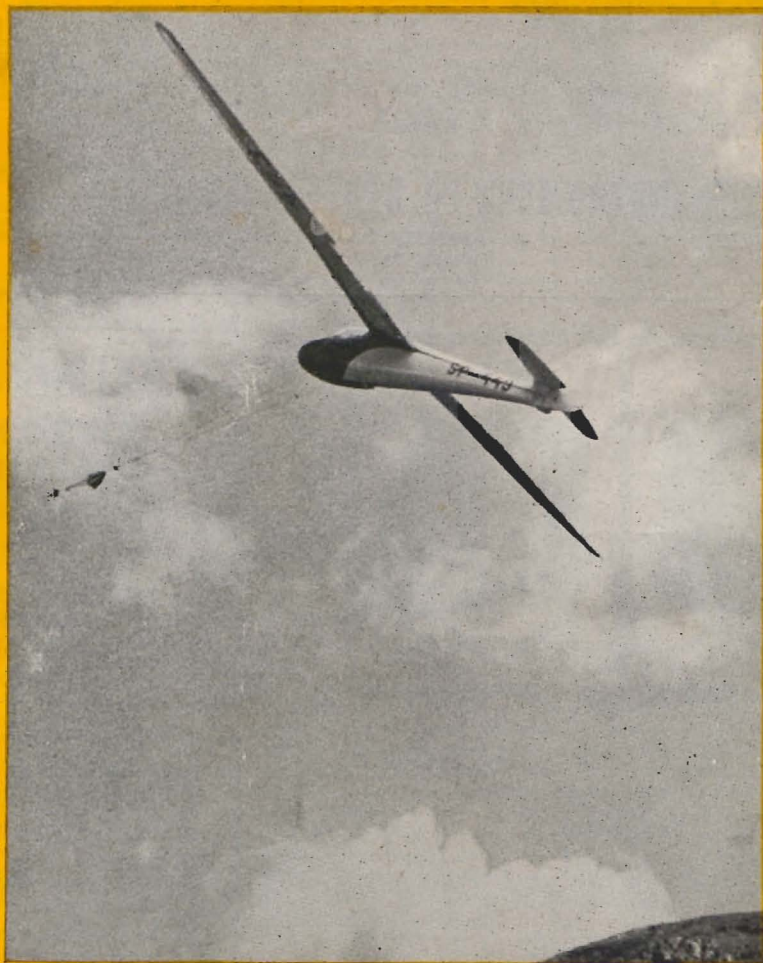


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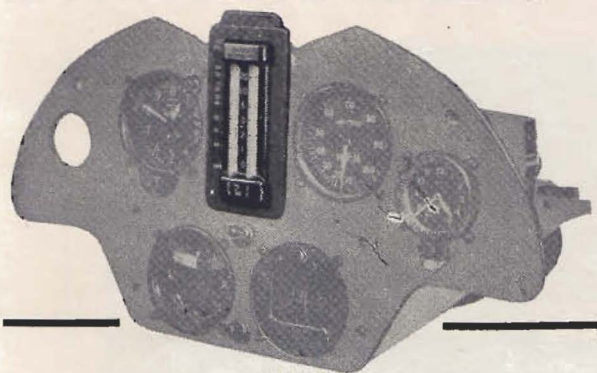
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JUNE 1951

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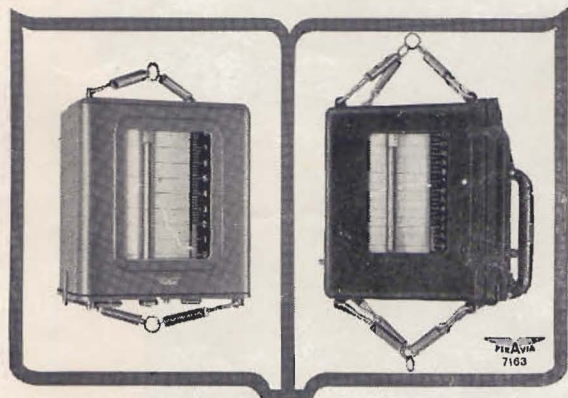
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THE FIRST JOURNAL DEVOTED
TO SOARING AND GLIDING

JUNE 1951 ★ Vol XIX No 6

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COVER PHOTO:

Polish Glider 'Sep', piloted by Adam Zientek, Crakow, being electrically winched at start of Samedan Meeting. By Thedy Heimgarmer.

Editorial

SINCE this is the only printed Gliding Magazine in the whole world which is independent of official bodies and therefore able to speak its mind, we can raise a storm about abuses and malpractices of all kinds, and generally keep alive the spirit of the 'under-dog' whose interests are apt to be overlooked by the High and Mighty. We are, therefore, the recipients of all sort of confidences. Most of these are uninspired by any malign thought, and even some of the latter we seem to recognise as being inspired by unselfish motives, though perhaps a little 'sour'. We ourselves confess to being animated by a spirit of doing our best for the Gliding Movement throughout the world. It sometimes happens that we are compelled by a sense of justice and moral fitness to lift the lid on what some people wish, for their own comfort of mind, we had left alone. In our opinion there is too much 'hushing-up' of many scandals, too much refraining from acid comment because of the fear of hurting someone's feelings or because the delinquent is in a position of power.

In the Services, the commander who lets his subordinates know his opinions of slackness, moral or physical, in no uncertain terms, gets the best results. In voluntary organisations, more tact is needed, and unless the tone of those at the head is of a very high order, rackets and self-interestedness are bound to creep in. There are more than one such bodies near at home of which this might be said, though perhaps with regret. We also regret the law of libel which prevents our saying either what we think or why we think it. When we ask those who are our informants why they do not openly attack these abuses, they reply: 'They do so much for gliding.' To which we reply that what they do would be much better done if they were criticised and that better people might come forward to do their bit, except that they do not wish to be associated with anything suspicious.

