heaps, begging battered fuselages and crumpled wings to carry off in triumph to their workshop to transform into splendid new sailplanes. They made gliding so popular that the police came along to stop it. They began with a single length of elastic launching rope, one primary glider and the wreckage of another one and became the biggest and strongest of the clubs. They gloried in the title of nursery of the British gliding movement.

Who? The London Gliding Club.

The growth of this one club was without doubt the outstanding example of the intense vigour and enthusiasm that typified the pre-war gliding movement in Britain. It was a symbol of achievement as well as a spur to encourage less successful clubs. But the London Gliding Club was a late starter compared with many other internationally known centres.

There had been sporadic attempts at motorless flight in Britain even before the First World War but gliding really caught on only after the Germans had proudly displayed their prowess at those early Rhön meetings in the 1920s. As a correspondent to *The Times* pointed out somewhat coolly in 1922: "The news of the magnificent progress that has been made by the Germans in the gliding experiments on the Wasserkuppe, and by the French at Clermont-Ferrand, must come as rather a shock to us when we realise the comparative indifference with which gliding is treated in this country."

A shock? Certainly a slap in the face. It was suggested that this indifference was due not so much to a lack of opportunity or enthusiasm as to the need for someone to take matters in hand and organise competitions and experiments similar to those



held in other countries. Prompted by the challenging mood of the moment, Lord Northcliffe's *Daily Mail* sprang into action and within two months they were promoting Britain's first gliding contest, organised by the Royal Aero Club and held at Itford Hill in Sussex. Thirty-six entrants from Britain and the Continent set their sights on the £1,000 prize for the longest flight in excess of half an hour, and it was picked up by a Frenchman, Alex Maneyrol, who swayed and strained in determined flight for 3 hours 22 minutes to beat by 12 minutes the best time recorded by anyone on the Wasserkuppe. National pride was redeemed in part, for although the best British time achieved was only 1 hour 53 minutes, that distinction belonging to pre-First World War power-plane pilot Freddy Raynham, the contests on the South Downs, held in October 1922, did at least demolish the old defeatist argument that the Germans had an unfair advantage on account of the lift-inducing configuration of their Rhön countryside. Henceforth, the Wasserkuppe obviously need not be held in quite so much awe.

The events at Itford Hill gave a much-needed fillip to British gliding aspirations, but unfortunately progress dawdled for a long time. Perhaps there was once more a preoccupation with powered flying, or perhaps the main trouble was a lack of any real organisation and national driving force. Germany, America, Russia and Poland all persevered with gliding, yet so far as Britain was concerned the next six or seven years were empty years. They were years of lost chances, years to regret, for when things did begin to move there was a considerable lead to be caught up. The turning point came at a lunch in the Comedy Restaurant in London's West End shortly before Christmas, 1929. Enthusiasts in the Home Counties formed what came to be known as the British Gliding Association, and they pledged themselves towards a renaissance in the sport of gliding. The organisation would affiliate the various clubs, promote branches, negotiate on the technical and sporting aspects of gliding and supply the clubs and branches with technical information and assistance in building gliders and choosing sites. From Lord

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Wakefield of Hythe, who had already done much for British aviation, came a £1,000 donation to head a fund to promote the art of gliding. The movement found a distinguished president, Air Vice Marshal Sir Sefton Brancker, Director of Civil Aviation for the previous seven years, who had retired from the R.A.F. in 1919 with a view to generally developing commercial aviation. Alas, just as the movement was getting on a sound footing, Brancker perished in the R-101 airship disaster with virtually the whole of one of the earliest clubs, the Airship Gliding Club, which was formed from crew members of the R-101. This, then, was the background for the great re-awakening in gliding.

Public imagination was stirring once again and on Sunday, 16 March 1930, on a flat field at Stoke Park Farm, Guildford, London Gliding Club (formed ten weeks previously) staged their first flying trials. Three weeks earlier, Kent Gliding Club had unveiled their new glider at Detling airfield amid a blaze of publicity, with the result that all the roads were so congested with cars that they could hardly get the glider to the site. Then, when the public saw that all it could do was short hops, some of them threatened to tear it to pieces. Seeking to learn from this lesson, London Gliding Club decided to keep their initial meeting a secret. Unfortunately, someone leaked the news to the Press, and now it was far from a hush-hush gathering. The crowds swarmed around the pair of waiting gliders like fans besieging their film-star idols. There was one difference: the mood was one of excited curiosity rather than out-and-out adulation, but it was an indication of public reaction. It cannot be said that this historic meeting was an entirely successful venture from the point of view of demonstrating the potentialities of gliders and glidermen, for the two fragile craft assembled there, one built locally by R. F. Dagnall, the other a borrowed German Zögling, managed nothing more spectacular than 200-yd. hops up to 15 ft. high. At least not until the closing moments. Then, with no fewer than two dozen helpers to flex the elastic for a really powerful launch, the glider shot into the air like a bullet from a gun. The astonished pilot had no chance to make

more than a token gesture at controlling his craft while the launching crew flung themselves to the ground and made passable imitations of moles burrowing a hidey-hole. The glider dipped a wing, swung round violently and plunged to earth. The pilot staggered out shaken and bruised, wondering what had hit him, and the glider strength of the London Gliding Club was thus cut by half on that first memorable afternoon. In those pioneering days, however, mere mishaps of that sort failed to daunt the serious aviators, being regarded as the natural hazards of the sport that just had to be accepted. In any case, gliders were usually repairable with the aid of a good carpenter, wood and glue, plus lengths of bracing wires.

Within six months of the birth of the British Gliding Association there were a dozen or so clubs in existence and more in the process of formation. The jubilant forecast was forty or fifty clubs by the end of the year and, in fact, there were as many as eighty in being by the end of 1930, although many never reached the stage of having a glider. The hint of a flying trial was enough to bring out hordes of spectators to watch the antics of these human fledgelings wobbling in hesitant flight on twitching wings. Royalty turned out in support, too. The Prince of Wales and Prince George, accompanied by Lord Louis Mountbatten, spent three hours one day at the London club's new Ivinghoe Beacon site near Dunstable Downs. Enthusiastic though they professed to be, only the Prince of Wales's personal pilot, Edward Fielden (later Air Vice Marshal Sir Edward Fielden, Senior Air Equerry to Queen Elizabeth II), actually chanced a flight. The royal party contented themselves with the safer role of spectator and followed every movement of the fliers, particularly the distinguished Austrian expert Robert Kronfeld, who was visiting the club to demonstrate the art of soaring.

From the outset the club gliders were kept in a marquee set up on the site of a petrol station at the foot of the Beacon and the proprietor kept a wary eye on them during the week. The Princes' visit had been kept quiet deliberately, in order to keep struggling crowds from hampering the demonstrations, but once

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news of these strange experiments had leaked out hordes of spectators flocked to the Beacon on fine week-ends in the hope of seeing the birdmen floating on the breeze. It seemed that all the world and his wife was converging on the site. The police eventually turned up, too, only their interest centred on the gaping crowds. Stern-faced and with notebooks at the ready, they blamed the club for causing an obstruction and ordered immediate removal of the gliders. There was no alternative; gliding was becoming too popular, and for a time, at least, gliding at Ivinghoe became a clandestine operation. The Beacon was too bright an attraction, so sadly the gliders were packed up and a new site less in the public eye had to be sought.

Five miles away at Totternhoe, two farmers came to the club's rescue. One let them put the gliders in his barn, and the other leased them some land for flying trials. Despite two moves in six weeks the prospects were considerably improved and the club was able to settle down to regular week-end training. Since no one came anywhere near Kronfeld's standard, it would have been a wild exaggeration to describe the efforts of Dunstable's embryo glidermen as being anything more than aerial tobogganing. The pupil did his first hops at the foot of the Downs, squatting in his roughly fashioned seat at the nose of the skeleton fuselage. When at last he reached the stage of being launched off the top of the hill, it was not to achieve soaring flight, for which he was not yet ready, but to make a downward glide of 30 seconds to qualify for his "A" certificate issued by the Royal Aero Club. The amount of flying that was possible, even as skills increased, could hardly be described as satisfactory because of the long periods taken up with rigging and de-rigging the gliders, heaving them breathlessly up the hill and retrieving them after each flip. To all but the real devotee, it seemed a high price to pay for a flight of perhaps 15 or 30 seconds.

In Arthur Mee's popular series of descriptive volumes about the various counties,\* Dunstable Downs are described as

\* *The King's England (the Counties of Bedford and Huntingdon)*, Hodder & Stoughton.

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affording a "major opportunity for those brave men of the Flying Age who were willing to rise on the wind and glide where it will carry them". It was an appreciable time before anyone rose on the wind from this site. Although London Gliding Club members gained no less than 25 out of the total 34 gliding proficiency certificates issued during that first summer of the renaissance of British gliding, only five of the 34 were the coveted "C" certificate awarded for actual soaring flight, the requirement for which was a flight lasting at least five minutes above the level of the starting point. All five recipients were experienced aeroplane pilots before trying their hand at gliding.

Most of the original flying members at Dunstable were already qualified power-plane pilots. Indeed, it was generally found that anyone who had handled early aircraft took to gliding with consummate ease because there were the similar characteristics of flight, rather poor controls and slow speeds. Marcus Manton, for example, flew with Grahame-White in pageants at Hendon before the First World War; he was known then as the "Boy Pilot". Several of them were in the R.A.F., and some had been in aviation so long that they were, as it is often said, flying box-kites when Pontius was a pilot.

Soon the more practised pilots started to feel their way around the site, finding out by trial and error at what distance from the hillside the up-currents began to decline, and endeavouring to plot the areas of lift in the immediate vicinity. Putting this knowledge to early use, Mungo Buxton,\* one of the first half-dozen British pilots to qualify for the international "A", "B" and "C" gliding proficiency certificates handed out in Britain by the Royal Aero Club, soared for 3 hours 1 minute at the Downs site in April 1931, reaching a height of as much as 650 ft., to establish a new duration record for a British pilot. Six weeks later, Major Henry Petre remained up for 3 hours 28 minutes

\* Group Captain G. M. Buxton, O.B.E., F.R.Ae.S., R.A.F. (Retd.), Engineer Officer with the Queen Bee Development Flight in the mid-30s and latterly Air Force Representative, Director General, Guided Weapons, Ministry of Supply.

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5 seconds, surpassing even the flight of the Frenchman, Maneyrol, at Itford Hill back in 1922. The club's site was fast fulfilling earlier promises of fruitful ridge soaring within easy access of London.

The publicity value of such flights was shown in the increased membership that invariably followed, the resulting increase in club finances always being extremely useful in meeting outstanding bills. When the first hangar was purchased in 1931, on a £20 down payment, subscriptions from the rising number of members helped to pay off the rest of the £120 bill by the end of the year. Expenses of this sort were necessary evils. The hangar, 50 ft. by 30 ft., was more than a storeplace. It was reckoned to be worth an additional  $1\frac{1}{2}$  hours' flying time each day, because the gliders could be kept there in instant flying condition instead of having to be humped out of the barn, assembled prior to flight and then de-rigged and carted back again every evening. Willing hands erected that hangar in a single week-end whilst struggling against snow, rain and high winds. Fortunately there was never a paucity of volunteer help at the site, for otherwise there could never have been such a surprising item in the club records as a profit of £254 8s. od. at the end of the first financial year.

There were now five club gliders—a Zögling, a Dagling, a Prüfling, a Professor and a two-seater—plus a trio of privately owned craft maintained either by individuals or a syndicate. To keep down expenses, London Gliding Club became scavengers. The smaller clubs often possessed only one glider, and if it should become too badly damaged for easy repair there was sometimes no alternative but to disband the club because of insufficient funds to replace the glider. A gliding club without a glider was in the same sorry state as an airline without planes. Hearing of such wrecks, London club members would go racing off to inspect and collect, sifting through the tangled heap to see if they could find enough pieces to rebuild it. A certain amount of cannibalism went on, too. A portion of wing from one smashed Dagling somewhere up in the Midlands might match up nicely

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with a wing section from a wreck discovered in another part of the country. The engineer at Dunstable, assisted by semi-skilled or downright clueless enthusiasts, would then construct a smart new glider in hours of patient work in the manner of a latter-day plastic surgeon. The hangar looked busier than a hospital operating theatre, although the grubby and dishevelled appearance of these surgeon-aviators would have horrified any theatre sister.

It is worth noting that none of the original club gliders at Dunstable was bought ex works. The nearest was the Dagling that was built by a firm in Surrey and based on the design of the German Zögling primary glider. The club obtained the plans on a visit to Germany and supplied them in exchange for the first glider to come off the production line. For the name they combined that of the constructor and the glider on which it was based—Dag(nall) and (Zög)ling, hence Dagling. On this same visit, London businessman Dudley Hiscox bought a Hols der Teufel in kit form; the wings were constructed at Hatfield by de Havilland apprentices, the centre section in Mrs Marcus Manton's drawing-room in Cricklewood, and the final assembly took place on the club's stand during an exhibition in the Agricultural Hall in Islington.

Dudley Hiscox, Marcus Manton and J. R. Ashwell-Cooke were the original directors of the London Gliding Club Proprietary Limited, a registered company with £100 capital in £1 shares and the laid-down objects of "promoting, assisting and encouraging gliding, soaring and aerial navigation in all its forms and the study of aeronautics". This step was taken to secure a solid business foundation for the fast-growing club. A clubhouse and second hangar were now in the course of construction and further improvements were envisaged. Proud officials escorting Wolf Hirth, veteran of a decade of gliding in Germany, glowed as he spoke of being very favourably impressed with what he considered to be an excellent site. And the much-travelled C. H. Lowe-Wylde, Britain's No. 1 glider pilot and designer-builder of the popular BAC1 primary training glider, echoed this comment by expressing the opinion that Dunstable

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was the finest ground from which he had so far flown. Coupling with this the fact that 19 members now held the "C" certificate, 31 held the "B" and 52 the "A", London Gliding Club had every reason to feel proud of their progress during the first couple of years' existence. Incidentally, beginners were now progressing so rapidly that a temporary bar on accepting new members could be rescinded. No one liked having to turn away prospective subscriptions.

The 230-ft.-high ridge that yielded the lift for soaring flight runs almost north-south, the launching point being about a mile from its northern extremity, with a plain at the foot of the ridge and a plateau to the rear. It had the doubtful distinction of being the lowest gliding site in Britain. The disadvantage was that whereas the sailplanes of the Wasserkuppe were often able to lift off right away into the influence of cloud currents, Dunstable gliders had first to find suitable conditions in which to work their way up many hundreds of feet to reach the area of cloud lift. It took considerable exploration to decide there was 1,000 ft. of almost guaranteed lift to draw upon at this site. Such matters as cloud lift were generally left to the more advanced pilots, although Wolf Hirth generously allowed himself to be pumped of all his Wasserkuppe secrets when he visited an instructional course held at Christmas, 1932. His answers to the non-stop barrage of questions were to pave the way for extended flying and using the ridge merely as a spring board for more striking achievements.

These courses were probably the most successful way then devised of making some ready cash. They had the annual subscriptions to rely upon, of course, plus the odd £20 that came from selling life membership, but the economics of gliding classes were especially appealing because even if everyone on the course should go berserk and smash every glider in sight, there would still be a pound or two left in the kitty. Instruction was given at most holiday week-ends (£2 3s. 6d. for five days' accommodation, flying tuition and meals, or a guinea without meals), and in 1932 the club gave a lead by instituting the first



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fortnight's camp, open also to non-members, with fees of £1 10s. 0d. for two days and £4 for nine days, including temporary membership and accommodation under canvas. No one doubted their teaching qualifications, for in less than two years over 150 hours of soaring flight had been achieved, despite the fact that knowledge of the subject was still only scant and there were very few men able to stay up for a prolonged period. Until that time, in fact, no one had ventured far from the home ridge because ridge soaring was the limit of their capabilities. It wasn't lack of understanding of the principles of glider flight. There was much to be learned about the effect of clouds on soaring flight, for example, and even influences as basic today as thermal up-currents from greenhouses, chimneys and road junctions were wrapped up in mystery so far as these pioneers were concerned. Landings, too, presented their problems and more than one pilot finished up sprawled on top of a haystack, draped over a hedge or spreadeagled around the base of one of the poles supporting high-tension electricity cables. It was seldom a danger to health; indeed, the club's first fatality was in a motoring accident.

British Gliding Association chairman E. C. Gordon England, who had been a pre-World War I gliderman and once held the UK duration record of 58 seconds, writing in the association's journal, *The Sailplane and Glider*, attributed the secret of the success of the London Gliding Club to the fact that those who formed what he called the "energetic planning and working nucleus" of the club had been resourceful enough to find a way out of their problems. "This fact in itself," he wrote, "should be an inspiration and encouragement to others forming or running clubs in other parts of the country." It was a timely commentary on self-sufficiency, for only the previous month the same journal had drawn attention to the financial support that was forthcoming from governments on the Continent (a subsidy of about £22,600 for German gliding and a sum of about £8,000 to be spent in France), whereas the gliding movement here in Britain had been entirely self-supporting for the past two years,

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apart from Lord Wakefield's £1,000 donation and other smaller gifts.

At that time £1,000 would have bought one glider for every major club in the country, plus a few trailers and launching ropes. Although some of the German gliders were costing close on £100 in Britain, British-made craft were to be had for as little as £55 ex works. C. H. Latimer-Needham, club instructor at Dunstable for the first two years, flew an Albatross, which was said to be the first British-built and British-designed sailplane. Buxton had a Scud, designed by club member L. E. Baynes and built by a branch of the Farnham coachmakers, E. D. Abbott Ltd. An R.A.F. member of the club, Flying Officer E. Lucas Mole, had a Wren, designed and built by a former R.A.F. corporal-mechanic; it was reckoned to be so nimble that the turning capabilities would do credit to a London taxi-cab. One of the German imports, called the Professor, a high performance sailplane for its day, was challenging for the title of the most successful sailplane of that era; in one of them, Mole managed to stay in the air for more than six hours during a visit he made to the Southdown Club site. It was in a Professor, too, that Eric Collins, one of the club's most talented pioneer pilots, soared up to a record altitude of 1,750 ft. at Dunstable in the summer of 1933. To give proof of the height attained on this occasion the Professor carried a sealed barograph, which supplied official confirmation of the record, although Collins had in fact previously gone several hundred feet higher in another glider without such an instrument.

Slowly, Dunstable's gliding enthusiasts were gaining experience and their skills increased. It was becoming possible now to venture away from the friendly ridge and distances of 10 and even 20 miles were being attained by the more adept fliers, foremost among them being Collins and another former power-plane pilot, Philip Wills. They enjoyed a spirited duel for supremacy with first Collins and then Wills establishing fresh national records for height and distance. Collins had his turn in August 1933, with 1,750 ft. and 22 miles respectively; seven months later Wills overtook him on both counts with performances of

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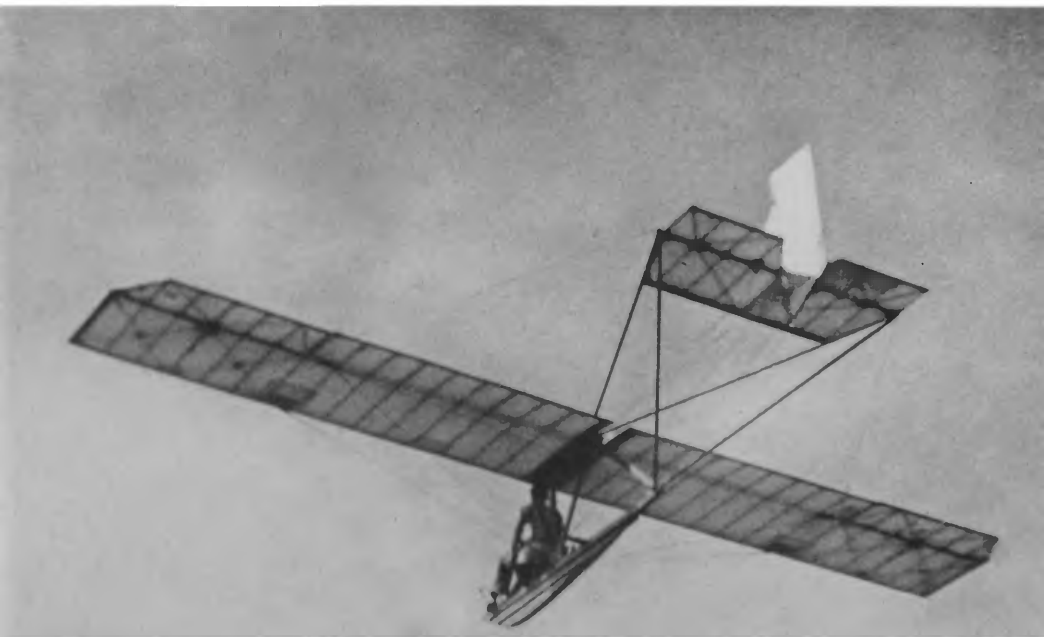
4,600 ft. and 55 miles. Collins' tragic death the following year at the age of 27, when his glider broke up in an inverted loop during a display watched by several thousand people at Upwood Aerodrome in Huntingdonshire, robbed Britain of a brilliant pilot. It was said at the inquest that the manoeuvre which was being executed would put a strain on any aircraft, although his glider was stated to have been built to include aerobatic as well as normal flight. The coroner described Collins as an exceptionally skilled young man, adding that no blame could be attached to anyone for the accident. The first Briton to gain the Silver "C" award for exceeding a distance of 50 kilometres, a height of 1,000 metres and five hours' duration, and the British distance record holder at the time of his death with a 98½-mile flight from Dunstable to Holkham Bay on the Norfolk coast, Collins had spared nothing to popularise the sport. He died, it appeared, a victim of his own enthusiasm.

The commencement of cross-country flying was one of the major events of 1933 but even this was eclipsed by the action of another flying member, C. Espin Hardwick, in a non-flying role. Faced with the prospect of having to give up the tenancy of their site, London Gliding Club found they had two guardian angels to smile upon them. To help them out of this difficulty, which threatened their very future, Hardwick bought the 117-acre site outright for £950, contracting to re-sell to the club at the same price whilst giving them 15 years to pay. The second guardian angel was Lord Wakefield, who donated the first £200 of the sum. There was also an unidentified Irishman who repeatedly walked into the clubhouse with five gold sovereigns, handed them over, yet refused to accept a receipt. All he would ever take was a place at the tea-table before strolling off. These were good men who did much to benefit the sport.

Short of money and unsuccessful in endeavours to get a government subsidy, Britain's gliding movement was being compelled to manage as best it could to keep functioning. Inevitably the weak fell by the wayside. The situation that had arisen was explained by the London Gliding Club President of



*Above, Slingsby Gull I over London Gliding Club site on Dunstable Downs;  
below, Dagling primary glider, which gave large numbers of pre-war sailplane  
pilots their first taste of the sport*





*Above*, Grunau Baby II sailplane, first produced in 1931 and still being made in Britain after the war, described as the most popular in the world; *below*, Philip Wills is launched in April 1938 at Dunstable in his new Minimoa, the first flight of the sailplane in which he was soon to establish a new British height record



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the day, A. G. Lamplugh, in a letter to *The Times* in April 1934:

“Now that British gliding appears to be firmly established, I would like through the medium of your columns to emphasise two points which I think are not generally known.

“After the first wave of enthusiasm had subsided the practical gliding movement in this country was carried on only by a relatively small number of clubs, the leading of these being the London Gliding Club, who accomplished splendid unaided work entirely by the individual efforts of the members. However, even these efforts would not have been productive without the timely help of that patron saint of British aviation, Lord Wakefield, and I have been asked by the committee to take this opportunity of paying tribute to the help he gave in a time of need.”

It was Lord Wakefield who had headed the gliding promotion fund four years earlier on the occasion of the foundation of the British Gliding Association. An Honorary Fellow of the Royal Aeronautical Society, Vice-President of the Royal Aero Club, President of the College of Aeronautical Engineering and life patron or vice-president of numerous flying clubs, Lord Wakefield had been associated with Sir Alan Cobham's flight to Australia and back in 1926 and the flight of survey round Africa in 1927-8.

What was London Gliding Club's current rating in the movement? The Aeronautical Correspondent of *The Times*, describing the club as “the real nursery of gliding and soaring flight in this country”, wrote of the spirit of self-help being a distinctive feature. He said it had become established at Dunstable without subsidy, improvising its own system for the repair and maintenance of the gliders, inventing some of its own essential instruments and providing the impulse that led to the establishing of the national gliding centre at Sutton Bank, Yorkshire, one of the finest sites in England for high-efficiency soaring flight.

By 1935, when at last the Government agreed to subsidise the gliding movement to the tune of up to £5,000 a year, London Gliding Club was 230 strong, the glider fleet had risen to ten and the need for new and larger buildings was becoming more

and more pressing. Sailplanes were being damaged through being crowded together in the existing accommodation, time was being wasted and further expansion of activities was being prevented. A scheme was drawn up for a new hangar to provide double the existing accommodation and incorporating a replacement clubhouse. Although some of the money came eventually from the government subsidy, London Gliding Club had already found sufficient financial backing with the help of a kindly bank and a hundred separate guarantors, among them a sailplane manufacturer and a brewery, each prepared to put up £500.

Each year saw marked increases in the size of the crowds flocking to the Downs at week-ends and on public holidays to sun themselves in the invigorating hilltop breezes and watch the gliding. The support was both flattering and embarrassing. Whilst the club appreciated public interest in their activities (the police had long since turned a blind eye to the encroaching crowds), the authority responsible for the upkeep of the downland was becoming more and more troubled by the number of motor vehicles that were pulling off the road to park and churning up the grassland in the vicinity of the club ground. It was feared that the beauty of the Downs would be irreparably spoiled unless action was taken to check this indiscriminate parking. Here, at Dunstable, there was the seed of a tremendous parking problem. The main trouble spot was a  $1\frac{1}{2}$ -mile tract of commonland, which became a vast car park whenever the weather seemed right for gliding. Absence of warning notices and an ignorance of the law aggravated the situation. According to a report presented to the Totternhoe Board of Conservators, very few drivers were aware there was any limit on the distance from the roadway they might park their cars. On one occasion an Automobile Association scout counted 293 motor-cars and 37 motor-cycles on a piece of land only 200 yds. square immediately above the launching site. It was a bigger attraction than a town fair. The Board of Conservators considered the time had come to set out proper parking areas. As their chairman pointed out: "We have no wish to interfere with people enjoying

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themselves but it is our duty to conserve the amenities of the Downs for the public.”

One piece of gliding history that the crowds didn't witness took place during the last week-end in March 1935, when a frustrating spell of bad weather kept everyone on the ground all day Saturday. There was no improvement until late in the evening just as members were winding up a clubhouse discussion before turning in for the night. Then the cloud cover began to break up and moonlight bathed the Downs. No one in Britain had ever been up in a glider any later than dusk because of the hazards of visibility. The moon now gave them a chance for the first night flight. While volunteers placed a string of hurricane lamps along the ridge, London architect Kit Nicholson\* prepared one of the gliders for flight and it was manhandled up the hill. At 1.50 am he was airborne, soaring in his Falcon several hundred feet up in the moonlight on a flight that was to last for nearly three quarters of an hour. The Falcon threw grotesque shadows across the Downs and he floated high above the site in splendid isolation. However, what was to have been a gentle joy-ride in the moonlight turned into drama when a large sheet of high cloud came up from the north-west and began to mask the moon. It grew darker and darker, and peering into the gloom, Nicholson strained to keep in view the flickering pin-pricks of light that were coming from the line of hurricane lamps spread out along the ridge. Guided by the lamps, he was able to bring down the Falcon smoothly on a makeshift flare path supplied by the headlights of a member's car. The first night flight in the country had ended—safely.

Of course, Nicholson's decision to fly that night was typical of the pioneering spirit prevailing within the club in those early years. That particular year, 1935, presented few enough chances for flying at Dunstable. Week-end after week-end the winds

\* Christopher Nicholson and another London Gliding Club member of this era, Donald Greig, were fatally injured in separate gliding accidents on the same day while representing Britain in the 1948 International Championships held at Samaden, near St Moritz, Switzerland.



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were unsuitable and activities had to be confined to ground work. Even flights of 41 and 35 miles ranked as prominent performances that summer. The wind was the star performer, rising in ferocity in mid-September to gale force and roaring across the Downs like a demon, crumpling the two original hangars and wrecking six of the Dunstable gliders in a single night. Fortunately the new buildings were almost ready. It was fortunate, too, that the members were such a handy bunch and capable of patching up even the most fearsome-looking wreckage.

To make lighter work of hauling the gliders up the hill to the launching point, London club members mechanised operations by rigging up first a car and a pulley and a quarter-mile length of rope, and later settling for an endless rope system. Four methods of launching were tried out on the site. First there was the hand-launching system with elastic shock-absorber rope as demonstrated on the Wasserkuppe in the 1920s. It was simple, safe and effective. Then Lowe-Wylde tried out a Bentley car to haul a glider up into the sky in the manner of a boy running along with his kite. This wasn't particularly successful because the ground was too rough for the car to gather speed with the desired smoothness. The next evolution was aero-towing with an Avro 504K biplane taking off from the site and trailing a glider on its tail instead of the more customary advertising banner that used to be unfurled to proclaim the virtues of a particular beverage. Initially these aero-tows for club members took place from a private airfield at Fenny Stratford but were made later from the club's own ground. The sturdy little Avro was able to haul the glider up to 2,000 ft. to allow it to be freed into the rising air and then return within five minutes having used a single gallon of petrol. These methods enabled gliding to take place even when the wind was coming from a direction other than the prevailing westerly sector. However, launching by motor-operated winch proved to be the most consistently successful in that it saved the trouble of hauling gliders up the hill on west-wind days and it was the only way on other days, apart from aeroplane towing, to give high launches. The winch was another home-made effort.

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An ancient American car was jacked up and the differential filled with molten lead to prevent it from working. A drum was fitted to one of the wheels, carrying the length of launching wire, which was fed through a pair of reels mounted on the front bumper. The problem was that the glider was swept off the ground so rapidly that only the experts were privileged with the luxury of a winch-launch in those days.

One guinea secured entry to the club and then there was a three-guinea annual subscription. Flying charges were as low as three shillings per person for up to 20 minutes in the air; if you exceeded 20 minutes the charge was assessed on the duration and the type of glider used for the flight. Whilst the degree of competence, the number of members and weather conditions were obviously factors of some relevance upon the extent of club performances, a fair indication of the progress being made at Dunstable is given by the fact that in 1936 a total of almost 125 hours' soaring flight was being achieved in a single month, whereas in the initial stages members were hard-pressed to achieve this figure in an entire year. Another contributing factor was the decision to appoint the first full-time instructor-manager, ex-R.A.F. flier Tim Hervey, in May 1936, for this not only widened the scope of training facilities but enabled mid-week flying to take place if members were fortunate enough to be able to spare the time.

The club site on the chalk downs of Dunstable faced the direction of the prevailing wind, of course, and conditions were impossible for sustained flight from an elastic-rope launch if the wind was not blowing up the hill. It was for this reason that the alternative launching methods were devised to secure some measure of independence over the whims of the wind. Even so there was the occasional surprise, like the inexplicable volcanoes that sometimes bubbled up in the air beneath a glider to force it up and up and up. They defied attempts to plot their location with any certainty although the ground pattern did not appear to have much bearing upon them. More perplexing at the time, although more easily understood as knowledge widened later on,

there was the day in January 1937 that Dudley Hiscox encountered potential lift when the wind was coming not from the customary west but right around from the south-east. He was pottering about in a two-seater, joy-riding with a passenger, when he noticed that the glider was not sinking as much as he would normally have expected. Intrigued by the phenomenon, Hiscox landed and transferred to his own craft, a single-seater of much improved efficiency, and in this he managed to get up as high as 2,250 ft. Hopefully, several other pilots scrambled for their gliders and they, too, found they were able to rise rapidly to heights of something like 1,500 ft. Smiles all round. A day of uncertainty thus turned into one of excitement. Probably the knots of people who watched on that winter's day were quite oblivious to such technicalities as wind influences; in fact, the pilots themselves were not too sure what was happening. The spectators may even have felt a little cheated at the sight of such a relatively small cluster of gliders wheeling above the Downs. Nevertheless, with as many as four gliders at 1,200 ft. at one time, in a wind that came from an alien direction, history was again being made at the Dunstable site. What was occurring was an early illustration of "wave effect", the wind striking the hills from the south-east and bouncing along to give parallel areas of stationary lift where, in those days, it was not expected.

The beauty of Dunstable is that it has always offered plenty of level ground to land without fear of bending your glider. It was a pleasant spot, readily accessible, full of lively lift off the ridge, with room enough for the most timid individual to set down his glider. True, the open acres of Whipnade Zoo at the southern end were perhaps a shade alarming, but you had to run right out of luck to find yourself heading on a collision course with an elephant. Lone animals anywhere are usually harmless because you merely shoo them off with an overhead pass that sends them scampering clear of your intended landing ground. If this doesn't budge the beast it's a fair assumption he has been tethered to that one spot and no number of low-level passes will have the slightest effect. However, one member of the club who dropped

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unexpectedly into the Whipsnade pony paddock one gusty Sunday afternoon was quickly surrounded by curious Shetland ponies with a taste for sailplane tailplane. A goat, seemingly a rejected regimental mascot, proved a more serious threat when he trotted on to the scene. The intrepid gliderwoman grabbed him by the horns and steered him firmly out of harm's way. Fortunately, fellow members of the club were already heading for the paddock on a rescue operation, having watched her plight when a capricious down-current thwarted her bid to reach the safety of the club ground, and they drove up hurriedly with a retrieving trailer. The glider, drenched in animal saliva although saved from the goat's ravaging horns, survived to make many more less troublesome landings. Yes, there was drama in the ups-and-downs life of pre-war Dunstable.

At the height of the 1937 gliding season, Dunstable perhaps became too popular. Membership topped the 350 mark, and the total of launches and ground hops that year exceeded 11,000. Soaring flight alone accounted for close on 1,200 hours in the air—more than half as much again as in the previous year. The sky over Dunstable was crowding, and beginners, especially, needed the maximum space for their cautious manoeuvres. It was suggested that the club might even have reached its limit and that a subsidiary site was now fast becoming necessary. It was purely a problem of too many gliders in too little air-space and this was bound to have the greatest effect on newcomers to the sport once they had overtaken the ground-hopping phase of their training. Inexperience compelled them to hug the ridge like "L" drivers pursuing a sedate course down the middle of the road. The more proficient pilots, on the other hand, who were often able to find lift-producing thermals to get them away, normally had the sky to themselves when once clear of the Downs. On one occasion in August, 1937, for instance, when members of an Anglo-German camp helped to launch Philip Wills, he soared far enough to catch a glimpse of the French coast. He had made first for London (earning the distinction of being the first glider pilot to cross the capital) and then carried

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on over Tilbury, Gravesend, Rochester and Ashford. At Lympe he considered he had the necessary height to glide across the Channel but for the sake of caution he decided to head first for Dover in anticipation of finding cloud that would lift him to a greater altitude and give him a better safety margin before nosing out to sea. The lift failed to materialise, and with the English Channel gleaming tantalisingly beneath him, Wills had to come down at Dover. The Channel had yet to be conquered in a glider.

Germany's fabulous Wolf Hirth was again at Dunstable on this particular course. He flew a Klemm aircraft on the 560-mile journey from a gliding school near Stuttgart with Fräulein Eva Schmidt, who at 21 held the women's world gliding duration record of 23 hours, flying a glider under tow. The trip was spread over two days although the actual flying time was not much more than  $9\frac{1}{2}$  hours. It was a strange reversal of the situation of the 1920s, for here were the Germans, who had started it all, coming over to Britain to see what could be learned from the glider folk of Dunstable. As *The Aeroplane* expressed it: "Although British gliding is scantily enough subsidised by the Government (in strong contrast to some other countries) it has won a respected position for itself."

The first step to ease the Dunstable congestion came at Whitsun, 1938, with the opening of a branch south of London at Colley Hill near Reigate, which got off to a promising start by providing 45 hours of soaring flight in the first week-end, cross-country flying including one journey of more than 75 miles. Soaring here was possible with winds from the south-east round to the south-west and this gave members a chance to ring the changes with Dunstable. On the opening week-end of the subsidiary site, Dunstable itself was not without some noteworthy flying, for the accomplished Philip Wills had gone up in his new German Minimoa sailplane, with its distinctive, swept-back mid-wings, and exceeded 10,000 ft. in a storm-cloud over Leighton Buzzard. It was a new height record for Britain. However, even in those early days, Wills' prowess was such that the faintest hint of wind, perhaps enough only to tease a sad and

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drooping flag, appeared ample to start him off on a cross-country journey, while his fellow members jammed the clubhouse bar launching pints down gossip-parched throats.

The biggest event of the British gliding year was always the national championships, which brought fresh problems owing to the congested locality when Dunstable was chosen as the venue for 1938. Entries were restricted to thirty and aerotowing was instituted for the first time at such contests. Aerotowing gave pilots a greatly improved chance of locating lift to get them on their way by first taking them under tow to an area where reasonable up-currents were expected to be easily attainable, and then leaving them to their own devices when once cast off from the tug-plane. Significantly, perhaps, the total of 2,342 miles flown by competitors in cross-country flights during those contests constituted a new record. It is even possible that there was a record crowd, too, but there was no means of keeping an accurate tally on spectators or of imposing any charge on them. A sore point, this, in gliding circles, for here was an untapped financial source of considerable size, which would have eased the burden on the contest organisers and the movement in general. Ironically, there was a £205 loss on the contest expenses that particular year, whereas a single penny from every adult in the crowd would have turned loss into profit.

But what of the Channel glider bid? Although pilots in those contests had been given documents in three languages in anticipation of someone getting to the other side, and a special prize was being offered for anyone who succeeded, weather conditions were against such a journey. It was a London Gliding Club member, G. H. Stephenson, who eventually achieved this feat, on Saturday, 22 April 1939, and made up for the disappointment that had been felt when Philip Wills was let down by the Dover clouds in August 1937. Launched by winch at Dunstable, Stephenson had originally planned to be at a party that night to celebrate the engagement of the Surrey Gliding Club's secretary. Instead, guests learned during the evening that he had crossed the French coast and brought down his Kirby Gull at a point some

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nine or ten miles east of Boulogne. The following day, the girl in whose honour the party was being held took a car and trailer across on the ferry, accompanied by another club member, to retrieve Stephenson and his stranded glider.

The overtures of war were soon to be heard reverberating across that same stretch of sea. At Dunstable, though, the gliding season had opened unusually early with warm weather and favourable soaring conditions even in February, so that chief instructor Tim Hervey was looking forward to what now promised to be the greatest year in the history of the club. Unfortunately, Easter brought poor conditions suitable only for short training hops, and Whitsun wasn't much better. It was an anxious summer, with siren tests, black-out drill and mock air-raids. Volunteer firemen tackled practice incendiary bombs in the streets and first-aid teams in gas-masks treated dummy casualties. Up on the Downs the first week-end car parks had been established so as to bring at last that necessary measure of control among the gliding centre spectators, drawing in the sum of £136 16s. 4d. net in charges that summer, the bulk of the money to be set aside for upkeep of the downland.

Yet peace was fast running out in the land. The lads of the Air Defence Cadet Corps who had been introduced to flying in special two-week gliding courses at Dunstable and other centres that summer would soon be pilots in their own right, flying fighters and bombers with the R.A.F. The club's big hangar was turned over to become a massive vehicle store, the site was let as grazing land for cattle and what little gliding did take place was limited to a 50-ft. ceiling that fateful September. Nine years earlier, in the summer of 1930, a flight to that altitude would have been acclaimed a triumphant achievement. Now it all seemed rather pathetic for the "brave men of the Flying Age" and those sporting gliders of Dunstable Downs.

## 1939–1943

The drab gliders that came silently down from out of the skies over the Continent of Europe in the early summer of 1940 were indulging in the sport of war. Tiny sailplanes would take a back seat in aviation for a few years while the industry concerned itself with military matters. Soaring performances would have little consequence now; the gliders merely had to be big enough and strong enough to carry armed troops into battle.

Circumstances made Germany the first nation to call upon the glider as an instrument of war, and trains of them, towed by powered aircraft, air-lifted their invasion forces into the Low Countries. Implementing the work of the paratroops, these airborne soldiers travelled right to the scene of attack in their gliders. The glider was thus appearing in its first war-time role as a troop-carrier. The invasion of Crete a year later saw wider use still in the seizure of important positions by glider-borne units. A vehicle for peaceful sport was now established as an insidious weapon of attack.

Even in war, the glider was mercifully destined to fulfil purposes less bloody than the waging of all-out war. While British and American airborne forces prepared to launch the invasion of Sicily in the summer of 1943, which would be the Allies' first experience of gliders in an attacking role, gliders several thousand miles away from the Mediterranean theatre of war were getting ready to mount a major operation of a very different sort . . .



## VOO-DOO OVER THE ATLANTIC

THE POPULAR CONCEPTION of voodoo centres around the practising of black magic, the casting of mysterious spells and strange acts of sorcery. However, in naming his Waco CG-4A glider *Voo-Doo*, Squadron Leader Richard Seys had no intention of prevailing upon any mystic powers to guide him in the accomplishment of his own special mission. If he were not to succeed in his aim, and this was to be a flight no one had ever before attempted, he would do so with material help from an international team of aircrew and ground staff and not the spiritual guidance of some black-skinned witch-doctor.

It was for him the culmination of ten years' flying and six months' training, this specialised training having been undertaken while the North American continent shivered in the grip of the worst winter for close on fifty years. Yet, when those first exploratory flights commenced at bases in Britain, Canada and America, not even he had any idea of the dramatic twist that was now to make him an aviation pioneer embarking on an historic journey. Sitting there in *Voo-Doo's* cockpit, poised for take-off on Runway 28 at Dorval Airport, Montreal, Canada, on 23 June 1943, while the hands of the Transatlantic Control Operations Room clock edged up towards 16.25 hours GMT, Seys' mind flashed back momentarily to those not-so-distant days when there was almost 10 ft. of snow on the base and the snow-ploughs were out incessantly in 50° of frost to try and keep the runways clear for the planes. It was green and lush now, with Lake St Louis shimmering in the sunshine, and the association of placid greenery and cool water set him thinking of the river near his home at Chertsey, Surrey. Soon he might see the swans gliding majestically past on the Thames, hardly rippling the

surface of the water, for his mission was to bridge that 3,200-mile transatlantic gap—by glider!

*Voo-Doo*, laden as heavily as was dared with supplies vital to the allied war effort, would be strung out behind a twin-engined Dakota aircraft, also carrying supplies, so forming an ambitious transatlantic aerial freight train. It was an extension of a scheme devised by Air Chief Marshal Sir Frederick Bowhill, who was in charge of the North and South Atlantic bomber ferry organisation operating from Dorval Airport. Situated some ten miles from Montreal city and adjoining the clusters of French-Canadian villages fringing Lake St Louis, Dorval had become the bustling despatch point for a non-stop stream of American- and Canadian-built bombers winging their way to the European and Mediterranean theatres of war. The big Fortresses and Liberators, the smaller Hudsons, Bostons, Mitchells, Baltimores, Venturas and Dakotas were making the one-way journey from Dorval to the operational bases in stages, flown either by civilians or resting Coastal and Bomber boys, or else by crews straight out of the training units in Canada. It was by way of these well-worn stepping-stones that Seys' train was routed.

The glider was a type designed by the Waco Aircraft Company of Troy, Ohio, and built by a piano manufacturer in New York. It was made with a tubular steel framework covered by a fabric skin. With an externally-braced, high-positioned mainplane spanning 84 ft., she was the biggest cargo- and troop-carrying glider in service with the American forces, although smaller than some in use in Britain. Normally used for air-lifting as many as fifteen fully equipped soldiers at a time, or even a jeep and equipment, or a small piece of artillery, she had a sturdy floor of heavy wood in honeycomb construction to support the freight-load and withstand the shocks inevitable in the event of a rough landing. The nose was hinged, immediately aft of the cockpit windows, lifting upwards to receive or discharge the cargo. The CG-4As used by the R.A.F. went under the name of Hadrian.

The Dakota, specially fitted out with an extra fuel supply for the long transoceanic haul, had no nickname to be painted proudly

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on the side of the fuselage; this Dak, a type already proven as a trooper-transport (she could carry a two-ton load), and the military adaptation of the widely popular DC-3 airliner, simply bore her American registration number FD900. A low-wing monoplane, known as the C-47 Skytrain in the States, she was powered with engines of 2,400 hp, which normally enabled her to cruise at about 190 mph. Towing would reduce this performance by up to 20 per cent—and then some! It would also have a significant effect upon the cruising ceiling, reducing it to about 13,000 ft.

Eighty pounds worth of white nylon tow-rope as thick as a man's thumb and 340 ft. in length linked glider and tug. It lay between them now on the runway at Dorval. The nylon possessed sufficient resilience to cushion the shock of the cable jerking tight; the steel attachments at each end were designed to withstand a 20,000-lb. pull. On that slender line would hang the fate of Seys' mission—and, perhaps, his own life and that of the man at his side, Squadron Leader Fowler Gobeil of the Royal Canadian Air Force, co-pilot of *Voo-Doo*.

Flying in the face of danger was no new experience for these men, since both had had their share of operational service. Seys, 31 years old and ten years in the R.A.F., had won a D.F.C. flying Fairey Gordon biplanes in Palestine and had specialised in photographic reconnaissance work and flown Beaufighters with a night fighter squadron in Britain before going to Canada. Gobeil, a native of Ottawa and a member of the R.C.A.F. since 1920, formed the first all-Canadian fighter squadron in the R.A.F. soon after the outbreak of war, eventually turning over command to legless ace Douglas Bader in the summer of 1940. Before joining the Atlantic ferry organisation he had been an instructor at a bombing and gunnery school in Ontario. He was “flying a desk” at headquarters, and the glider mission now about to start would be his first taste of crossing the Atlantic by air.

There was nothing novel in having a glider tagging along in the wake of a powered plane; after all, it had long been an established launching method among the world's gliding enthusiasts in

pre-war days, and attack troops had been transported in this manner to their objectives on several war fronts. What was being contemplated now was no short hop but a series of gruelling journeys made under largely unpredictable weather conditions with  $1\frac{1}{2}$  tons of freight in bulky packing-cases lashed down inside the fuselage.

Seys had been brought in by Sir Frederick Bowhill to form a small unit at Dorval to investigate the possibilities of transporting urgent supplies by glider. In Canada alone there were many outposts where surface delivery was impossible throughout the winter. A plane might drop small packages by parachute but this was not practicable for bulky or fragile supplies. The current hover-planes were so tiny as to preclude freight-handling and, in any event, they had an extremely limited range. The towed glider, therefore, presented a means of conveying relatively heavy loads, as well as bulky or precious supplies, for many hundreds of miles without a stop; delivery would be effected by simply releasing the glider from the tug plane so that the glider became a free agent capable of being set down safely in restricted spaces. The idea appealed to Richard Seys, although he had not previously done any gliding, and he was sent back to Britain to receive initial training in glider flying at Brize Norton, Oxfordshire. In a series of flights, mostly of the circuits-and-bumps variety and none lasting longer than an hour or so, Seys learned the rudiments of the art of gliding—take-off, launching and landing procedures, handling while under tow and in free flight, and so on, until he felt he was ready to return to Canada to begin the real work for tug-and-glider freighting. Back in Canada, Seys liaised with the Americans, who were also involved in similar towing projects, while awaiting the arrival of his Waco gliders with which to begin his own training programme.

In one sense glider-towing is like water ski-ing: there's no point in having a pair of skis without the use of an adequate tow-boat, and it isn't much good possessing a glider without a competent tug. Seys was able to call upon a number of aircraft but none was designed specifically for hauling gliders around the



*Above, Voo-Doo lands at Prestwick, Scotland, on completion of her 3,200-mile flight from Montreal, Canada; right, Squadron Leader Seys (left), pilot of Voo-Doo, and Squadron Leader Gobeil, co-pilot, examine the tow-rope; below, Flight Lieutenants Longhurst (left) and Thomson, pilot and co-pilot of the Dakota tug*





*Top*, a Tetrarch tank enters one of the Hamilcars in preparation for the invasion of Normandy; *middle*, Tarrant Rushton on the evening of D-Day. Most of the gliders on the runway are Hamilcars; *bottom*, a Handley Page Halifax towing a Hamilcar transport glider during a training exercise

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sky and, just as using a saloon car to pull a furniture van will wear out the clutch, the choice of an unsuitable aircraft must play havoc with its engines. The Americans tried various planes, among them the Liberator, Fortress, Boston, Mitchell, Lightning, Ventura and Dakota; Seys tried only the Ventura and the Dakota.

The Ventura was not the ideal tug and *Hoo-Doo*, which was the singularly apt name for *Voo-Doo*'s twin, was not the best behaved among gliders. The two of them together on an early training flight during the winter gave Seys his first real trouble and served to indicate what a dicey business it was to mess around with gliders dangling behind powered aircraft. There were a couple of relatively inexperienced Canadian pilots in the tug on this occasion and one of the Ventura's engines began to overheat, and then seized up completely. Seys, who knew that the plane had no hope of remaining airborne on one engine with the glider still in tow, pulled the quick-release mechanism and parted company with the crippled Ventura. He brought the glider down successfully on a snowdrift 60 miles from Montreal, slithering along on the frozen surface. Seys and his co-pilot found shelter in a nearby French-Canadian homestead, where they were marooned for two days while waiting for help to arrive to de-rig *Hoo-Doo* and tow her back to base—behind a tractor and truck along frozen roads piled high with snow. The Ventura survived on one engine but the presence of the tow-rope, still streaming out behind the twin-tail, cut short phone conversations for miles around Montreal by severing the overhead telephone wires on the run-in to Dorval Airport. Later, when the pilot was asked why he hadn't dropped the rope, he apparently replied that he had been too busy.

The short, circuit-and-bump flying gave way to longer and more adventurous journeys. The glider was now being filled with supplies for ferrying between the various air bases in Canada. The effect upon handling of tug and glider was carefully checked as the freight loads were increased by degrees, and fuel consumption of the tug was studied. It was a ritual of flying training and assessment, more flying and further assessment, to see what

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the prospects were of transporting supplies by airborne trailer.

On to the scene during the training programme came a Dakota for towing duties and two new tug pilots, Flight Lieutenant William S. Longhurst and Flight Lieutenant C. W. H. Thomson who, like Seys and Gobeil, had seen operational service in Britain before the posting to Montreal. Longhurst, a Canadian whose home was in Toronto, and Thomson, a New Zealander, formerly flew with Coastal Command on anti-U-boat strike missions from the same airfield in Northern Ireland. The glider towing business seemed to represent an interesting change from instructing and ferrying Liberators and the like across to Britain, West Africa and the Mediterranean war-zone, so the two men had volunteered their services. They were part of an instruction team in the training wing of the ferry organisation and, flying regularly from Dorval, both were aware of the glider flights although the specific purpose was not general knowledge outside Seys' section.

Happily, the arrival of Longhurst and Thomson coincided with a turn in the fortunes of the glidermen. As the long, hard winter gave way to spring, Seys and his team evolved fresh projects, one of them the transportation of Service freight over a triangular course via Gander (Newfoundland) and Goose Bay (Labrador), which were bases regularly used by aircraft on the North Atlantic ferry *en route* for Britain. The final leg of this 2,000-mile epic flight was the 820 miles between Goose Bay and Dorval, and a new record for a glider fully laden with freight was established by beating the record of an American crew by 150 miles. A week later Seys' team was off on another endurance flight and the first leg, Dorval to Atlanta over-flying Detroit and Cincinnati, involved approximately  $8\frac{1}{4}$  hours in the air without a stop, covering 1,177 miles at an average ground speed of slightly under 150 mph. From Atlanta, Longhurst and Thomson towed Seys to the newly opened South Atlantic ferry base at Nassau in the Bahamas, again with a gliderful of supplies required at their destination. Seys and the engineering staff concerned in the



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project were assembling a wealth of information indicating the feasibility of a glider-borne freight service, provided that weather conditions were suitable.

These long-distance, experimental flights were carried out in association with the freight sections of the various airfields within the transatlantic ferry organisation. However, whilst there were assorted stores that could be air-lifted from Dorval down the American Eastern Seaboard to Nassau, there was nothing to be moved back to Dorval. A ballast-load of coral rocks was, therefore, put on board the glider so that the flight might continue to provide information relevant to the operational performances of glider and tug. All was well on the first stage, Nassau-Richmond, and again on the second stage, Richmond-Washington, but a cold front north of New York on the last leg brought unexpected problems. Seys fought to control the glider under the storm conditions, bucking up and down like a hooked fish, while Longhurst in the Dakota tug had to check the antics of his own aircraft and at the same time try to anticipate the roller-coaster movements of the craft dragging on his tail. An ominous crashing noise aft in the glider fuselage warned Seys that his cargo was no longer secure, and a downward current sent the glider skidding unpleasantly to port and lurching on the tow-rope. Another jerk caused some of the stacked boxes of ballast to break free, and lumps of jagged rock shot forward. A crew member was cracked on the head and thrown on the floor; pieces of rock burst through the fabric-covered fuselage like a fist through paper, and Seys ducked for his life as a fresh fusillade bombarded the cockpit. Faced with the prospects of the entire load tearing loose, coupled with the fact that it was impossible to climb above the turbulent frontal cloud, Seys and the tug pilots had no alternative but to make an unscheduled landing. They made contact with the civil airport at Newark, just across the river from New York, and put down for the night. It was the only time that Seys had failed to reach his destination, apart from the snow-ditching episode. Exhausted with the sheer strain of flying his glider in such appalling conditions, and tense with the

realisation that minutes later the rocks might have been avalanching through his fragile craft, he hurried off to rest. It is hardly necessary to mention that the glider was *Hoo-Doo* again.

The series of experimental flights over the North American continent was now all but finished, and a less determined person than Richard Seys might have decided that it was time to call a halt. The project had already run sufficiently long to yield all the worth-while data that was within the scope of their original briefing. The glider had been loaded to capacity and towed vast distances through fair weather and foul but even so Seys was still not fully satisfied with these achievements. He wanted to end on a real note of triumph—and it was here that an unexpected twist to the glider project was to come.

Seys outlined a daring and imaginative scheme. He proposed to fly the Atlantic in his glider, carrying freight, and hauled by the Dakota as on the previous trips. He saw his chief, who wanted to know why Seys was suggesting this strange mission. The gliderman was ready with his answer: "Well, Sir, no one has ever done it." There was a hint of a grin on his face as he spoke, but he saw at once that this wasn't the right answer.

The R.A.F. was reluctant to sanction this bravado, and also costly, scheme unless there was a very good reason. Seys was advised to have second thoughts, and his chief was left to contemplate the consequences if he were to agree. It would take time that might be better spent; it would require aircraft that were sorely required for more pressing duties; it would probably fail, anyway, and this could mean a waste of useful lives and valuable freight.

Now Seys pulled his final card and declared: "Well, Sir, if the R.A.F. doesn't do it first, then the Americans are likely to have a crack at it."

The reaction was immediate. Allies in the war effort and buddies, for sure, Britain still had her national pride and this was as valid a reason as any for harmlessly stealing a march over the Americans. Down the chain of command Seys received his go-ahead.

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To make the journey, Seys planned to utilise the existing transatlantic stepping-stones of Labrador, Greenland and Iceland, the longest hop being the final leg down from Iceland to Britain, but even this was considerably less than the team had covered without a stop during the earlier training. There was always the prospect, however, that bad weather might prevent them landing at one of the three scheduled stops. The safest plan was to carry sufficient fuel to over-fly one scheduled stop and combine two hops into a single journey; to do so would mean carrying considerable reserves of fuel, with consequent increase in weight to make handling the aircraft even more hazardous.

A further problem was that if it should become necessary to jettison some of the emergency fuel, either to gain height or prepare for landing, petrol sprayed out behind in the normal manner might become ignited by static electricity and set the glider ablaze. To prevent this from happening, Seys had the Dakota equipped with a miniature railway track running through the fuselage so that the extra petrol, carried in 100-gallon cans and hand-pumped into the main tanks when required, could be slid to the doorway in the containers and dumped overboard in seconds without risk.

The considerable extra load threatened the mission at the commencement that 23rd day of June 1943, because the Dakota's all-up weight was now 32,000 lbs. instead of the maximum permitted 29,500 lbs.—and she still had the glider tagging along, carrying the equivalent weight of a baby elephant.

It seemed as if the Dak was never going to stagger off the ground as it ate up runway at an alarming rate. In the right-hand seat of the Dak's cockpit, co-pilot Tommy Thomson had one hand on the tow-rope quick-release lever, conveniently placed on the bulkhead at his side, and the other hand forcing the throttles wide open as his captain nursed the plane down the runway. At the first hint of trouble with the aircraft, Thomson would smartly operate that lever and the nylon rope linking glider and tug would drop free of the fuselage housing. Apart from the modifications for extra fuel, Dakota FD900 (and,

indeed, earlier Daks that Seys' team had used) was basically the same as the rest of that type being ferried regularly to Britain for transport duties, and the towing equipment was a standard fitting.

Take-off always held inherent dangers, mainly because of the relative wing-loadings, discounting power or controls failure. The glider, having a lower wing-loading than the tug, always became airborne while the Dak was still on the ground, so that if Seys should allow *Voo-Doo* to rise too steeply the Dak's tail would be pulled up prematurely and there was the likelihood of a crash. A knot of R.A.F. and R.C.A.F. personnel, off-duty W.A.A.F.s and civilian ferry aircrew watched with fascination as the morning sunshine glinted on the cockpits of the slowly-moving aircraft. The same scene had been enacted many times before but there was special point to this take-off. At 250 yds., Seys gently lifted the glider away from the runway while his eyes noted every fractional movement of the Dak gathering speed ahead of him. At between 1,000 and 1,200 yds., Longhurst should have coaxed the Dak off the runway, too, but the extra weight made the plane too cumbersome for a normal lift-off. Struggling now, Longhurst drew on more power from his racing engines. Sensing the problem, Seys dipped *Voo-Doo's* nose and the tow-rope slackened to ease the burden on the labouring tug-plane. At 1,750 yds., with the trees at the end of the runway coming perilously close, Longhurst felt the strain easing and he pulled back on the stick. Undercarriage—UP! Passing over the airfield, Seys glanced down and picked out the spectators; as the freight train began a weary climb there must have been many who thought the two craft would never make it under the tremendous load. The first-ever bid to haul a glider across the Atlantic was now on.

Soon fading away in the distance were the imposing white skyscrapers of Montreal, the mile-long Victoria Jubilee Bridge, the internationally famed shrine of St Joseph's Oratory, known rather irreverently as "Joe's Place" among the ferry fliers, and finally Mont Royale itself, from which the city took its name.

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The patchwork fields bordering the St Lawrence drifted below as Longhurst set a course to the north-east, roughly following the path of the river, and maintaining a laboriously slow climb on heading towards the Goose Bay air base. This first leg of the long journey was the ferry organisation's 820-mile milk run, a route well known to the crew of the Dakota, because there was a regular service of freight and passengers, food and newspapers, between Dorval and this huge £5,000,000 feeder airport close to the outlet of Goose River at the head of the Hamilton Inlet in Labrador. Bulldozed out of a plateau once thick with spruce trees, Goose was one of the biggest and loneliest of the strategic air bases. There was a triangle of runways, splendidly constructed in concrete and asphalt and each one well over a mile long. It was always a hive of activity, for 100 planes and more a day were passing through Goose on the transatlantic crossing at this time.

Also aboard the Dakota were Pilot Officer R. H. Wormington (flight engineer) and H. G. Wightman (radio officer), with Wing Commander H. Furner, deputy flight engineer at Dorval, who had arranged the structural modifications to tug and glider. Everyone was conscious of the lethargic climb to cruising height but at least their progress was smooth. After three hours, though, banks of cloud began to pile up above the rugged outback of Quebec Province. They were not yet at the halfway point and an attempt to climb above the cloud mass to reach clear skies was proving unsuccessful. 9,000 ft. 10,000 ft. It was a grim battle for height. 11,000 ft. 12,000 ft. At 13,000 ft. the cloud still towered above the aerial freight train. The glider had no oxygen and Gobeil, struggling through the 2-ft. space between the top of the packing-cases and the roof to fetch his captain some more warm clothing from a compartment at the rear of the fuselage, found himself puffing like a grampus. There wasn't any heating system, either, but putting on extra clothing, or taking it off, became necessary according to the prevailing conditions; even when the air temperature was below zero the glidermen would be roasting, because the cockpit intensified the sun's heat like a glasshouse, but they would be shivering as soon as they passed

under cloud. Thunderstorms buffeted glider and tug, and ice forming on the wings, fuselage and tail unit to an extent not encountered during the experimental flights, added to their difficulties. There was no way of breaking through the cloud-trap; they must either drop down or become so heavy with ice as to be virtually uncontrollable. For almost the whole of the remainder of the first stage, Dorval-Goose, *Voo-Doo* and the Dak were in the grip of successive storm belts that forced them down to 1,500 ft. above ground level as Quebec gave way to Labrador. Tommy Thomson at the navigator's table aboard the Dak kept a wary eye on the charts for fear of a variation in course taking them too near the mountainous terrain on either side of the route into Goose.

Flying a glider under tow permits no relaxation even in normal conditions. There is no automatic pilot, such as the crews of powered planes can often use for straight and level flying on a fixed heading to relieve the monotony. Before entering cloud, Seys and Gobeil, who were alternating at the controls, kept their gaze fixed on the Dakota and maintained the set flying position in relation to it, normally about 20 ft. above the level of the tug, for this station caused them the minimum interference. If *Voo-Doo* was permitted to fall too low, however, the tug's tail would be pulled down and the plane would stall in too steep a climb. Hemmed in now by cloud, though, Seys had long since lost sight of the Dak and he had to concentrate upon the position of the nylon rope, knowing that if his eyes wandered for a second both craft might hurtle out of control. There were no instruments to help him keep position relative to the tug. Apart from intermittent glimpses of the Dak, he had to rely for judgement upon the angle at which the tow-rope was dangling, and was almost hypnotised by the constant surveillance of that slender, gently curving rope.

In preparation for the Atlantic crossing, Seys had fitted *Voo-Doo* with an airliner-type seat with a head-rest and this meant that his head remained in the same position during flight. Utilising this fact, he rigged up an ingenious yet simple contraption that

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would help him to assess the position of the tug. He tied a strip of coloured rag securely around the tow-rope, 15 ft. from where the attachment for the rope coupling was fixed to the cockpit roof, and then, during a practice flight, made two marks with lipstick on the windscreen. The level of his eyes was static, on account of his fixed seat, so all that was necessary to keep his current flying position relative to the Dakota was to be sure that the cloth on the dipped rope remained between the marks directly ahead.

Four hours was a reasonable time for planes on the Dorval-Goose milk run; *Voo-Doo*, under tow, struggled through atrocious weather for close on seven hours to complete stage one of the transatlantic glider marathon. Turning gently over the Kenamu River, which flowed into the southern waters of the Hamilton Inlet on the Atlantic coast of Labrador, tug and glider parted company on the final approach. Seys brought his craft coasting in for a smooth landing in a manner reminiscent of those earlier flying days when, in light planes, the power would be switched off and you made a glide approach on to the airfield. Seeing the glider safely down, Longhurst made a low pass alongside the runway to drop the tow-rope before making his own landing. There were congratulations from base personnel and a guard was placed over *Voo-Doo* and her valuable cargo—serum for Russia, radar spares, and a bunch of bananas, scarce at that time, for Seys' parents.

Now bedded down at Goose Bay, the fliers had to wait until the fourth day, 27 June, until the weather improved sufficiently for them to undertake stage two, which was to be their first run over the North Atlantic—almost as long as the first leg of the journey but this time almost entirely over water. Even in early summer the Atlantic Ocean was still extremely cold; the survival time was reckoned to be no more than about 20 minutes. They had “dropped in” at some homely spots on their travels around the North American continent but no one relished the idea of dropping into the Atlantic.

The next stepping-stone was to be one of the air bases set up

by the Americans in the South-west region of Greenland when, a year after the Germans marched into Denmark, an agreement was signed making the Danish Kingdom a temporary protectorate of the United States for the duration of the war. The world's largest island and her northernmost point only 400 miles from the North Pole, Greenland's interior was covered by a sprawling sheet of ice, dwarfing the greatest of all the Northern Hemisphere glaciers and burying even the mountains. Greenland possesses a coastline indented with numerous fjords, and at the head of one of these was *Voo-Doo's* next port of call—Bluie West One.

To ensure that the glidermen were safeguarded in the event of *Voo-Doo* being forced down into the sea, Seys had instigated a number of precautionary measures. There were two types of undercarriage available for the Waco gliders, one with brakes and shock-absorbers, which was fixed to the fuselage, and one without them, which could be jettisoned. Seys chose the latter variety, sacrificing comfort and controlled handling on landing for the assurance that if compelled to ditch in the Atlantic he could drop the wheels and utilise the smooth under-section of the fuselage to land like a flying-boat, with a greatly reduced risk of tipping up. The glider carried an American two-man inflatable rubber dinghy and flotation gear, and Seys and Gobeil regularly practised the escape drill, unstrapping themselves, discarding parachutes and seizing a knife which hung in readiness from the roof, performing the motions of slicing through the fabric-skinned fuselage to release themselves. There was also a Catalina flying-boat detailed for escort duties, flown by Captain Jerry Durand, a civilian pilot well known in New Zealand before the war and now one of the ferry aircrew personnel. It was fortunate that no one was unduly superstitious, for the crew of the *Cat* brought the number of men in the air on this mission up to thirteen—two in the glider, five in the tug and six in the flying-boat. The *Cat* would make a landing attempt should the aerial freight train run into difficulties. The main advantage was her tremendous range; she could remain in the air for up to thirty-six hours at one stretch. If landing was impossible she would orbit



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the ditched tug, or tug and glider, until a ship reached them. The Cat, immense gun position blisters aft on her fuselage sides, gave them all a feeling of security as they roared away from Goose Bay and nosed out to sea, *en route* for the Arctic Circle.

The three-day wait for better weather proved to have been worth while, for flight conditions on the second leg were much improved. The flight was almost without incident, in fact, and Seys was able to hand over much of the flying to his co-pilot. Seys always took the controls for take-off and landing and the two men usually alternated with hourly spells, but when conditions were bad, as on the majority of the first leg, Seys remained in control for as much as four hours without respite. There was no prospect of any real rest for either man, because concentration overran tiredness. Unless over-flying one of the staging posts became necessary, and so far this had not been the case, the period in the air was not unusually long, so that there was little risk of the pilots being overcome by a desire to sleep. However, the tension of keeping the glider stable was considerable, even in unhampered flight, and they were forever watching that dancing cloth tied to the tow-line.

Cloud blanketed their landfall at Greenland, noted for the uncertainty of its weather, and liable to change swiftly from sunshine to fog or snow. Taking instructions from the ground control tower, Longhurst flew over the radio beacon situated on an island at the mouth of the fjord. Having broken cloud, the train flew up the fjord, free now of the icebergs which remained there for most of the year, and made a 90-degree turn to the right for a first glimpse of the runway, which was built on glacial debris and ran uphill from the water's edge towards a glacier. Hemmed in by a mountain on the right and wasteland of boulders on the left, which could easily smash them to pieces, Blue West One gave little margin for error. Seys had already made a 3,190-mile round trip from Dorval in a Dakota to “case the joint”, so that now, with that knack born of experience, he judged precisely the moment for release on the first pass and *Voo-Doo* sailed swiftly down to the tarmac. Prepared for the kick in the pants and the

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forward leap that always came when the Dak was free of the glider, Longhurst immediately threw the Dakota into a steep bank and made a tight turn to the left to orbit the landing strip at a safe height and make his second run-in, this time in order to drop the tow-rope. Another hard turn, another orbit, and this time the Dak was down on the deck. Stage two, an improvement upon the first leg, had lasted  $6\frac{1}{4}$  hours.

There was a three-day stop at Bluie West One to await suitable weather. There was time for relaxation, too, and Seys did some fishing while Thomson took time off from his maps to put in some climbing on the rocky face of the fjord. Fitters scrambled over the engines of the tug, as well as the airframe of tug and glider, checking for evidence of strain, and eventually pronounced that all was in order for the third stage of this transatlantic pioneering venture, which, to be precise, commenced at 13.22 hours GMT on 30 June.

Although it was the shortest leg, Bluie West One to the next stepping-stone, Iceland, covered more than 750 miles, and they would be out of sight of land for all but the brief period following take-off. Heading out over the ice-floes and occasional towering icebergs, still escorted by the Catalina flying-boat, they were quickly up in the clouds and Seys had to rely again upon his makeshift position indicator. Turbulence tossed the glider like a leaf in the wind, each movement having to be countered by the pilot. The erratic see-saw action was invariably transferred to the tow-plane and a tightening of the linking rope would be enough to pull back the Dak's speed by as much as 10 mph—a critical amount should ice bring down their speed close to the point of stall. If the glider should drop to the same level as the Dak, it would come within the slipstream of her 2,400-hp engines. To complicate matters further, ice put the radio-telephone contact between the crews of glider and tug out of action, a throat microphone and earphones system, because the batteries froze up when the temperature inside the glider dropped below zero. The batteries were normally switched off to conserve power when there was no necessity for conversation, and

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Longhurst merely waggled the Dak's wings to signal that he wished to talk to the glidermen.

They climbed cautiously, and snow was falling as the train headed westwards out to sea. After about 50 miles they turned south and rounded the southern tip of Cape Farewell, rather than chance being smashed into the massive ice-cap covering most of Greenland's interior. It was the old familiar pattern of flying blind for long stretches, and they caught only occasional glimpses of each other in three hours of blizzards. Such was the power of concentration required during long periods of flying through cloud and blinding snow that even when one or other of the pair rested from the controls he still sat there mesmerised by the swaying rope—it was like some fantastic rope trick, and made *Voo-Doo* seem an appropriate name for the glider. Occasionally the bulky shape of the Dakota would come suddenly into view through the snow blanket, but at one time the maximum distance Seys was able to see was a mere 15 ft., the distance of the piece of coloured cloth he used to keep his station in relation to the Dakota, and in a bid to battle clear of the snow belt the labouring train dropped lower and lower until a matter of 50 ft. separated them from the smooth yet hostile Atlantic Ocean. The air pulsed over the glider like “a goods train on worn tracks”, as Gobeil remarked.

The aerial freight train was bound now for the spot where the first Nordic settlers in Iceland had made their home in the ninth century—Reykjavik, capital of this volcanic rock island of hot springs and lakes of boiling mud. Formerly an independent Danish state, Iceland had been occupied by British forces three years previously to prevent the Germans from seizing it after over-running Denmark. The destination airfield was a British staging post used by a proportion of the bombers on the Atlantic ferry run. Although the worst of the snow was over and a safer height had been achieved, the fliers knew that Iceland, like Greenland, would be subject to sudden weather changes, and there always had to be reckoned the crosswinds and lava-dust flurries that could make handling a plane an extremely tricky

operation. Soon the crews were able to pick out the Lutheran cathedral overlooking the great bay of Faxaflói and minutes later tug and glider were entering the landing routine. Longhurst put the Dakota into orbit and waited for Seys to take the initiative.

“Pulling off—NOW!” Seys called out over the intercom.

The crew of the Dak saw the tow-rope fall free from *Voo-Doo* and trail out behind like a giant wireless aerial. The approach was across the bay and Seys, anxious to keep as much airspace as possible between *Voo-Doo* and the sea, misjudged the point of release, so that he was still rather high when he was over the runway. He dared not jab the stick forward for fear of the great load making the craft unstable, and losing height as swiftly as he considered prudent, he dropped *Voo-Doo* far along the runway with a thump that made him regret choosing the undercarriage without shock-absorbers. Without brakes, Seys had no means of stopping *Voo-Doo* or slowing her down, but she lost momentum fairly rapidly and rolled to a gentle halt just short of a low wall, beyond which lay the sea.

Flying overhead in the Dakota, Longhurst radioed the control tower that he would release the tow-line on his next run alongside the runway. Permission was granted and the rope snaked down, the steel coupling on one end smashing against some rock. Another circuit and the Dak was down, too, although her touch-down was smoother than that of the rope. This leg had taken a little over  $7\frac{1}{4}$  hours, and the next touch-down would be the end of the line.

Reykjavik was the shortest stopover of the entire flight. The damaged tow-rope coupling was re-welded in the base workshops and the end of the nylon line was re-spliced and anchored securely through the steel sleeve. Wanting to take advantage of the current spell of good flying weather, Seys' team allowed themselves only two hours in bed (Thomson, for one, didn't sleep a wink because he was preparing and filing the flight plan), and the alarm bells roused the crews for an 05.30 hours GMT take-off on the final leg. It was the longest of the four hops, just

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over 850 miles, and the destination was Prestwick, Ayrshire, UK terminal of the bomber ferry across the Atlantic.

Hom ing on a radio beam, and flying strongly in the trouble-free air high above the clouds, the glidermen were blessed with a smooth last leg of the long, hard tow from Canada to Britain. They were able to relax more now, although, true to the saying that the longest mile is the last mile home, they kept wondering when the flight would be finished. Far ahead and low down were smudges of cloud, and Seys and Gobeil often mistook them for their first glimpse of the Scottish coast line.

There was still cloud overhead when the flying train reached Prestwick some  $7\frac{3}{4}$  hours after leaving Reykjavik. Exactly on time, according to the calculation that Wightman had passed to base after take-off, Seys pulled the toggle to release the tow-line, and to the watchers on the ground the glider appeared to have the sky to itself because the tug had yet to break cloud. He set *Voo-Doo* down in a typically gentle landing, centre of the runway, and as the Dak lost height, Longhurst's crew could see the trucks preparing to unload *Voo-Doo*'s cargo—all intact except the precious bananas, which were now black with frost and, alas, uneatable. The tow-rope was dropped at the appointed spot beside the runway and ground personnel ran over to collect it. Appropriately, this nylon link between glider and tug—a lifeline throughout the 3,200-mile epic flight—was later divided among the fliers as a memento of their journey across the Atlantic gap.