We will say no more now, but as we have said before, Gliding in Great Britain will not prosper until it gets better leadership. What is needed is more of the spirit of *noblesse oblige* and a purge of the small-minded people who now run the B.G.A. The 'under dogs' can begin to help achieve this by choosing more independent-minded representatives on the Council, and by refusing to allow any office holder to be awarded any of the B.G.A. Awards. They might institute awards for unselfish service. Having done that they might set about getting a constitution which allows them to say what they think at the A.G.M. Instead of being presented with a set of *faits accomplis*. No professional, or anyone earning money out of aviation, should be allowed to have any voice in the affairs of the B.G.A. except in an advisory capacity. If this happened we might get less axe-grinding and more morale. What is wrong with this great Country of ours is that there is too much axe-grinding in High Places, and hence there is no morale.

We might also get more attention to the need for getting more people into the Movement. No Movement prospers on High Performance achievements. It prospers on the common effort of the common people to do a little better than they have ever done before. We have yet to see a single scheme launched by the B.G.A. to get more recruits, but they have done a lot to enable the pundits to add to their trophies. In this connection we may say that we deplore the award of the Wakefield Trophy to Lorne Welch who, brilliant pilot and instructor though he may be, is a professional flier. He is C.F.I. of the Surrey Gliding Club, and as such, can fly when he likes. We would like to see the Kemsley Fund give a prize to the Club which trained more *ab initio*s in proportion to its size, than any other club. A cash prize of £100 would stimulate effort, and be of real use to a Club who gained it. Or Lord Kemsley might give prizes to amateurs only. We yield to none in our admiration of F/L Bedford's achievements, but, what incentive is there for the ordinary sailplane pilot to attempt records? He has neither the cash to pay for long retrievers nor the personnel to make them. Nor has he the time! It would be much fairer if these kind of prizes were awarded for flights on recognised public holidays only, including Saturdays and Sundays. Could not the Kemsley Fund assist by agreeing to pay the cost of all retrievers over a certain distance if the flights were made in pursuit of certain definite ends, e.g. Silver and Gold 'C', records, and even the Kemsley Prizes with certain limits?

Lord Kemsley is the President of the B.G.A., and we hope some hardy member of the B.G.A. Council will bring this Editorial to his notice. On second thoughts we might send it to him ourselves. At any rate we have no axe to grind and are not afraid of speaking our mind.

NEW BRITISH RECORD-

Philip Wills, chairman of the B.G.A., established a British 'out-and-return' Gliding Record, on Sunday, June 3rd.

Flying a 'Weihe' single-seater machine, Wills took off from Redhill, Surrey, and reached the R.A.F. station at Little Rissington, Gloucestershire, before turning back to Redhill, where he landed—a distance of 160 miles in 6½ hours.

NEW BRITISH CHAMPION

F/L A. W. BEDFORD, A.F.C.

257 MILES — 4 RECORDS — 2nd DIAMOND

FLIGHT LIEUTENANT A. W. BEDFORD, A.F.C., has become the first British Glider Pilot to gain two diamonds for his Gold 'C' badge.

With his flight of 257 miles on May 2, Bedford gained four records in both the British National and U.K. Local categories, and the second diamond for his badge. All have been officially homologated by the F.A.I.

Flying an 'Olympia' the pilot released four miles south of Farnborough (Hants.) and landed 257 miles away at his declared goal of Usworth airfield, near Newcastle.

British National Records broken were (a) Distance (previously held by P. A. Wills with his flight of 232 miles in 1949), and (b) Goal Flight (previously held by F/L R. C. ('Jock') Forbes, 192 miles in 1948).

U.K. Local Records broken were (a) Distance (previously held by P. A. Wills—same flight as above) and (b) Goal Flight, previously held by David H. G. Ince, Midland Gliding Club, C.F.I., 192 miles in 1949.

F/L Bedford, who is attached to the Experimental Department at South Farnborough was, in fact,

flying an 'Eon Olympia' belonging to the Empire Test Pilot's School.

He already holds the British National and U.K. Local Gain of Height record (19,120 ft.), and the absolute altitude record (21,340 ft.).

BEDFORD'S COMMENT

After his success F/L Bedford told a *Sailplane* correspondent that it was his belief that far more record breaking flights would be made in this country if only pilots were able to be on the spot ready to take-off when the conditions were right. 'The conditions are there alright but not always the pilot,' he added.

DIAMOND NOTE: Diamonds are awarded for

- (a) A flight of more than 500 km. in a straight line.
- (b) A flight of more than 300 km. to a declared goal.
- (c) A gain in height of more than 5,000 metres.

Sailplane offers congratulations to F/L Bedford, and in doing so knows that it speaks for the British and world-wide gliding fraternity.

LOOK BEFORE YOU LEAP

By F/O. G. MELVILLE-JONES, M.B., B.Ch.

The author is a specialist on pressure breathing at the R.A.F. Institute of Aviation Medicine and has also much experience as a glider pilot.

His article is inspired by the flight of Bill Ivans, world record breaker, and he offers sound advice on the intrinsic hazards of dicing in the stratosphere.

THE other day when I was at the winch end of a cable line, would you believe it, I waited a long, long while for the signal to take up the slack, but it did not come. I walked the length of the line to chastise my friend, and, as I drew nigh, heard something like this going on between ground crew member and pilot: 'Yes, and have you checked the contents of your main oxygen supply, of your emergency oxygen bottle, and the parachute descent oxygen bottle? You're sure your mask fits without leakage, that your pressure waistcoat is in order and all connections joined up? The pressure does build up to its correct value, does it, and the mask still doesn't leak? Good. I take it the duration of your supply is worked out, but don't forget to keep checking the cylinder contents—there may be leakages anywhere