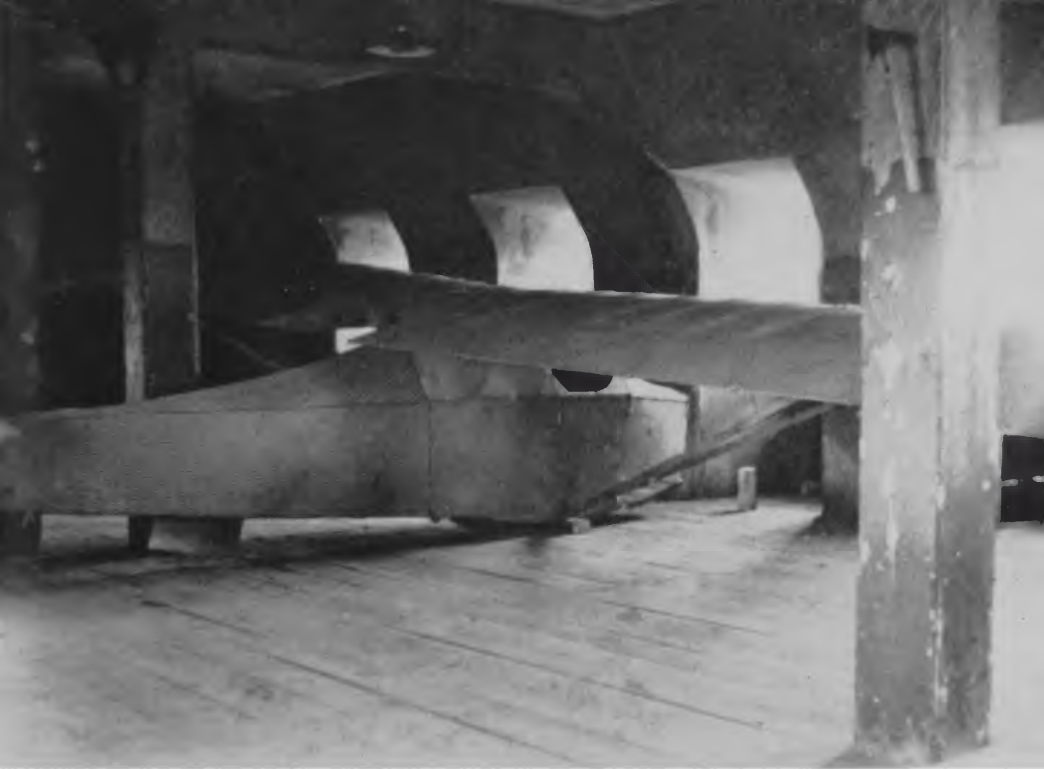
Aviation experts were sceptical of the benefits to be derived from the flight, although there was unanimous applause for the plucky crews. It was questioned, for instance, whether it was really necessary to tow the  $1\frac{1}{2}$  tons of freight instead of carrying a large proportion in the Dakota alone, thus making the journey faster and less dependent upon the whims of the weather. Certainly Seys' team proved the feasibility of increasing the payload of a powered aircraft over long distances by transporting the extra load in a trailer. It also left no doubt that flying a glider under these conditions was no picnic. And somebody, sometime, had to do it. As Marshal of the R.A.F., Lord Trenchard, declared

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in a congratulatory message, the R.A.F. had once again shown that it led the way.

The main participants, Squadron Leaders Seys and Gobeil in the glider, and Flight Lieutenant Longhurst, captain of the tow-plane, each received the Air Force Cross for their efforts. The citation spoke of the adverse weather and noted that the glider might have broken adrift but for the pilots' skilful flying. But there was a less happy ending to the story so far as *Voo-Doo* was concerned, for she was smashed up in a crash landing while being flown by another pilot shortly after the Atlantic crossing.

Let us remember one important point. The feat which these men performed had never been tried before—nor, indeed, has anyone else attempted it since. It may be arguable whether or not their journey was really necessary but, once proposed, none of the fliers would have wished otherwise than to press ahead and succeed in their mission. After all, it isn't often that one is given a chance to become an aviation pioneer and cross a mighty ocean in a glider.



*Above, The Colditz Cock, seen in attic adjacent to chosen launch site; below, Colditz Castle. The launching roof and attic are visible behind the spire at extreme left*





*Above*, Philip Wills (right), winner of the World Gliding Championship in July 1952, with Gérard Pierre, who gained second place; *below*, Derek Piggott (left) and Brian Whatley with *Red 31* after their gain-of-height record flight from Camphill in the 1953 National Gliding Championships





## 1943-44

The sea is seldom a good landing ground for a glider.

*Voo-Doo* might have been fortunate, given acceptable conditions, but she was never put to the test. By ill-chance, however, some of the gliders used in the Allied invasion of Sicily in July 1943 were indeed put to this test when high winds upset the plans for an airborne attack. They lost height too rapidly after offshore release from their tugs and finished up in the sea. Irrespective of their buoyancy attributes, these glider-troopers could hardly be regarded as entirely successful participants in that operation, and there was no doubt that gliders and glidermen had their limitations.

If a glider required to land on the sea, would this ever be possible? America, where flying-boats had been pioneered, produced the answer—an amphibious transport glider, designed for the U.S. Navy for use by the Marines. Another milestone had been positioned along the road of gliding history.

In Britain, factory-workers had been turning out glider upon glider in preparation for the Allied liberation of Europe. D-Day was now near at hand and at one works, where before the war railway coaches were built, a giant of a glider was now being created—a glider that would carry a tank across to the fields of Normandy . . .

## THE TANKS THAT WENT GLIDING INTO NORMANDY

**H**ADRIAN! HOTSPUR! Hengist and Horsa! Great names from the pages of history, and apt for the modern-day chargers that would carry the proud men of a new-style army to their battle stations. These four figures of history, plus one other of similar stature, were the names given to the training and operational gliders that the British forces used in the Second World War. Hamilcar—the missing name—was a warrior general from Carthage who was the scourge of his enemies. The huge gliders that bore this worthy name were destined to strike fear into the hearts of the enemy, too, because they were the biggest of them all.

Britain was a late-starter with airborne troops, whether transported by plane and dropped by parachute or conveyed into action aboard gliders towed behind powered aircraft, because no one seems to have thought much of the idea until Germany invaded the Low Countries in May 1940. As M. M. Postan has since recalled in the *Official History of the Second World War, Design and Development of Weapons*, gliders, and indeed airborne forces, had no place in pre-war plans or schemes; they were entirely neglected until June 1940, when Mr Churchill directed that we should proceed with equipping a parachute troop of 5,000. Postan wrote: "To provide the troops with air transport appeared an impossible task, since the only suitable aircraft was the Whitley, and the number available would carry not more than 800 men. Gliders were obviously the solution. . . ."

Britain was to design and build the Hotspur to carry eight troops, the Hengist to carry 15 and the Horsa 25. America would later contribute to the glider force by building a troop-carrier and cargo glider capable of carrying a 75-mm howitzer, carriage

and crew, or a 15-cwt. truck, together with crew and assorted equipment, instead of troops, depending upon tactical requirements in any operation. It would have the name Hadrian in Britain. The largest of the H-class quartet, however, would be Britain's Horsa, spanning 88 ft.; loaded, she would weigh more than 7 tons, and the troops would sit on benches along the tube-like fuselage. Drop-type supply containers could be hung beneath the wings to increase the load. These were the craft, then, that would be built to wing the airborne troops into action.

The ponderous Whitley bomber, which was the only aircraft capable of being employed as a glider-tug or troop-carrier at the time of the conception of the airborne forces in Britain, had been in squadron service since 1937 and despite valiant work in bombing missions as far distant as Italy, Czechoslovakia and Poland, it was obvious that she must be approaching obsolescence. Armstrong Whitworth, who built the Whitley, were engaged on another twin-engined aircraft, the Albemarle, designed originally for bombing and reconnaissance work. Ready for the R.A.F. in 1941, it was decided early in production to convert the Albemarle instead into a troop-carrier/glider tug and in this role it was soon replacing the Whitley. The first British operational aircraft to have a tricycle undercarriage, the Albemarle was powered by two Bristol Hercules XI radial engines and had a maximum speed in excess of 250 mph. Ten parachute troops could be carried and their exit was a drop-hole in the floor of the rear fuselage. It was to become a stalwart of the Airborne Forces squadrons of the R.A.F. and the only twin-engined aircraft in regular tug-and-trooper duties.

In the early 'forties, work was in progress, then, to produce gliders capable of carrying soldiers with small arms, howitzers, trucks and miscellaneous equipment ranging from medical kits to shells. There would be planes to tow them and others to carry troops and supplies to be dropped by parachute. One fighting vehicle, however, did not so far seem to have been provided with any means of aerial transport. And that was the tank.

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The tank had long been an accepted and valuable weapon. It had been used first in the Battle of the Somme in the First World War and proved a considerable success. The tanks carried powerful armament and were able to move readily over rough terrain. They took ditches in their stride and rode through hedgerows in deep and penetrating reconnaissance forays. Tanks could surprise and terrify an enemy, strike hard blows and take savage punishment; in short, they revolutionised land warfare. They were so much a part of the battle scene that it was realised some way of flying them into action must be found.

During 1940, therefore, while the Services were so acutely glider-conscious, the War Office called for a tank-carrying glider as a tactical requirement. The tank that would sprout wings was the Tetrarch, a light tank by Army classification, but still quite a monster with an all-up weight between 7 and 8 tons. Its height was a fraction of an inch short of 7 ft., its length 13½ ft. and width 7½ ft. It had a three-man crew, consisting of tank commander, driver and gunner, and was powered by a 12-cylinder Meadows engine giving a maximum road speed of 40 mph. It could travel at 25 mph across country and its manoeuvrability was such that a 35-degree slope was conveniently negotiable. The normal armament was a two-pounder gun and a co-axially mounted Besa machine-gun, so that the gunner, using a single sight, had the choice of switching his fire at will from singly placed shells to a sweep of machine-gun bullets. The glider to transport this versatile and lethal weapon would obviously need to be tailor-made to fit around it.

A tank-carrying glider came under Specification S.27/40. A General Aircraft Limited design team, under F. F. Crocombe, began the long job of building this mighty craft, to be called the Hamilcar, on the drawing-boards. The far smaller Hotspurs, Hengists and Horsas did not pose the same problems because their loads were to be considerably less; their development was more in keeping with the natural evolution of peace-time sail-planes, and some, like the Hengist, were produced by people who built gliders before the war. The Hamilcar, utterly removed

from anything hitherto visualised, was a giant beside the little Hotspur trainer which also came from the design department of General Aircraft. It certainly bore no comparison with planes like the popular twin-engined cabin monoplane, Monospar Universal, which Crocombe had worked on while chief designer of the company in pre-war years.

The Hamilcar had to be capable of taking inside the fuselage a variety of military equipment up to about 8 tons (specifically the Tetrarch tank, but alternatively a pair of troop-carrier vehicles or miscellaneous loads), whereas the limit expected of any of the other gliders was a mere fraction of that weight. It would have to be hauled into the sky bearing its massive load and glide freely once released from the tug-plane. It would also be necessary for the pilot to be able to select a suitable landing spot by day or night and fly down to it. At the time the Hamilcar was conceived, however, there wasn't even an aircraft flying that was strong enough to tow the great ship off the ground. The anticipated wing-span was not only greater than that of the largest bomber in service but bigger even than the first of the secret four-engined bombers then undergoing final tests prior to joining an operational squadron. The Hamilcar fully loaded would scale something in the region of 16 tons—a weight even in excess of a Whitley with full tanks and a bulging bomb bay.

So the Hamilcar progressed through the normal stages of development. As an approximation, it would carry a load equal to its own structural weight; the cargo alone would equal the fully loaded weight of the largest British troop-carrying glider.

At one stage a half-scale model was built in order to provide a guide as to the likely handling characteristics of this huge craft. Finally, the finished full-size prototype emerged from the company's works on the outskirts of London. With a wingspan of 110 ft., length of 68 ft. and wing loading of 21.7 lbs. per sq. ft., there were few powered aircraft of this size anywhere in the world and none to match it in wooden construction. The cavernous fuselage freight compartment was square-sectioned and unobstructed, and stretched back more than 25 ft. from the

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opening nose of the glider. Give or take a few pounds, the glider's empty weight worked out at 18,500 lbs. and the transportable load was 17,500 lbs.

The two-man crew occupied a flight compartment in the upper portion of the fuselage just aft of the nose, and it was entered by climbing a wooden ladder in the hold, going through a hatch in the top of the fuselage and then along a walkway. They sat in splendid isolation in the cockpit, in tandem positions with dual controls, the broad wings sweeping away behind them. A bullet-proof windshield offered protection to the front and sides while to the rear was armour plating; beneath was the vehicle load, a comforting screen against fire from the ground. Contact with the tank and tug crew was by means of an intercom telephone link, the wire to the towing aircraft being intertwined with the tow-rope.

The tank or similar vehicle was to be secured to the floor at a single anchorage point, and the driver could make the lashings fall away at will. A novel system of telescopic undercarriage would enable tracked or wheeled vehicles to be driven out without the need of a ramp or lift. Pressure in the undercarriage shock absorbers was released to allow the Hamilcar to sink gracefully under its own weight for this purpose so that the fuselage, instead of being in the normal nose-up attitude, became horizontal and rested on the ground. The bulbous nose was hinged to starboard and would swing open, either manually or automatically, as the vehicle inside began to move forward under its own power. There were rails on the fuselage floor and these were adjustable to suit the tracks of different vehicles. Exhaust extractors in the fuselage sides enabled vehicles to start up their engines safely before unloading. These refinements were necessary in order that the tank could move into action within seconds of the glider reaching the ground, for it would be no use arriving on a battlefield and then having to wait for an unloading gang.

The mighty Hamilcar flew for the first time towards the end of March 1942, from an airfield near Newmarket. It was towed cautiously into the air by a Halifax II, a bomber with a wingspan

smaller than that of the glider itself but equipped with four of the most powerful engines then in service, each with the new four-bladed airscrews. In less than a month the flight trials were ended and production went ahead. The airborne tank was now no mere fantasy but an earnest reality.

Concurrently at Blackford, near the market town of Dunblane in Perthshire, a new Army unit was formed, called the Airborne Light Tank Squadron, an independent squadron consisting of five troops of Tetrarchs. It was formerly a Special Services Squadron. The unit moved eventually to Salisbury Plain, being based first in hutments at Tinkers Firs and then occupying former married quarters at Larkhill. These were the tanks and men that would one day make military and aviation history by going gliding into battle.

The year of the unit's formation, 1942, the airborne forces came into their own as an attack arm of the British Services. In February, paratroopers flown in Whitley aircraft took part in the combined operations raid on the Bruneval radar installation on the French coast, 12 miles north of Le Havre, and in November came the Allied landings in North Africa, with parachute troops in a major role. In factories dotted about the British countryside, Horsas, Hengists and Hotspurs were flowing from the production lines in readiness for their operational baptism. Hadrians were coming across in crates from the United States. And at the Birmingham Railway Carriage and Wagon Co. Ltd. works the first of the Hamilcars were about to be laid down on the factory floor. The great airborne army build-up was now in progress.

The gliders themselves were R.A.F. equipment, as were the tug-planes and troop-carriers. The glider pilots, unlike the crews of these aircraft, who were R.A.F. Transport Command personnel, belonged to the Army, and were in a special formation, The Glider Pilot Regiment, inaugurated early in 1942 as part of the Army Air Corps. They were formed into separate Glider Pilot Wings, comprising flights of twenty gliders, each with two pilots so that they could take turns and one would be

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able to replace the other in the event of injury while under fighter or flak attack. In the main the glider pilots were NCOs.

The men were recruited from the Army and trained in conjunction with the parachute troops and the airborne infantry. They received elementary flying training from the R.A.F. in powered planes such as the Tiger Moth and Miles Magisters and passed through initial glider-flying training in Hotspurs before converting to the heavier operational types, the Horsas, Hadrians and Hamilcars. The Hotspur had started out in life as a troop-carrier, having a wing-span of 61 ft. and accommodation for eight armed soldiers, but the urgent need for a standard training glider prompted a conversion job to be made on it. The major effect outwardly was the amputation of the wing tips, reducing the span by 15 ft. and giving a more suitable gliding angle for the novice pilots. Pre-war biplanes were used for tug duties early on and ballast was put aboard the gliders to simulate full operational loads.

Actual flying was only one side of the instructional work in the Glider Pilot Regiment, however, for the men had to become all-round soldiers once they had landed. The role then was to fight alongside the comrades they had flown on to the battlefield until they could be withdrawn to make the next glider drop. The rifle was the glider pilot's normal weapon but they were also trained to handle Stens and tommy-guns, Brens and mortars, and some of the heavier weapons that might be employed in an airborne assault. They learned to tackle some of the duties of the engineers and the medical teams, too. These flying soldiers had to be Jacks of all trades but masters of two: glider-flying and ground-fighting.

King George VI and the Prime Minister were among a succession of VIPs who watched the airborne troops undergoing operational training. On one occasion, fifty MPs saw a demonstration on Salisbury Plain and as a highlight they were taken up in groups for a ten-minute flight. Unfortunately, a journey in a military glider does not always provide a smooth passage: a number of Horsas made heavy landings, throwing their passengers



to the floor, and two MPs were taken to hospital, Miss Ellen Wilkinson with a broken ankle, and Sir Derrick Gunston, bruised and suffering from shock. A letter to *The Times* queried whether the journey of these MPs was really necessary, and many months later, when the need for secrecy was no longer felt, Sir Derrick was able to reveal in the correspondence columns of that same newspaper the sequel to the demonstration on Salisbury Plain. In assuring the correspondent that the journey had been necessary and worth while, he put the record straight by stating that the MPs who visited the airborne soldiers' training-ground had been so impressed with the potential of this new arm of the Services that they had addressed a memorandum to the Government urging that more airborne divisions should be created and the necessary equipment provided for them. Sir Derrick did not claim that this action by the MPs was a decisive factor in the eventual decision taken to increase the strength of the airborne troops, but he did say that perhaps the MPs concerned might feel a special pride in the success of the men who had the privilege of wearing the Airborne flash on their shoulders.

Meanwhile the Airborne Light Tank Squadron, commanded by Major Godfrey Stewart, 13th/18th Hussars, awaited their own gliders with great interest and much speculation. The idea of flying tanks into battle in a glider was greeted initially with quizzical forbearance; it was an unconventional form of transport, certainly, but war-time expediency bred many weird and wonderful ideas. If the boffins said it could be done the tank men saw no reason for doubting it. General Aircraft and the Tank Squadron personnel kept in regular touch, the aircraft company having a man living at the camp, and there were periodic visits by the Army men to the company's premises at Feltham to survey progress. While the tank crews awaited their Hamilcars, a mock-up of the glider's fuselage was used for advance practice so that they could become familiar with driving into and out of the fuselage hold. Then, late in 1943, when their role as a reconnaissance unit had already been decided and their military training had reached an advanced stage, the officers and men of the

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Airborne Light Tank Squadron, which was reputedly the first such unit anywhere in the world, watched with fascination the arrival of their long-awaited gliders.

The Hamilcar squadron was commanded by Major J. A. Dale, and based at Tarrant Rushton, an airfield near Blandford in Dorset, where the runway was not only very long but there was a conveniently low cliff at the end of it to give impetus to any glider-tug which might become lethargic on the take-off run. They didn't need to rise to get airborne—they merely let the ground slip away beneath them on running out of runway. The gliding Goliaths themselves rose into the air after a comparatively short run and handled surprisingly lightly; it was the tug that made heavy weather of the operation. At first it was thought that when gliders needed towing, all that was required from the R.A.F. was any spare aircraft not immediately engaged on a bombing mission. Whilst there was a limited choice of planes capable of towing the smaller operational gliders, only the Halifax could cope with the Hamilcar, and then only when modified for the purpose. These modifications were to ensure an acceptable safety margin above stalling speed when towing and included removal of the dorsal gun turret, which was then a standard fitting on the Halifaxes, and alterations to the engine radiators. The tug-and-glider combination travelled at about 140 mph, and when cast off, the Hamilcar relied upon large-area flaps and the pilot's skill to control her descent.

A handicap in towing was the necessity to reach a reasonably high speed, because the greater the towing speed the greater the stability of the glider. Although the Hamilcar was nimble for her size, it was prudent to treat her with restraint, and she wouldn't loop, of course, like some of the other gliders—at least, no one has owned up to having attempted it. Unlike the Horsa, which had only elevator trim controls, the Hamilcar could be trimmed all round so as to give stable flight when carrying heavy loads.

It is worth digressing briefly here to recall what happened to one of the Horsas from Tarrant Rushton on a night exercise.

The reciprocal heading of one of the runways was a direct line to Poole and the pilot obviously became confused while trying to sort out his compass heading to give him a reading for base when he had slipped his tow. Instead of landing on the airfield he brought his glider down right along the centre of a flare-path marked out in the harbour and intended for an incoming Sunderland flying-boat. When the pilot returned to camp after his unexpected soaking, he found the following message above his bed: "Remember Poole Harbour!"

The first major demonstration of the practicability of transporting a Tetrarch inside a Hamilcar unintentionally gave a startling testimony to the immense strength of this combination. One of the Hamilcars, apparently attempting a landing at too high a speed, hit a Nissen hut that was sub-divided inside by means of a series of brick walls throughout its entire length. The glider came to an abrupt halt but the tank tore through wall after wall before it could stop. The pilots were saved by their harness and the position of the flight compartment high above the point of impact. The tank crew were also unhurt and the vehicle itself was none the worse for wear, for without any maintenance the guns were tried out on the range shortly afterwards with highly satisfactory results. There could be no better proof to support the contention that glider and tank had little to fear from a rough landing.

During the training programme the landing speed of the Hamilcar was reduced through practice from more than 100 mph to somewhere around 75 mph—a less frightening forward rush with such a heavy load aboard. When training was ended, 2,800 lifts had been made by the squadron, averaging fifty lifts per glider crew—"a superb effort", Brigadier George Chatterton, who created and commanded the Glider Pilot Regiment at that time, declared in his book telling the story of the Regiment.\* Giving credit to the R.A.F., Brigadier Chatterton wrote: "Few knew how difficult it was to fly a Halifax with a huge Hamilcar on its tail, and I am told that sometimes the pilot had little more

\* *The Wings of Pegasus*, Macdonald, 1962.

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than ten miles an hour on his air-speed between stalling and flying on. It must be to the eternal credit of the Halifax crews that their calmness and courage never faltered.''

While this was going on, the main pre-occupation of the glider pilots was naturally enough that of flying their gliders and such matters as military training had to take a back seat. Earlier they had gone through a rigorous Commando battle school, leaving them supremely fit, but that was back in 1943 and the glow of perfect health was losing some of its lustre as a result of their more sedentary life in the cockpit. However, in anticipation of action stations, orders were issued for a series of physical fitness exercises to commence, the most alarming of them being a succession of cross-country runs with full battle equipment, including rucksacks so weighty as to crumple the shoulders of even the toughest men in the regiment. The initiative of the NCO glider pilots was equal to this challenge; they put life jackets in their rucksacks, inflating them to simulate a bulging pack, and trotted gamely beside sweating officers, wearing suitable expressions of pain and anguish upon their faces. In a humble way this was to remain perhaps one of the best-kept secrets of the glider pilot's war!

By now, 3,500 gliders were at the disposal of the Allied airborne units and the stage was set for the biggest and most crucial airborne assault of the war—the Invasion of Western Europe.

American and British parachute troops and glider-borne formations were thrown into the attack in successive waves during 6 June 1944, drifting down silently from the sky into the fields of Normandy. First down were half a dozen Horsas from Tarrant Rushton, carrying men of the Oxfordshire and Buckinghamshire Light Infantry and a field company of the R.E.s to seize vital bridges straddling the River Orne and the Ship Canal between Caen and the Normandy coast on the eastern edge of the assault area. In the American sector, to the west, 101st and 82nd Airborne Division paratroops dropped behind Utah Beach; St Mère Église was captured before dawn, largely because one of the gliders landed on a rooftop in the town and the unexpected

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visitor prompted the main German garrison to surrender to its occupants. Out of 98 gliders so far despatched to Normandy with the British 6th Airborne Division, which was spearheading the attack behind the German lines, less than two dozen failed to reach their objectives. Seventy-one of the 196 glider pilots involved in these operations became casualties, either while crash-landing or in the immediate fighting. It was a casualty rate of more than one in three for the Glider Pilot Regiment, whose men distinguished themselves by their skill in flight and their tenacity in action on the ground.

In the House of Commons on that evening of D-Day, Mr Churchill described the landings of the airborne troops as being the outstanding feature of the early operations, and on a scale far larger than anything so far seen in the world. The landings took place, he declared, with extremely little loss and with great accuracy. Amid cheers, Mr Churchill went on:

“Particular anxiety attached to them because the conditions of light prevailing in the very limited period of the dawn—just before the dawn—these conditions of visibility made all the difference. Indeed, there might have been something happening at the last minute which would not have enabled airborne troops to play their part. A very great degree of risk had to be taken in respect of the weather. But General Eisenhower’s courage is equal to all the necessary decisions that have to be taken in these extremely difficult and uncontrollable matters. The airborne troops are well established and the landings and follow-ups are all proceeding with much less loss—very much less—than we expected.”

In fact, the major follow-up was in progress as he spoke in the House on that tension-charged summer evening when freedom was being returned to Occupied Europe. So far the gliders employed in the British assault had been almost exclusively Horsas, which comprised 90 per cent of the fleet, but during the afternoon and early evening of D-Day, on airfields in the southern counties of England, preparations were taking place for a massive reinforcement drop of men and equipment to assist

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the weary 6th Airborne Division advance parties in their bridge-head positions in the region of the Orne. And here, at last, the tank-carrying Hamilcars were to make their operational début.

In the knowledge that all was going so well across the Channel, the denim-clad loading teams whistled cheerily as they trundled the urgently required stores and equipment into the waiting gliders ranged out neatly on the airfields. Jeeps, artillery pieces, anti-tank guns and medical supplies were hustled through the wide jaws of the gliders, each one of them bearing besides the R.A.F. roundels the newly introduced black and white stripes that distinguished the invasion force aircraft.

The correct loading of every glider was vital to the safety of both glider and tug. So far as the Hamilcars were concerned, General Aircraft Ltd. men alone handled this task. During the preparation period, load tables had been prepared and now every piece of equipment, pre-weighed, had to be accurately positioned in the glider's hold, so that there would be no interference with the aerodynamic qualities of the Horsas and Hamilcars. A truck wrongly placed in the hold, or a cargo which exceeded the maximum permitted load, could make the glider unstable.

The Tetrarchs now formed a part of Major-General R. N. Gale's 6th Airborne Division and came under the 6th Airborne Armoured Reconnaissance Regiment, comprising "A" Squadron with 15 Tetrarchs formed into five troops, "B" Squadron with Jeeps and Bren carriers and the Headquarters Squadron with two Tetrarchs, Vickers machine-guns and mortars. The Armoured Reconnaissance Regiment had grown out of the original Airborne Light Tank Squadron six months previously in January 1944, the Regiment being under the command of Lt.-Col. Stewart and the Tank Squadron now led by his former second-in-command, Major Paul Barnett, a Territorial soldier. The "A" Squadron tanks each had a 2-pounder gun with a Littlejohn attachment on the end of the muzzle to boost the shell velocity and so improve its penetration and effectiveness, while the Headquarters Squadron tanks had a 3-in. howitzer for high-explosive or smoke shells instead of the 2-pounder on "A" Squadron's

roving tanks. Before nightfall these tanks would be 150 miles distant in Northern France, ferreting out troop positions and observing vehicle movements behind the enemy lines, and then relaying this information to regimental HQ. It was to be the first armoured formation in history to fly to a battleground. And the troops that had to face them so far back from the main sea-borne supply lines would be extremely surprised.

There were 250 gliders assembled for the reinforcing operation. At Tarrant Rushton, where before midnight the advance parties climbing into their Horsas had been given a warm send-off from those who were now to follow them into Normandy, the gliders were poised in line-astern columns on the runway, while Halifax tugs were lined up on the grass on both sides. The towropes were draped carefully between each tug and glider. Zero hour was here; one after another the tug-planes of No. 38 Group (Airborne Forces) would draw their swaying Horsas and lumbering slab-sided Hamilcars into the evening sky, the Horsas laden mainly with troops and their big brothers crammed with vehicles, weapons and supplies.

Alternately from left and right of runway 010, a Halifax moved in to draw away on the tow-line and then roar down the long ribbon of runway with its Hamilcar dragging on its tail. No. 644 Squadron towed the 15 gliders of 6 Flight and No. 298 Squadron a similar number from 7 Flight. Strapped in darkness within a tank within a glider, Major Barnett heard wood chippings thrown up from the runway spattering the nose of the Hamilcar like hailstones. Every man that evening took away a special memory of the sight or the sound of England, and Barnett retained that sound as a reminder of his own D-Day departure from friendly shores. Then, quite suddenly, there was silence again but for the swish of air around the glider. In something like 20 minutes, 30 Hamilcars were already circling above the Dorset countryside; it was a feat that had barely seemed credible in the early days of training when such a mass take-off lasted as long as an hour.

Once airborne and at cruising height, the tank crews were



*Above*, Lorne and Ann Welch competing in the two-seater class in the 1954 World Championships at Camphill; *below*, Anne and Denis Burns each have a place in the international record-books







*Above*, Prince Philip and National Coach John Everitt strap themselves into a glider at the opening of the British National Gliding Championships at Lasham, Hampshire, in 1963; *below*, Prince Philip learns about a Russian sailplane entry at the 1965 World Championships



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able to leave their vehicles and walk around the freight hold. There was a window in the nose through which Barnett and his crew kept peering, unsuccessfully, for a glimpse of the fighter umbrella which they understood the R.A.F. had laid on for the Normandy-bound glider trains. The fighters were there all right, watching and waiting up above and out of sight, as the 250 gliders crossed the coast in the Littlehampton-Worthing area and flew southwards over the Channel in two long columns. It was a majestic sight, and people aboard the armada of ships ferrying supplies across the Channel gazed skywards in admiration. It was not yet 9 pm.

In another of the Hamilcars, Staff Sergeant Ernest Lamb saw "C" Squadron's only non-starter dive away and turn back to make a successful landing at Ford airfield when the tow-rope snapped just after crossing the coast. Lamb was one of the privileged handful of glider pilots in that mission who had been given a parachute. It was not normal issue because troops aboard the weapon-carrying Hamilcars would have no chance to bale out if the glider should be hit and it hardly seemed fair to leave them to die alone. However, Lamb and his second pilot were the only men aboard their Hamilcar, so they could carry 'chutes. It was small comfort, for instead of a tank or guns or jeeps, Lamb's glider carried supplies of petrol, oil and ammunition, and one wonders if those 'chutes would have been much use if that little lot had gone up in a puff of smoke.

From their initial height of only a few hundred feet above the sea, the glider-trains rose in unison on approaching the French coast to present a more difficult target for the anti-aircraft guns and to allow the gliders, once the tow-ropes were released, to have sufficient altitude to manoeuvre into the landing zone. During the run-in the 15 escort squadrons supplied by the R.A.F. kept the Luftwaffe fighters at bay, although anti-aircraft fire accounted for one of the only four gliders that failed to get through to the landing zones. They called this mission "Operation Mallard", yet these were no sitting ducks.

Soon the time came for the airborne reinforcements to split.

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One column of about a hundred released their trailing gliders over Colleville-sur-Orne to land near the canal north of Benouville; the other column of about 140 continued on towards Ranville. The men of both sides, often engaged in close fighting, paused a moment as the glider-trains passed overhead. The operation was singularly successful—"to the joy of the hard-pressed men of the 6th Airborne Division, who watched their advent with lightened hearts", according to Mr Hilary St George Saunders in *Royal Air Force, 1939-45, Vol. III, The Fight Is Won*.

In his Tetrarch, Major Barnett heard the Hamilcar pilot saying over the headphones that the landing zone was in view and he was preparing to cast off from the tug. Seconds later the tank crew felt the nose of the glider rise as though on the crest of a gentle wave as the rope was released. On full flaps it dropped into a steep dive towards the north-south landing lane on Drop Zone "N", east of the Orne, close to the village of Ranville. The Hamilcar swept through knee-high corn at 70 or 80 mph, lurching violently and losing half a wing in hitting one of the obstacle poles that the advance parachutist-engineers had failed to demolish. Just before touch-down, Barnett's driver had started the engine and once the Hamilcar had come to rest the crew "pulled the plug out" to drain the oil from the shock-absorbers and allow the fuselage to sink wearily on to the ground. Spoiling for action, Driver Clark shed the mooring ropes in an instant and the Tetrarch rolled forward, striking the trip-wire to open the nose door, before emerging upon the soil of France intent on early battle.

The Hamilcars, those flying pantechnicon vans, jostled for position in the eager dive for the cornfields that comprised the landing zone, as space was at a premium. On approaching touch-down, one of them, flown by Staff Sergeant Charles Channell, slammed into a Tetrarch which had suddenly appeared 40 yds. ahead, having moved off without waiting for the pilot's all-clear, and the 7-ton vehicle was bowled over on to its side as if it had been merely a matchbox. It appears, however, that this was the only casualty among the Tetrarchs that were borne by glider to

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Normandy. Even that Tetrarch was not long out of commission; the crew were unhurt and during the night, helped by another crew with their tank, it was righted and able to go into action.

While the Hamilcars and Horsas were disgorging their tanks, equipment and men, German units kept the landing zone under mortar and shell fire. It was sporadic and regarded more as a nuisance than a threat but one of the glider-borne Tetrarchs, within two minutes of touch-down, silenced one of the more troublesome enemy positions with a few well-placed shots. In that single reinforcement drop involving 250 Horsas and Hamilcars, the effective strength of the 6th Airborne Division had been doubled with the arrival of men of the 2nd Bn The Oxfordshire and Buckinghamshire Light Infantry and the 1st Bn The Royal Ulster Rifles, together with tanks, jeeps, some light field artillery, anti-tank weapons and miscellaneous supplies. And the loss in lives and equipment was remarkably light for such a large-scale delivery in daylight and under conditions when the enemy must have anticipated some sort of airborne reinforcement operation.

Some of the gliders were barely marked in this landing. Lamb's Hamilcar ripped down a hedgerow but he considered that it would have flown with no trouble if there had been a runway and tug close at hand. One of the first fatal casualties was Staff Sergeant C. B. Robinson, a Hamilcar pilot from 6 Flight, who was killed by mortar fire almost immediately he had brought down his glider. He wouldn't be needing the document which all the glider pilots carried, urging that they be afforded the maximum assistance in getting back to their depot to prepare for a further mission. In fact, Robinson was the only one of the 58 Hamilcar pilots and second pilots who didn't make it. They assembled in an orchard, trying unsuccessfully to dig defensive trenches with inadequate tools, a failing which thoroughly upset a platoon of tough paratroopers intending to position themselves there and almost produced a state of civil war between the two factions. Next day the glider pilots withdrew to the beaches, past the crumpled Horsas and over one of the bridges which the

troops they carried had captured and held intact since early the previous day. A steamer then ferried them home for a de-briefing at their Salisbury Plain depot.

Regrettably, there is often a black side to even the finest achievements in war. There is that human weakness when, perhaps, someone overlooks a vital point; or there is the eventuality that a sudden change of weather will upset the best-laid plans. So, with the airborne Tetrarchs, there was an inglorious start to their service on D-Day. It was thought there was nothing basic that could go wrong with the operation. If the boffins of Britain could come up with a glider that would carry a tank, in itself a gigantic feat, surely there was no set of circumstances that might stop the tanks from fulfilling their destined role.

The Hamilcars played their part perfectly, depositing their fast and powerful tanks from out of the sky many miles inland from the beaches when the Germans thought their load was merely fresh troops carrying small arms. Then, as the Tetrarchs rumbled out of the gliders, intent upon heading swiftly south-east through fields and hedgerows to their pre-arranged rendezvous near Bréville, they found the ground littered with discarded parachutes that brought troops and supplies dropped earlier in the day. It was these abandoned parachutes that blotted a copy-book exercise and brought the downfall of the Tetrarchs. The nylon canopies and rigging lines, by becoming wound around the sprockets and choking with a tighter and tighter stranglehold, immobilised half the tanks within the space of 200 or 300 yards of the landing-point.

The first intimation of any trouble usually came only when the tank's performance started to become sluggish and there was nothing to account for this behaviour. Although Barnett warned his crews as soon as he realised the danger, it was too late. The multi-coloured canopies of the supply parachutes were easy to distinguish from a distance and the drivers had a chance to steer around them; the paratrooper 'chutes, being camouflaged, merged deceptively with the ground and it was often impossible

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to avoid them in the failing light. The tanks were trapped within the unyielding nylon net of snaking lines amid the young corn. Instead of reaching their objective by nightfall, therefore, most of the tanks remained pinned down in the vicinity of the landing-ground, while the crews struggled desperately to get them unravelled from the spaghetti-like tangle and once more mobile to fulfil their intended role as scouts for the 6th Airborne Division. Mercifully the disgruntled crews were completely undisturbed by enemy opposition throughout this anxious time, for there was no sight of the Germans at all and no fierce bombardment to force them under cover. Fortune thus took pity in a tense situation.