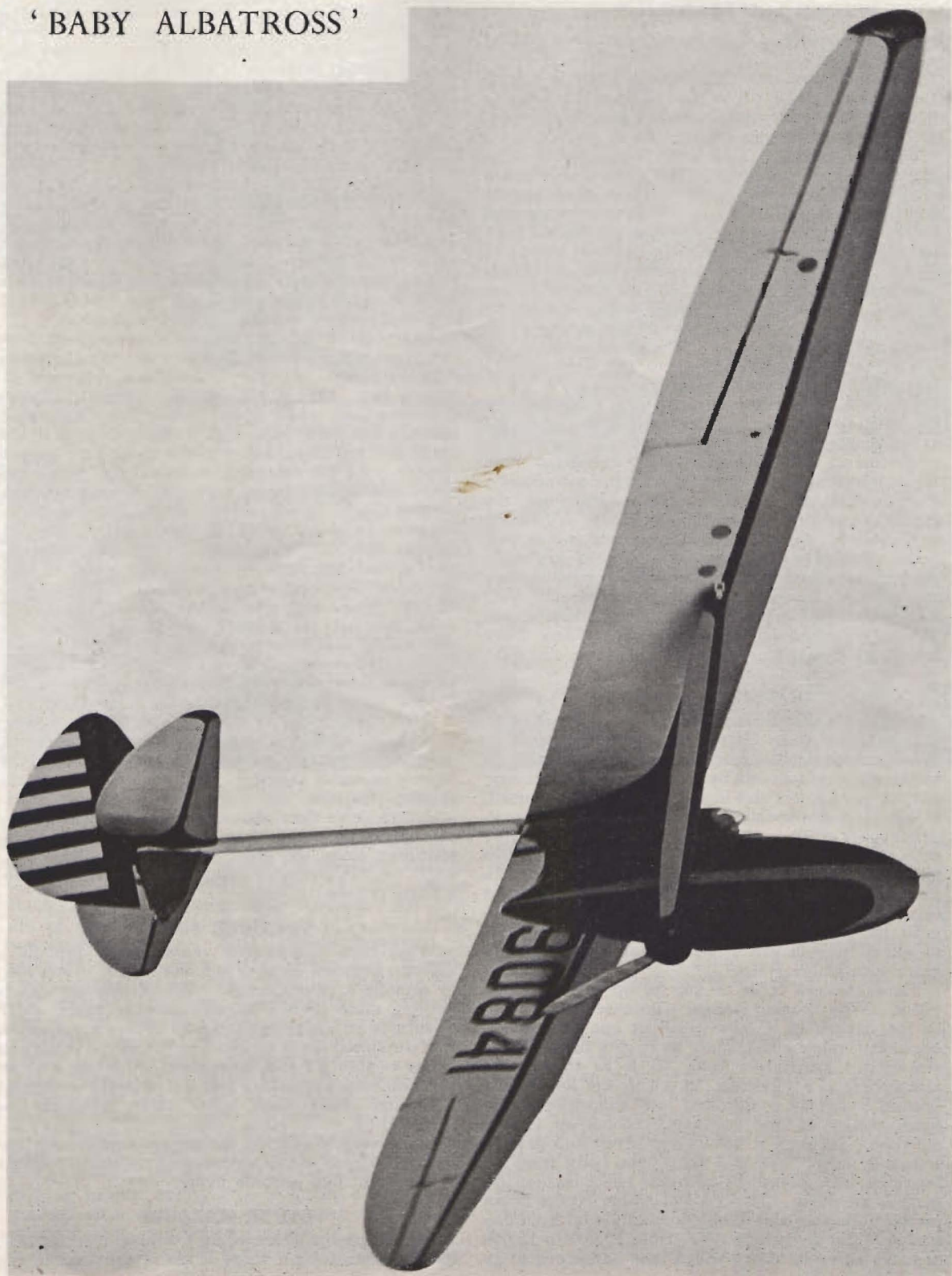
in the circuit. Now remember your limits which we learnt last week in the decompression chamber, and above all, at the least sign of anoxia, COME DOWN AT ONCE.'

At this point I ventured to force a word in edgewise, to ask the significance of this learned one-sided conversation. 'Ah', said my friend, 'briefing the modern sailplane pilot—that's all.'

A WORD OF WARNING

All indeed—yes and more, for there are many aspects of this 42,000 foot nonsense that have to be considered in all seriousness. And since flights over 30,000 ft. are becoming commonplace for the sailplane pilot, and the power plane altitude record is seriously jeopardised, a word of warning or at the

'BABY ALBATROSS'



LOOK BEFORE YOU LEAP—continued.

least a statement of facts would not seem out of place.

First and foremost, OXYGEN. 'What is behind this oxygen racket? Why, in the Boer War Granfer managed without oxygen and what was good enough for he, be good enough for oi.'

Yes, yes, indeed. This latter statement is true. I'faith, what was good enough for granfer *is* certainly good enough for you; BUT the former statement is most untrue. Granfer never lived without oxygen. Granfer always had oxygen so long as the old man had a breath of life in him. To be more exact, he always had oxygen in a concentration or partial pressure adequate to sustain life in his old bones. What I mean is this. A living body, a pilot for instance, continues to live by virtue of the solid, liquid and gas it consumes. The solids, or food, are carried by the liquid (water) to the engines, and liberate their energy by combining with a gas—oxygen. All three are vital for the sustenance of life. Food and water can be stored in the body and so can be engulfed intermittently with longish periods of abstinence. Oxygen cannot be stored for more than a few seconds and must be taken in continuously. Most certain and rapid trouble ensues when the supply is cut off. Consider for instance, suffocation or drowning. We all know that death ensues post haste. But now, what if the supply is gradually weakened without cessation of respiration movement, and without occlusion of the lungs by water! Well, a more or less definite series of things happen, and the end of it all is as dead-making as any other means of oxygen deprivation.

YOU BECOME 'DRUNK'

First, without your being consciously aware of it, your ability to see clearly in low light intensities deteriorates, visual acuity becoming progressively worse. This is followed by worsening mental acuity, so that you are less and less able to criticise yourself, or assess and correlate the events around you in either space or time. In fact you compare favourably with yourself after the odd double whiskey or two followed by the occasional brandy and soda. In short, you become drunk. The surrounding daylight closes in, darkness ensues and you know no more until by chance or circumstance either oxygen is provided in sufficient concentration or the pearly gates open before you.

These changes occur as you go up in the atmosphere. Why do they occur? Because the air, and so the oxygen in it (always about one fifth of it), becomes thinner and thinner as it gets further from the earth's gravitation field. It is as though the atmosphere is a haystack, in which the hay at the bottom is tightly compressed into almost brick-like form, whilst on top, as every schoolboy knows, (and more besides), it lies loosely about and is most soft and fluffy. We said that your body must be provided with oxygen in adequate concentration (or partial pressure). The critical value varies from person to person, and in any one individual from day to day. But a working range from 10,000 to 15,000 includes altitudes above which it is dangerous to go

without added oxygen. Nothing you can do in the way of breathing faster or more deeply, can help you above this range because it cannot increase the oxygen partial pressure. Only one thing can help, and that is to supplement the air you inhale with more and more pure oxygen as altitude increases. In this way nitrogen is progressively excluded until about 33,000 ft., above which pure oxygen, to the exclusion of all nitrogen, is desirable.

Yet this is not all. In the lungs there are other gases which for one reason and another always exert the same partial pressures whatever the altitude. The total pressure exerted by these gases (viz. water vapour and carbon dioxide) is about 90 mm. Hg., and so, however pure the oxygen that comes to your mask, it can never be pure in the lung, and is always diluted by water vapour and carbon dioxide.

As you go further up, the partial pressure of these two gases remains the same, whilst the total surrounding pressure, i.e., the atmospheric pressure, is getting less; that is, the partial pressure of oxygen is getting less. And at last, when the atmospheric pressure falls to 90 mm. Hg., there is no room in the lungs for anything but water vapour and carbon dioxide. All the oxygen is squeezed out. At some stage in this continuous sequence only just enough oxygen can be squeezed in to maintain life, and this happens at about 40-42,000 feet. Above this the oxygen that can be squeezed in becomes marginal and at last too little for the maintenance of consciousness, and the sweet disaster of oblivion comes on rapidly and with great subtlety.

To sum up, the average person (for it must be emphasised that there is great individual variation), needs extra oxygen to a varying extent from about 10,000 ft. onwards, needs pure oxygen above 33,000 ft., and even this is inadequate above 40,000 ft.

What then, above 40,000 ft.? Well the only way to get oxygen into the lungs, together with the carbon dioxide and water vapour that is already there, is to force it in under pressure. But even this is not the answer, because the lungs alone cannot stand pressures more than about 20 mm. Hg., and in any case pressures more than this will prevent blood returning along the great veins back to the heart, which of course cannot pump blood into the arteries if there is none to pump.

PRESSURE SUITS

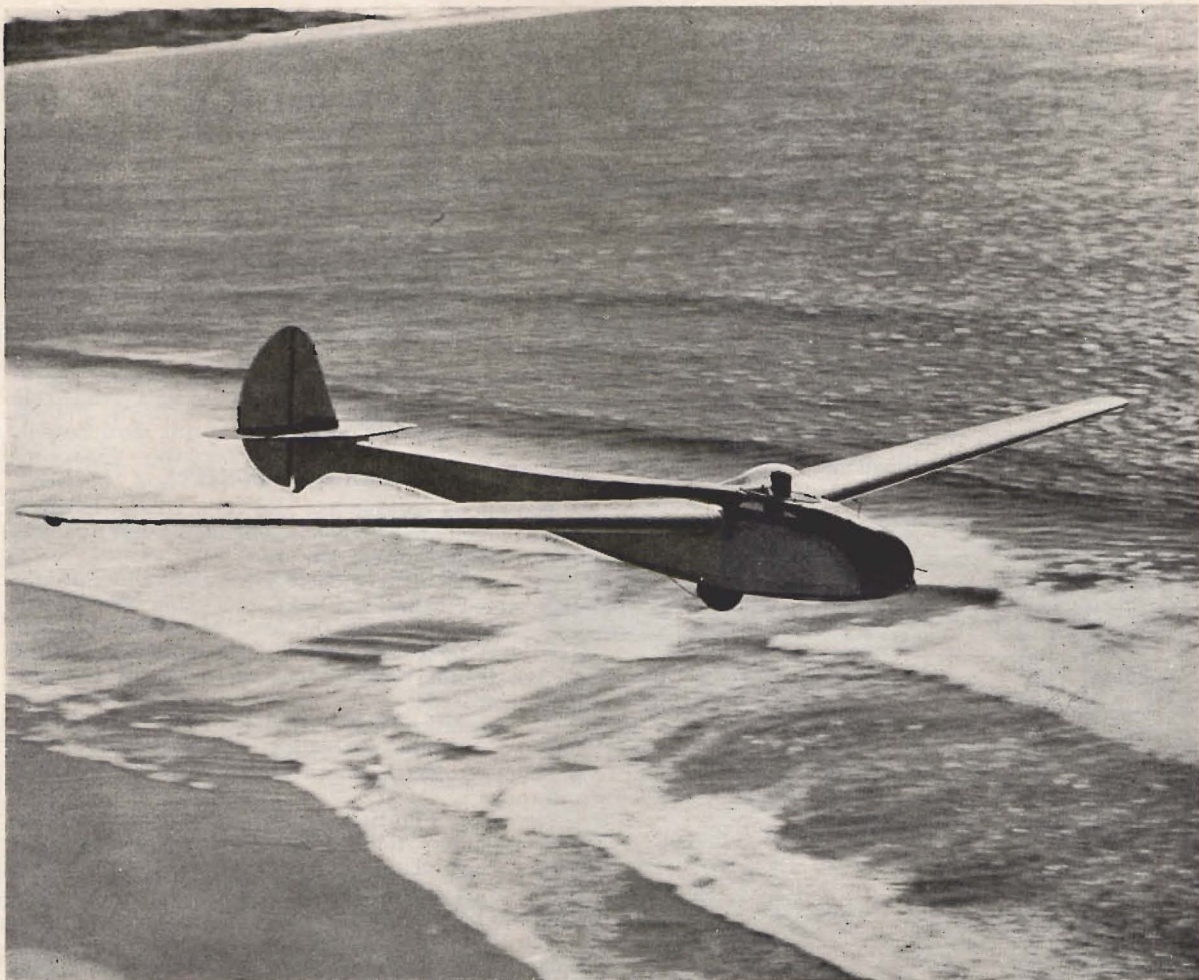
What then? Here the answer is to provide a uniform pressure all over the body. Or, if you like, to provide a pressure suit. Now a pressure suit is nothing more than a tailored pressure cabin which in turn is an apparatus designed to bring you down to a simulated lower altitude, so in the end it may be better to stay AT this lower altitude and do without pressure cabins, pressure suits or pressure breathing.

If you don't stay below these altitudes—be prepared!!

That, very briefly, is the oxygen story—and the oxygen story is but a beginning to the list of hazards involved in high altitude flying.