The tanks had been rendered *hors de combat* by a human failing; no one seems to have realised that where tracked vehicles are concerned, voluminous parachute canopies and their straggling nylon rigging-lines can halt them just as effectively as any tank-trap devised by a cunning enemy. It was rather like fluff accumulating in a child's clockwork motor-car; the tanks just ground slowly to a dismal stop. Tetrarch, which means "one who rules", fell from majestic grace on this particular mission through unfortunate and unforeseen circumstances.

For most of the night the stranded tank crews worked with blow-lamps and hacksaws to clear the sprockets, tracks and driving gears of the crippling web of nylon. The following day, 7 June, D-Day + 1, the tanks were finally free to move warily towards a new rendezvous at Le Mariquet, Barnett himself taking with him a paratrooper with a broken leg, whom he carried on a bed of camouflage netting on the top of his tank. From Le Mariquet the regimental tanks advanced south through the Bois de Bavent to the high ground in the region of Troarn to reconnoitre with the 8th Bn The Parachute Regiment. The episode of the nylon tank trap, which showed the velvet glove to be a good deal more powerful than the iron fist on this occasion, lapsed into the dim past.

In the official history of the Royal Tank Regiment\* mention is

\* *The Tanks*, Liddell Hart, Cassell, 1959.

made of the valuable support which the Tetrarch tanks gave to the parachute battalions in the fighting during the following days. These Tetrarchs were later replaced by the more powerful Cromwells and joined the Airborne Reconnaissance Regiment in leading the eastwards breakout drive of the 6th Airborne Division in August 1944. Vindication was proving a sweet tonic.

What of the Hamilcar? Could this initial setback to the Tetrarchs mean the end of the Hamilcar as an operational glider? On the contrary, whilst the initial specification did call for a glider that would carry a seven- or eight-ton tank, it was in fact built to transport a whole range of armoured weapons and equipment, in addition to a larger number of troops than any other glider which saw service with the British forces in the war. The Hamilcar could carry alternatively a 17-pounder anti-tank gun, two Bren carriers, field gun and tractor, two armoured scout cars, a self-propelled Bofors gun, or 40 armed troops and supplies. Its spacious cargo-hold could gobble up miscellaneous loads, whether for assault or construction work.

In the next major airborne operation after D-Day—Arnhem—Hamilcars were again in the glider fleet and this time, in addition to anti-tank weapons and lorries, they carried assault boats which were to convey many of the beleaguered troops across the Lower Rhine to safety in the British 2nd Army lines. In the final big-scale airborne assault in Western Europe, that of the Rhine crossings in March 1945, Hamilcars again reverted in part to their original role as tank-carriers, flying this time from the emergency landing ground at Woodbridge, Suffolk. Even this operation, however, was not without the unexpected, for one tank plummeted out of the Hamilcar somewhere over the North Sea; the truth will never be known, as the two pilots and the tank crew lost their lives, but if the accident was caused by a structural failure in the Hamilcar it was the only time it ever occurred, a fact that speaks highly for the designers, builders, and the operators, of this Goliath of gliders.

As the war in Europe drew to its close, and the continuation of operations in the Far East attracted fresh thoughts and new

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weapons, General Aircraft were at work on a project to provide the Hamilcar with engines so as to overcome the difficulties that might be expected in the Far East in finding suitable planes to tow a glider with a 110-ft. wing-span. By the end of hostilities, Hamilcars had been equipped with a 965 hp Bristol Mercury 31 engine on each wing, mounted at specially strengthened points, giving an independence that no other British glider could enjoy. It could carry an enormous load still and cruise quietly along at more than 100 mph under its own steam. The Hamilcar, that mammoth among our gliders, was a true glider no more.



## 1944-45

Thus the Hamilcar, as big as Britain's biggest bombers, became the ultimate in transport gliders by flying the tanks right on to the battlefields of Normandy. In Europe, though, as in the Middle East and Far East campaigns, the glider was more than a troop-carrier; it was proving quite a versatile creature at the hands of the ubiquitous transport men of the Armed Services.

Where the roads were jammed and delays inevitable, gliders were pressed into action to airlift urgent supplies, equipment and ammunition. Self-contained military units were able to travel in them from place to place; R.A.F. operational squadrons could use them to move in their entirety from base to base. Some gliders were even fitted out with triple-tiered bunks and so became aerial ambulances: a maid-of-all-work *par excellence*.

But what of gliders which, once landed on the ground, had no adjacent runways for their tugs to use when the time came for them to be moved on elsewhere? The Americans came up with the answer in an ingenious pick-up system which enabled ditched gliders to be snatched from their resting-place by slow-flying powered tow-planes. In remote areas, casualties could be evacuated in this way. And gliders which had survived an attack landing without serious damage could be retrieved to fight another day.

Such was the ingenuity of Man in times of war that the glider became truly a multifarious bird. Could it, though, enable someone audacious and brave to fly out of Germany's most celebrated prison camp?

*THE COLDITZ COCK*

OF ALL THE places where a glider might be conceived and built, Oflag IVC during the Second World War was surely the least likely. The idea was quite ludicrous, really, because Oflag IVC was one of the most notorious prison camps in Germany, and better known as Colditz Castle.

Colditz was a prisoner-of-war camp with a special rating. It was reserved for Allied officers who had already tasted freedom by means of at least one prison escape in Germany and, as a consequence, the astute guards were well aware of all the normal escape ruses and also a high percentage of the less popular ones. These were the naughtiest boys in Germany's prison camp network and the grim, impregnable castle on a cliff-edge high above the River Mulde was to be their home until the end of the war.

In theory, Colditz was escape-proof. It towered 300 ft. into the sky with sheer drops, miles of barbed wire, a moat and sweeping searchlights at night to deter even the most hardened escaper. In practice, eight Britons alone succeeded in getting out of Colditz and reached neutral or friendly territory, and there were numerous other occasions when prisoners managed to flee the castle only to be recaptured and returned in chagrin to its forboding surroundings.

Leaving aside the finer points of the game, escaping from any prison camp falls within three basic categories: you go under the wire, through the wire or over the wire. It makes no difference whether the camp is large or small, old or new, huddled encampments or a solitary castle. There are, however, countless variations that may be played on each of these themes. By early 1944, the Escape Committee formed among the 200-strong British contingent in Colditz had listened sympathetically to the most

incredible proposals, some of them reasoned and practical, others hastily conceived and crudely impracticable. The most complicated schemes were not always the most successful. For instance, French POWs tunnelled for months and then a snap search revealed their subterranean secret. On the other hand, a couple of Chief Petty Officers in the Royal Navy decided the main gate was the easiest exit. They pestered the German authorities for a posting to another camp, on the grounds that Colditz was an officers' camp, and managed to get away from their new abode with much less trouble than they would have expected to encounter by an enforced stay in the castle. It had been all too simple—they'd just asked to be allowed to leave the infamous castle and their request had been granted!

The biggest problems facing new arrivals in Colditz were, firstly, that the existing occupants had already tried out every known method of bluff and disguise, every sort of wire job and every kind of tunnel and, secondly, there was a depressingly long waiting-list for schemes already registered with the Escape Committee. Here was the frustrating situation where prisoners were actually queuing up for the chance to break out of camp. The only way to by-pass this bottleneck was to devise a method with an entirely new slant which did not conflict with any other project already sanctioned by the committee.

Of course each prison camp suggested its own obvious methods. The sombre, grey shape of Colditz sat astride a hill-top and sweet freedom beckoned way down below this seventeenth-century eyrie. An over-the-wire job seemed the most logical category in the escapers' rule-book to fit these special circumstances. A parachute drop, perhaps? A hot-air balloon, even? Or a crude glider, maybe? A glider . . .

On their wooden bunks and in the dank recreation rooms, they contrived the most weird and wonderful schemes. A couple of chums here and a trio there, huddled in pretence of study or playing cards, earnestly set about solving the riddle of how to emulate primitive flight. They needed the craftsmanship of a Leonardo da Vinci, the audacity of a Lilienthal and the inventive

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genius of the Wright Brothers. Yet, even with all that talent, success would not be forthcoming without the utmost secrecy. A word in the wrong ear or fresh footmarks along a dusty corridor might wreck everything.

Among these speculative hatchings, two separate groups came up independently with the same suggestion, a suggestion so novel and so ingenious that it must surely qualify for Escape Committee blessing. It clashed with no one; it had the merit of practicability. On the one side were two Army officers, Lieutenant Tony Rolt, Rifle Brigade, one of 65 inhabitants of Eichstätt who had tunnelled their way to temporary freedom in June 1943, and Captain David Walker, Black Watch, who figured in the mass escape over the wire at Warburg in August 1942. They approached the committee with the principle of using a glider as an escape vehicle, but without much idea of constructing it, and learned that simultaneously two R.A.F. officers were already talking of building a glider, although at this stage they were at a loss to know where to make it or how to effect the launching on completion. The R.A.F. officers were Flight Lieutenant Bill Goldfinch, who had been captured during the Greek evacuation, when his Sunderland flying-boat crashed and he was injured, and Flight Lieutenant Jack Best, whom he had met in hospital.

Although initially the Escape Committee thought the idea sounded pretty crazy, expert advice was sought, including that of two prominent R.A.F. prisoners, pre-war glider pilot Lorne Welch and legless ace Douglas Bader, and the concensus of opinion was that the proposition was perfectly feasible. A simple primary glider was proposed, capable of carrying two people, which would be shot across one of the highest rooftops in the castle in the darkness at just sufficient speed to avoid stalling. The basic requirement was for the glider to remain stable enough to be put down safely in a shallow stretch of water 300 to 400 yds. from the castle walls. There was no intention of attempting to glide any greater distance, because of the obvious limitations of the glider and the unlikely event of there being favourable wind conditions. However, if the glider could enable two people to

slip out of Colditz unseen, depositing them uninjured at ground level and giving them a reasonable start on their homeward journey, it would have achieved the principal aim. No one would ask any more of the Colditz glider—a glider born of sweat and craft and secrecy within the prison walls.

The glider escape project was duly registered but before it began taking shape there was a change in personnel. Walker stood down to take over a position on the Escape Committee, which precluded him from active participation in any bid for freedom, and a Royal Navy submarine officer, Lieutenant Geoffrey Wardle, stepped in to fill the vacancy. The operative four, then, were Rolt, Goldfinch, Best and Wardle. And the escape plan upon which they were now to embark was to evolve into one of the most incredible in the history of modern war.

Drawing upon the knowledge of aeronautics that he had accumulated in the R.A.F. Volunteer Reserve before the war and later in his training and operational units, together with study books borrowed from the Colditz camp library, Bill Goldfinch set to work on preparing rough sketches of the proposed glider. It had to be a simple design because of the inadequacies occasioned by location; a conventional high-wing monoplane, the wings braced by twin struts secured to the fuselage keel, it had a single rudder with the tailplane mounted on top of the fuselage, the leading edge just ahead of the rudder. The fuselage was slender yet tough, and in place of wheels, which were deemed unnecessary, there was a central ski-shaped landing skid incorporated for'ard in the keel. The empty weight was calculable for various overall dimensions and was kept down to the minimum consistent with a size adequate to convey two persons. The proportions were determined by one further basic factor: sinking speed. Being heavier than air, the glider would lose height relative to its forward movement, so this gliding angle, or sinking speed, which it was possible to regulate to some extent in design, had to be capable of allowing the craft to reach the chosen touch-down point in the river. Although the stretch of water was out of sight of the Colditz inmates, they had already

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become familiar with the geography of the surrounding area by careful grilling of tame Goons. The water was known to be no more than 2 or 3 ft. deep at this spot, a depth sufficient to cushion the landing, yet unlikely to hamper the occupants when they had to scramble out of their seats and reach dry land.

It was assumed that even if the fleeing fliers had the extreme misfortune to be spotted in the air, there was no real likelihood of the glider ever being brought down by gunfire. The scheme was for the glider to clear the rooftop at flying speed and bank to the right to get above the river and thus be poised for a flat glide in a straight line towards the landing point. This path would take them clear of ground obstructions and although there would be a certain amount of reflected light from the water, this was not considered to be a hazard. The launching would take place at night, ideally during an air-raid, so that even if the Germans risked turning on a searchlight and managed to pick up the glider in its beam, they were unlikely to get a pot-shot at it. A diversion was easy to arrange, anyway, with perhaps a dummy strung beneath a window-sill to attract the attention of the guards. Additionally, the sentries were invariably of an inferior medical grading, on account of service in appalling conditions on the Russian front, so they would have no end of a struggle to get their rifles up to the shoulder, aim and fire before the glider was down out of range and the occupants were scampering away along the freedom road.

Goldfinch had drawn up an inch/foot general arrangement blueprint of the projected glider, with plan view, side elevation and front elevation, from which the craft would be constructed. The eventual wing span was 33 ft., a little bigger than the Messerschmitt 109 fighter yet still smaller than the Spitfire, while the length worked out at  $19\frac{3}{4}$  ft. It was calculated to have an empty weight of 240 lbs. and a wing loading of just under  $3\frac{1}{2}$  lbs./sq. ft. The estimated gliding angle was 1 : 12, representing 12 ft. of forward flight for 1 ft. loss in height.

The launching plan was for a ramp built in prefabricated sections to straddle a ridge on one of the roofs of the castle. At

the far end there would be a pulley, around the top of which would pass the launching wire, and to the end of this wire a weight would be secured. By allowing this weight to fall, the glider would be propelled along the ramp. A length of conductor wire stretching down the side of one of the castle towers was earmarked provisionally as the launching wire; it was sufficiently long and strong enough to lift a tank. The nose of the glider would be equipped with an automatic trip-release catch of the sort used in normal winch launchings, so that the wire would slip free as soon as the glider cleared the far end of the runway. The weight itself would need to be calculated carefully so as to ensure the glider was exceeding the estimated stalling speed of 31 mph (26/27 mph with only one occupant) by the time the glider reached the end of the runway. The weight was a critical factor, because if the glider failed to attain flying speed at the point of take-off it would stall and plunge to the ground beneath the castle walls and carry the fliers to a probable grisly end. A bath filled with sand and stones, probably mixed with a crude form of cement, appeared most suitable for this makeshift launching weight to catapult the glider off the rooftop. It would have to fall at least a distance equivalent to the length of the ramp and there were, in fact, two alternatives for the passage of the released weight: it could either be allowed to drop down the sheer face of the castle wall, at the risk of descending upon a sentry and flattening him to the ground, or the launching wire could be fed back beneath the ramp to allow the weight to fall inside the castle through holes that would need to be gouged out in readiness in at least two of the floors directly beneath the rooftop runway. This second alternative, whilst more humane, presented rather more technical problems. It was a decision that might well be deferred until nearer the time for launching the Colditz glider.

With the drawings now ready, Goldfinch set about having a scale model built to test the glider's airworthiness. Using paper scrounged from John Watton, the artist, a group of the prisoners constructed a model with a 2-ft. wing-span. Hoofy Barnes, a

*Right*, Tony and Nick Goodhart, the best-known brothers in the world of gliding, have each set up new British records; *below*, Air Scouts (from the left) Colin Bastin (44th Fulham), Pat Wiegand, Alan Foreman and David Baddaley (all 5th Wallington), who flew solo at the end of their Scout Gliding Course at Lasham







*Above*, Schweizer I-23E, as used by American pilot Paul Bikle when he set up the new world altitude record; *below*, Pathfinder I, a T-31, first of the gliders presented to the Upward Bound Trust by the Pathfinder Association



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Royal Navy submarine officer, launched the baby glider from a third-floor window before early morning roll-call and the select band of men who were in on the scheme positioned themselves at vantage points overlooking the main courtyard. A retrieving party stood in readiness at ground level as Barnes catapulted the model off the window-ledge. It worked perfectly, above all expectations, gliding with supreme dignity in smooth and graceful flight to slither across the cobbled yard. The rescue party leaped into action to scoop up the model before any of the Goons came on the scene, feeling rather like boys in a boarding-school playing with paper aeroplanes when supposedly tucked up asleep in their beds.

In order to make maximum progress it was first necessary to establish a secret workshop where the glider could take shape, because there were no real facilities available for such a mammoth task in the dormitories. And, as it was virtually impossible to struggle any distance with the completed fuselage, mainplanes, fin, rudder and tailplane without detection, it was desirable for the glider to be built as near as possible to the ultimate launching point. This point had been determined already and its location was a steep-angled rooftop ridge, about 20 yds. long, high above the north wing of the castle. The chosen spot was valuable on account of its extreme height and commanding position above a sheer drop, and there was another splendid attribute in that this particular rooftop was a blind spot right out of sight of the sentry posts and clear even of probing searchlights. It was possible to clamber around in the open in this dead ground without the risk of being spotted and, as the launching was scheduled to coincide with a night bombing attack on nearby Leipzig or more distant Berlin, when the black-out would be in full force, there could hardly have been a safer place in the entire camp. It was also known to be an unoccupied part of the castle, further reducing the risks.

The launching area settled, there now came the question of finding somewhere close by to set up the workshop. A reconnaissance was instituted and this yielded a number of most

interesting facts that strengthened the whole project. The chosen rooftop was above a section of the castle where the French contingent was originally housed before being moved from Colditz, but now the rooms were empty and locked up, and out of bounds to all prisoners. Consequently, the Germans would not be under any great incentive to pay more than cursory attention to the area and this, too, made the location attractive to the glider-builders. The long attic that gave access to the launching roof was reached by way of an echoing spiral staircase from the cobbled inner courtyard, up two storeys and then through two heavy doors, each fitted with complex cruciform locks that for a time defeated the amateur locksmiths. It was musty and dark, but large enough to build an entire fleet of gliders. Statistics of the guards' movements suggested that although there was reasonable immunity, it was likely that a search would be made at least once every four or five weeks, which was insufficient time to build and launch the glider. However, they planned only for a single glider, so that if a small portion were to be sealed off by a false wall at the far end, a wall the Jerries would assume to be the original one, the glider could be constructed without disturbance from routine checks. Moreover, it was too remote there for anyone to hear the screeching saws and pounding hammers. When the time came for launching, it would merely be necessary to demolish the bricks forming the real end wall, for it gave immediate access to the chosen rooftop ridge. Only if the Germans spotted the false wall, or caught the glider group red-handed at work or in the immediate out-of-bounds area of the workshop, would the game be up. It was a cheeky move and a calculated gamble; as safe a bet as you'd ever pick up in a prisoner-of-war camp.

The scheme now was to build that dummy wall the full width of the attic and leave space behind it and the real end wall to position a workbench and tables and to store the main components of the glider as each one was completed. The area comprised a width of about 10 yds., which was ample to accept the maximum length of the fuselage, and the depth was perhaps

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half that distance. The wall would need to be erected in the shortest possible time because if the guards should find any hint of what was going on the whole operation would be prejudiced. Even if Jerry didn't tumble to the full scheme, it must necessarily focus unwelcome attention on a part of the castle that held out considerable promise for the inveterate escaper.

The wall was finally built in a single night, while the Germans were merrily celebrating a national holiday. Stolen doors and similar wood panels made into upright sections, covered with canvas sacking, were used as a key for the mixture of mud and clay to simulate the plaster finish of the existing end wall. Directing these proceedings, which were carried out beneath shielded lamps, was “Bricky” Forbes, an R.A.F. pilot who had been in the brick industry in his pre-Service days. The sight of a dozen officers, all looking utterly filthy, slapping mud feverishly upon the prefabricated wall panels like youngsters playing a game of mud pies, must have been one of the most amusing scenes at Colditz in the whole war. The critical period was now the drying time, for if any guard was to go up to that attic for a crafty smoke, even after the builders had retired to bed, there was every chance of the synthetic plaster revealing itself in the torchlight or crumbling under the touch of an inquisitive hand.

The entrance into the secret workshop was via a trapdoor. It was made by Major Anderson, R.E., with Squadron Leader Lockett assisting him, and was let cunningly into the floor at a spot where, from the empty room below, the plaster was falling away to expose the laths and the edges were scraggy. The trapdoor now would have defied the most thorough search of the dusty, cobwebby castle. To enter the workshop from the lower room one of the team had to brace himself against the side wall while a second man hopped on his shoulders to unfasten the trapdoor and pull himself up. There was a ladder inside which was then lowered for the remaining team members to use and draw up again to allow the trapdoor to be closed. Here, in this hideaway, the glider they christened *The Colditz Cock* was now to be built.

The necessary raw materials for this clandestine enterprise were wood, glue, cloth, dope, wire and assorted metal fittings. Obtaining a supply of wood to plane down into sections was probably the least of their worries, because there were floorboards and bed slats in plenty and the guards always seemed to accept a certain amount of wastage. Not even the most suspicious Goon would think other than that a missing bedboard here, or a floorboard there, had been ripped out for firewood to keep the prisoners warm. It must be remembered, too, that this could only be a long-term effort, so wood disappearing spasmodically over the course of several months was unlikely to be queried. Although the gathering together of the necessary stocks of suitable wood was not expected to be too weighty a problem, the choice of cloth to cover the glider was viewed with some concern. It had to be closely-knit cloth of a texture that would pull taut as a drumskin over the fuselage, wings and tail unit when coated with a liberal amount of dope. And cloth of any sort was in short supply. Experiments proved, however, that the problem was going to be a lot easier to solve than was first feared, because the blue-and-white check bed covers were exactly the desired material. As to glue, a certain amount was being smuggled inside by devious means and a substitute could be brewed up on a stove, using such ingredients as boot polish and fats. Dope was finally produced from finely ground German ration millet, the only complication being its susceptibility to the weather; whilst it shrank the glider skin ideally in a dry atmosphere, it was less successful in damp conditions and the tendency was for the cotton to become soggy and aerodynamically useless after a few hours. In the event of a stand-down, therefore, a further coating of dope might be necessary before the glider could fly. Wire for the controls came from odd lengths of telephone wire left around the castle corridors, and the metal-work for such items as wing pin-joints was scrounged from any available sources. The glider operation was given a code name: "Heavy Industry". It was a scheme that captured the imagination to such an extent, among those who were privileged to be in

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on the secret, that a man would willingly give up his most prized possessions to help such a worthy cause.

There were plenty of first-class carpentry tools in the prison camp theatre but these were provided through the agency of the International Red Cross and as such they were on parole. Although it is often said that all's fair in love and war, the Colditz glider-builders obeyed the unwritten law and faithfully left these tools well alone despite the sometimes overpowering desire to sneak them away to their attic hide-out. Fortunately one of their number, Jack Best, already possessed a remarkably fine set of tools and these proved invaluable. The extent of the miniature tool chest has since been detailed by Pat Reid, whose own home-run from Colditz had taken place before the glider was conceived, in the second of his two absorbing books on Colditz, *The Latter Days*.\* The kit, he explains, consisted of the following principal tools: a side-framed saw, the handle of beech bedboard, the frame of iron window bars, and the blade of gramophone spring with eight teeth to the inch. A minute saw for very fine work with gramophone spring blade, 25 teeth to the inch. A square, made of beech and gramophone spring. A gauge, made of beech, with a cupboard bolt and a gramophone needle. A large plane, 14½ in. long, with a 2-in. blade, bribed from the Goons, the wooden box made of four pieces of beech screwed together. A small plane, 8½ in. long, with a blade made from a table-knife. Another plane, 5 in. long. Drills for making holes in wood were made of nails; a ⅝-in. drill for metal was obtained by bribery. And lastly there was a set of keys, including a universal door-pick, forged from a bucket handle.

It was now May 1944. The designs of *The Colditz Cock* had been finalised and the workshop was ready. A start had been made on preparing the 2 cwt. of materials. There was no shortage of volunteers to build the glider, and the tools were to hand, but there was still a major aspect of organisation that had to be worked out before a practical start could be made. To overlook this one vital function was to threaten the success of the venture.

\* *The Latter Days*, Hodder & Stoughton.

It was possible to negotiate the spiral staircase, the locked doors and the trapdoor without assistance but there remained the many-sided problem of security. The three- or four-man team at work in that dingy attic eyrie up in the rafters of Colditz Castle had to be ever confident that there was no chance of a surprise search being set in motion in their vicinity. This could only be achieved by an elaborate system of organisation embracing three or four dozen prisoners. They would work in shifts in various parts of the castle, each an important link in the chain, few of them having more than the sketchiest notion of the overall scheme. It was the top-secret "Heavy Industry" project and that was enough to win their instant and unqualified support.

The key link in the security network was a man in the workshop. He sat astride a cross-beam in silent vigil, peering through a chink in the roofing tiles, his eyes fixed on a window-sill two storeys below across the courtyard. Here, on this sill, messages were transmitted by means of various coloured tins signifying the all-clear and warnings of enemy activity. The information was relayed to the window through an intricate spider's web of observation posts at strategic points all over the castle. The signalling system was highly organised and there was always an alternative window within sight of the attic spotter in case anything should go wrong. Stooges were positioned to command all entrances so that any undue movement of the guards, inside or outside the castle, could be picked up by the glider-builders within 15 to 30 seconds. They were blind only for two to three minutes between mounting the spiral staircase and entering the workshop at the start of a construction session and between opening the trapdoor and reaching the foot of the staircase within bounds again at the end of the shift. If any of the team had been surprised at this time, probably in a dishevelled condition from strenuous work in a confined space, they would have been exceedingly hard pressed to find a convincing explanation. That, however, was a hurdle to be overcome at an appropriate time.

The signalling system worked perfectly for weeks on end. In the attic, assured of advance warning of any impending search,

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the team watched the glider components taking shape. They worked in gloom for most of the time, their only illumination coming from a gap left by a tile prised from the gables and a crude lamp that burned on fat. Numerous times the work was hurriedly halted on account of a warning alert and everyone would fall into a strained silence. The measured tread of jackboots clomping along the bare boards of the adjacent attic raised beads of sweat on the grubby foreheads of the glider team. They would see the light of the guard's torch flick past a crack in the false wall and hear him strike a match. Then there would be the sound of his breath as he exhaled cigarette smoke. Ten minutes; 20 minutes; 30 minutes. Even as much as an hour. Wouldn't he ever leave them in peace? Then tension relaxed. He was moving towards the far door. He unlocked it; he was gone. Work on the glider could recommence. And up on that rafter the stooge sat patiently watching for a change in cans on the window-sill 45 degrees across the courtyard.

The intruder was not always of the two-legged variety. Once, at least, Jerry took a guard dog into the lower attic during some special search. The animal must have had a poorly nose, however, for any self-respecting dog could hardly have failed to pick up human scent at such short range. What the Germans would have done, having found a two-man glider being built beneath their noses at a time when they were preoccupied with poking around for odd files, compasses and maps, scarcely bears contemplation. Life was like that in Colditz, though—luck was on the side of the brave most of the time.

Slowly the aerofoil sections, the ribs, the side trusses, the main spars, the struts and the landing skid were completed and Charles Lockett ran strength tests on all the finished products. Lorne Welch cast his expert eye over the wing assembly in particular and began heaving at the wing tips, upwards on the rear spar and downwards on the front spar, while applying all the twist he could summon before pronouncing them stiff enough to pass muster. The team could crow if they so desired for *The Colditz Cock* was almost ready for flight.



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The "Heavy Industry" project had been planned and executed with meticulous attention to detail in all but one almost basic aspect, and this was the composition of the glider's crew. There were two seats, one behind the other, so except in an extreme case two men would be making an aerial bid for freedom. The big question: which two? Deliberately, the choice was put off until the very last moment; it was an understandable reason, of course. If the selection were to be made before completion, perhaps by means of a lucky draw among the four principal figures, the unsuccessful pair might be less inclined to pull their weight. A probable combination would have been either Goldfinch or Best in the pilot's seat, because of their flying experience, and either Rolt or Wardle sitting behind as the passenger. Certainly that composition would have been considered both sensible and fair to the quartet and also acceptable among those on the outer fringes of the project.

However, there was one further permutation that had to be borne in mind and it was an equally important factor in the decision to delay selection of the crew until the time came for the glider to be assembled for flight. Colditz contained a number of Very Important Prisoners ("Prominente" was the name given this group within the castle), like war correspondent Giles Romilly, nephew of the Prime Minister, Captain The Master of Elphinstone, nephew of the Queen, Lieutenant Lord Lascelles and Captain Earl Haig, whom the fanatical Nazis might intend to use as hostages in some desperate last-ditch stand in a fortress hideaway in the closing stages of the war. If such action should be suspected, there might be every reason for ensuring the escape of one or more of these men, or an emissary, by means of *The Colditz Cock*. There were truly so many imponderables at this stage as to make it vital to delay the crew selection until the Escape Committee, whose choice it would then be, might assess the up-to-date situation and ensure that such an ingenious escape vehicle was able to yield maximum value. The total number of prisoners who had worked on the project, as a ratio to the known limit of individuals able to take advantage of it, probably stands

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higher than any other escape scheme in a British POW camp. Tunnels might convey scores to freedom before their presence was discovered; the glider could fly once only.

With the glider virtually complete, Colditz Escape Committee actually had the audacity to organise an Open Day! Invitations went out by word of mouth to all the senior officers in the camp and a rota system was put in force allowing them to go up to the secret attic under strict security and inspect the work in progress. Two or three at a time were cautiously shepherded into the out-of-bounds area and handed from guide to guide up the spiral staircase, through the two locked doors and up the ladder into the tiny workshop. Douglas Bader, whose judgement had been sought regarding the practicalities of the glider escape in the initial stages, joined the steady stream of visitors that day; willing hands bundled him through the hatch in the floor, tin legs and all, for he wasn't the chap to miss a chance of seeing what progress had been taking place during these past months.

Early in 1945, by which time an instruction was being circulated by the Allied authorities calling for a suspension in escape attempts because the enemy appeared to be getting rather trigger-happy with recaptured prisoners, the glider project was put into cold storage. It was like a pre-packaged meal, ready for sampling yet kept back for serving at just the right occasion. And that order would come only from the Senior British Officer at a time he judged to be the most opportune. Discipline being what it was in the camp, the decision was accepted without a murmur. It seemed entirely sensible to hold back *The Colditz Cock* for a last-resort escape bid.

It was not to be the end of the story, though, because the four principal players, Goldfinch and Best, Rolt and Wardle, had another role to fulfil as custodians of the workshop. As long as that sealed-off room remained unknown to their captors, there was every reason for it to be put to good use. It had hidden the glider and team already for close on a year; surely it must make an equally convenient hiding-place for a dozen or fifteen men

compelled by desperate circumstances to go to ground in Colditz?

As the Allied advance nudged towards Colditz, the Americans from the west and the Russians from the east, the Germans knew that the castle must soon be over-run by one or other of these forces. The Germans, if they had any firm instructions, kept silent. The British prisoners, who were by now swollen in number with the influx of hordes of Frenchmen pushed into the once isolated wing where the glider was ensconced, thought they would most likely be despatched on a forced march across the countryside in the true traditions of a fleeing enemy. If this were to happen, Goldfinch, Rolt, Wardle and Best intended remaining behind in that workshop until the future became less confused. They'd grown used to Colditz; they preferred it to a long walk into obscurity.

With this in mind a crystal set was installed in the hide-away and a month's supply of food and some water was cached there. Only a single makeshift skylight ventilated the room, so conditions would not be too pleasant, particularly when the fat-lamp was burning, and sanitation was a real problem. However, even though the British were evacuated, it was reckoned that the Frenchmen would be kept behind in the castle in their present quarters. On this assumption the four Britons took two of the French prisoners into their confidence. It was vital that they entrust someone with the knowledge of their existence, in case of an emergency, and there had to be someone to empty their toilet buckets at intervals. At one point, in fact, when the Allies were only a short distance off, some of the VIPs were secreted in the attic workshop under these siege conditions so as to keep them out of German hands. They were brought out after a few hours, however, when the Senior British Officer, Colonel Willie Tod of the Royal Scots Fusiliers, pointed out that there was little to be gained for the time being, because it was obvious that their captors would insist no one could possibly have left the castle and they could, if they wished, toss a grenade into every room until they found the missing men.

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It was now vital to have some form of contact with the outside world in order to keep right up to date with information about the Allies' advance and the reaction of the Germans in the district. The radio was useful for a general assessment of the state of the war in central Germany but it was neither sufficiently detailed nor fast enough to give the necessary reliability. What was really required was someone in the town who could keep them posted, particularly when the Castle began to be evacuated and the handful of Britons took up residence in their secret eyrie. If, for example, it was intended to turn the castle into a military stronghold, which would become the focal point of a raging battle, the group would wish for prior knowledge so that they could decide where to move.

Their salvation came with the help of Checko, a Czechoslovakian airman with a tongue-twisting surname, who had evidently won the favours of a charming dental nurse he had met in the town while allowed out on parole for specialist treatment. Over the course of several weeks, in readiness for what might happen, Checko and the girl worked out a complicated system of feeding information to the group. It was to cover such occurrences as evacuation of the town, advance of the Americans and Russians and various decisions regarding the future of the inhabitants of the castle. The nurse would pass on the information to them by making certain movements while out in the street in the view of one of the watching British stooges; these included pushing a pram with her hands in a particular position, stopping by a lamp-post, crossing the road at predetermined points, and so on. By means of these signals the prisoners in the hilltop castle could have a valuable indication of what was likely to happen so that they might plan their own course of action. It was as good as fool-proof—an idea born of love and gift chocolate!

By mid-April, Colditz's "Prominente" of several nations were being moved towards Austria in heavily guarded coaches under cover of darkness. On Saturday, 14 April General Hodges' armoured spearhead units were within a mile or two of Colditz and Colonel Tod was trying to stall the German Commandant's

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order to get the three hundred or so British prisoners ready to be moved eastwards ahead of the liberators. Still he held the glider ace up his sleeve. In the woods around Colditz, Hitler Youth and Stormtrooper formations were preparing to fight to the bitter end. A marker shell slammed into the castle, the one casualty being a German NCO whom the prisoners regarded as being probably the most unpleasant of the whole bunch, and the battle showed every sign of hotting up. A further barrage of shells crashed into the town and buildings toppled in heaps beneath plumes of grey dust. The crump of shells and the rattle of machine-guns punctuated sleep throughout that long night. Next day the Americans were trundling into Colditz and accepting the surrender of the German castle garrison. According to a story going around at the time, the castle had had a most fortunate escape. Apparently, one of the American armoured units had lined up their sights on it, believing there was an enemy observation post situated in one of the lofty towers, and information about Colditz being a prison camp came through only when the shells were already loaded and the tank commander had opened his mouth to give the order to fire.

In view of the danger that still existed from the nests of German troops sniping and rampaging in the immediate area, Colonel Tod kept his charges within the castle grounds, allowing only a few out at a time to scrounge food, one of them returning with fresh trout plucked from the nearby river. He had gone out equipped with a supply of American Army hand-grenades and tossed them into the water to knock the fish senseless. The trout made a superb meal but even so the real mouth-watering joy was a scrumptious fry-up of fresh eggs and bacon, the first that the majority of the prisoners had had in years of captivity.

Meanwhile, up in the attic that had been a vantage point for the glider group to survey the course of battle, *The Colditz Cock* was being assembled for the first time. Rolt, who knew nothing of this because he was riding proudly around the town at the wheel of the former Commandant's DKW in search of food, now roared through the main gate to be met by Stooge Wardle.

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“Quick!” shouted the excited Royal Navy officer. “Something’s happened to the glider!” In the midst of the joy of liberation, Rolt suddenly became glum. What on earth had happened? What dreadful fate could have befallen the lovely dream bird that he had inspired and helped to build with his own hands? With anxious steps, he hurried along at Wardle’s side to the lower attic and pushed his way through the crowd blocking the entrance. Only then did he realise the trick that had been played on him. Nothing had happened to *The Colditz Cock* at all—nothing except that the jigsaw pieces had been fitted together so that it rested now on the dusty floor, a craft of grace and beauty that brought a lump in Rolt’s throat. Several thousand man-hours had been put into this bedboard wonder out of sight of suspicious eyes. Here it reposed, complete, yet with the big question unanswered.

Could the glider really fly? The liberation was accomplished so swiftly that there was no way to find out with any certainty. It had always been reckoned that there was no doubt about it; yes, that glider would have been able to fly, although no one was worrying unduly about applying for a Certificate of Airworthiness in Colditz before pushing the thing on to the rooftop ridge. As the ramp had not been built, on account of the project being curtailed, the original launching system could not be operated at this stage, so there was no sense in thinking about a flight trial yet. If the prisoners had not been trucked out of Colditz Castle within three days of liberation, instead of the expected two or three weeks, they would surely have found the answer to that intriguing 64,000-dollar question. Whilst Goldfinch had ambitious plans to get hold of a Tiger Moth and tow the glider home to Britain, there was in fact an equally feasible system of getting *The Colditz Cock* airborne without resorting to a scheme with such far-reaching consequences. Once the wild-eyed Hitler Youth had been winkled out of their positions in the surrounding countryside, Rolt had high hopes of hauling the de-rigged glider to a flat field he had already selected and getting the craft into the sky by means of an auto-tow, probably using a 15-cwt.

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Army truck or even his borrowed DKW and the length of lightning-conductor wire previously earmarked for the launching-cable. Instead, he and his fellow glider-builders were on their way home before there was any opportunity to put the glider to the supreme test.