OTHER HAZARDS

Decompression sickness, for example, can manifest itself as 'bends' (i.e. more or less severe pains in the



U.S.A.—First flat-top 'L-K' on the West Coast

joints and muscles) or in a number of other more fearsome ways. There is still considerable uncertainty as to the cause but it is known that gases dissolved in the body tissues (especially those containing fat) come out of solution in the form of bubbles, when the surrounding pressure falls. These bubbles are probably the major cause of symptoms of pain, coughing or central collapse, according to where they first appear. The onset, then, depends on altitudes. But it also depends on the length of stay at any particular altitude. Symptoms disappear as a rule almost immediately on starting a descent.

Generally speaking, below 25,000 ft. decompression sickness does not occur. At 35,000 ft. about 30% of subjects succumb after 1-2 hours; at 40,000 ft., about 70-80% of subjects succumb after 1-2 hours. Cure is by prevention. In short, if you anticipate flying above 25,000 ft. make sure you have no heart or lung trouble acting as a handicap and then try yourself in a decompression chamber and find for yourself what your limitations are.

Air sickness becomes a real hazard above heights

where survival is impossible without any additional oxygen; intense cold (sometimes below -70° C., above 35,000 ft.), is encountered: abdominal pain due to expansion of gas in the intestines can be severe: ears and sinuses will obstruct on the downward passage if a technique has not been mastered for keeping them open, and it is unwise to attempt high flying within 3 weeks after a 'stuffy head cold.'

BE PREPARED

As a general warning, beware of dabbling in this Cu-Nimb. and standing wave nonsense unless fully prepared on every occasion. There are likely to be a number of incidents in the near future resulting directly from the unwary approaching these potent forms of lift in a light-hearted way. Approach them, yes, but not unawares, or unprepared. One day you may find yourself rising steadily despite all attempts to find the red ball. And although at worst the game of seeking the green ball can land you in amongst the tree tops, yet seeking the red ball when in uncontrollable lift can (Continued page 130)

THE LG-124 'GALÁNKA' GLIDER

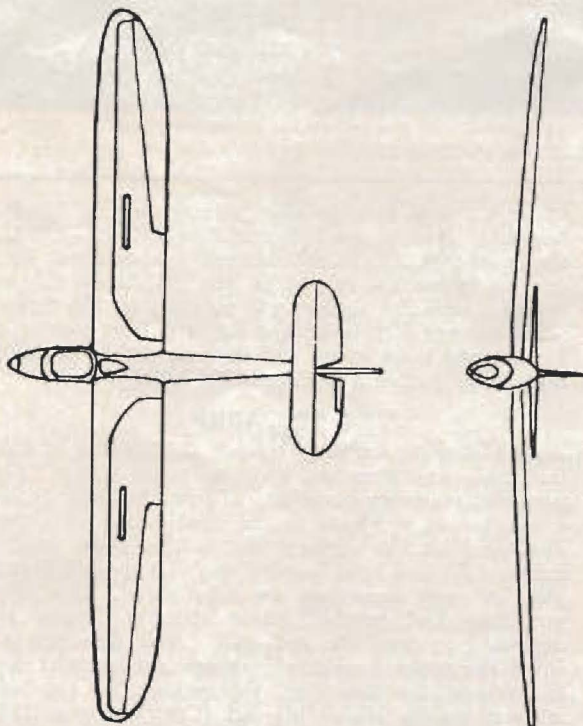
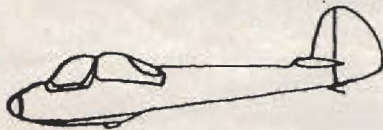
By R. A. G. STUART, M.A. Hons. (Cantab.)

AFTER four years' experience with the Z-24 'Krajánek' intermediate training sailplane it was decided to design an improved version.

The new sailplane had to be such that it would not present any real difficulties to pupils who had previously only flown primaries like the Z-23 'Honza' or to those who had flown 2-seaters, as there was no definite policy with regard to initial training.

The main design requirements were as follows :

1. To retain the 'Krajánek's' controllability with better flying qualities (finesse, rate of sink).
2. To increase the pilot's comfort and view.



3. To facilitate transport.
4. Not to exceed the 'Krajánek's' dimensions.
5. Not to make repair or maintenance more difficult.

Owing to the increasing use of enclosed two-seaters for training it was decided to fit a detachable hood, as on the Z-25 'Sohaj.'

ENLARGED COCKPIT

The pilot's cockpit has also been enlarged, which will be much appreciated on long flights and by pilots of more than normal stature.

Other refinements include adjustable rudder pedals, upholstered cabin and seat and cabin ventilation. The latter is fitted at the front of the hood and is controlled by a hand screw. Transport is facilitated by the landing wheel. The safety factor has also been increased.

On December 5, 1950, the LG-124 'Galánka,' as the new machine was called, was test flown in the presence of officials from the MD, LVU and the LET enterprise.

The pilot, Frantisek Sváb, was well satisfied and the 'Galánka' fulfilled all the designer's expectations. Controllability was good, both in circling and in other evolutions. It looks as if the new glider will soon become very popular.

The 'Galánka's' fuselage is of oval section with bulkheads of laminated pine which have the minimum thickness and therefore minimum weight. It is typical of current monocoque construction. Because it was impossible to use wing hinges as on the 'Krajánek,' which had a braced wing, a welded steel tube spar was bolted to the fuselage at specially strengthened attachment points. A vertical fix is used in place of the 'Krajánek's' main hinge and a horizontal one in place of the subsidiary hinge. Behind the cockpit there is room for a barograph.

The wing shape, area and profile are in every way similar to those of the 'Krajánek' but, since the 'Galánka' is a cantilever high-mid wing monoplane, the spar is considerably stronger. For the first time TBU strengthened wood was used.

The torsion box is plywood-covered and the rest of the wing has fabric covering. The ailerons are big enough to ensure good controllability even at low speeds. The spoilers, which are on both upper and lower surfaces of the wing, open in opposite directions and are controlled by a lever on the port side of the cockpit.

The tail surfaces are of normal construction and of almost the same shape as the 'Krajánek's.' They have ribs of lattice-work construction, glued from pine. The tailplane and fin are covered with birch ply and the elevators and (Continued page 138)

'BISHOP' WAVE IN SPAIN

OFFERS CHANCE OF TWO WORLD RECORDS

By *SAILPLANE CORRESPONDENT*

DISCOVERY of what might well prove to be another Bishop Standing Wave to the lee of the Sierra Nevada range, near Granada, Southern Spain, was made by *Sailplane* correspondent, Miss Ann Cotton shortly before Christmas.