Was the conception of the Colditz glider merely a flight of fancy plucked from the idle minds of captive men? On the contrary, the considered answer must be that this fantastic escape bid was entirely possible. *The Colditz Cock* is flying today—if only in the thoughts and dreams of the men who conceived this most inspiring of all the war-time gliding ventures.

## 1945—52

The Second World War now over, time was still needed before gliding as a sport would regain the ground lost on account of preoccupation with military pursuits. Land and premises had to be returned to original owners; clubs had to be reorganised as members drifted back from the Services. Soon, though, those huge camouflaged troopers were seen no more strung out behind their tugs in the skies over Britain and there came instead the soaring single- and two-seater craft wearing again their gay colours and club insignias.

National and international organising bodies were resuscitated and soon, in Switzerland in the summer of 1948, teams representing Britain, Switzerland, Sweden, Finland, France, Italy, Spain and Egypt were fighting out the first international competitive events of the post-war years. The honours in the end went to Sweden, and with them the distinction of being invited to stage the next such meeting in 1950. With an increased field in Sweden, and the tally of competing countries now up to eleven, gliding at an international level was surely riding high. Germany alone among the major nations was a non-starter.

A reluctant non-starter? Certainly not for lack of interest. The enthusiasm was there right enough. The hold-up was purely due to circumstances controlled by the aftermath of war. Coupled with restrictions made on aviation similar to those enforced at the end of the First World War, the Allied occupying powers this time imposed a ban on gliding at the end of hostilities. It was to last until the summer of 1951 when the West German Federal Chancellor successfully appealed to the Allied High Commissioner for the country's youth to be permitted once again to indulge in gliding as a sport. They got quickly off the mark—an obvious sign of their enthusiasm. Within a few weeks the first post-war meeting was being held, appropriately enough at that cradle called Wasserkuppe again, and within a single year Germany had a team in the world competitions in Spain. The nation was eager, excited.

These contests, held in 1952, drew the widest field of all so far, 18 countries, alphabetically ranging from Argentina to the U.S.A. And the Man Of The Match? A German, perhaps? A Frenchman or a Swede? No, it was undoubtedly Britain's Philip Wills . . .



## WHERE THERE'S A WILLS . . .

IT WAS HARDLY the luckiest omen when the British team arriving in Madrid for the 1952 World Gliding Championships discovered that there was no Union Jack in their luggage. They had their sailplanes and their crews; they had their repair kits and their multi-language phrase books. Everything, so it seemed, apart from the national flag to be unfurled proudly alongside those of the seventeen other competing nations at Cuatro Vientos airfield seven miles outside the Spanish capital. And a team without a flag would be like a team without a captain, still able to join in yet suffering under the moral disadvantage of lost dignity and fallen pride.

The obvious place to find a Union Jack was the British Embassy, so one of the team was despatched on a mission to retrieve their honour. The Embassy didn't have one! Help came in the end from the Spaniards themselves on the now bustling airfield shortly before General Gaellarza, Spain's Air Minister, was due to open this third of the post-war series of international gliding championships. They gaily produced a blue bedspread, cut it to size, and then tacked red and white ribbons in the appropriate pattern. The honour of Britain thus appeared to have been saved by some quick thinking and even quicker needlework. The teams formed up in smart columns on the sandy airfield and slowly the flags of the participating countries were raised by the captains in due ceremony to flutter in the breeze. Only then, when they were each at the top of the line of flagpoles, did anyone spot that something quite vital was missing on that makeshift Union Jack—they'd put the red and white stripes on one side only and left the reverse side its original all-blue. What a galling start to a world championship!

Since the end of World War II, Switzerland first and then Sweden had been the host nations for these biannual championships. Sweden had won them both, with Britain trailing in tenth place in the 1948 events and fifteenth in 1950. In each of them Philip Wills was Britain's senior pilot and it was to Wills, naturally enough, that everyone was looking to put up the best performance again in hot and dusty Spain. Wills was both an expert and a veteran. Now 45 years old and Chairman of an import merchant company in the City, he had taken up gliding 20 years previously at Dunstable and breaking British gliding records was almost a hobby with him; he had been national champion three years running, in 1948, 1949 and 1950. If any Briton could wrest the international crown from Sweden, Philip Wills was that man.

He was heading a strong team, comprising full-time gliding instructor Lorne Welch and R.A.F. flier Jock Forbes, both with previous international experience, London engineer Geoffrey Stephenson and airline pilot Frank Foster, both of whom had distinguished themselves at national level although they were new to world competitions. Of these five pilots, Wills alone had flown before in Spain and during the earlier visit he had become well aware of at least one glaring deficiency in Spanish flying organisation—they had shockingly poor maps. A glider pilot must possess detailed and accurate maps of the countryside over which he is flying or else he cannot make maximum use of the geographical features to aid his flight. The maps Wills had been forced to rely upon may have been all right for the Spaniards, who had the benefit of local knowledge anyway, but they were neither sufficiently detailed nor particularly accurate for a visiting pilot. Wills laid great store by maps. Before going out to Spain for these championships, therefore, British European Airways were asked whether they could find some better ones for the British team. One of their pilots, Frank Foster, was in the team and he came up with some maps in Italy of all places—and even more surprisingly they had apparently been produced by the Germans at the time of the Spanish Civil War. Wills inspected

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these maps carefully and noted particularly the brown smudges signifying land undulations and the regions where the burning rocks might be expected to generate powerful up-currents to benefit the sailplanes. Wills expressed his delight, for these were certainly just the job. He ordered a set for each pilot and retrieving crew and felt considerably more at ease. His foresight would pay off in the end.

The team were flying the latest British craft, Skys made by Slingsby Sailplanes Ltd., of Kirbymoorside, Yorks, from whom the majority were on loan for the championships. Industry supported their efforts patriotically with generous donations towards team expenses and miscellaneous equipment that was to prove an especially valuable contribution. For instance, Standard's made them a loan of Vanguard estate cars and each glider carried a lightweight Pye radio set to keep in contact with the ground team. Regulations allowed a maximum of three people to each competing sailplane, so 15 was the British complement. Besides captain Ann Douglas and the pilots there were drivers, mechanics and their own meteorologist, Dr R. S. Scorer from Imperial College of Science and Technology, one of the leading met. men in the world, who has made a prolonged scientific study of the influences of weather conditions upon soaring flight. Britain was now geared for victory with the finest available pilots and sailplanes, the latest equipment and adequate maps, as well as the most competent technicians and handymen, capable of attending to every detail from advising on the passage of a cold front that might help or hinder the glidermen to repairing the engine of a car that has broken down on the dash to retrieve a landed sailplane. Nothing was left to chance in the determined bid for gliding supremacy.

In order to prepare themselves for the contests, Britain's team decided upon a minimum of a full week's practice period at the competition venue. Some contestants had the same idea while others, like the Belgians, Italians and Egyptians, put in an appearance only on the opening day. There were two basic reasons for this lengthy preparation. Firstly, the team had to

get themselves accustomed to the new way of life (Spanish tummy can defeat a glider pilot even before he gets off the ground) and, secondly, there was much to be gained from preliminary sorties in which to gather practical knowledge of soaring conditions in a country so different from Britain. Some of the later arrivals were by now wagging their fingers in criticism of Wills & Co. because it was considered that they were tiring themselves out with irrelevant hard practice; the British party shrugged off these comments and stuck to their pre-arranged schedule. Only time could prove them right or wrong.

It was arguable whether the pilots or the repair men were the busier during that training week, because Welch's Sky had been damaged in transit and out of commission for three days and Wills' Sky was grounded for a similar period after a rough landing. Had it been absolutely necessary, Wills' glider could have been put right in half the time but there was much for him to do on the ground and consequently there was no great urgency about the repairs. It was a matter of relief that the damage was no worse, for Wills had ground-looped and come precariously close to writing off the Sky. Nevertheless, when the time came for competitive flying, Britain's pilots had sampled a tantalising cocktail of flight conditions, in the course of which they achieved promising performances in distance as well as height—good heights were proving easier than long distances because of the criss-crossing mountain ranges that were often stumbling-blocks to the unwary visitor. The retrieving teams were becoming familiar with mountain driving by this time and the maps were already a source of profound jealousy among the less fortunate nations who had failed to take the precaution of procuring them.

In the air a competition pilot wins or loses on his interpretation of the available sources of lift and the manner in which he rides them. These chimneys of rising air, which may come from rocks warmed by the sun and are often marked by clouds scudding across the sky, form his power units, for he has no engine to boost him on his journey. He reads the clouds and the

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ground below to find clues to those invisible columns of lift. Practice is his greatest asset. He must know where to find them and he must know when the time has come to seek a new one after extracting the most lift from his present source. There is much he can learn on the ground but only the sky can breed a champion.

Monday, 30 June. The ceremony of the flags. The opening speeches. Everybody drifted to another section of the field. The one-sided Union Jack was later replaced by a conventional, though out-size, version which had been unearthed somewhere in Madrid, and again the situation provoked embarrassment because the flag was larger than those of the other nations and once more stood out like a sore thumb.

It was a duel almost from the start between Philip Wills, the only contestant to have flown in all the full-scale internationals since they were first held as long ago as 1937, and Gérard Pierre, a 19-year-old Frenchman who was a complete newcomer to the international scene. Pierre, short and stocky and shock-haired, flew a Castel-Mauboussin 8-15 sailplane with an unconventional "V"-shaped tail unit. Ignoring for a moment the relative merits of the two sailplanes, one wonders which would count for the most—the experience of the mature Briton or the eager enthusiasm of the Frenchman, less than half his age, a youngster who wasn't even born when the tall, slim Wills began gliding. As to the sailplanes, Wills' Sky was larger and slightly heavier than the older CM 8-15, one of four different types of sailplane which the French had brought down to Spain. The Sky was built of spruce and birch plywood and had a 59-ft. wing-span. The wing area was 187 sq. ft. and the aspect ratio was 18.7. The maximum all-up weight was 800 lb. The CM 8-15, on the other hand, weighed not much more than 700 lb. fully loaded. The span was some 10 ft. less than the Sky; wing area was 161.4 sq. ft. and the aspect ratio 15. Like the Sky, it was of wooden construction.

Aero-towing was the method adopted for launching the sailplanes at these competitions and the Spaniards had assembled a veritable armada of 21 aircraft working in relays to get the

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gliders airborne in the minimum time. In the draw for take-off positions on the first competition day, 3 July, Wills was placed in the No. 1 spot and led off the field of 41 single-seaters and 17 two-seaters just after midday, the final one becoming airborne in the wake of the tow-plane hardly more than an hour behind him, a creditable attainment considering the unusually large number of craft to get off the ground. The task was a free distance flight with maximum points going to the pilot achieving the greatest distance. In the practice week, Welch and Forbes had each exceeded 150 miles and Wills once made an out-and-return trip to a point more than 120 miles away. When the competitors were already on their way, the weather started to deteriorate rapidly. An extremely violent cold front passing over the region brought shifting winds and troublesome gusts, particularly at low level, and one of the first victims was Britain's Frank Foster who, on approaching to land, dropped from still air into a vicious squall within only a couple of hundred feet of the ground. The cherry-red glider careered down a boulder-strewn slope and was flung against a telegraph-pole. The fuselage was torn apart and a wing was crumpled. Ironically, Foster had put up one of the best performances of the day with a flight of practically 140 miles and now he was right out of the contest, since it was out of the question to get the wrecked Sky flying again with the limited resources available.

With Britain now reduced to four competitors, Jock Forbes brought some cheer by covering 161 miles to head the team and Wills followed with 126 miles but it was the young Frenchman, Pierre, who scored the 1,000-point maximum with a 186-mile flight out to the valley of the River Ebro, north-east of Madrid and more than half-way to the Pyrenees. Foster was not alone in his grief, for two more sailplanes besides his were written off in landings on rough terrain in the unnatural gale-force winds; one sailplane was even blown on its back after making a safe landing not far from the battered Sky. A Danish competitor was lost overnight, despite an air and land search, because a thunder-storm had brought down the telephone wires in the vicinity of

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his lonely touch-down point in the mountains and there was no way he could let the organisers know that he was unharmed. Spain, a country normally noted for sunshine and blue skies, looked to be in the throes of a meteorological revolution to overthrow the aces of the gliding world.

Holding the lead in the first contest, Gérard Pierre could afford to take a risk in the next event two days later, a flight to a set goal which pilots would choose from a list of 32 compiled by the task-setters. There were bonus points to be earned for reaching the goal but an over-optimistic selection could be unfortunate, as there was a penalty for the pilot who chose a goal beyond his reach. The majority of the targets were to the north-east. Pierre chose León, a town 180 miles away to the north-west, the least popular direction from Cuatro Vientos, their airfield of the Four Winds. Wills, on the other hand, who had gone to the contests with the firm belief that a good overall average would triumph over an isolated blaze of glory, chose the popular goal of Zaragoza, 170 miles distant and ten less than Pierre's goal. He preferred to strike out for a goal he believed to be within his grasp than chance over-reaching himself, as he thought the Frenchman might do on his longer journey to a more difficult target. Wills had team-mate Geoffrey Stephenson for company on the route to Zaragoza; they scraped over the last ridge with precious little height in hand, yet succeeded in keeping on to their goal and set down their respective Skys within the space of a minute on the same patch of ground.

Back at Cuatro Vientos, Wills was to learn that after all Pierre had made it to his goal, too, and as his was the most distant goal attained he had collected maximum points for the second successive contest. The score was now Pierre in front with 2,000 points and Wills up to second position with 1,616 points—673 for the first contest and 943 for this second event. The Englishman's tactics were proving quite sound even though Pierre had struggled on to his intended goal. Wills had played his hand cautiously by picking out a relatively modest goal in the knowledge that there were valuable points to be amassed even

if (as had now happened) the Frenchman also got home. In bridge parlance, Wills scorned the spectacular grand slam in favour of the longer-term prospects of a regular four spades. The Americans MacCready and Schweizer, for instance, aimed high with a point 195 miles away and just short of the Portuguese frontier to the west-south-west, only to be forced down considerably short of their goal in a losing battle against the wind.

Could Gérard Pierre hang on to his lead or would he now drop his first points of the contest? Could Philip Wills catch up or even pass him? These were the questions in the two pilots' minds as they joined the briefing for the third task of the series. It was a lengthy business, since the information had to be imparted in Spanish, French, German and English, in a manner vaguely reminiscent of the building of the Tower of Babel. The task emerged: a race to a finishing line at Torre Sevinan, 77 miles to the north-east. Wills was launched into a strong up-current, giving him a fine start, and he touched down 1 hour 24 minutes 25 seconds later to win the race and pick up maximum points, although he didn't know this at the time because the system of staggered launchings meant that even the last to arrive might have clocked the fastest time.

It was a close race and several gliders were already in sight when Wills skidded to a halt. There was no way of assessing their respective chances because no one knew the next man's release time. They had to wait for the official timings. Across the field there was the American pilot Paul MacCready; he had done better this time and completed the course in only two minutes longer than it had taken Wills. Two seconds separated two more of the leading pilots—Jock Forbes and the Dutchman G. J. Ordelman, both of them flying the British-built Sky sailplane, Ordelman's with a red identification patch on the starboard wing. Pierre finished more than 25 minutes behind Wills in an average speed of 41.64 mph against the Briton's 54.21 mph. For the first time the Frenchman had failed to secure maximum points, yet he still retained the lead, a much reduced lead, which now



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amounted to a mere eight points—so close, in fact, that a puff of wind might decide it.

In contests such as these, tasks are set on the day itself, depending upon the weather pattern expected at the time of the flight. There are a number of different tasks to form the basis of a competition programme, notably free distance, goal flight and speed events, but because the day's task must be chosen relative to the prevailing weather, their composition and sequence cannot be predetermined. Even when all the sailplanes are massed ready for take-off on a selected task, or some are already airborne, the organisers may declare a "No Contest" day if the weather fails to come up to expectations.

It seemed that sporadic banks of cloud were now expected over the airfield region and the Spanish authorities decided to discontinue launching because those who caught the passing cloud would have an unfair advantage over those who had to be released into the gaps between them. At least two of the pilots who had already started were sorry to see the Storch plane that was sent up to bring them back to earth; one reckoned he had never come across such hefty thermals while the other considered that a 125-mile trip was quite on the cards. Still, the organisers ruled "No Contest". These are the irritations of gliding, for the rivalry is immensely keen, especially when the gap is closing as rapidly as that between Britain's senior pilot and the young Frenchman, who was now just eight points ahead. The scoreboard in the briefing room now bore the legend: Pierre (France) 2,624; Wills (GB) 2,616. Yet, like boxers in the ring, these two men did not say a word to each other. Gliding has no barriers save that of language—and neither pilot knew enough of the other's tongue to enter into conversation. A smile, a wave—these were the symbols of recognition and acknowledgement between the present leaders of the field.

Next day's task was another distance flight, as on the opening competition day, although this event was especially critical in that it was the fourth of the series. Four competition days would mean that the series rated for full championship status;

although it was not due to end for another four days, no one could be certain of the weather remaining sufficiently stable for any further competitive flying during this period. If, therefore, the distance flight should turn out to be the last event because of unsuitable weather for the remainder of the contests, the winner would be the person with top points at the end of the flight. With only eight points between Wills and Pierre, Wills had to dispense with caution and fight for the lead. And what made the situation even more tense was the fact that there was the Flying Dutchman, Ordelman, about to start breathing down Wills' neck with 2,414 points—202 behind Wills and 210 behind Pierre. The trio were incredibly close with three dozen variously spaced contenders to bring up the rear among the solo pilots. At this delicate stage in the competition, with so few points between the Frenchman, the Briton and the Dutchman, everything seemed to hang on a wisp of wind or, perhaps, upon the accuracy of their maps.

British equipment was playing a major part to benefit the team and reinforce the flying achievements. Competition gliding is so dependent upon team work, with the pilot and ground crew combining to maximum effect. The sailplane, once it has landed, must be located and returned to the launching site quickly to allow repairs to be carried out, should they be necessary, and to ensure that the pilot has sufficient rest before the next contest flight. A retrieve can only be successful if the crew are fully aware of the pilot's whereabouts throughout the flight. The radio was the link and the sets that the British team carried were proving efficient in operation and range. Often retrieving entailed long, hard drives through the Sierras with the trailer rocking and bouncing behind the estate wagon along twisting roads and through narrow defiles. It wasn't quite as bad as Italy, where a retrieve can sometimes extend to double the air distance because of the tortuous mountain roads, but even so a glider flight of 100 miles could necessitate a 140- or 150-mile drive to reach the touch-down point. The ground team did as much as anyone to boost a pilot's chances in these contests. And a sloppy retrieve could ruin him.

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In gliding, where competitors do not necessarily even fly in the same direction and altitudes often differ in any case, the pilots are usually unable to follow each other's progress visually and even information over the radio link with their ground crew cannot always keep them fully in the picture. Back at base, however, as the telephoned reports of landings are received and tabulated, there is soon an indication of the overall pattern. It is rather like building up a jigsaw puzzle when many of the pieces are missing. The first names chalked up on the results board will probably be those who have failed to achieve notable distances. Then the spaces will fill gradually as more and more landings are notified from farther and farther away. There are the occasional upsets when a particular pilot is assumed to be doing well, because there is no word from him, and it transpires that he landed a couple of hours ago and couldn't get to a telephone to report back to the airfield.

Yet the tense drama of expectation and disillusionment in the control room is more than matched among the competitors themselves for they are after all the central players in this game of aerial hide-and-seek. They pick up a snatch of conversation on the radio that Switzerland's Pirat Gehriger is down; he's done 148 miles in his Air-100. A Canadian has been stopped somewhere to the south-east by a cold front. It's not yet clear how far he covered before he had to land. So it was with Wills, that afternoon of the second distance flight and fourth event of the championships, for he had stretched out his journey to 146 miles and was now waiting for his wife Kitty to roll up with the trailer to get the bright blue Sky back to Cuatro Vientos. He knew he had had a good flight but had no idea when he landed how he had compared with the remaining fliers—particularly his French rival. Only after the gruelling drive back to the airfield did he learn how he had fared—Pierre had managed only 108 miles and picked up 713 points; Wills himself had gained 963 points. The positions were thus reversed and the Briton was now in the lead with a total of 3,579 points, and Pierre, 242 points behind him at this stage, occupied second place. Could he hold it, that

slender lead, if the weather should permit further competition flying before the flags were pulled down in four days' time? It was hard to believe that originally the organisers expected a minimum of eight days for competition flying and now the championships were almost at an end after half that number of flights.

Competition flying was taking place on alternate days and this break was necessary not only to enable the sailplanes to be brought back to the site and give the pilots and ground crews a respite, but to allow running repairs to be completed. In the event just concluded, for example, Geoffrey Stephenson's Sky suffered from landing on stony ground at the end of his 140-mile journey. Holes were punched in the fuselage and the sailplane had to be trundled into an airfield hangar at Cuatro Vientos while the damage was made good for the next event. Fred Slingsby himself was one of the repair gang on this occasion; no one knew more about the Sky than he did, and this cheery designer, working in his shirt-sleeves long into the night, inspired them all with his confident approach to the situation, and sure enough the Sky was ready well before briefing for the next contest event.

Briefing this time caused a stir because the organisers had no task ready for the pilots. They couldn't reach a decision as to the most appropriate event although the choice fell squarely between another speed race or another goal flight. The alternatives were put to the competitors themselves—and the result was a tie! The organisers, who were now forced by circumstances to make the ultimate decision, cast in favour of a race to Torre Sevinan, 77 miles off, which made the event a repetition of the race held four days previously. Wills had won that event; might he, then, win this one, too?

Out on the airfield the sun is beating down upon the teams of 18 nations preparing their sailplanes for flight. They check the controls; test the radio. Pilots study their maps and imprint upon their minds the principal features that stand out to left and right of the pencilled line between the home airfield and the spot to which they must soon race. They relive the previous race over

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and over in their minds. Where did they go wrong? Will the circumstances be the same this time? How about the weather? They look up into the sky and wonder . . .

It is more than 100° F. on the parched airfield, and the sky is clear except for the familiar line of cumulus clouds to the north along the Sierra mountain range; they've been present most afternoons and seem to cling like fluff to a carpet. By 1.50 pm Wills' Sky is hitched to the tow-plane and he is on his way. Already several competitors are circling high above the site and climbing impatiently so as to command a lofty position from which to race towards their goal. Wills spots the distinctive shape of the French CM 8-15. The first race had been by way of an undistinguished series of thermals and with a similar weather forecast it seems for the moment that this repetition event will be alike in flying tactics, too.

At 1,500 ft. Wills slips the tow and the tug pilot waves him on his way. As the plane turns back to pick up the next competitor, Wills skims towards a plantation of pine-trees a short distance from the airfield which was shown in practice flying to yield reasonable lift. He is again fortunate, for the variometer indicates lift of 10 ft. per second and this is certainly a healthy sign. He calls up his ground crew, who are waiting on the airfield for word from him, and warns them he is about to move off. By now Wills has climbed to around 9,000 or 10,000 ft. and as he crosses Madrid it becomes clear that the weather is changing from the expected pattern. Ahead there are early indications of cumulus, probably to become the towering cu-nimb. storm-clouds a little later on, while an unexpected sheet of high cloud is drifting southwards towards the competition course.

At this point Wills is roughly following the direction of the main highway out of Madrid north-east of Zaragoza and trying to keep a good height. At Alcala de Henares, cumulus is now stretching across his path and promising a fair extent of lift. He swings the Sky round towards the north to get under the leading edge; he feels the upward pull as the lift becomes increasingly pronounced. Circling round and round in the column of lift,

Wills is climbing confidently at 15 ft. per second. Over Guadalajara, the biggest town on his course and somewhere near the midway point in the race, he senses from the make-up of the cloud formation above him that there is enough lift to carry him far above his present 10,000 or 11,000 ft. And herein lies the problem. He could do with still more height to carry him towards Torre Sevinan, yet, if he ventures deep into the great black thundercloud poised overhead, there is a danger he might lose himself and have to waste precious time picking up the course again once he had returned to clear skies. A radio is a comforting piece of equipment but no use in such a predicament, when the retrieving crew cannot see you and you cannot even see your wing-tips.

Dare he go into the cloud for guaranteed lift at the risk of becoming lost? There was another factor to be taken into consideration. That towering cloud was awkwardly placed in relation to his course, so if he abandoned this region of lift to glide in the direction of his goal, he would be in danger of being pulled down by compensating influences the farther back he travelled from the rim of his cloud. It was like an obstacle race, for if he lost too much height at this point, on account of the cloud, he might be unable to regain sufficient in another thermal to get him to the goal. The choice was this: go up and chance getting lost or move on and chance being forced down short of his goal. Instinct settled the dilemma, for whilst he had height he could always carry on somewhere and hope to make up lost time, whereas if he lost height with half the journey still to be covered, he would probably be throwing away the race without a struggle.

Perhaps swaying his judgement to some extent was the fact that he saw this aerial escalator as an opportunity to get the Height Diamond to his Gold "C" (just over 20,000 ft. on his altimeter—representing the required height gain of at least 5,000 metres), although this could not be permitted to prejudice the result of the race to Torre Sevinan. The elusive Diamond had still to be won by a Briton, yet it would be a dubious honour

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if it were to be achieved at the cost of a world championship. Up he soared, circling in the powerful up-current with his oxygen mask now on, watching the altimeter needle spin round the clock—15,000 ft., 16,000 ft., 17,000 ft., 18,000 ft., 19,000 ft., 20,000 ft.

Wills had two barographs in the Sky to prove his attained height, so there was no worry on that score. 21,000 ft., 22,000 ft. He pulled off his mask for a moment to try to call his retrieving crew on the radio to tell them his height and course and to see if they could estimate the cloud base for him; thinking ahead, he knew this would indicate the amount of height he must lose before the ground came into view. If the base was extremely low, Wills might break cloud too far from the goal to be able to stay airborne long enough to reach it. In fact he couldn't get through; everyone else in the team seemed to have the same idea. Wills gave up the attempt and returned the oxygen mask to his face. Flying completely blind, he had to try to retain his direction by constant reference to the compass bearing as he rose higher and higher in a wide circling movement with thunder crashing around him and silver-blue sparks of static electricity shooting off the metal fittings in the cockpit. He was wearing only light clothing but there was no suggestion of cold inside the sealed cockpit, although there was rime inside the cover and one of his airspeed indicators had already iced up. 23,000 ft., 24,000 ft. Still climbing, so now he must have not only exceeded the Gold "C" Diamond height requirement but also the existing British altitude and gain-of-height records. He blessed the adjustable rudder pedals which enabled him to alter his seating position and thus avoid cramp. It was a comfortable cockpit for the lanky six-footer.

By now Wills had made one more attempt to reach his ground crew and this time he was successful. He put his question about cloud base and in a few moments back came the answer. At 24,000 ft./25,000 ft. he called off the climb and watched the altimeter spinning back to 15,000 ft. before he broke cloud and

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picked up the main road some miles north-east of Guadalajara. At 10,000 ft. he had less than 20 miles to go to his goal. Damn! He was too high. Wills thrust the nose down in the direction of Torre Sevinan and screamed through the sky with the airspeed indicator nudging 120 mph—he dare not go any faster for this was already the Sky's maximum permissible speed. Wills had judged the dive perfectly and he swooped across the line in a dramatic, if not classic, finish to the race.

How had he fared? At Cuatro Vientos, competition officials marked up the landing times as each pilot reported in by phone. Richard Johnson touched down in the remarkably fast time of 1 hour 8 minutes 39 seconds in his RJ-5. It wasn't surprising, for this was the glider in which he had set up a new world record of 545 miles less than a year previous to these contests; it had come over by sea and been held up at Barcelona until the championships began. Another American, MacCready, was close behind him, yet there was no news of Wills even having landed. It was known he had gone up to 24,000 ft. or so into the storm-cloud (messages exchanged on the radio were clear enough at this range to be monitored at Cuatro Vientos) and the assumption was that he had gone too high to do a fast time. The more landings that were recorded, the more slender seemed the Briton's chances. It was known this was the final contest—so had he sacrificed his lead for the Height Diamond after all?

It was close on four suspenseful hours before Wills' landing was reported, although he was then found to have clocked the third fastest time—1 hour 28 minutes 31 seconds, averaging 52.43 mph for the 77-miles course against the 55.55 mph of MacCready and the 66.80 mph of the winner, Johnson. Maximum points went to Johnson, and Wills was awarded 754; Gérard Pierre averaged only 49.40 mph and picked up 711 points. So Wills had won the contest, scoring 4,333 points to the 4,048 that gave the Frenchman second place, and a Briton was world champion for the first time. He struggled to find words to console the tearful Pierre and explained that there would be other



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championships for him to win. Indeed, this was to be the case.

Against this triumph there had to be set one small personal disappointment. It will be remembered that there were two barographs in the Sky when Wills sailed up into that stormcloud on the way to Torre Sevinan. They should have provided the evidence to support a claim for a new British national gain-of-height record, a new British national absolute altitude record and the Height Diamond of Wills' Gold "C" badge. In fact, the equipment let him down, for one of the barographs failed to function at all, while the second ran off the top of the chart and thus failed to register the summit of the monumental climb. The 22,430 ft. which was found to be recorded on the barograph gave him the Diamond and the altitude record but he missed the gain-of-height record by not much more than a couple of hundred feet. It is sometimes said in jest that a pilot who insists on carrying two barographs is as untrusting as a man who wears both braces and belt to keep up his trousers. The experience of Philip Wills proves no one can be too careful when he is after a record in gliding.

But what of the scene at Cuatro Vientos airfield when the results of the contest were announced? There is a traditional ceremony with the flags at this time, too, and they are all hauled down before the flag of the winning nation is raised alone once more to the masthead. Alas, that poor Union Jack was again in a sorry state—and this at a time when a British pilot had led the world and seven of the all-British Sky sailplanes had been flown into the top 14 places, three of them being in the Top Four, Wills and Jock Forbes respectively first and third, and the Argentinian pilot Cuadrado taking his Sky to fourth place. Being so much larger, the Union Jack had been flapping itself to ribbons on the neighbouring masthead in the storm of the previous day when Wills was winning the championship. There was no time to repair it. Standing proudly in his position as victor of the meeting, Philip Wills and the British team watched

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their tattered national emblem being raised in their honour against the setting sun. The sight was horribly symbolic of a British Empire in the final stages of decay rather than a rare moment of triumph. Mixed thoughts tumbled around at this time in the mind of the No. 1 gliderman but one was uppermost—maybe he should save future embarrassment by taking along his own flag next time.

## 1952—53

The urge to improve upon gliding performances led to much time and thought and money being spent at the drawing boards of the world's glider factories. The aim: craft that would fly further, and faster, and higher, and stay up longer, than their predecessors.

There came slim gliders and even slimmer gliders. There came gliders with pulsejets beneath their wings; there came gliders with turbojets aft of the cockpit; there came a tail-first glider in Poland and one with no tail at all in France. And when Richard Johnson, a student at Mississippi State University, built his own rather more orthodox sailplane he set up successive national and international records.

Gliding was fast becoming a science as well as a sport. College meteorological students put their paraphernalia into sailplanes and began investigating the very principles that govern the art of gliding—thermals, cloud formations, land masses, and so on.

Inevitably the sport began drawing more and more support among the youth of Britain as pre-Service organisations like the A.T.C. and the C.C.F. arranged gliding instruction courses at week-end and summer camps. Schoolboys even were flying solo now—until representations led to an announcement in Parliament in April 1953 that the minimum age limit for solo flying in gliders was to be raised from 14 to 16 years. It would “remove the anxiety” caused by the number of fatal accidents involving 14-year-olds in solo flying, declared the MP who had brought up the subject in the House.

The A.T.C. were particularly strong on gliding and there was no doubting their enthusiasm. They learned fast and they learned well. And if ever there was a chance to go up, then the A.T.C. lads would quickly seize it . . .

THE ASCENT OF *RED 31*

**T**O BE BLUNT, *Red 31* was a bit of a joke. She was utterly reliable but hardly the most graceful of gliders; an ugly duckling with no great turn of speed among the fairest of all these man-made birds. It was rather like entering a family saloon in a sports car race meeting. Yet, joke though she may have been among contestants in the 1953 National Gliding Championships at Camphill, Great Hucklow, Derbyshire, *Red 31* was soon to have the last laugh.

*Red 31* was a Slingsby Type 21B entered by the Home Command Gliding Instructors' School of the Air Training Corps at Detling in Kent. Known in the R.A.F. and the A.T.C. as the Sedbergh TX Mark I, she was a two-seater trainer of proven dependability and popularity throughout the world. An ideal type of glider for instruction purposes, safe and entirely practical, she was nevertheless a hefty thing beside the slim and sleek racing craft that had begun to be assembled at Camphill over the weekend for the start of the championships. The airframe fitters from Detling, fussing over her with infinite care, put on the competition number 31 and painted the nose a bright red, hence the name and call-sign *Red 31*, so she stood out with even greater prominence in the sky. It was like a gesture of defiance against those who seemed to regard the entry of a lumbering trainer as being something in the nature of a piece of cheek.

A good many of the gliders were individually owned, but not so *Red 31*; she was to be shared by no less than five people, two of them instructors from the school and three A.T.C. cadets whose prowess had gained them top marks on a course at Detling which had given them their first taste of gliding a year or so previously.

Gliding types are a friendly breed of folk who mix well but the A.T.C. lads, on account of their tender years, felt conspicuous and out on the fringe of this traditional comradeship. Deep down in their hearts the lads must have thought there was precious little chance of scoring over the experts. Pride bristled up inside them, however, when Mr Profumo, Parliamentary Secretary to the Minister of Civil Aviation, opening the championships, remarked upon the admirable opportunity that gliding seemed to him to offer for the spirit of initiative, enterprise and courage. In these words there seemed to be a special challenge for the youngsters in Air Force blue. They'd show 'em! Could they *really* do so, though, in Old Red-Nose? It might be too much to ask after all.

The first day was not a notable one so far as the Air Training Corps H.C.G.I.S. team performance was concerned. The second day, so it seemed, would be noteworthy only in respect of the dismal weather which threatened to keep everyone firmly on the ground. Despite these adverse conditions, Flight Lieutenant Derek Piggott, Chief Flying Instructor of the School and the senior of the two officers with the team, kept in readiness during the morning and afternoon in case of an improvement that would permit competitive flying. The task of the day had been set, a pre-declared goal flight, but as the time dragged on the prospects of winching away from Camphill were growing hourly more slender. If flying was to be feasible, Piggott would be taking up *Red 31* with a member of 2157 (Mitcham) Squadron, newly promoted Flight Sergeant Brian Whatley, sitting alongside him in the rôle of co-pilot navigator. The three cadets had put their names into a hat to determine the order of flying in the championships and it was now the turn of young Whatley, whom Piggott had picked up at Hyde Park Corner the previous Saturday to give him a lift up to the championships. It had been an ignominious start because the 15 cwt. truck Piggott was using had broken down on the way to London, and while repairs were being carried out Whatley had been kept waiting and wondering

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for five hours on the pavement, squatting on his bags, expecting every minute that the truck would soon be driving up.

At 17, Brian Whatley was quite recently out of school and was learning to be a motor fitter like his father. In the one-week gliding course at Detling the previous summer he had gone solo after only 11 launches, a creditable performance that marked the boy's aptitude for the sport since the majority of his fellow pupils seemed to require twice as many launches before they could satisfy the instructors of their competence for a solo flight. The letter inviting him to join the H.C.G.I.S. team in the National Gliding Championships had come right out of the blue. He asked the gov'nor if he could have the week off, received an instant sanction as well as a pat on the back for being chosen, then sent off his letter of acceptance by return of post. He was feeling pretty pleased with himself—but he had no means of visualising just what drama was to be in store for him at those championships.

At Camphill, on the second day of the championships, Flight Lieutenant Piggott kept popping out of the tent to eye the weather. There was the mere flicker of a scowl on his face but no indication of the impatience that he must have been experiencing throughout that long waiting day. At lunch-time it was raining heavily; he hated the idea of so much time being wasted, yet there was nothing he, nor anyone else, could do to remedy the situation. The afternoon wore on and still the prospects remained bleak. By now a number of competitors were beginning to give up all hope; they were even considering de-rigging their gliders and bedding them down for the night. Just about the time people were thinking of their tea, though, there came encouraging signs of a break in the weather—the first glimmer of hope to cheer the contestants' despair. Map in hand, Piggott took Whatley to one side.

"We'll have one go at getting away," he told the boy. "I've been watching the wind. If we can manage to get away we shall find ourselves heading in this direction"—here he traced a path

with his forefinger across the map—"There's an airfield here, look, Grimsby. We'll set that as our goal."

They spent some minutes attending to the formalities, reported their flight intentions to the contest officials, made a final check with the met. men and perused the equipment before preparing for the winch launch. Camphill was springing to life as one after another of the competitors decided to take a chance with the unexpected easing in the weather. Luring them on was the knowledge that valuable points were to be won; conditions were far from ideal but there was little choice when points were vital. However slight the prospects, anyone who succeeded in getting away would secure some points, whereas failure to make an attempt must mean a nil score on the tally sheets for that event. A bumpy ride was certain but Piggott and the A.T.C. cadet had only one thought, and that was to get airborne while there was any possibility of doing so that day. *Red 31* was going up . . .