Miss Cotton says that the three photographs, published herewith, were taken by herself from the garden of the Commander-in-Chief's residence four miles south of Granada and the nearby aerodrome of Armilla.

'In response to my eager questions about these clouds,' she says, 'he said that he knew nothing at all about them, and when I suggested that he took one of his planes up to investigate (there were a dozen or more ancient and dilapidated machines on the 'drome) he would not think of it, fearing that the engines might go u/s, as they did frequently, whilst over the rugged Sierra.'

NEVER TRIED

According to Miss Cotton these clouds have never been 'tried' although they appeared quite often during her stay from mid-September until Christmas.

The three pictures were taken at noon, 12.30 p.m., and 12.45 p.m., on a day when they were at their average size. They disintegrated early that day, at about 4.30 p.m., but were to be seen frequently after dusk and in the early morning.

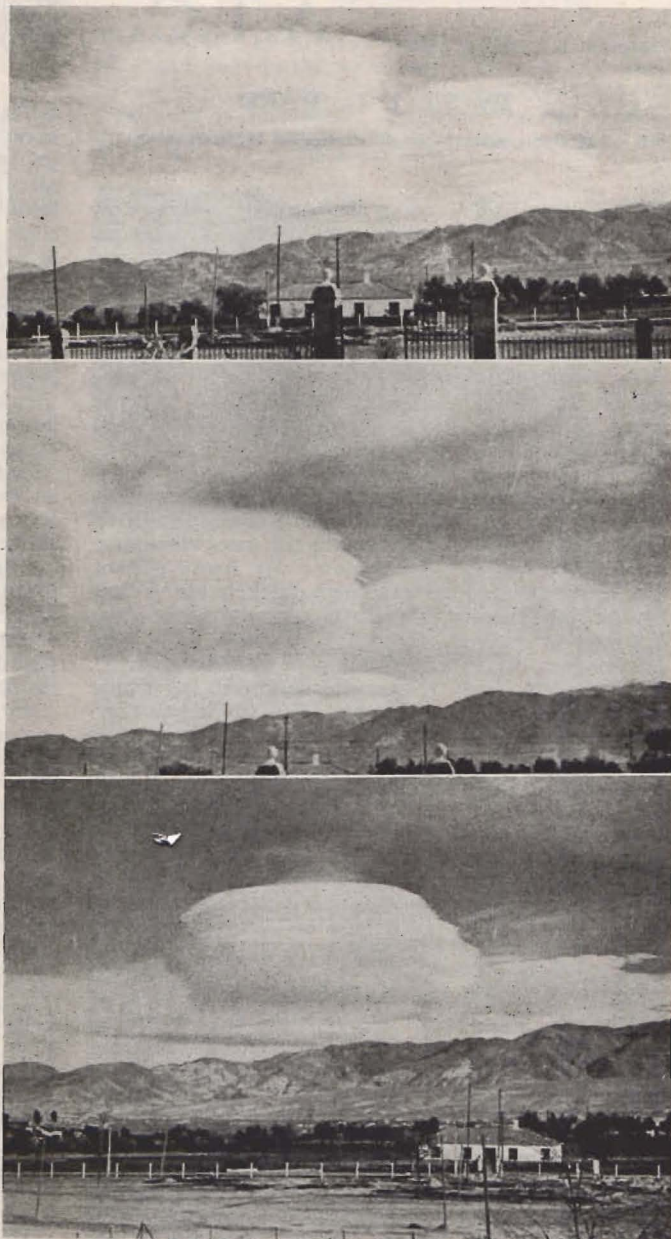
It is Miss Cotton's belief that if anyone was to take a light power plane to the Armilla Aerodrome, 4 miles south of Granada, they seem to welcome foreigners she adds, they would share a chance of finding a second Bishop Standing Wave.

The two Sierra Nevada's, Spanish and Californian, seem to have much the same physical characteristics and it would appear that an expedition of this nature would not be fruitless.

GREAT OPPORTUNITY

It is hoped to publish more details about this amazing discovery in the next *Sailplane*, but, meantime is there anyone who is interested in exploring these possibilities and perhaps, who knows, a chance to break the two world records, established recently by William S. Ivans, Jr., in both the Absolute and Altitude Gain Categories?

His altitude was 42,000 feet above sea level flying a 'Schweizer 1-23' sailplane, after an altitude gain of approximately 30,000 feet at Bishop, California.



Photographic data: Retina I camera, Kodak xx film
16 1/100 yellow filter

GLIDING IN THE A.T.C.

By S/L J. C. WARD

Staff Officer responsible for A.T.C. Gliding, at Headquarters' Home Command

WHEN an A.T.C. cadet starts his flying career by gliding, he is following in the footsteps (if one may use that metaphor) of the brothers Wright and earlier pioneers. After December, 1903, when the Wrights made the first powered heavier-than-air flight, gliding went out of fashion for twenty years until Germany, forbidden by the Treaty of Versailles to use powered aircraft, started to train the future Luftwaffe on gliders, and continued to do so until VE Day.

A BRITISH SPORT

Gliding grew in popularity in Britain in the nineteen thirties, but only as a sport. The R.A.F. did not use it for training. Even in the war, when large numbers of pilots were required for Army gliders, the authorities chose to give them their elementary training on powered aircraft. At the same time future power pilots—the cadets of the A.T.C.—were being given elementary training on gliders.

This seems a little paradoxical until we realise that the Army glider pilots had to be trained quickly. When they had passed out on powered aircraft they required little further instruction before they were competent to handle a glider.

The A.T.C. cadet, on the other hand, had time to spare, as he could not be called up until he was eighteen, and gliding was less costly in equipment and paid man-hours than power training. Moreover, his gliding training is not designed to make a service pilot of him—he has much to learn when, after entering the R.A.F., he begins his flying training.

SENSE AND CONFIDENCE

The advantage of his gliding is not that it saves a great deal of time when learning to fly powered aircraft (although it does save a little), but that it gives him at a most impressionable age a sense of the air and the confidence that he can handle at least one kind of aircraft. It also has the valuable effect of stimulating his classroom work and lending colour and realism to what might otherwise have become dull routine.