Whilst she may not have been the entrant with the highest performance, *Red 31* certainly possessed some virtues all her own. She was a hefty glider, perhaps twice the bulk of the streamlined, high-performance jobs that graced the parking lots on Camphill, and it was from her size that she drew one tremendous advantage in rough weather. *Red 31* was a tough old bird with immense strength and the capacity to endure great punishment. The T.21bs had to be strong; they had to be safe in the most adverse flight conditions; they had to be ever reliable. And *Red 31* was no exception. Well aware of these special capabilities, Piggott enthusiastically told young Whatley: "We'll have this one go. If we get away we shall be one of the very few to do so today. We might get buffeted around the sky, but believe me, if we get lift—BOY!!"

In the Sedbergh the two seats were side by side in a single cockpit, the pilot instructor normally occupying the left-hand seat and the pupil or passenger the other. There was dual control so that the glider could be flown from either position; the controls were quite basic, comprising twin control columns and rudder pedals, with centrally placed quick-release and lift-

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spoiler controls. The only protection for the occupants was a small, curved, transparent screen, rather like an enlarged eye-shield, fixed just ahead so as to deflect wind and rain from blowing straight into the face. Unlike some two-seaters there was no cover over the cockpits.

A high-wing braced monoplane, the Sedbergh had wings made from wood with a fabric covering aft of the main spar; her fuselage comprised wood-stressed skin and fabric-covered girder construction. At a shade over 600 lbs. empty weight, she was half as heavy again as some of the single-seaters in the contest. By comparison, the Sedbergh was a lethargic bird. It was reckoned that the Sky single-seaters, which were specially built for competition gliding anyway, could glide half as far again as the Sedbergh for every 1,000 ft. drop in height—and they'd be travelling faster, too. She was no speedbird but she was steadfast.

*Red 31* carried only the bare minimum of instruments: an speed indicator, turn and slip indicator, altimeter, variometer to indicate sensitive upward and downward movements, as well as a recording barograph. The barograph, which incorporated a clockwork mechanism, required winding up before each flight. It had to be sealed by the competition officials before launching and re-examined on the glider's return to establish the height that had been achieved. It was no good swearing black and blue that the altimeter had read such-and-such a figure; proof would be needed, and it would always be furnished by inspection of the barograph tracing, assuming that the pilot had remembered to wind up the motor before take-off.

Gliders at Camphill were always winch-launched, the glider being headed into the wind, held steady at the wing tips, and attached to the far end of a steel cable, which was then wound in mechanically on a revolving drum so that the glider became airborne and gained height in much the same manner as a kite. Piggott and Whatley, both wearing their uniforms with denim overalls on top, fitted their parachutes and climbed into their seats, adjusting and securing the shoulder straps quite firmly in preparation for what looked like being a bumpy trip. The



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officer, as usual, had the controls for the launch; the cadet's job was to navigate and take over the flying when the officer required him to do so. *Red 31* waited her turn and soon she was nosing nicely upwards—10 ft., 20 ft., 50 ft., 100 ft., 250 ft., 500 ft. She was climbing more steeply now and moments later Piggott was releasing the cable which had pulled the two-seater up into the sky. *Red 31* was aloft and in the hands of two masters—currents as capricious as a child at play and a wily pilot of great experience intent on proving that H.C.G.I.S. was game to take on the best in Britain's gliding fraternity and give them a jolly good run for their money.

Although Whatley had not been under Piggott's wing on his gliding course at Detling, he had been up with him once or twice at Camphill already and was by now well versed in the officer's demands upon whoever among the cadets was in the next seat. The cadet's rôle in the early stages of a flight was primarily that of a spotter, keeping his eyes skinned all the time, watching and reporting upon the progress of other gliders in the vicinity. Piggott instructed the cadets how he was to be given the position of craft within their slice of the sky—"Down on the right" or "Upper left", for instance. Understandably, he wanted to know the existence of anyone within 100 ft. Aerial collisions are mercifully rare indeed but Piggott was a particularly cautious man.

Once launched and free of the winching cable, *Red 31* was in the contest at last, but it was only like the dropping of the starter's flag on a race track. Gliders can be put into the air under all but the most severe weather conditions; the problems lie not in the launching but in the search for lift to sustain flight away from the launching site. Camphill squats on the western edge of a plateau some ten miles south-west of Sheffield and in Derbyshire's famed Peak District, 1,300 ft. above sea level. The geographical location of the site was conducive to keeping the gliders airborne for reasonable periods but that was not much consolation on this occasion. The aim was to get to Grimsby—so far as the A.T.C. glider was concerned, other competitors

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having pre-declared their own goals—and that meant seeking out a series of up-currents in the general direction of this Lincolnshire fishing-port. The chances weren't bright, and Piggott had admitted as much to Whatley as they poodled around the sky "over the patch" endeavouring to hunt out these elusive sources of lift.

"We haven't got much hope", Piggott warned the boy as yet another optimistic twitching of the wing-tip indicated first the promise of pending lift and then the maddening realisation that the suspected rise was falling away to nothing.

It was a time of despair, this thermal-chasing. Eyes peeled, Whatley kept up a running commentary on the activities of those gliders that were already aloft and on the prowl for the thermals, or up-currents, which might get them away from Camphill and off towards their goal.

"Upper left," Whatley indicated. Piggott nodded. He had seen the other glider at the same moment as it popped out from behind a cloud. "And down, right," the boy chanted. There were a lot of gliders about, yet no suggestion of any mass exodus seemed likely for a while. *Red 31* was certainly not alone in being confined to Camphill.

It was vital for the Sedbergh to be away promptly because she was handicapped on speed; the high performance sailplanes would have left her standing with no trouble.

"We've got one here," cried Piggott. His uncanny feel of the controls told him that he was on the fringe of a thermal. Excited, he started to turn into the thermal and a few seconds later Whatley too, a babe-in-arms by comparison, felt its tug. Up sailed *Red 31*, one among half a dozen competitors in that same part of the sky.

"Are we away, do you think, Sir?" queries Whatley. He need not have bothered, for the thermal petered out after less than a couple of thousand feet. "There's lift somewhere," answered his officer, "but goodness only knows where!"

They were below cloud base, floating along in uncertain flight over Sheffield after a down-wind run, watched by fascinated

spectators on the ground. Farm-hands in the fields to the south of the city paused by the grey stone walls to watch the graceful aerial ballet. The powerless ones up there, silhouetted against a backcloth of cloud, swooped and rose in their incessant search for the thermal escalators. *Red 31* had been up for more than an hour already and remained in sight of Camphill. The scheme was to get under a cloud and into the thermal, circle in the thermal and be drawn up into the cloud; you had then "bagged" that cloud and no one else would try to go in unless you were seen to come out of it. Two in a cloud isn't healthy.

Whilst Old Red-Nose was no match for the high-performance boys in speed, she did have a trick or two up her sleeve which could give her the edge over them in flying tactics. She had a lower stalling speed, less than 30 mph in fact, which enabled her to fly more slowly, and circle more tightly, than her more nimble rivals. *Red 31* was soon to play this ace.

High above and to one side was a massive hulk of cumulonimbus, a stormcloud, black and forbidding to watchers far below but full of hope for the glider men. Whatley drew his pilot's attention to a fast Olympia beneath it; she was "going great guns" in the familiar wide sweep of someone who has found his long-awaited thermal.

"Look, he's gone," said Piggott, adding with obvious relish: "The air's full of life. There's a lot of lift about here!"

Piggott dived in the direction of the climbing Olympia and, once there, began circling in the same way. Custom demands that for the sake of safety all gliders will follow the direction set by the first one to find the thermal. The Piggott Plan began to unfold—but first a note of caution. "I didn't see anyone going into this one, did you?" he asked the boy, who answered with an emphatic denial.

The strength of the thermal was becoming more and more pronounced. *Red 31* would now show the way. Smiling broadly, Derek Piggott kept the Sedbergh turning tightly, inside the circling Olympia above them, and soon she was actually over-

taking this other glider, for the pull was far stronger in the centre of the thermal.

Again the two conferred about the possibility of someone else having already "bagged" the cu-nimb. that was now looming immediately overhead. No, neither of them had seen anyone remotely near this cloud, with the sole exception of the sailplane they had left behind at a lower level. It was safe to go on—safe to go into that big, black monster that would lift them away from Camphill.

At last, *Red 31* was away!

The variometer carried in this glider was unlike the more usual sort which, by means of a green and a red blip moving up and down two tubes, would indicate the rate of lift or fall in feet per second. The equipment in *Red 31* was reckoned to reduce the appreciable time lag before the rise or fall would register on the instrument. It gave an audible indication, too, clicking in the manner of a Geiger counter, when the glider was in a thermal. Piggott set great store by this device.

Click-click-click-click-click. The variometer was chattering away like a machine-gun. "Listen to that, listen to that," said Piggott as they were swept upwards into the stormcloud. There was no mistaking the strength of this thermal, and the evidence was really superfluous, but the sound of that constant click-click was beautiful to their ears after so much wasted time.

Click-click-click-click-click. Up and up and up sailed *Red 31*. Up through the core of that monster cloud, which was grey and moist and clammy. Pilot and passenger were conscious of the cold immediately on entry; it registered in the way that would be experienced if, when in an otherwise warm house, one went into a room that had long been unused and empty. The temperature had not dropped by any marked degree; it was merely the comparison, after something like  $1\frac{1}{4}$  hours in the air below the cloud base, that struck them when entering the cu-nimb.

In the grip of the cloud, *Red 31* was being kicked and shaken, but in reassuring tones the officer at the controls told the cadet: "Don't worry. She can take it."

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They were climbing fast, with the needle of the altimeter clocking up the hundreds of feet as steadily as a seconds hand sweeping around the face of a clock. It was fascinating to watch that rotating hand. Five thousand ft., 5,500 ft., 6,000 ft., 6,500 ft. The last 1,000 ft. had taken only 45 seconds. Almost in disbelief, Piggott tapped the altimeter glass with his knuckles. It was O.K. The variometer bore witness to the spectacular rise, too, for it was still clicking away vigorously—"Listen to that," chuckled Piggott, "just listen to that . . ."

For young Whatley, at least, conditions aboard *Red 31* were becoming more and more uncomfortable for one basic reason: the higher the glider rose, the lower the temperature fell.

"Crikey," exclaimed Piggott, "we're bound to cop some ice at this rate. It's certain to affect the handling. Still, not to worry!"

Under normal circumstances the glider would not have exceeded 5,000 or 6,000 ft., but by now she had sailed way above this level. Whatley was not equipped for these heights, for this was an open cockpit craft and beneath his A.T.C. tunic he wore only a shirt and jumper. He had on a pair of leather gloves, wellington boots and his beret; he had no flying helmet, nor goggles, which might have helped to keep his head, ears and nose warm. He glanced across at his officer but he was apparently unconcerned about the cold. Looking directly above his head, Whatley saw an unfamiliar sparkle along the leading edge of the mainplane. Ice! It was glistening on the smooth surface from wing-tip to wing-tip. He watched with fascination as the ice thickened. Frost was forming on his and Piggott's overalls, growing like a fungus in some science-fiction film, as the glider maintained a circling climb.

Click-click-click-click-click. There was still the incessant clicking of the variometer to break the silence of the flight. It was fantastic. Higher and higher climbed *Red 31*, creaking and groaning, shuddering now and then, but riding the thermal as shoppers ride the escalators in a department store. From time to time, without warning, *Red 31* would be shaken violently by

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cross-currents but Piggott remained the master. With no useful rôle to perform, and nothing to see, for being in the stormcloud was like being in a swirling fog, Whatley fought to control the sickness that he knew was fast coming over him. It was no surprise he succumbed; head reeling, he struggled weakly against the broad straps that were holding him in his seat and managed to twist his head over the cockpit side before his first-ever bout of air sickness overtook him. He was weeping with the cold and the feeling was gone from his feet and fingers.

Click-click-click sang the variometer. The needle of the altimeter was still sweeping round but the airspeed indicator was out of action—Whatley had watched an icicle growing longer and longer on the pitot head mounted on the nose before finally the boy's forward view was obscured totally by ice on the windscreen. The ice was thicker now on the leading edge of the wing and, although he could not see it, he knew there must be some forming on the control surfaces, too. He had never seen ice on a plane before nor, indeed, had he seen frost forming on his own lap, but no sense of fear or danger prevailed, because of the example of the man at his side. Whatever his thoughts, Piggott did not transfer any feeling of apprehension at the quite unexpected course which this flight to Grimsby was now taking; the only feeling he transferred was one of excitement.

Excitement? *Red 31* was being thrown about the sky. She was being coated with ice. It was bitterly cold in the open cockpit. She was still climbing. Visibility was nil ahead and to the rear; only the wing-tips were just in view. The cloud hung round them like fog beside a river. Yet the only feeling Derek Piggott transferred to the A.T.C. cadet was one of excitement. Why? The answer was to be found in the gliding record books. He knew that Old Red-Nose was coming pretty close to establishing a new gliding record if there was any more lift to be had from the towering bank of cloud that still engulfed them. From this prospect, Piggott drew the strength and the will to carry on.

At 11,000 ft. there was a glimmer of a smile on his face as he

asked the cadet: "Have you got any idea how the gain-of-height record stands for two-seaters at present?"

Whatley, who knew only that he was bitterly cold and miserable with nothing to see and nothing to do, mumbled: "I haven't a clue, Sir."

Unlike the boy, though, Piggott had a fair inkling that *Red 31* was already close to the altitude achieved by Austin and Bedford the previous year when they set up a new British gain-of-height record. The gain-of-height is the difference between the height actually reached and the height above sea level from which the glider was launched; for example, a glider winched up from Camphill and reaching an altitude of 6,300 ft. would have made a gain-of-height of 5,000 ft.—6,300 ft. minus the height of the Camphill site above sea level. Piggott, full of excitement, kept repeating: "I know it's about 13,000 ft., so if we can get over 13,000 then I think we're in!"

It was merely a matter of academic interest to Whatley at this stage. He was aware he was freezing, that he still felt sick and wanted to go to the toilet. The Sedbergh was rising as swiftly as on the initial launch. The variometer was clicking away merrily and that silvery, glistening layer of ice on the leading edge of the mainplane was still ominously thickening. Whatley was still weeping, yet, to his utter amazement, the officer at his side was displaying absolutely no sign of being affected by the rigours of the climb through that fog-like blanket of dank cloud. They were at the same level at which many airlines now fly on domestic routes over Britain, but, unlike their occupants, they were exposed to the elements. Even Austin and Bedford, when they set up their record (a 12,750-ft. gain-of-height, in fact, so Piggott was not far out in thinking it was about 13,000 ft.), had been spared this form of discomfort because their glider had a completely enclosed cockpit. It may have been that Derek Piggott was too busy piloting to feel the cruel cold, but be that as it may, Piggott appeared to the boy to be blissfully ignorant of it. Only two thoughts seemed to occupy his mind; firstly, would they exceed Austin's and Bedford's record? Secondly,

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would they be able to prove their height? For as the altimeter needle kept circling the clock, Piggott was wondering whether or not he had remembered to wind up the recording barograph. Whatley tried to convince him that all was well on that score but there remained the nagging worry that something could have gone wrong with the mechanism. Up, up, up sailed *Red 31* with no suggestion of running out of lift. She was still in the grip of a good strong pull. It was the record, and not so much the target of Grimsby, which was now the single glorious aim.

Every minute they expected the thermal would peter out and so end their amazing lift; every minute, though, Whatley watched the frost in his lap growing thicker and thicker as the increasing altitude brought down the temperature still further. It now started to rain ice crystals. They were at more than 14,000 ft. above sea level, higher than Piggott guessed was required to beat Austin's and Bedford's record, and a new hazard faced them. At these heights man finds every movement requires extra effort and breathing becomes more and more laboured on account of the rarefied air. For this reason, gliders often carry oxygen equipment; it is usually accepted, in fact, that the use of oxygen above 15,000 ft. is necessary to maintain efficiency. *Red 31*, a trainer more accustomed to transporting pupils on circuits-and-bumps than venturing so high in the sky, carried no such equipment.

"Breathe deeply. Breathe deeply. If you feel you're passing out, tell me," urged Piggott, speaking slowly, "and we'll dive out of it."

Whatley was unable to feel his feet or his hands, his legs or his arms. He was motionless, frozen in his seat; the only part of him that seemed capable of movement was his lungs. He was methodically taking massive gulps of air and he knew he couldn't stand much more. On his mind was only one thought: "I've had it, I've had it. . . ."

"Tell me when you've had enough," said Piggott.

Sixteen thousand! They were higher than the tallest peaks of the Alps and the variometer was still clicking its cheerful tune to



signify continued lift. Surely the barograph *had* been wound up? It was this instrument, stowed behind and out of sight, that would determine their truly achieved altitude for the official reckoning. The temperature would never be known, although if there had been a thermometer aboard the reading would probably have been  $-4^{\circ}$  F. by now,  $36^{\circ}$  below freezing point!

Again the officer asked if the boy felt he would pass out under these extreme conditions. Whatley tried to speak but the words wouldn't form; he tried to shake his head but he couldn't move. He felt crippled and in agony. He wanted to quit, but how could he? He couldn't let down the man at his side—the man who, despite the same cold and the same shortage of oxygen, had managed to keep them flying in the face of danger without a grumble or a trace of self-pity. A man who simply said it was “damned cold” and hadn't even realised that his hand had frozen around the control column. Whether he wanted to do so or not, Brian Whatley just had to stick it out until *Red 31* tottered on the top of the thermal and Piggott eased off into the homeward glide.

The moment came around an altimeter reading of 17,000 ft. over Lincolnshire when Piggott realised that the lift from that cloud was exhausted. They broke through the feathery anvil top of the cu-nimb. and blinked half-frozen eyelids to find they were in clear sky with broken cloud like a tattered and uneven carpet beneath them. The worst was over now—or was it?

They had left behind the cu-nimb., the sort of cloud that fliers invariably try to avoid because of severe icing conditions and treacherously unpredictable currents capable of smashing planes to pieces, but there still remained a legacy of crusted ice that made the glider unwieldy to handle.

“Any idea of our position?” queried Piggott, turning the Sedbergh warily around in the sky while seeking a landmark. Whatley hadn't the faintest idea. While Piggott studied the map, Whatley managed to keep the glider on an even keel. Eventually, Gainsborough and the River Trent, visible through a gap in the

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clouds to the south, supplied the much-needed pin-pointer. It also gave Piggott an idea.

He began working out a little sum concerning the gliding ratio of *Red 31*. Gliders are built to "freewheel" the maximum distance once they run out of lift, the glide path being as flat as possible so that the greatest distance can be covered for the minimum loss of height. "Seven miles for 1,000 ft.," he kept saying. "Seven miles for 1,000 ft." Actually the Sedbergh was credited with a best gliding angle of 1-in-21 at 42 mph but the wind at 15,000 ft. was probably about 35 mph, enabling this semi-aerobatic two-seater trainer to cover almost twice its normal gliding distance. Anyway, Old Red-Nose had already survived a record-breaking climb in the most gruelling circumstances with nothing worse than emitting a few creaks and groans.

"Seven miles for 1,000 ft.," said Piggott again. A glutton for punishment, he now sounded out Whatley by commenting, "It makes you wonder if we could make it to the Continent!" From their height of between 16,000 and 17,000 ft. the record-breaking pair might just have done it, given further help from thermals *en route*, although a good couple of hundred miles separated them from the nearest Continental landfall.

"No thanks," murmured the boy, "I don't fancy it. I don't fancy it at all." He didn't relish the prospect of flopping down in the North Sea after the ordeal of the stormcloud.

Abandoning any idea of a Continental bid, Derek Piggott began the descent through the cloud blanket; once more they regarded themselves as being a championship entry and the aim was to secure maximum points by reaching the pre-declared goal, Grimsby. At about 6,000 ft. the ground finally emerged with a fine view all the way to the coastline.

Breathing was becoming easier and the ice was beginning to shift now that the glider was losing height. It was odd the way the ice was moving; first there came a noise like sporadic rifle fire as the sheets of ice cracked in the warmer air and then the glider would shudder as a patch of ice broke away and slithered

into space. There was a need for extreme caution in controlling the movement of the Sedbergh for fear of disturbing stability. A lump of ice on the mainplane broke free, and then a further slab slid over the trailing edge out of sight behind pilot and passenger in their open cockpit.

“There must be ice on the nose, too,” said Piggott, “and if that comes back at us it will slice off our heads.”

Needing no more warning, Whatley slid down in his seat as far as he was able so that his head was below the level of the cockpit top. A runaway sheet of ice from the upper surface of the nose of the glider would probably sweep away the windshield like saplings in the path of an avalanche. Now ice on the leading edge of the wing, once as much as half an inch thick, was snapping loose with the sound of a whiplash. Head ducked down like he'd never ducked before, Whatley constantly admired the patient skill of his officer in coaxing down the glider carefully through the warming air to minimise the danger of the melting, crumbling coating of ice. The mould of frost on their overalls was diminishing rapidly and by 4,000 ft. the pair were sitting in pools of water. Gently, Whatley moved his lead-heavy arms and legs; life was back in his fingers and toes but he was still cold, bitterly cold, and was wondering if he might have sustained some permanent injury up there in the ice-laden cloud.

Piggott spotted his airfield goal at last and positioned himself for landing. It was coming up to 6.30 pm; they'd been in the air for almost three hours—an hour in getting away, an hour and a half or thereabouts in the cloud on the ascent and no more than 20 or 30 minutes in the descent from the cloud cap. He was justifiably elated; a gain-of-height record in their pockets, so it seemed, and maximum points for reaching their goal. It only remained for him to find someone to clock them in for proof to satisfy the contest umpires two counties distant in Derbyshire. He saw then that the airfield he had selected was ominously deserted.

“All right, son?” asked the pilot.

Whatley managed a smile and a nod. “Yes, thanks, Sir. Oh,

congratulations. It was a tremendous achievement. But I'm sorry I wasn't much use to you, Sir."

"Oh, yes, you were!" answered Piggott. "One word from you and we would have had to pack it in!"

The officer, who had spotted a house some hundred yards from where the Sedbergh now rested, wet and glistening in the evening sunshine, climbed stiffly from the cockpit.

"I'll run for help," Piggott told the boy. And he ran (yes, actually ran!) like a drunken man, swaying on wobbling legs, across the field. Every minute would count, so in the shortest possible time he wanted to find assistance for the cadet, besides confirming the location of the touch-down and securing a certified time of arrival to take back to Camphill.

Meanwhile, a middle-aged couple, who had watched the glider landing near the perimeter track, drove across the airstrip, unstrapped the boy and helped him to the ground. He walked around and around and around that glider, easing the circulation back into his numbed limbs, until Derek Piggott returned, waving a slip of paper and accompanied by the man whose signature was on it.

By an odd coincidence, the occupant of the house to which Piggott had gone was himself an A.T.C. officer and, by a further happy coincidence, the squadron to which he was attached was due to parade on that very airfield within a short time. Thus, an A.T.C. squadron would salute an A.T.C. gliding achievement at the moment of triumph. Piggott phoned Camphill to report their safe landing and arrange for the retrieving truck to be despatched to collect the Sedbergh. A local newspaper photographer who was on the scene in connection with the routine affairs of the A.T.C. squadron found himself with a scoop, because he was the first person to photograph glider and crew after the record-breaking flight.

For record-breaking flight it was after all. When the instruments were checked, championship umpires found that *Red 31* had attained a 15,240-ft. gain-of-height—2,490 ft. in excess of the previous British and national record, Austin's and Bedford's

from Farnborough on 16 August 1952. Of course, Piggott had guessed that he had smashed this record whilst he was still up there in the stormcloud; what he didn't know until several hours after the landing at Grimsby was that in the process an additional national record had been smashed—the 100-km speed record! They had covered the 71 miles from Camphill to Grimsby in record time; they had accidentally broken the gain-of-height record (for they certainly didn't have an attempt in mind when first entering the cloud that swept them to this achievement) and they had reached their intended goal. Old Red-Nose, the ugly duckling, had really had the last laugh.

In their way, Flight Lieutenant Derek Piggott and Cadet Flight Sergeant Brian Whatley became heroes overnight. There was even a civic reception in the boy's home-town of Mitcham. A pity, though, that public memory is fickle and often short. Two days after the flight, Whatley still had trouble with the loss of feeling in his legs and a doctor who examined him at Camphill explained that he was still suffering from exposure. He did little gliding afterwards because his work, first in the R.A.F. and then in the motor trade, gave him insufficient opportunities. He has since had his feet very much on the ground, for he has joined the Metropolitan Police, but he thinks frequently about that record-making flight from Camphill during the National Gliding Championships on 27 July 1953. He never ceases to be filled with awe over the courage of his pilot, the man who was too excited to feel the cold, and he talks with admiration about the punishment that *Red 31* sustained on the long, hard climb.

Like Piggott, he remains as pleased as Punch that Old Red-Nose, the David among so many Goliaths, gave all those other gliders such a run for their money. It was, indeed, some run. For the gain-of-height record remained unbeaten for ten years—and it took a more refined craft even then to clip this performance!

## 1953—66

Camphill, that celebrated Derbyshire gliding centre which turned out to be so lucky for Old Red-Nose in the British national championships of 1953, proved less fortunate a venue the following summer when the top glider folk of 19 nations assembled for the world championships.

Camphill—more like Damphill. Poor weather truly put a dampener on the proceedings and, as if to jolt still further the pride of the host nation, Britain's Philip Wills came off second best this time against his old rival of '52 in Madrid, Gérard Pierre. The French were going great guns now, Pierre leading the world and a couple of his countrymen raising the international duration record to 57 hours 10 minutes.

In Britain, too, the records were tumbling. In 1957, that for absolute altitude in a single-seater glider stood at 29,700 ft., but then, three years later, along came an R.A.F. officer to top the 30,000-ft. mark over Norfolk and establish a new one at 30,100 ft. Up, up and up.

Across the Atlantic, though, the sport was galloping along at a furious rate. One Dick Schreder in particular was moving fast; he succeeded in setting up new international speed records over the 100-, 200- and 300-kilometre distances. A triple triumph. Faster, faster and faster.

American *gliderman*, Englishman, Frenchman—it looked very much a man's world, this world of gliding. Almost a man's world, yet not quite! The presence of Britain's Anne Burns, and a few more like her, knocked that supposition fairly and squarely on the head . . .

## A PRINCELY SPORT

IF ANYONE DESERVES to wear the British crown as king of glidermen, Philip Wills is surely that person. Four times national champion and the only Briton so far to win the single-seater world championship, Wills has reigned supreme in these post-war years. And if he is to be regarded as the monarch to sit upon the gliding throne, Anne Burns must surely be the queen. In the record books there is no one to be ranked as her equal, for she has achieved the distinction of holding, at one time, seven out of the eight national gliding records open to British women pilots and there is not one she has not held at one time or another in little more than ten years as a glider pilot.

Anne astonished the gliding world by sweeping into the record books with the first flight she ever made outside the precincts of the Lasham site near Alton, Hampshire, where she had been taught to fly by Derek Piggott. In this single flight, which was her first crack at a cross-country journey in her husband's Olympia sailplane, she was in the air alone for almost five hours and touched down 134 miles away at Ternhill aerodrome near Market Drayton, Shropshire. It was June 1955, and Anne had only just recently made her first soaring flight. Up to this time no woman in Britain had ever exceeded 100 miles; Cambridge University Club instructor Mrs Naomi Allen had covered 91 miles four months before the outbreak of the Second World War in a flight from Norwich to Desborough, but that was before women's records came to be recognised by the British Gliding Association.

Two years after the Lasham-Ternhill record-breaking flight, Anne Burns became the first woman to cross the English Channel in a glider, flying from Lasham and establishing a new distance

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record of 166 miles. She landed on a tiny war-time airfield at Rely, where the citizens of the district fêted her and laid on an ancient open trailer to parade the Skylark 3 along the streets to Merville, from which she was given an aero-tow back to Britain.

Within three years of taking up gliding, Mrs Burns had become the first woman to complete the Gold "C", setting up new UK women's distance, goal flight and speed to a 300-km goal records with the final flight of this series, a 192-mile cross-country from Lasham to Perranporth. A 97-mile flight from Lasham to Kidlington and back gave her the women's UK out-and-return record. The following year, 1959, seven out of the eight British national and/or UK women's records were in her possession. These were the 100-, 200- and 300-km speed triangles, free distance, out-and-return, gain-of-height and absolute altitude records. The only one eluding her at that time was the goal flight record—and even this she had held previously with the Lasham-Perranporth flight before losing it 16 months later to another gliding wife, Mrs Ann Welch, who made a 221-mile flight in France to a pre-declared goal in August 1959.

A visit to South Africa early in 1961 produced a phenomenal crop of four world women's records (gain-of-height, out-and-return, 200- and 300-km speed triangles), together with the British distance record for good measure. Like the 351.4 mile world goal-and-return record established by her husband, Denis, on this same visit,\* Anne Burns' record flights were all made in a borrowed Skylark 3b and all began at the gliding site in the diamond-mining centre of Kimberley in Cape Province. The setting could hardly have been more appropriate, as these flights yielded the final Diamonds for Anne's and Denis's Gold "C" badges, Anne being the first British woman to earn this top rating and only the fourth Briton among the recipients up to that time. The first British woman to exceed 100 miles and the first to exceed 200 miles, Mrs Burns was now the first to

\* Although beaten by S. H. Georgeson (N.Z.) with a 466-mile flight on 6 January 1965, it remained a British national record until Alfred Warminger's 374-mile flight on 13 January 1966.



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exceed 300 miles, for she had raised the distance record to 326.56 miles with a six-hour flight east-north-east from Kimberley to Volksrust.

However, the most dramatic flight of the series was surely the one that began as an attempt on the 100-km speed triangle record. A build-up of big, black stormclouds looked particularly inviting and she nosed up through the 12,000-ft. base, circling fast and smooth, sweeping up and up and up on a strong thermal in the core of one of the cu-nimb. clouds. Electric shocks came zipping through the rudder bars and the radio equipment. At 34,500 ft. the Skylark was struck by lightning while in a steep bank, still climbing, and Anne was knocked momentarily unconscious. It punched a hole in the wing and damaged the nose and tail. But in the process of taking this punishment she had reached a ceiling which set a new world's gain-of-height record for women and gave her the women's British National records for height and height gain. She reckoned it was worth it.

The record-breaking Burns came home in triumph. There was a congratulatory telegram for them from Prince Philip and at the Royal Aircraft Establishment, where Anne worked as a senior research engineer on flight testing duties, they named her Sportswoman of the Year. The award was presented by the person who had taught Anne to fly only six years previously—Derek Piggott.

In ten years' gliding, Anne Burns has now broken a total of seven world records for women and 22 British or UK women's records. Truly a queen of gliding.

A king, too. But how about a prince? British gliding, which rejoices in being a classless sport, can in fact claim no fewer than three real-life princes—Prince Bira of Thailand, a British resident for many years, who has gained some of the top honours in the sport; Prince Philip, Patron of the British Gliding Association in recent years; Prince Nicholas of Yugoslavia, who has gone gliding with London Club on occasions.

Prince Birabongse Bhanutej Bhanubandh of Thailand, an Old Etonian and one of the great motor-racing drivers, quickly

answered the call for instructors to teach Air Training Corps cadets how to glide early on in the Second World War. He has been a popular figure at several gliding centres in Britain, notably on the Long Mynd and at Rearsby, as well as at sites within convenient distance of his home at Tredethy, near Bodmin, Cornwall. He achieved the 3,000 metres height leg of his Gold "C" badge while flying from the Long Mynd and in the same week at the same site he came within only five miles of fulfilling the 300-km distance leg which he eventually gained in the Argentine. Both flights were among a striking series that took place when Cambridge University Gliding Club were guests of the Midland Gliding Club at a soaring camp in June 1946.

The gliding prince has displayed his soaring prowess in several countries. Once, when arriving at a gliding club at Buenos Aires, Bira dutifully spent the morning on short hops under the watchful eye of an instructor; the very next day he made an out-and-return flight of 174 miles and the day after that he carried out a distance flight which lasted 233 miles. He has had his anxieties, though, for on one cross-country over Dartmoor he found himself losing height and, when about to land, a gust of wind caught the sail-plane and smashed it to pieces on the ground. It narrowly missed some high-tension cables and Bira received hospital treatment for cuts and abrasions.

The most notable flights Prince Bira has made in Britain were those from the Long Mynd. He flew with his Sealyham Tichiboo squeezed into the cockpit for company; when he climbed to around 14,000 ft. in a stormcloud, Tichiboo was the first dog to go half as high as Everest in a glider. A happy coincidence about these flights was that they were made in the *Minimoa* that originally belonged to Philip Wills, the one in which he captured the height and distance records in 1938. The distance flight of Bira's, a 182-mile cross-country to Aldeburgh on the Suffolk coast, brought him the British Gliding Association's Wakefield Trophy for the longest distance flight of the year. To mark this event and to stimulate cross-country flying among Midland Gliding Club members, Bira decided to present a trophy of his

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own to be awarded annually to the individual making the longest distance flight from the Long Mynd site. The trophy is of Siamese craftsmanship and takes the form of a large silver eagle. The first winner, Charles Wingfield, who was one of the first holders of the Gold "C" in Britain, qualified with a flight of 100 miles to Thrapston, Northants. Although several winners have since managed to improve upon Bira's 182-mile journey, usually by no more than 10 miles, there have been two occasions only when the Siam Trophy has been won with a flight in excess of 200 miles; Philip Wills was the recipient each time, accomplishing a 275-mile cross-country to Callington in Cornwall via Lasham in 1950 and a 204-mile trip to Dover in 1957.

Prince Philip had his first flight in a glider at the Bristol Club's Nympsfield site while in the district primarily to visit the Wildfowl Trust run by Peter Scott, an avid glider pilot himself, during the early summer of 1957. Club manager Peter Collier took him up in a two-seater, launched by the winch, although the weather was so blustery that at one time it looked as though the flip might have to be cancelled. Collier picked up a thermal at 800 ft. and circled strongly at a rate approaching 20 ft. a second. It is not often anyone has such a promising start to an initial gliding flight. However, whereas time does not normally matter, Prince Philip's rigid timetable dictated that they land without undue delay; they were being beaten by the clock. At 2,000 ft. Collier put out the air brakes and turned back towards Nympsfield rather than risk being carried away by the wind and overshooting the site. A landing anywhere other than Nympsfield, or a late arrival, would have thrown the royal schedule off balance. Thus, by his strict adherence to the timetable planned for him in advance, Prince Philip sacrificed some of the excitement of gliding in his first taste of the sport.

Two months later, Prince Philip was gliding again, this time at Lasham, where he was aero-towed into the sky in a two-seater Slingsby Eagle flown by Derek Piggott. The occasion was the National Championships, which he declared open with a breezy little speech about it being "far from me to come between a

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man, or a woman, and his glider". The Prince had arrived in a Royal Navy helicopter to be met by Philip Wills, the reigning British champion and Chairman of the British Gliding Association, who took him to an open-air flight briefing for competitors. The royal visitor toured the glider park where the 71 sailplane entries were assembled and he talked to some of the 127 pilot-competitors and their ground crews, among them being Peter Collier, who had given him his first trip in a glider, and Peter Scott, whom he was visiting at that time; Collier and Scott were flying a two-seater in the contests. At Buckingham Palace the following year, in his new capacity as Patron of the British Gliding Association, Prince Philip received the team chosen to represent Britain in the World Championships in Poland. By now, a Fleet Street columnist was talking of the Prince's own gliding aspirations, suggesting that it was his wish to compete in the next National Championships.

The truth of the matter is that Prince Philip has still to fly solo in a glider, although at Lasham in May 1963, when he opened the Nationals for that year, he did much of the flying while up in a two-seater with national coach John Everitt. He handled take-off under Everitt's guidance and carried out various manoeuvres above the site. Coming up to cloud-base, Everitt asked if he would like to carry on inside it. The Prince, who was then flying the glider, answered, "No thanks, not with just a turn-and-bank indicator!" After being used to flying powered aircraft with rather more blind-flying aids than an elementary glider, the royal pilot had decided to let prudence be his guide. However, he maintained the flight below the clouds and handled the landing under his instructor's supervision.

More recently, while visiting the 1965 World Championships at South Cerney, Glos., Prince Philip temporarily lost his princely status when the Russian pilots variously addressed him as "Mr King" and "Tsarist Duke". In these contests, which were won by a Pole in the open class and a Frenchman in the standard class, 86 competing sailplanes made 2,507 flights, covering more than 48,000 miles of cross-country soaring in the

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six flying days, against 8,200 miles in ten days by 27 gliders at the first Internationals, held in Germany in 1937.

Undoubtedly the two best-known brothers in gliding are Commanders H. C. N. and G. A. J. Goodhart. It is often said that the finest way of seeing the world is by joining the Navy. In the case of the Goodhart Brothers, both of whom have served in the Royal Navy in peace and war, it is certainly true to say that being sailors has proved to be one way, if not the best way, to see the world's gliding centres. Between them, Nick and Tony Goodhart have not only gone gliding in Australia, America and throughout Europe, but they have also managed to set up an impressive tally of records in these various countries.