As early as 1939 the Air Defence Cadet Corps (the forerunner of the A.T.C.), was giving its cadets some training at the British gliding clubs. The war interrupted this and for some time after the formation

of the A.T.C. there was no gliding.

In 1942 the first A.T.C. gliding school was started at Kirbymoorside, Yorkshire, the home of manufacture of so many gliders. To this school went the experts to devise the best and most economical methods of training.

Due to the shortage of two-seater gliders it was decided that training would be by the well tried solo or single-seater method and that all launching would be by winch. Early in that year instructors' courses were begun on this site and continued for approximately one year, training the nucleus of the present 400 instructors.

A GREAT PROBLEM

The enthusiasm amongst embryo officers commanding and others was great (some had air experience—some none at all) and sites were found after extensive search by officers in their various localities. Amenities and equipment were harder to come by. A still greater problem was the training of instructors, especially as even those with power-flying experience must learn the all-important art of winching.

However, the energy of enthusiasts prevailed and produced wonderful results of achievement and improvisation, such as (to mention one of the many) the begging of Anderson shelters from the local borough council so as to provide a lock-up storage on an open site with no buildings near.

But on one occasion it over-reached itself to such an extent that, having raised subscriptions locally to buy a glider, the school arranged an official opening as soon as the glider was built by a local firm.

Flights in the command dual-control glider were given to donors by the command gliding officer, but as there were no qualified instructors or hangar accommodation, ten months elapsed before a glider took the air again at that 'school,' and then to train instructors, not cadets.

By the end of 1943 many schools were training instructors and cadets, although the number of gliders available (most of them impressed from the pre-war gliding clubs) was small. It was only with the help of donors of new gliders, made by a few firms when they could obtain spare materials from the Ministry of Aircraft Production, that further development was possible: for the almost parental care and hours of labour that were lavished on the old impressed gliders hardly kept the schools going. And truly it was 'Venture Adventure' with some of them.

TWO HUNDRED GLIDERS

In 1944 organised gliding became the rule rather than the exception, though there was much disappointment to many because, although a contract for two hundred gliders had been placed by the Air Ministry early in the year, the new gliders did not start to come through in large numbers until about mid-summer, and so the courses of training were protracted, thereby reducing the number of cadets who could be trained.

But schools got firmly established on sound lines, and glider training became available for a large proportion. Though some units jibbed at travelling fifteen miles to a gliding school, others willingly did

double the distance.

At the end of the war in 1945 there were eighty-four schools with excellent amenities and a most keen set of officers and civilian instructors. About 4,500 cadets had reached the high-hop proficiency stage, and an equal number had received some gliding instruction.

After the war there was, not unnaturally, a reduction in the number of schools in operation. With the demobilisation of a large portion of the Royal Air Force, numerous aerodromes were being used for storage purposes only or were de-requisitioned and returned to agriculture.

FINDING NEW HOMES

This meant that new homes had to be found for gliding schools and in some cases there was no alternative location available. In addition, many instructors who had given valuable and unstinted service during the war, now felt that they were justified in retiring to the more leisurely atmosphere of the re-constituted civilian gliding clubs where they could indulge themselves to their hearts content in soaring flights which hitherto had been forbidden to them by war-time restrictions on gliding.

In May, 1946, the functions of the Air Ministry Directorate General of the Air Training Corps were assumed by the newly formed R.A.F. Reserve Command now known as Home Command. A review of A.T.C. gliding activities was made and as a result, the total number of authorised schools was reduced to 50.

One of these was to be a central school run by the R.A.F. on a full time basis for the training of instructors. Other improvements were authorised including the replacement of launching winches and retrieving vehicles and the provision of new types of gliders.

During 1950 this revised organisation carried out 105,614 glider launches and trained 1,474 cadets to the F.A.I. 'A' certificate standard, 252 to the 'B' certificate standard and 3 to the 'C' certificate standard.

DAGLING—A ROBUST YEOMAN

And what of the aircraft? In the early days the majority (of the very few) were 'Dagling Primary'; there were also some 'Kirby Cadets,' and a few sailplanes of varying types, and eight dual-control two-seaters. The 'Dagling' has no nacelle; you sit out in the open with the ground slipping by beneath your feet, with nothing between you and it. Certainly the 'Dagling' does give you a great thrill. It is sturdy and robust, and has done yeoman service, but its day—at any rate in A.T.C. gliding—has passed.

'Kirby Cadets' are now the standard type on which normally cadets will do most of their training. They are very satisfactory for the purpose, having been designed by Mr. Slingsby of Kirbymoorside, Yorks, who has a very long association with gliding.

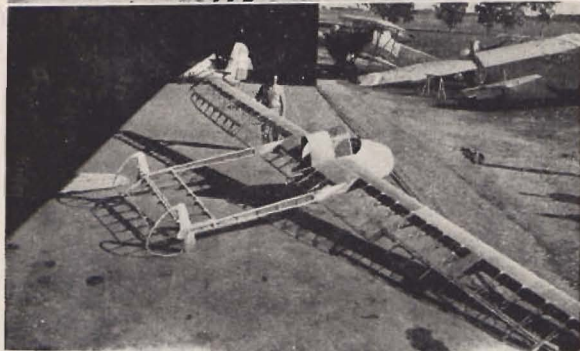
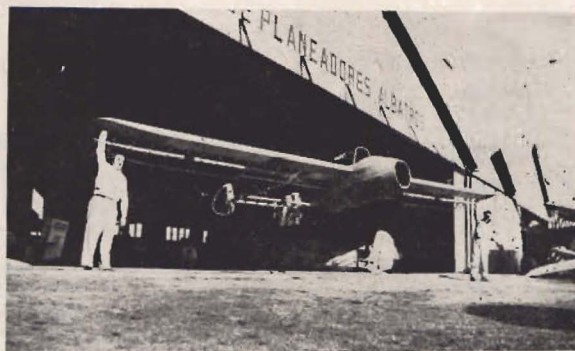
In 1943 he generously gave copies of the drawings to the A.T.C., so that units might build gliders from materials made available by the Air Ministry. Unfortunately only a few units had the facilities to undertake this work.