Both of the globe-trotting, record-breaking brothers saw shipboard action in the Mediterranean during the Second World War, Tony aboard the cruiser *Ajax*, where he won a Distinguished Service Cross for courage, enterprise and skill in successful action against Italian destroyers, and Nick on the aircraft carrier *Formidable* and the cruiser *Dido*. Each held the rank of Lieutenant-Commander by the end of hostilities. It is only in post-war years, however, that they have become international figures in gliding. They first made their mark in the National Championships when sharing the flying in the Royal Naval Gliding and Soaring Association's entry, to finish in second place to Philip Wills in 1950 and winning the team championship the following year. In 1952, at a time when much of their spare time was being devoted to teaching gliding to the cadets of the Royal Naval College at Dartmouth, Nick and Tony Goodhart were already on the international success trail, aero-towing each other up and down southern England in highly determined attempts to get their Gold "C" award. By 1955, with the award long behind them, Nick had become the first Briton to add the three Diamonds (he was only No. 42 on the international register, incidentally), having achieved this distinction in America while serving with the British Joint Services Mission in Washington. One outstanding flight he made in the States was a 37,050-ft. climb at Bishop, California, to claim a new British absolute altitude

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record that has remained intact more than ten years. He was not the only Goodhart to get into the record books, though, for by this time his brother was in Australia, serving on the staff of the Royal Australian Naval Air Station, Nowra, some 70 miles down the coast from Sydney, and he was starting to crack gliding records on his own account. He set up a new British out-and-return record of 197 miles on the final day of the Australian gliding championships in January 1955, and raised it a year and a day later to 205 miles. He raced at 48 mph round a 300-km triangular course and set up another British record.

In 1956, at St Yan in France, Nick Goodhart and airline pilot Frank Foster won the world two-seater championship for Britain. Tragedy was to break up this partnership, for Captain Foster was killed in October 1958, with his crew and all the passengers, when the BEA Viscount he was flying was in collision with an Italian jet fighter a few minutes before the airliner was due to land at Naples. In those same world championships, those of 1956, Tony Goodhart had hoped to take part, too, representing Australia, for he was then resident in that country, but he failed to qualify as an Australian. Later, whilst serving as a NATO staff officer at Fontainebleau, Tony flew in both the French and Italian national championships, using one of the new "V"-tailed Breguet 905 Fauvettes. In this same sailplane he raised the British distance record to 384 miles with a flight from Fontainebleau to Pau, down in the Pyrenees.

Meanwhile, back home in Britain, Nick was flying in the 1959 Nationals at Lasham, which attracted the largest field of any gliding contest held anywhere up to that time, with 81 sailplanes and 133 contestants assembled at the site. He was runner-up and the winner of the inter-Services championship which was a part of the major contest. In the course of these championships, Nick Goodhart established new British distance and goal flight records—360 miles from Lasham to Portmoak in Scotland—as well as gaining the first UK speed record to a 500-km goal, 56.4 mph, on this same cross-country journey. Again this is a record that stands today.

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The following year, 1960, saw Tony repeating his brother's earlier success, achieving flights that gave him all three Diamonds to his Gold "C" badge; he was only the second Briton to gain this distinction, although in the five years that had now elapsed, 99 pilots of nationalities other than British had carried out these 500 km distance, 5,000 metres height and 300 km goal qualifying flights. Fresh international honours came their way in this same year with the Goodhart brothers going to Germany as members of the British team chosen to compete in the world championships. Nick reached 4th place in the open class in the Olympia 419, while Tony was less fortunate and finished 24th in the standard class in a Skylark II. Two years afterwards, at Aston Down, Gloucester, Nick Goodhart was British champion for the first time. Yet again a Goodhart had triumphed.

Gliding is very much a family sport and, despite there being a pronounced male majority, some of the wives are also pilots in their own right. There are husband-and-wife teams, too, like that of Lorne and Ann Welch, who have represented Britain in two-seater events against the pick of the world's finest pilots.

Lorne Welch, a gliderman in pre-war days, served with the R.A.F. and after being shot down during a bombing operation became a prisoner in Colditz where he gave technical advice during the conception and construction of *The Colditz Cock*. In a previous prison camp, Sagan, he had toyed with the idea of a glider of his own but he was moved before much progress could be made on the project. He became chief flying instructor with the Surrey Gliding Club after the war and has made a special study of the meteorological influences on gliding. Although spending most of his time teaching other people how to glide, Lorne completed a number of outstanding flights, including the longest distance flight of 1947, and represented Britain in the first post-war international gliding contests; he was beaten only by Philip Wills among the British competitors. In the 1951 National Championships he reached third position, a feat that helped to secure for him a place once more in the British team at the world championships the following year in Spain. As

already related, Welch started off unluckily with a crash on the road journey through France, damaging his Sky sailplane in the process, and he just scraped into the Top Ten in the final placings. However, only two of his team mates gained higher points—Wills, who won the title, and Jock Forbes, who was placed third. Managing the British team for the third time on that occasion was Ann Douglas, nicknamed "*La Tigresse*" by the French because of her determination on the team's behalf, who was to figure in the news twice within the next few months—firstly as recipient of the MBE in the 1953 New Year Honours List for her services to gliding, and secondly with her marriage to Lorne Welch.

Now one of the foremost authorities on the sport in Britain and Chairman of the B.G.A. Instructors' Panel, Ann first learned to fly powered aircraft in 1934 and took up gliding initially at Dunstable in the Anglo-German course held there during August 1937. She founded Surrey Gliding Club in 1938, as an off-shoot of London Gliding Club, and during the war flew with the Air Transport Auxiliary, the organisation responsible for ferry-flying all manner of aircraft between factories and operational airfields. Save for the 1965 World Championships at South Cerney, when she was Director, Ann Welch has captained the British gliding team in every one of the post-war series of international championships so far, except for the 1954 contests which were being held for the first time in Britain. The reason was that Ann was flying herself on that occasion, as the only woman competitor, navigating and second pilot, with her husband as first pilot in a T-42 two-seater when the cream of 19 countries were gathered at Camphill, Derbyshire, home of the Derbyshire and Lancashire Gliding Club. Although outside the top half-dozen in the final placings, Lorne and Ann Welch finished 337 points ahead of the Spaniards, winners of the previous world championships. By now Ann must have become quite at home in almost every major gliding centre in the world, for she has travelled extensively with Britain's gliding aces and goes up herself whenever there is a chance. Once, when in



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Poland in a non-competitive capacity with her pilot husband, Ann actually exceeded the then British women's distance record of 326.56 miles; the margin was too slender to count for official recognition but the 328-mile goal flight record set up with this journey almost to Russia, remains today.

How long does it take to become a champion? Obviously there can never be a timetable to success in gliding but newcomers can at least take heart from Peter Scott, the ornithologist, artist and yachtsman, who was the first person to be trained to the solo pilot stage at the Bristol Club's Nympsfield site overlooking Scott's wildfowl sanctuary at Slimbridge, Gloucester. It was the summer of 1956 when he took up gliding; seven years later he had become an international figure in gliding and the British National Champion. He gained his "C" Certificate within two months of starting training, his Gold "C" within two years, and by January 1962 he held all three Diamonds to his Gold "C" badge, a distinction attained previously by only six Britons—the Goodhart Brothers, Philip Wills, Mr and Mrs Burns and R.A.F. flier John Williamson. Scott had his own glider, which he used for such diverse activities as creating club and national records and even as a form of transport to fulfil a lecture engagement. He has persevered locally and internationally to the extent of twice setting out from Nympsfield for Great Yarmouth in the same week in unsuccessful bids for his 300-km (186 miles) distance flight award, first covering 144 miles and then stretching to 154 miles, and he has also utilised some of his spare time on a visit to South Africa to borrow a glider and achieve the ultimate in these distance flight awards, the 500-km (310 miles) Gold "C" Diamond, with a flight of 320 miles while in that country in another sporting capacity—President of the International Yacht Racing Union.

Peter Scott was a comparative latecomer to the sport, since he was already in his late 40s when he started receiving instruction at Nympsfield. In India a boy went solo at the tender age of nine. In Australia, a 12-year-old lad reached 8,500 ft. in a four-hour solo flight. In Britain, boys of 14 have become "C" pilots

and there is at least one case of a 17-year-old boy being one up on Dad by beating him to the Silver "C" award. Although nowadays in Britain the minimum age for solo flying is 16, many schoolboys are regularly having tuition in two-seaters in readiness for the time when the law will permit them to fly alone for the first time. In the Boy Scout movement, for instance, which seeks to foster interest in activities as varied as astronomy and zoology, gliding was first seriously considered for inclusion in their training programme as far back as 1953 when exploratory meetings were held with the British Gliding Association.

Two experimental full-week courses were organised on a national level at Lasham in 1955 and these proved so successful that four courses the following year were easily filled. The first courses for Scouts under 15 years of age were arranged following the introduction of a badge for gliding proficiency. In 1958 a full-week Scout course at Sutton Bank was added to the programme and two years later, so as to allow further expansion to the training course programme, the Boy Scouts Association purchased its own two-seater glider. In 1961 the number of Scout launches reached a thousand for the first time; this figure was trebled at Lasham alone during 1965. Full-week courses are open to all Scouts over 14 years of age at the commencement of training. Charges have been kept as low as £11 for Senior Scouts, to include all expenses except travelling and pocket-money, while the cost for those over Senior Scout age was set at 12 guineas. Gliding Bursaries are available through the Boy Scouts Association for the most deserving cases if the Local Education Authority refuses financial assistance. Since the first experimental course, some five hundred full-week course places have been filled and about two thousand boys have attended the shorter courses for the Air Glider badges. In addition, Scout gliding facilities have been negotiated with other centres besides Lasham, where now the Scout Air Training Base has been established on a ten-acre site with its own accommodation and camping ground. Boys whose first pilot training was in the Scout

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glider are serving as pilots in the Services and in civil aviation and one is a pilot for the Flying Doctor service in Basutoland.

Of course, gliding is not the prerogative of youth. The Indian Premier, Pandit Nehru, was almost 70 when he made his first passenger flight; Mrs Abraham, mother of the Swansea Club's chairman, had her first flight as a Golden Wedding Day celebration treat, with her son at the controls. At Camphill, Derbyshire, Mrs Mabel Harwood was introduced to soaring flight at the age of 86. In Yorkshire, Major Alan Simpson, a grandfather in his late 50s, flew a glider solo for the first time exactly 30 years after qualifying as a pilot of powered planes. He first learned to fly in 1934 when a pupil of First World War fighter ace Tommy Rose, winner of the King's Cup Air Race in 1935 in a Miles Falcon which averaged 176.28 mph for the 1,285-mile course. Simpson has commented that gliding brings him in close touch with the adventurous type of young person he likes and admires. Glider pilots, he declared, form a happy crowd.

Lately, club entrance fees have ranged between two and ten guineas, and annual subscriptions between seven and ten guineas. Launchings by tow-car or winch cost between 5s. 6d. and 8s. 6d.; an aero-tow is likely to be nearer 30/-. The old "A" certificate, for which the pupil was required to fly an elementary glider solo on a straight glide of more than 30 seconds with a normal landing, has become virtually extinct nowadays. It has been largely abandoned as a separate test and linked with the "B" certificate, which required two flights each lasting more than a minute, with simple turns to left and right. The "A" and "B" certificates are now usually gained together with three solo circuits, one of them in the opposite direction to the other circuits. The "C" certificate is gained with a soaring flight of at least five minutes above the release point and there is also a short written examination on air law. Only then is a pilot allowed to fly beyond the precincts of the gliding site.

The Armed Services have strong affiliations with the sport and hold regular championships. Although some members of the Service clubs are engaged on power-plane flying in the course of

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their normal duties, the majority are ground personnel in jobs as varied as clerk, engine mechanic and assistant commandant of a staff college. Many of the pilots in the civilian clubs first gained their interest through being associated with glider activities during their Service days in the last war. Indeed, one such organisation, known by the particularly apt name of Upward Bound, comprises veterans of the now disbanded Glider Pilot Regiment who flew in the Sicily, Normandy, Arnhem and Rhine airborne assaults of the Second World War.

Based on a privately owned airfield at Haddenham, Bucks, where many GPs first learned to fly the Hotspur training gliders in the early days of the Regiment, the Upward Bound Trust is an expression of the vanished Regiment's tribute to adventurous youth. Initiative was a marked quality of the war-time glider pilots; today the ex-GPs salute the initiative of the spirited young people of a later generation through a love of gliding which is their common bond. At week-ends, organised groups of boys and girls learn the rudiments of gliding from instructors who all served in the Glider Pilot Regiment. They are trained up to the standard of the British Gliding Association's "B" Certificate, more than 120 youngsters having qualified within the first two years of the inauguration of this worthy scheme. It is only in recent months that Upward Bound has become a registered Trust with several eminent Service and civilian personages as Patrons. Chairman and Founder is Brigadier George Chatterton, who headed the GPs during the war, with Sir Frederick Hoare, a former Lord Mayor of London, and Lady Hoare, as Trustees. The organisation has been functioning for most of this time with little more than a single T-31 glider, a winch, a rota of seven instructors and a limitless store of enthusiasm but the recent recognition through the acceptance of Trust status promises considerable developments at Haddenham itself with the possibility of further such centres being established elsewhere in Britain.

Towards the end of 1965 a hangar was built at Haddenham, by courtesy of Messrs Airtech Ltd, capable of housing the three

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T-31s, one T-21 side-by-side dual, one Blanik L-13 and one Olympia 4b, which will comprise their fleet in the near future. The hangar, together with the purchase of a Clayton winch, the latest of its kind, which now steps up the number of launches possible at this site, results principally from a very generous gift of £2,500 from the Goldsmiths' Company. The Pathfinder Association, whose members led the big bomber raids of the Second World War, presented two of the gliders, Pathfinder I and Pathfinder II, which have been decked out in their familiar colours of maroon and blue. The Blanik has come from an anonymous donor to encourage advanced flying for the instructors, for all the GPs who fly in Upward Bound must intend to become instructors. Upward Bound is not a club and would not be permitted to fly at Haddenham if this were the case, nor would it have been accepted by the Ministry of Education and Science as a Trust on any other condition than as a flying training school for youth.

The hope is that more and more of the Horsa, Hamilcar and Hadrian pilots will be encouraged to renew their experience of flying gliders and this time extend their skills towards soaring flight. Already some of the ex-GPs, who have long since outgrown their khaki battledress with the weighty burden of advancing years, have returned to the cockpit and flown sailplanes in solo flight preparatory to becoming future instructors with Upward Bound. The winch launch, sweeping the "Bounders" upward, seems strange initially compared with the memory of aero-towing by the Halifaxes, Albemarle and Stirlings of bygone days. And the little sailplanes look so feather-light on the controls that a sneeze would seem enough to send them into a loop. Yet, here at Haddenham, the GPs are reliving the happier moments of their Army life with none of the anxiety and strife that blackened their earlier gliding days.

From time to time groups of patient and dedicated men have toiled to build their own gliders. Some years ago, Armstrong Whitworth aircraft apprentices constructed a replica of the Hawk glider in which Percy Pilcher made the first controlled

flight in Britain towards the end of the last century. Built primarily for exhibition purposes, the full-size replica was flight-tested for a TV programme and crashed from 20 ft. when a gust of wind caught it, snapping part of the undercarriage, loosening the mainplane bracing wires and crumpling a wing. Senior boys from Leighton Park School, Reading, were more fortunate with their endeavours. Cheered by progress which was already being made in flying tuition given them at Dunstable by senior science master John Simpson, they set about building their own glider. Governors, parents, Old Boys, all helped finance the venture. It was so successful, 1,049 man-hours later, that they were able to launch *Min* with due ceremony and so further their lessons in this sturdy two-seater trainer. Orthodox in design and construction, the Reading schoolboys' glider differed considerably from the home-made effort of two brothers on a farm at Brinksworth, Wiltshire, which comprised parts of disused aeroplanes, notably a defunct Tiger Moth. It exceeded expectations in reaching more than 100 ft. although the venture became somewhat clouded when expert opinion suggested that the glider was not really airworthy.

The British Gliding Association insists on certain safeguards to minimise the risk of accidents. They will not deprive an individual of his basic right to break his own neck on his own land, if he chooses to do so, but they will not permit any glider to fly from one of their sites if it does not possess a valid Certificate of Airworthiness. The Association's C. of A. must be renewed every year; inspectors carry out a thorough examination and the certificate will be issued only when the inspector is completely satisfied that the craft is safe for flight. Additionally, club gliders are checked before each day's flying and owners of private gliders, too, ensure that these are similarly given a pre-flight inspection. Like a motor-car, a glider is required to be insured in respect of third-party damage although, like the C. of A., insurance in this case is a requirement of the British Gliding Association and not a legal requisite. Yet, even with these stringent safeguards, accidents will always happen; inevitably

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there is the human factor which lies quite outside the control exercised by the most safety-conscious organisation.

How stands the safety record? A report presented to the British Gliding Association in March 1966 said that about one hundred accidents were notified during the past year, half of them serious, giving an accident rate of one per 2,000 launches or, for serious accidents, one per 4,000 launches, which appeared to be about the European average. There was one fatality and one near-fatality from low altitude spins while the glider was still attached to the cable; in one case, two fatalities resulted from the aftermath of a cable break; there were 11 reports of accidents involving misjudgement of approaches and 17 accidents, numerically the largest in the Safety Panel's analysis, involving heavy landings, the majority to inexperienced pilots having trouble with air brakes. There were two mid-air collisions, one between thermalling gliders and the other during a cross-country event at the World Championships—"By chance no pilot was killed but it would be surprising if further collisions do not prove fatal," commented B.G.A. Safety Panel chairman P. Minton in the report. It was tragically prophetic, for the ink was hardly dry before news came of two R.A.F. men and a German civilian losing their lives when their gliders collided over the Butzweilerhof air base in West Germany.

The gaudy colours in which the modern-day gliders are painted are not necessarily manifestations of the pilot's personality. Colour is a safety factor in gliding, so bright colours and identification markings have the merit of ensuring that a glider can be easily distinguished in the air. Reds, pale cream, white, orange and black have been proved to show up well; silver, pale blue and pale green don't show up so well and therefore increase the risk of a collision.

It has yet to be proved that the ultimate choice of colour has any antagonistic effect upon the feathered inhabitants of the sky but for one reason or another there have been occasions when a pilot has had to join battle with a suspicious eagle. Once, in Switzerland, a glider flying along serenely over Locarno at 7,000 ft.

## THE POWERLESS ONES: GLIDING IN PEACE AND WAR

was attacked by an eagle with a wing-span of practically 9 ft. and the pilot dodged the onslaught only by diving to safety. It was left to a Swiss Air Force fighter pilot to chase away the frustrated bird. Nor is the eagle the only bird of prey which the world's glidermen may encounter in the skies. A word of advice from the experts, therefore, may not be out of place. If you meet a vulture, get your nose up; if you meet a kite, get your nose down—and fast! It appears that the vulture, when wishing to avoid a collision, tucks in his wings and plunges into a nose-dive, whereas the kite's normal form of evasive action is to pull up into a stall. There's not much risk of coming across a vulture over Ventnor or an eagle over Eastbourne but remember the Boy Scouts' motto . . .

A rather more common hazard of the skies is lightning. It was once worked out that at one British site alone at least one sailplane would suffer damage through being struck by lightning for every ten that exceeded 15,000 ft. during a thunderstorm. It can be a disturbing business even when the glider escapes damage. The prelude is an assortment of hissing noises and then blue sparks begin leaping from instrument to instrument across the fascia panel; it is mildly fascinating. Then your flying arm becomes a lightning-conductor and you feel an electric shock shooting up from the hand gripping the control column. A thundercloud flight is a journey into temptation, for the lift potential is tremendous although there is always consolation in the knowledge that no one has yet come to grief in Britain in such conditions.

Strong winds and turbulence have made pilots lose control and in Britain in 1965 alone there were five such cases resulting in serious damage to the sailplane, three whilst on final approach and two during hill soaring. The failure of hill lift caused two gliders to make unpremeditated and disastrous field landings, while a third pilot failed to clear a spur and actually landed on it. Accepting that you should never drop below 2,000 ft. without having a fair idea of where you're going to set down your glider, even the most experienced pilot is liable to run



## A PRINCELY SPORT

into trouble through a fickle wind switching direction or giving way to utter calm. It can smack you down in a duck-pond or land you in jail. Who dares guess the waiting hazards? The pleasant meadow just ahead looks O.K. but you're dropping so quickly there's no time to look for a lurking bull. Or maybe you'll settle for a patch of heather-strewn open countryside and find you're on a firing-range. You can't always be permitted the luxury of picking your spot. A surprise down-draught once forced a Cambridge Gliding Club flier into the sea off Llandudno; he had to sit on the wing of the ditched craft and wait for a rescue boat. An American pilot in the World Championship held at Butzweilerhof, near Cologne, competing in an event where the task set was to fly the furthest possible distance and still remain inside West Germany, strayed over an island in the Baltic and came down red-faced and full of apologies in East German territory. And at least one man who has descended innocently upon a security-conscious V-bomber base in Britain has found himself escorted to the guardroom to await acceptance of his credentials.

There is a traditional course of action upon which the good-humoured glider pilot will rely when faced with the embarrassment of having to account for a forced landing on someone else's property. He will no doubt sigh and hang his head in mock shame. Then he will express his regrets sincerely and profusely, pleading that it was all due to his having run clean out of petrol. The most difficult job is keeping a straight face when they start searching for the tank to check your story.

Of course, if you keep being bundled into the guardhouse for unauthorised visits to military airfields, or you are continually violating frontier regulations, or you just can't seem to avoid a soaking in the sea, you may in desperation wish you possessed a powered plane after all. Don't worry. If you study the magazine advertisements you will probably come across the firm in Central London selling light aircraft which announces tantalisingly: "Your glider or your car welcomed in part exchange."

Swap it—and happy landings!

## *Gliding Onwards*

Gliding is a cosmopolitan sport. It is enjoyed in both hemispheres and on both sides of the Iron (and Bamboo) Curtains.

While the basic shape of the glider may not differ much from those developed while gliding was growing up between the two World Wars, manufacturers are now calling upon the latest materials to assist in the quest for peak performances. Glass-fibre bodies, aluminium honeycomb sandwich panels and polystyrene foam wing filling have been specified to play a part in the eternal struggle to provide maximum efficiency with minimum weight.

Yes, there are build-it-yourself kits, too. And one built by the Americans to glide down through the Earth's atmosphere, dropped from beneath a turbo-jet bomber, in order to gather data for future manned spacecraft returning to Earth.

In Britain, 1966 has seen the number of gliding clubs exceed 50, B.G.A. membership standing at 26 full clubs, 32 associate clubs, two overseas associate clubs, 165 private-owner groups and 31 individual members. The Services each have their own gliding associations; airlines, universities and even industrial giants also have them. The Air Training Corps goes gliding from as many as two dozen centres scattered around the country on R.A.F. airfields and civilian aerodromes. During 1965, civilian clubs flew a total of 37,617 hours from club sites from 183,527 launches; R.A.F. and R.N. association members flew 10,567 hours from 60,305 launches. Thus, membership of the gliding fraternity, flying time and the number of launches were all showing a healthy increase on previous figures.

Records will keep on falling while Man continues to find satisfaction in the sport. There will be deliberate bids to capture records—and there will doubtless be records broken by accident. Make no mistake: Britain can hold her head high in this fascinating world of gliding. There have been champions in the past and there are world-beaters from Britain holding honourable places in the present-day record books. International records are like the gliders themselves, though—they won't be easily cracked . . .

## ON TOP OF THE WORLD

**A**MID THE RUGGED regions of the Sierra Nevada, backbone of the sunshine-and-oranges state of California, there boils up from time to time some unseen force that will sweep a sailplane to fantastic heights. It is a massive, dangerous power. Whilst the phenomenon is not peculiar to this particular region, it is probably true to say that more time and effort has been spent on scientific study here than in any other location. Yet even now, despite a good understanding of the basic factors that create this situation, there still remain some imponderables to form an endless topic for clubhouse discussion not only in America but all over the world.

The Sierra Nevada stretch for some 400 miles through practically the entire length of the state, averaging close on 80 miles in width and rising to 14,500 ft. in Mount Whitney, highest peak in the whole USA. It is wild country with only a scattering of permanent inhabitants, a sprinkling of townships, lumber-camps and recreation centres, but little else. This great range lifts the prevailing winds that drive eastwards off the Pacific Ocean from Crescent City down to Long Beach, producing heavy rain on the western slopes and creating a desert eastwards towards the neighbouring state, Nevada. In the Sierra Nevada are some of America's best-known national parks—Yosemite, with its valley enclosed by lofty granite rocks; Sequoia, a forest region with those famed skyscraper trees; King's Canyon, with a gorge one and a half miles in depth. A strange region, all in all, especially when you take into account that it is also the birthplace of what has become known in aviation circles as the Sierra Mountain Wave.

Peril lurks amid these upsurges. One of America's leading

glider pilots, William S. Ivans, Jnr, who soared to a record-breaking altitude of 42,100 ft. above sea level on one of these strong, standing wave updraughts formed in the lee of the Sierra Nevada range, wrote these words of caution in the January-February 1951 issue of the Soaring Society of America journal, *Soaring*: "Standing waves have been known to develop and to intensify with great rapidity; vast areas of strong lift may suddenly surround the pilot, lift so strong that neither spinning nor diving with full spoilers will keep him from being carried upward."

Nowhere is there anything quite like it, this Sierra Mountain Wave. There are wave conditions generated in various parts of the globe but this is the Daddy of them all. Yet, knowing the dangers that may befall them, Ivans and several other pilots have deliberately gone seeking out the wave, sailing up to heights greater than those reached by civilian fliers even in powered planes anywhere in the world. In one such flight, when an altitude of almost 40,000 ft. had been achieved, the glider was smashed to pieces in a rapid build-up of treacherous roll-cloud conditions at about 15,000 ft. in the lower regions of the wave, while returning to the airport. The pilot blacked out, but recovered consciousness to escape by parachute with the crumpled wreckage of his sailplane tumbling all around him.

Most of the early exploratory flights into the wave were made from Bishop, California, close to the Nevada State-line, northwest of the 135-mile-long Death Valley. At Bishop, Paul MacCready and John Robinson reached 29,500 ft. and 33,000 ft. respectively within two days in a wave-soaring expedition over the Christmas holidays in 1948; six records fell there in a single day the following Christmas with ten flights to over 25,000 ft. and three in excess of 30,000 ft. Ivans' record in 1950 was set up from Bishop, too. And so was the two-seater height record of Lawrence Edgar and Harold Klieforth. These two reported updraughts of between 2,000 ft. and 3,000 ft. per minute while flying south along the Sierra mountains in the vicinity of Mount Whitney, 60 miles or so from Bishop, and there was still lift of

several hundred feet a minute at 44,000 ft. when they decided to call it a day.

Another top pilot, Duke Mancuso, had different ideas about the ideal location for high-altitude soaring. He moved down to Antelope Valley on the southern end of the mountain range, where airline pilots had experienced strong waves, and in the November–December 1960 issue of *Soaring*, Mancuso was able to write: “The experience of the past two years of wave soaring has convinced me that the Antelope Valley is the most fruitful wave area of all other areas in which I have flown. The arrangement of the principal mountain ranges are such to permit wave formations under a wide variance of wind conditions.”

Bishop? Or Antelope Valley? Where to place the foot of the soaring stairway to the stratosphere?

Mancuso wasn't alone in plumping for the latter location. Paul Bikle, Director of the National Aeronautics and Space Administration Flight Research Centre at Edwards Air Force Base in the Mojave Desert region, and then in the first weeks of his first term as President of The Soaring Society of America, Inc., decided to forsake Bishop in favour of Antelope Valley. In Bikle's case it was largely a matter of convenience, for his home was at Lancaster, which lies within Antelope Valley, although he was able to look back upon several successful outings from Bishop, a couple of hundred miles northwards along the State Highway, tasting there the thrills of riding the Sierra Mountain Wave and once soaring as high as 36,000 ft. By now, though, he knew the sort of cloud formations that heralded wave conditions and in the years he had spent at Antelope Valley he had often seen cloud developments as spectacular as any observed at Bishop. There was a fine airport now in the area, Fox Field, some 2,349 ft. above sea level north-west of Lancaster (Bikle had given a demonstration of high-speed low-flying in his glider and done some precision paper-cutting as a highlight of the opening ceremony), so early in 1961 he moved his glider to Fox in readiness for a fresh crack at high-altitude flying if circumstances should seem to warrant it. Record-chasing was a secondary consideration

and, in any event, this kind of gliding is too chancy to plan a deliberate assault with any real confidence, but the stage was thus set for a remarkable bid to test the strength of the Sierra wave.

Bikle's glider came from good stock. It was a Schweizer I-23E, a later version of the model Ivans had taken up to 42,100 ft. at Bishop, and built by the same company which produced another of the gliders that had figured prominently in mountain wave research, Model S-25, a twin-seater sailplane. It was a mid-wing cantilever craft of all-metal construction with a span of 50 ft. and just under 21 ft. in length. It could reach more than 130 mph in free flight and cruised comfortably at 85 mph; its gliding ratio was as high as 30 : 1 and the minimum sinking speed only 2 ft. per second: a sturdy yet sleek bird. Bikle had all the standard equipment then available for high-altitude gliding. The moulded cockpit canopy had the refinement of double-vision panels and there was a pressure-demand oxygen system (like the fighter pilots were using towards the close of the Second World War), in addition to all the usual instruments for indicating height, airspeed, turns, etc. It was, none the less, conventional in design and construction; it was a standard production model built for high-performance competition flying and used by Bikle in a number of contests in the States.

It was Friday evening, 24 February 1961, when he had a phone call from meteorologist Harold Klieforth in Bishop that was to be the prelude to an extraordinary soaring expedition. Klieforth was in fact trying to trace Duke Mancuso, who was to fly from nearby Inyokern that week-end, but during the conversation the meteorologist reported the likelihood of the wave forming next day, basing his forecast upon the velocity and direction of the wind, pressure systems, temperature changes, and so on. It wouldn't be anything dramatic, he thought, but there would certainly be a wave situation and Bikle thought he might as well take the opportunity for some high gliding if the wave should materialise. The indications were that a cold front would be passing over Antelope Valley in the afternoon and there should be wind from the west or north-west at sufficient velocity to

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produce wave lift to reasonably high altitudes. The wind would come cascading over the Sierras and then, according to custom, roll forward in a wave-like motion triggered off initially by the composition of the undulations in those ranges. Next day Bikle booked a plane to give him an aerial tow to the most suitable launching spot. He was like a boy with a toy aeroplane waiting for conditions to be just right for a flight, biding his time and trying not to display too much impatience.

Bikle, 45 years old, married with three boys and a girl, had 2,000 hours flying time to his credit, 750 hours in small powered planes and the rest in gliders, but he seldom missed a chance to go up when the signs were as encouraging as that afternoon. By now he could see for himself what was happening to the weather pattern. He reckoned a pretty good wave was in prospect and it should yield an enjoyable flight. Maybe conditions up aloft would produce a good flight; maybe they wouldn't. Either way, Bikle would soon have the answer.

Far away to the north of the airfield large lenticular clouds were beginning to develop. These clouds take their name from their shape in that they resemble a lens in side view, rather like an elongated almond, and the glidermen abbreviate the name to "lennies". They are his signposts to a mountain wave because they often form at the crest of these aerial waves. By 2 pm, Bikle saw that the lennies had now extended south to the area of Mojave. One large, sharply defined lennie was prominent about 25 miles to the north-east; smaller and more transient fragments were forming and melting to the lee of the mountains just north of Fox. He knew that beneath these lennies, as well as within the windward half, there should be powerful up-currents to lift him high into the sky. He reckoned the time had come to be airborne and go chasing the wave.

A gusty wind whipped up the airport dust as Bikle gave the word to James Moeller, President of the Antelope Valley Soaring Club and Soaring Society of America official observer for this flight. Barographs were duly sealed and installed in glider and tow-plane as a matter of course, for without them there could

be no acceptable evidence of the heights achieved in the event of a claim being made for recognition of a record performance. There was no great expectation or anticipation involved in these preparations, and the arrangements thus made, whilst being routine for flights of this nature, were comparatively casual. So far as Bikle was concerned, at this moment he was merely out for an afternoon's ride on the Sierra wave.

Shortly before 3 pm, Moeller started up the engine of the tow-plane and hauled the Schweizer into the air. The pair nosed first towards the west, climbing slowly, and then northwards for Mojave (Bikle, appropriately enough, possessed a dog of the same name!), where the first of the big lennies was now more or less right overhead. Already he was feeling lift. At around 10,000 ft., with the 6,500-ft. fringes of the Tehachapi Mountains away to the left and the Mojave Desert sweeping away for mile upon desolate mile to his right, Bikle jettisoned the towline. A wave of the hand from Jim Moeller and he was flying on his own at last and in relatively strong lift.

Bikle scanned his instrument panel. The indicator put the lift at between 500 and 600 ft. a minute and at this steady rate of climb he began working his way north, according to plan, the intention being to get to the rich area of rising air beneath the leading edge of the lennie, scout out the extent of available lift and then drop down to about 6,000 ft., giving him a presentable altitude from which to commence the big climb. It had been necessary to go up to 10,000 ft. on the end of the tow-rope so as to be suitably positioned in the wave area, but now that he was on his own he really wanted a lower altitude calibration on the barograph if he should happen to get up really high during the afternoon, for the difference between the absolute altitude achieved and the height recorded at the start of the climb to this height might represent a fresh gain-of-height record. You couldn't tell how you were likely to make out in a climb of this sort but it was a sensible precaution, in keeping with the character of the man.

Wave flying has its frustrations—literally its ups and downs.



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The air flow striking a mountain range located at right angles to its path rises over the mountains and then, tumbling down the other side, ripples across the countryside in the undulating pattern of water coursing over a submerged rock in a shallow stream, some of the ripples remaining stationary with the water flowing through them. The wave defies prediction. It can build up to useful heights and then subside with temperamental indifference to the height-chasing glider pilot. And Man's knowledge, despite his insatiable appetite, does not yet permit accurate plotting, for wave conditions depend so much upon wind velocity, direction, shape of the intervening land masses and similar geographical and meteorological factors. It's these imponderables that add spice to the quest for fuller understanding of the mighty Sierra Mountain Wave. Much the same wave situation occurs elsewhere in the world, especially in New Zealand, and also in Britain, but our understanding of mountain waves, like the ability to forecast correctly tomorrow's weather in London or New York, suffers on account of the large number of variables involved and the problem of measuring and sampling the structure of the atmosphere in sufficient detail to acquire the necessary data.

After climbing to 12,000 ft. in the first part of the wave, Bikle elected to move towards the mountains in the expectation of finding stronger lift in that direction. In fact this turned out to be a mistake and he found himself right outside the zone of lift and instead in descending air. Allowing his airspeed to reach 100 mph, 110 mph and finally 120 mph to race through the area of rapid sink, Bikle watched the spinning hands of the altimeter ticking off lost height at an alarming rate.

Playing for safety, he searched the bleak rock-strewn desert wastes for a landing place in case he should fail to find a fresh column of lift. He was worried about having to sacrifice so much height and then, away to the north-east, close to a dry lake, he saw a movement of salvation in the still land. Blowing dust was being sucked from the ground in a near-vertical sheet; it was a tell-tale sign of what the meteorologists call a "shear condition".

The layer of air close to the ground was being forced up along a narrow area running parallel to the base of the Sierras and perhaps five to eight miles downwind of them. The curtain of dust marked that shear line. Here, at last, was a source of renewed hope to beckon him on, for this could only mean a situation associated with the wave, although not a wave in itself. It indicated an updraught of some sort even though there was no guarantee that the strength would be enough to boost him to any great height.

He swung his Schweizer round in a skidding turn towards the rising dust and maintained the speed of his dive until he reached it. He levelled for a moment in expectation of lift but the feeling of buoyancy was missing. The gliderman was still dropping like a stone. A glance at his altimeter showed that by now he was considerably lower than his intended start-off point of 6,000 ft. above sea level; unless he hit lift in a few moments it seemed that his afternoon of wave flying must surely end here with the hazards of a desert landing. He had removed his oxygen mask in resignation; it looked as though he wouldn't be needing it any more this flight. At about 4,000 ft. a.s.l., a couple of thousand feet above the hot Mojave sands, Bikle was selecting a site for his touch-down.

Suddenly, for no apparent reason, the glider began to shake and shudder. The transformation was as unexpected as a skier running out of snow and finding himself hurtling across cobblestones. Still racing along at 100 mph-plus, Bikle had slammed head-long into a patch of rough air. The glider was seized like a leaf in a gale and he knew he dare not lose a second in killing off his speed. He heaved back on the stick to zoom into a climb. It was requiring all his strength. The speed dropped back as the climb became steeper and steeper. The glider was practically standing on its tail but the object had been achieved; he had successfully penetrated the zone of severe turbulence connected with the low level shear. The violent shuddering was over as quickly as it had begun. He had cut his speed by half and now, with the altimeter flipping cheerfully past 5,000 ft. a.s.l., he

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rolled into level flight and found himself in a fresh volume of lift between the El Paso and Rand Mountains, and back again on the trail of the Sierra Mountain Wave.

The rate of lift here was not far short of that which he had experienced directly on release from the towing aircraft. He was by now some 25 miles north-east of Mojave. Feeling his way carefully to keep within the area of lift, which he found to take the form of a narrow band at this point, Bikle performed a series of "S" turns within the band of lift and in this way he was able to regain all his lost height.

The problem was now that he was approaching the altitude where an oxygen supply becomes necessary and he hadn't enough hands to fit on his mask, attend to the adjustments that would ensure its efficient operation and still be able to fly the glider. There was no alternative but to allow the Schweizer free rein while he fiddled with the mask. It was a rough passage, like a cross between being on a see-saw and a switchback railway, until the mask was comfortable.

Thirteen thousand feet, 14,000 ft., 15,000 ft., and by now the lift was smoother as he neared the base of the lennie. The ride here was more akin to his previous excursions into the wave. Flight in the wave is exceptionally smooth and, since the air velocity is close to the speed of the glider, it is often possible to fly for long periods in one position over the ground without turning. Although the outside temperature was already below zero, dressed as he was in two layers of clothing, gloves, heated socks and hiking boots, so far he felt no discomfort in his sealed cockpit. He was about three miles south-west of the leading edge of the lennie, a third of the way back or thereabouts, and still maintaining his climb in that stationary updraught being bounced off the ground as part of the uncharted pattern of airflow over the Sierra Nevada.

Basically, a glider is always descending through the air in which it is flying. If one is to go up, one must find air that has an upward movement greater than the rate at which the glider is descending. Bikle was holding his position in the part of the wave

where the air was moving upwards, and staying here he could keep on with his effortless climb. It seemed too easy.

Those who aim to fly these aerial waves are under a severe handicap compared with surfing enthusiasts eager to ride the sea waves. They can't see their waves; they have to nose them out by moving round a patch of sky in cautious exploration until maximum lift has been located. The lennies are a visible indication in signifying a likely region of lift, sitting there like a ping-pong ball balancing upon a fountain of air at a shooting-gallery, but there still remains the necessity for gentle probing to seek out the most virile up-currents and sticking to them. At 19,000 ft., therefore, Bikle decided to do a little investigating and began to fly towards the leading edge of the cloud to test the prospects for increased lift. It wasn't much use; the lift dwindled dismally and he allowed his speed to slacken so that he would drop back to stay in the zone of strongest lift. Such are the irritations and the challenges in this aerial game of chance.

He calculated the wind to be only about 60 mph or 65 mph (wind velocity generally increases with height and a 10-mph wind at ground level may reach 80 mph at 20,000 ft.) and the outside temperature by now would have been in the region of  $-20^{\circ}$  C. Inside, frost had begun forming and at 25,000 ft. Bikle's canopy was caked with rime and even the double-thickness clear vision panels were misty. The oxygen supply was O.K.—he'd glanced at his finger-tips for any trace of the bluey tinge that warned of anoxia but the prime indication was a mechanical blinker device showing the system to be functioning properly. It was as well that all was in order, for he was by now above the first lennie and really riding high on the crest of the Sierra wave in graceful and silent flight.

The lift was steady here and the area quite extensive, so he was able to keep on climbing at between 1,000 and 2,000 ft. a minute, only occasionally slipping off the aerial staircase and having to regain the lift by diving ahead or turning round to retrace his steps. Thirty thousand feet and  $-40^{\circ}$  C. He was higher than Mount Everest and as high as anyone had ever gone

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in a glider in Britain. A heading of 280 degrees and a speed of 50-60 mph kept him in the rising volume of air propagated by the arrangement of the Sierras. He had never felt so cold before in his life and he tried stamping his feet. He shuffled uncomfortably in his seat and wished he had come out in more suitable clothing; the truth of the matter was that he hadn't expected to need anything more adequate. Turning up the oxygen pressure regulator to maximum setting, Bikle tightened the straps and held the mask tight against the face with his left hand to ensure an efficient seal. Although he was higher than ever he had been before how could he tell the difference, but for the vicious creeping cold, when the white curtain of frost masked his view and the only indication left was an altimeter that might not necessarily be giving a true reading?

Forty thousand feet and  $-60^{\circ}$  C. Climbing, climbing, climbing. The cold had become a very real problem; there was no sudden demarcation, a function of time as well as temperature, just a cumulative effect of being cold. The rate of ascent was down to only 1,000 ft. a minute at this point and Bikle looked at his watch to find he had been airborne for  $1\frac{1}{4}$  hours. He had gone higher than any other lone gliderman, save for Bill Ivans more than ten years ago, yet he knew he must abide by a decision he had made long ago and carry on only until he reached 45,000 ft. or spend a maximum of ten minutes above 40,000 ft. A man of discipline, Bikle had set these as his personal limitations when first he practised high-altitude soaring. They need to be basic ground rules in flying and not left to the excitement of the moment when one might not make the proper judgement, perhaps through insufficient oxygen. Forty-five thousand feet would be enough to give him the world altitude record, this he well knew, but he'd long since made his decision in anticipation of one day reaching this point of maximum endurance. The critical time: 4.20 pm. He'd be a world-champion by then or diving earthwards in bitter disappointment, beaten by the cruel cold and a disciplined mind, perhaps to make a fresh attempt on

some future occasion when the wave was more favourably disposed towards him.

The minutes dragged with unyielding tension: 4.11 pm; 4.12 pm; 4.13 pm. It was quiet but for the air brushing the glider; it wasn't surprising that people have said they have heard voices up at these heights—he didn't have even the sound of racing engines for company. By a quarter past four, Bikle had overtaken the record in spite of a marked slackening in his rate of climb. It was down to less than 500 ft. per minute although at 43,000 ft. he did note some temporary improvement. He kept on climbing, anxious to avoid the misfortune of being cheated of the title by any flaw in his instruments, and allowed his speed to build up momentarily to about 80 mph. Above 44,000 ft., Bikle bled off the speed down to an indicated 40 mph as he cleared the 45,000-ft. mark on his altimeter. He'd gone out for an afternoon's wave flying but such was the inconsistency of the Sierra wave that an expedition of no tremendous promise had first threatened to ditch him in the desert and now hoisted him to unsurpassed heights. Too numb with cold for even a smile of satisfaction, Bikle dived towards the area of sink behind the wave crest that had put him on top of the world. He'd made it—with three or four minutes to spare!

So far as lift was concerned, Bikle could undoubtedly have gone even higher. The rate of ascent was still nearly 500 ft. a minute when the climb was terminated and he had done very little searching for better lift which probably existed elsewhere in the wave. He abandoned the climb solely on account of that long-standing determination based on his understanding of the limitations of oxygen equipment and the average human limitations when using such equipment. It was not a decision brought about by any personal limitation observed on the flight; in fact, Bikle puts as his own estimate that it could have been extended to at least 50,000 ft. on the lift then available to him.

At 4.20 pm, the deadline he had set as his margin for success or failure, he was levelling off at 35,000 ft., 20 miles east of his release point and 40 miles north-east of Fox Field, scraping the

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frost clumsily from the inside of his canopy with his gloved finger-tips. It was a joy to be able to look out again upon the world from the confines of his cockpit. To the east and the south there was a splendid series of lennies as far as he could see in the direction of Phoenix and Tucson in the next-door state of Arizona, suggesting stationary up-currents in a continuous wave bouncing on and on through the air mass. Flying home to Fox, sinking gently through layers of woolly cloud and using the setting sun as his directional beacon, the new world champion found there was plenty of lift in the region to bear out this contention. And champ he was for the *Fédération Aéronautique Internationale* were to confirm both the absolute altitude of 46,267 ft. calibrated on the barograph, and the gain-of-height of 42,303.3 ft., as new international gliding records.

The flight up that bumpy staircase to the stratosphere earned for Paul Bikle a place in the Soaring Hall of Fame at the Helms Athletic Foundation in Los Angeles. It also made him something of a national hero. The story goes that when Joe Walker reached an altitude of 31 miles in the X-15 research aircraft, Edwards Air Force Base test controller Jack McKay cautioned him over the radio: "Careful Joe, Paul Bikle is 1,000 ft. above you in his glider."

In his flight, which lasted 2 hours 10 minutes from take-off, Paul Bikle had gone close to the physiological limit that Man can withstand unless he is wearing a pressure suit or flying in a pressurised cabin. One day, perhaps, scientists will have developed this equipment for the use of glider pilots, but for the time being problems of weight and the limitation of available space have somewhat precluded this undoubted aid to high-altitude soaring. Be that as it may, Bikle had done what he set out to do on that afternoon of 25 February 1961 and gone riding the Sierra Wave to a new peak of human endurance.

For a footnote to his story, however, suppose we absorb the hint of potential triumphs that lie in a comment made by Bikle in a letter he wrote to the author: "A number of people in this country have already obtained pressure suits. One sailplane is

being built with a pressure cabin. It is only a matter of time before someone goes higher."

A matter of time . . .

For more than half a century gliding achievements have been assessed on time. A matter of time. A matter of how long a pilot was able to eke out his supply of lift and hold his featherweight craft in the air. Yet, alone among the international records in the sport of gliding, duration flying is no longer recognised by the governing body, *Fédération Aéronautique Internationale*. It makes no difference whether you stay airborne for a week or a month, you cannot now claim an official world record and have your name noted for posterity. Height records still count for recognition by the *FAI*, as do distance and speed achievements, but duration soaring, which has been the fiercest among challenges, lacks current respectability; it is back on a par with the dubious American sport of pole-squatting, with sheer physical endurance, rather than flying ability, forming the criterion for success.

Whilst it may be argued that sitting astride a rising column of air does not deserve to merit international acclaim as a sporting attainment, gliding was born of the determination to remain aloft in powerless flight for longer than anyone else. The story of modern-day gliding has been a story of these achievements in duration flying—Orville Wright and his 9 minutes 45 seconds in the air above the North Carolina sandhills, Wolfgang Klemperer and those of his pioneering era on the *Wasserkuppe*, and so on down the years. In the past, then, duration gliding has at least earned some distinction. It was always a matter of time. A matter of seconds; a matter of minutes; a matter of hours. Always a matter of time.

Still, whatever may happen in the future, the name of French gliderman Charles Atger is secure in the files of the *FAI* in their headquarters building in rue Galilée, Paris; he was the last person to be credited with an official world record for duration flying in a glider. He made his lone flight into history from a site in the South of France on 2 April 1952 in an *Arsenal Air-100* sailplane. It was an episode of drama which, strangely enough,



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attracted little attention outside France and hardly any at all in Britain. It will be a courageous man who attempts to beat Atger, for his achievement must stand without equal in gliding when measured in terms of personal adversity.

Atger was 30 years old and unmarried; he farmed the estate of his father, a naval officer. Solid and sturdy in build, he was over 6 ft. tall and weighed more than 13 stone. He came from a village in the Basses Alpes region and gained his first gliding certificate when he was 16 at the famed St Auban centre towards the Riviera. At the time of his gliding marathon he had spent more than 650 hours in soaring flight. Apart from St Auban, the centre from which he had done most of his gliding was close to St Rémy de Provence, a small town in a valley of olive trees south of Avignon. It was an area noted for duration flying. Away to the south there was the Alpilles chain of hills, which tended to support soaring flight admirably when the wind was right, and there was an inspiring history of soaring flights of this nature. Already two pilots, Carraz and Brunswyck, had kept a two-seater CM-7 in the air for as long as 53 hours 4 minutes by sharing the controls to beat fatigue. Atger would now be flying alone, though, winched up in his Air-100 from this same spot on a dawn take-off, with the helpful mistral blowing down the Rhône Valley and across the Alpilles hills towards the Mediterranean.

Atger was dedicated to duration soaring. It held the fascination of an unconquered Everest and the compulsion of a trumpet call rallying troops into battle. He had trained hard for this day, even preparing himself for the inevitable solitude. He knew the feeling well, for this was his third attempt on the record in as many months. The first bid was a dismal failure because of weather conditions; the second time was better, although after 28 wearying hours he was brought down by a dying wind. Perhaps conditions would be kinder to him today.

With three representatives of the French Aero Club as official observers, Atger snapped down the cockpit cover and was away at 6.21 am, the centrally placed wheel of the sailplane gradually

easing its pressure on the ground as the cable was drawn in and the craft reared up steeply into the overcast sky. The Air-100 was a high-performance sailplane built for the national gliding movement in France. A cantilever high-wing monoplane made from spruce and plywood, it had a span of just under 60 ft. It was popular, comfortable and easy to fly. Special equipment for the attempt included a two-way radio, identification lights and a landing lamp in the nose all operated by dry batteries, a seat tailor-made at St Auban, a combat-type toilet installation and two barographs.

The limit of the launch gave him sufficient height to nose around for lift to sweep him clear of the site. Soon he was picking up the rising currents that he knew so well from his previous experience of the region. Elsewhere in France this morning there was rain and snow, although down here, almost within sight of the Mediterranean, it looked like being reasonably warm. The wind was the most important factor, though, and Atger was hopeful that the mistral wouldn't yet abate; with its strength he might stay up many hours, whereas without it he would be as helpless as thistledown on a failing breeze. The forecast was promising and he had both food and drink for the duration attempt. He had the radio to keep in touch with the ground; the voices he would hear through those headphones would be his only company throughout the long and tedious hours ahead.

Les Alpilles extend east-west for 15 miles between the fertile plain of St Rémy to the north and the vast, pebble-strewn and desertlike plain of Crau to the south. Down through the funnel of the Rhône Valley, across that plain, there sweeps the icy mistral when in season and the deflection on meeting the chain of limestone peaks produces sustained and powerful lift. They stand in its way like a punch-drunk boxer in the path of a champion's fist. There are wooded areas on the northern edge of this jagged, rocky range; these hills are torn by deep ravines and live up to their name of Little Alps. Averaging 750 to 1,000 ft. Les Alpilles reach their highest point in the south-east corner

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with the 1,614-ft.-high Aupiho, whose slopes bristle with pines. To the west there is the ruined city of Les Baux where bauxite was first discovered early last century. With gliding, too, Les Alpilles have secured a place in history.

Below, as Atger varied his height between 600 and 6,000 ft. according to the availability of rising air, although normally keeping to 1,500 to 2,500 ft., life was following its usual unhurried pattern. People out in the fields watched the slow-moving sailplane from time to time during the morning and wondered why the pilot seemed to be lacking any desire to explore more distant parts. They didn't know that the man in that tiny cockpit must cling to those hills because only there could he be sure of finding a wedge of lift on which to balance a sailplane equal to half the weight of a small family car. That cold and dry northerly wind, the "Master Wind" they call it, which could blow with tremendous force and wreak havoc among the fruit-trees that gave the region its livelihood, would act as an invisible cushion for his sailplane in the pending hours—a cushion upon which he dare not ever sleep nor even snatch a moment's rest for fear of toppling off it.

It had been a rough passage almost from the start. Over the radio Atger gulped out a message that the battering he was receiving, jolting the craft violently up and down, had already begun to make him ill.

Two o'clock. He had now been working along the ridge for a shade over  $7\frac{1}{2}$  hours, merely the length of a pleasant outing by contemporary standards, yet less than 20 years earlier a similar glide had set up a new British duration record for single-seater gliders. In those days, however, one of the problems was the lack of flying experience in the hours of darkness, both from the point of view of locating adequate lift and ensuring safety in failing visibility. Dorset telephone engineer John Laver, for example, when he secured the British record with a 7 hours 23 minute hill-soaring flight at Sutton Bank, Yorkshire, in October 1933, found that by the time he was forced to come down, quite early in the evening, he was unable to see the hilltop because it

was already too dark. He had to judge the position of the ridge from two rows of lamps. It seemed that duration record attempts were best tackled in the daylight hours and, of course, this was usually quite practicable when a flight of under eight hours could create a fresh record in Britain. For the Frenchman, though, his unusually early launch gave him more than 12 hours of daylight before failing light would start to play tricks on his eyes, making him see ghostly outlines of summits looming where none existed, and the searchlights that were sweeping eerily across the hills would dart and flicker in a perplexing dance, both fascinating and dangerous in its hypnotic influence.

Dusk settled over Provence like a heavy curtain being draped evenly over his own cockpit. Night was the really taxing time for the lone pilot. Every half-hour or so he was in touch with the ground by means of his radio, the ground station, named *Nor Radio*, being under the control of engineer M. Taupin, and he was receiving constant encouragement and advice from Louis Brun, chief instructor of the St Rémy centre—the man who had taught him to fly. Midnight came and still he was floating aloft, lower now because of an easing in the wind, although there was as yet no sign of the up-currents drying up and depositing him on the ground again. The mistral was his salvation, of course; at times it could reach 90 mph in savage gusts and even now the indications were that a steady 50- or 60-mph average would be maintained if only he could last the night. It must soon be dawn and Atger knew the first critical period in his struggle to remain awake was all but at an end. He was stiff and tired but there was indescribable relief in the first flickers of daylight chasing away the gloom of the long and anxious night.

He had now overtaken the 22 hours 13 minutes 35 seconds performance of Flight Lieutenant W. B. Murray and Mr J. S. Sproule\* at Dunstable Downs in July 1938, which was not only unbeaten in Britain before the outbreak of war but also stood for a while as a world record. Where flights of this length are

\* Later to have a leading role in the development of the scoop rescue device used by helicopters over the sea.

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involved, there is probably more point in describing them as endurance rather than duration glides. On this one, for instance, the British pair, cramped side by side in the narrow cockpit, had to endure a succession of heavy rainstorms and battle against buffeting winds in addition to the normal discomfort of immobility in a confined space. As a further handicap, Sproule, suffering from the pain of a wrenched knee, succumbed repeatedly to airsickness. On top of all this the two men had to contend with hunger pangs when their supply of sandwiches slithered out of reach on the cockpit floor and defied all attempts to retrieve them by wobbling the glider; even a try at dropping them a further supply on the end of a line dangling beneath another glider proved abortive. Duration gliding was rapidly reaching the stage of becoming a trial of human endurance instead of an expression of soaring capabilities. Pole-squatting on a chimney of rising air—that's what they called it. Man had learned how to keep up in the air for long periods; now, given suitable flight conditions, it was more a case of Man against himself and not, as in earlier times, Man against nature. No one appreciated this fact more than Atger as he began his second day in the sky above Provence.

So it was with Murray and Sproule during that summer day and night back in 1938. Even with encouraging messages signalled to them on a penny whistle and loudspeaker voices wafting on the evening air imploring them not to give up, and also the sight of spectators massing on the Downs as a result of progress reports given in BBC news bulletins late into the night as the glidermen patrolled their aerial beat for hour upon hour, they must have felt compelled many times to abandon the record attempt. No food; no radio; no comfort. Yet there was certainly drama in the flight and their sense of participation must have given them a great fillip. As soon as darkness fell, motorists flocking to the scene of triumph parked their vehicles and turned on their headlights to indicate the windward edge of the Downs. Spotlights illuminated the windsocks, one on the hilltop and another on the clubhouse. It was sometimes a struggle to remain

airborne, however, for at one time the wind dropped and the glider slumped to within 30 ft. of the crest of the hill. Later, when Murray was exhausted from so much time spent at the controls, Sproule took over for his first-ever taste of night flying and soon after 2 am, amid a tumultuous chorus of car-horns and the existing world record safely surpassed, he brought the glider down for a perfect landing on a flarepath lit by car head-lamps and an aircraft landing light. It was probably the most epic flight in a glider in Britain of pre-war years.

At least Atger was fortunate in escaping the stormy conditions that dogged the British pair for much of their flight at Dunstable. Murray and Sproule had each other for company; Atger was flying alone. Like the young German student Kurt Schmidt of pre-war gliding fame, he had now experienced the solitude of a long night alone in a glider. Schmidt had made a record-breaking flight of 36 hours 35 minutes over towns bordering the cool waters of the Frisches Haff on the Baltic coast near Königsberg (now the Russian city of Kaliningrad) in August 1938, while Britons sweltered in temperatures up in the 80s and looked forward to a record-shattering Bank Holiday week-end. Munching sandwiches and chocolate and drinking from a bottle of water while he soared to and fro on a 15-mile beat between Petersort and Korschenruh, Schmidt had made an early-morning start, as had Atger, remaining up for the whole of that day and night, and the whole of the following day, landing just before nightfall on his second day. As Charles Atger was now realising, it is at night-time when the strain becomes most severe and there is an overpowering urge to return to the sanity and comfort offered on the friendly ground pinpointed by the twinkling lights far beneath the lone glider. Ahead of Atger was another day—but could he face another night, too?

On the ground, Atger's supporters were being refreshed with sleep on a rota system. There was no sleep for their pilot-hero. He knew that if he were to rest for an instant he might lose his life. It was not being melodramatic to think in this way; it was essential to stay calm and alert unceasingly so as to remain poised

on the rising air as the mistral tumbled over the Alpilles hills. Unlike a pole-squatter, Atger had the luxury of freedom of movement in his present environment. There was a region extending eight or ten miles wide in which he was able to seek out his lift and this ensured that his mind was continually busy as a defence against the perils of boredom. He could alternate his hands upon the control column but there was nothing he could do to ease the feeling of cramp inching its way insidiously up his legs, for he had to keep his feet on the rudder bar. He had to watch his height and climb whenever the instruments confirmed that he had located lift. Always there was the demand for concentration. He must watch his speed for he dare not let the nose wander up into a stall; he must guard against losing too much altitude or else his dulled reactions might be inadequate in a sudden emergency. His eyelids were heavy but he mustn't close them. He must keep on soaring. Keep on soaring. Keep on. Keep on soaring.

At the time most people below were finishing breakfast in the comfort of their homes, Atger became conscious of an excited voice in his headphones telling him that he had succeeded in staying up longer than on his previous duration attempt, which ended after 28 hours. The news spurred him on like a tonic. The radio was his insurance against boredom; there was always somebody at the microphone urging him to remain awake and stay with it. He'd been lonely before, when he was practising for this sailplane stint by the somewhat incongruous training programme of driving around on a tractor for a day and a half without sleep, but he had never quite appreciated how comforting it would be to possess the means of communication at the flick of a switch. It didn't matter much what was being said over the wireless. The point was that it was like having someone sitting alongside for company—except that the unseen companion couldn't even ease Atger's aching shoulders by holding the control stick for a brief spell, let alone take a turn at flying.

When he slipped down below 1,000 ft., Atger's tiring eyes could pick out the blurred shapes of the spectators who were by

now converging on the launching site as the news of his astonishing aerial ride spread right round the region. He sensed the warmth of their greeting whenever he approached the field, and he knew he must try to ride the mighty mistral until at least nightfall. It wasn't so bad in the day-time because the strain of piloting was less severe. Lift was easier to find and retain and it was stronger, too. It was hot with the sun beating down upon the perspex hood of his cockpit (he wore a white linen hat to protect his head and sun-glasses to minimise glare) but that wasn't as gruelling as the creeping cold of night-flying with the temperature slumping to zero. He wanted food yet couldn't face it; his mouth was dry as a desert and his flask was almost empty. Could he really keep going until night?

Afternoon dragged into evening; dusk into darkness. He had been up for more than 36 hours and now he must face another cold and unyielding night. He wanted to sleep but he had to fight this dreadful yearning. The mistral was blowing strongly still and he was experiencing little trouble in soaring in the shadow of the hills at a safe height. He could think of nothing but carrying on while the buoyancy remained, for he knew that he must be coming close to the existing duration record. The voice in his earphones pleaded and cajoled him into remaining awake. His head was throbbing and his whole body was listless.

Just before 11.15 pm, although the time meant little to him for he was already too overcome by his ordeal to read his watch, Atger had now overtaken not only the existing single-seat world record set by fellow Frenchman Guy Marchand but also a previous world record for two-seater sailplanes established by Austrian gliding instructors Kahlbacher and Fuhringer. Coincidentally, both flights ended after precisely the same length of time—40 hours 51 minutes. More than ten years and 600 miles separated these two record flights yet by some odd twist of fate they both clocked exactly the same time! The two Austrians had been given an aerial tow to start their flight near Vienna in September 1938; Marchand was winch-launched in March 1949, from the same spot as Atger had begun his great glide. It wasn't yet mid-



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night and still there were many wearying hours of chill darkness ahead for the flying farmer from the Basses Alpes if he chose to see out the night. Battered by turbulence and bombarded by the voices on his radio, the plucky Frenchman refused to quit. He was after the record—and he was going to get it.

From the cockpit of his Air-100, Charles Atger saw a third successive dawn breaking over Les Alpilles. He had gone without sleep for two whole days and had scarcely eaten any food during this time. He had lived in that slender little cockpit with his body forced to remain in virtually the same sitting position while the hands on the clocks of a rota of officials turned round and round and round throughout first one day, then a night, and then another day and now another night. Surely, he was approaching the limit of human endurance, for it wasn't just a question of scorning sleep but of maintaining a sufficient degree of consciousness to be able to keep the glider nosing for lift in the mistral rolling over that ridge of hills between Avignon and the Mediterranean. It wasn't automatic flying; it was soaring flight with all its attendant problems of coaxing out every available inch of height in order to stay airborne.

By midday on this third day of his marathon, Atger had remained in the air longer than any other lone gliderman. He had far exceeded the official world record (Marchand's 40 hours 51 minutes) and was now ahead of those of even greater duration which had been ineligible for *FAI* recognition because they were claimed during the war years. Foremost among these was the flight of Ernst Jachtmann, a National Socialist Flying Corps officer, who took off from a site in East Prussia at mid-morning on 22 September 1943 and crash-landed two days later in the early evening, giving him a recorded time of 55 hours 52 minutes 50 seconds according to a contemporary German publication. Post-war reports elsewhere have, however, put his time at two hours less, 53 hours 52 minutes. Jachtmann, no stranger to the tribulations of endurance gliding, had taken the precaution of installing a couple of vacuum flasks in the wings of his glider, with tubes leading to the cockpit, but apparently they sprang a

leak and his valuable supply of coffee drained away, leaving him so parched that he couldn't take any solid food. Ravaged by hunger and thirst, Jachtmann succumbed after two nights and three days to claim an unofficial world record and receive promotion at the hands of Corps Commandant General Keller in recognition of his outstanding performance. No one was to surpass this feat for more than eight years; no one at all until Charles Atger went soaring in the skies over Les Alpilles that first week of April 1952.

On the ground, Atger's crew were now imploring him to abandon his flight in the knowledge that he had long since shattered the official record and he had a clear margin over Jachtmann's tremendous war-time performance. There was little to be achieved now that he led the world. By now he was in a state of near collapse brought on by mental fatigue. The strain of fierce concentration without sleep or rest or proper food had weakened him physically; moreover, lacking anything more to drink, he had an insatiable thirst, too. The big fear was that in such a condition he might smash the glider to pieces whilst landing. After a flight of this magnitude, anything might happen. If he misjudged his height, or his speed, or if a wing should drop . . .

Louis Brun gave his one-time pupil the order over the radio; he must come down—NOW! The crowd watched tensely as the Air-100 dipped and banked in the direction of the field in obedience. A sigh went up as they saw the sailplane skimming across the grass in a perfect touch-down. He'd made it safely after all those agonising soaring hours, a momentous feat in itself in these circumstances.

In a moment Atger was surrounded by congratulatory crowds yet he was hardly aware of the acclamation. It was 2.36 pm and he had been in the air for 56 hours 15 minutes. As the sailplane halted he passed right out in final, wonderful relaxation. Willing hands hauled him from the cockpit and helped him across to the clubhouse. He had lost 12 lbs. in weight and two nights' sleep in his ordeal. After the briefest rest he bravely faced the

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crowds massed on the field and tried to explain that his record-breaking flight had been possible only because of the strength of the wind that had been sweeping down from the north and deflected upwards in powerful waves on striking the range of hills.

There was a familiar ring to his explanation. It was in this way that Orville Wright had stayed up for nearly ten minutes at Kitty Hawk in October 1911. It was in this way that Wolfgang Klemperer had stayed up for almost half as long again on the Wasserkuppe in August 1921. It was in this way that the latter-day Wrights and Klemperers have stayed up for longer and longer periods to demonstrate their prowess at the sport. It may be that someone, somewhere, will one day beat Charles Atger's official record of 56 hours 15 minutes—for inevitably the world's glidermen love a challenge. As Paul Bikle says about his own world height record—it's only a matter of time . . .

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## GLIDING RECORDS

### INTERNATIONAL SINGLE-SEAT

Distance	A. Horne Parker (USA), 31.7.64; 647.17 miles
Height gain	P. F. Bikle (USA), 25.2.61; 42,303.3 ft.
Absolute altitude	P. F. Bikle (USA), 25.2.61; 46,267 ft.
Goal flight	W. A. Scott (USA), 23.7.64; 497.562 miles
Goal-and-return	S. H. Georgeson (NZ), 6.1.65; 466 miles
100 km triangle	G. B. Moffat (USA), 16.8.62; 79.77 mph
300 km triangle	G. B. Moffat (USA), 6.8.64; 74.48 mph
500 km triangle	E. Dommissie (SA), 25.12.63; 66.561 mph

### INTERNATIONAL TWO-SEATER

Distance	V. Iltchenko and G. Petchnikov (USSR), 26.5.53; 515.6 miles
Height gain	L. E. Edgar and H. E. Klieforth (USA), 19.3.52; 34,425.85 ft.
Absolute altitude	L. E. Edgar and H. E. Klieforth (USA), 19.3.52; 44,255.25 ft.
Goal flight	P. Antonov and V. A. Oplatchko (USSR), 24.4.64; 436.664 miles
Goal-and-return	S. Ratusinski and S. Maciejewski (Poland), 29.7.62; 337.715 miles
100 km triangle	V. Iltchenko and G. Stepanov (USSR), 28.7.64; 64.76 mph
300 km triangle	V. Tchouvikov and J. Logvin (USSR), 1.8.64; 56.27 mph
500 km triangle	H. Sorg and H. Sorg (W. Germany), 7.1.64; 52.03 mph

### BRITISH NATIONAL SINGLE-SEAT

Distance	P. Lane (in Germany), 1.6.62, Skylark 3F; 460.5 miles
Height gain	G. J. Rondel (in UK), 18.6.60, Olympia 2b; 29,100 ft.
Absolute altitude	H. C. N. Goodhart (in USA), 12.5.55, Schweizer 1-23; 37,050 ft.
Goal flight	H. C. N. Goodhart (in UK), 10.5.59, Skylark 3; 360 miles
Goal-and-return	A. Warminger (in SA), 13.1.66, Standard Austria; 374 miles
100 km triangle	A. Warminger (in SA), 21.12.65, Standard Austria; 372 mph
300 km triangle	A. Warminger (in SA), 6.1.66, Standard Austria; 62 mph
500 km triangle	Anne Burns (in SA), 25.12.63, Standard Austria; 64.20 mph

### BRITISH NATIONAL TWO-SEATER

Distance	L. Welch and F. G. Irving (in UK), 14.5.55; 254 miles
Height gain	C. Morgan and L. G. Stanbridge (in Austria), 5.11.62; 16,453 ft.
Absolute altitude	C. Morgan and L. G. Stanbridge (in Austria), 5.11.62; 19,685 ft.
Goal flight	W. A. H. Kahn and J. S. Williamson (in UK), 12.4.58; 194 miles
Goal-and-return	F. A. O. Gaze and Rosemary Storey (in UK), 7.8.59; 170 miles
100 km triangle	D. B. James and D. Marshall (in UK), 13.5.57; 35 mph
300 km triangle	W. A. H. Kahn and B. J. Davey (in UK), 27.7.63; 30.08 mph

### UNITED KINGDOM SINGLE-SEAT

Distance	H. C. N. Goodhart, 10.5.59, Skylark 3; 360 miles
Height gain	G. J. Rondel, 18.6.60, Olympia 2b; 29,100 ft.
Absolute altitude	G. J. Rondel, 18.6.60, Olympia 2b; 30,580 ft.
Goal flight	H. C. N. Goodhart, 10.5.59, Skylark 3; 360 miles
Goal-and-return	J. S. Williamson, 30.8.64, Olympia 419; 274 miles
100 km triangle	I. Strachan, 20.5.65, Skylark 3b; 48 mph
300 km triangle	H. C. N. Goodhart, 25.6.57, Skylark 3; 41.2 mph
100 km goal speed	M. Bird, 4.8.62, Skylark 3f; 71.09 mph
200 km goal speed	I. Strachan, 2.6.63, Skylark 4; 71.1 mph

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300 km goal speed E. A. Moore, 27.5.57, Skylark 2; 57.4 mph  
 500 km goal speed H. C. N. Goodhart, 10.5.59, Skylark 3; 56.4 mph

### UNITED KINGDOM TWO-SEATER

Distance L. Welch and F. G. Irving, 14.5.55, Eagle; 254 miles  
 Height gain R. P. Saundby and B. Roberts, 7.6.64, Blanik; 17,750 ft.  
 Absolute altitude R. P. Saundby and B. Roberts, 7.6.64, Blanik; 19,050 ft.  
 Goal flight W. A. H. Kahn and J. S. Williamson, 12.4.58, Eagle; 194 miles  
 Goal-and-return F. A. O. Gaze and Rosemary Storey, 7.8.59, Eagle; 170 miles  
 100 km triangle G. Camp and Delphine Gray-Fisk, 21.8.64, Eagle; 39.3 mph  
 300 km triangle W. A. H. Kahn and B. J. Davey, 27.7.63, Eagle; 30.08 mph  
 100 km goal speed D. B. James and K. O'Riley, 27.5.57, Gull 2; 60 mph  
 200 km goal speed J. S. Williamson and D. Kerridge, 9.4.55, Eagle; 34.9 mph  
 300 km goal speed W. A. H. Kahn and J. S. Williamson, 12.4.58, Eagle; 43 mph

### INTERNATIONAL SINGLE-SEAT (WOMEN)

Distance Olga Klepikova (USSR), 6.7.39; 465.53 miles  
 Height gain Anne Burns (GB), 13.1.61; 29,917.97 ft.  
 Absolute altitude Betsy Woodward (USA), 14.4.55; 39,993.43 ft.  
 Goal flight Adela Dankowska (Poland), 7.7.64; 391.463 miles  
 Goal-and-return Anne Burns (GB) 6.1.66; 337 miles  
 100 km triangle Anna Samossadova (USSR), 27.6.60; 57.85 mph  
 300 km triangle Y. Leeman (SA), 6.1.66; 64.6 mph  
 500 km triangle Anne Burns (GB), 25.12.63; 64.20 mph

### INTERNATIONAL TWO-SEATER (WOMEN)

Distance Z. Solovey and S. Ivanova (USSR), 27.6.64; 385.246 miles  
 Height gain D. Trouillard and S. Suchet (France), 11.12.61; 23,805.77 ft.  
 Absolute altitude D. Trouillard and S. Suchet (France), 11.12.61; 28,120.079 ft.  
 Goal flight P. Majewska and I. Raze (Poland), 8.8.62; 335.78 miles  
 Goal-and-return D. Zachara and M. Olszewska (Poland), 29.7.63; 260.54 miles  
 100 km triangle W. Kamunska and E. Sawon (Poland), 19.7.65; 55 mph  
 300 km triangle O. Manafova and V. Lamova (USSR), 12.6.64; 46.176 mph

### BRITISH NATIONAL (WOMEN)

Distance Anne Burns (in SA), 3.1.61, Skylark 3b; 326.56 miles  
 Height gain Anne Burns (in SA), 13.1.61, Skylark 3b; 29,917.97 ft.  
 Absolute altitude Anne Burns (in SA), 13.1.61, Skylark 3b; 34,590 ft.  
 Goal flight Ann Welch (in Poland), 20.6.61, Jaskolka; 328 miles  
 Goal-and-return Anne Burns (in SA), 9.1.61, Skylark 3b; 268 miles  
 100 km triangle Anne Burns (in SA), 12.1.63, Skylark 3b; 52.2 mph  
 300 km triangle Anne Burns (in SA), 5.1.64, Standard Austria; 53.84 mph  
 500 km triangle Anne Burns (in SA), 25.12.63, Standard Austria; 64.2 mph

### UNITED KINGDOM (WOMEN)

Distance Anne Burns, 10.5.59, Skylark 3b; 282 miles  
 Height gain Anne Burns, 10.5.59, Skylark 3b; 16,750 ft.  
 Absolute altitude Anne Burns, 10.5.59, Skylark 3b; 18,400 ft.  
 Goal flight Anne Burns, 12.4.58, Skylark 3b; 192 miles  
 Goal-and-return Anne Burns, 26.5.63, Olympia 419; 134 miles  
 100 km triangle Anne Burns, 25.7.59, Skylark 3b; 37.3 mph  
 300 km triangle Anne Burns, 1.6.60, Skylark 3b; 27.6 mph  
 100 km goal speed Rika Harwood, 27.5.57, Olympia 26; 51.6 mph  
 200 km goal speed Anne Burns, 2.6.63, Olympia 419; 53.2 mph  
 300 km goal speed Anne Burns, 12.4.58, Skylark 3b; 39.7 mph

NOTE: Although the records stood correct at March 1966, based on information kindly supplied by the British Gliding Association, flights had already taken place in some instances which were still the subject of claims for recognition of new records at the time of printing.

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