(Continued page 131)

THE A.M. 11 'ALBATROS'

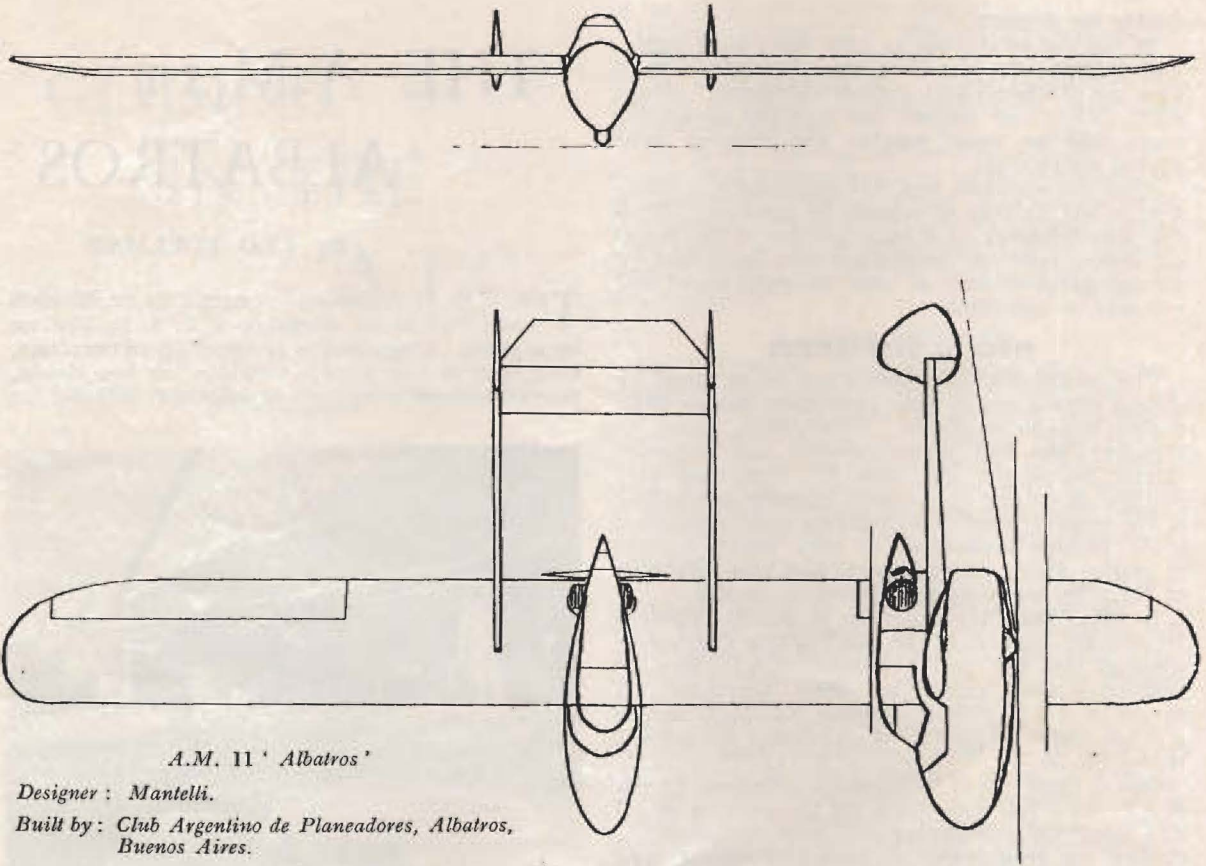
By LEO FOLLMAN

THE A.M. 11 'Albatros' designed by Sr. Mantelli and built in the workshop of C. A. P. Albatros by a group of members is of all wood construction, wing spar in one piece; tailplane on two beams, pivoted around wing trailing edge and foldable for



Top: Not a big job to handle
Centre: Folding tailplane back
Bottom: General view

Photos by Conems



A.M. 11 'Albatros'

Designer : Mantelli.

Built by : Club Argentino de Planeadores, Albatros,
Buenos Aires.

less storing space ; few fittings and much easier to build than average sailplanes such as 'Gr. Baby' etc. Tailplane to wing braced with two wires.

Dimensions.

Wingspan : 10 metres.
Wing surface : 10 m².
Aspect ratio : 10.
Length of Fuselage : 4.40 metres.
Height : 1.15 metres.

Engine.

Kiekhoeffler 2 cylinder opposed 18 h.p. at 2,600 r.p.m. American target engine.

Weights.

Empty	{	Without engine : 65 kilogrammes.
		With engine : 80 kg.
Flying	{	Without engine : 145 kg.
		With engine : 160 kg.
		Complete with petrol for three hours of power flight : 180 kg.

Wing load : 18 kg. m².
Safety co-efficient with full load : 12 g.
7 litres of petrol per hour of power flight.

Performances.

With engine stopped.	{	Sinking speed : 0.80 metres/sec.
		Gliding angle : 1:20.
		Minimum speed : 55 kms./h.
		Best speed : 65 kms./h.

with engine running.	{	Maximum speed : 150 kms./h.
		Cruising speed : 130 kms./h.
		Climbing speed : 3 metres/sec.

Simple aerobatics have been done such as loops, stall turns etc., it has been impossible so far to make her spin.

LOOK BEFORE YOU LEAP—continued.

be dicing with death in its most lurid sense.

As a final word, may I suggest that these comments are designed to induce respect for, and not fear of, the intricacies of the upper atmosphere. To be encouraged are they who would venture furthest from the house tops, the trees, the mountains and the valleys below ; but to venture armed with all the relevant knowledge and apparatus available. Learn to know yourself and what your limits are (and those of your passengers) so to avoid being the first pilot coming to grief as a direct result of high altitude gliding.

GLIDING IN THE A.T.C.—continued.

The 'Kirby Cadet' flies well and is not so 'heavy handed' as the 'Dagling.' The earlier ones rested on a skid when on the ground. Those now in use are fitted with a landing wheel, which facilitates handling on the ground and lessens wear.

All schools are equipped with a secondary sailplane, usually a 'Kirby Cadet Mk. II,' which is similar to the civil 'Kirby Tutor,' although some more fortunate schools have a 'Prefect' or 'Grunar II' sailplane. These gliders are used for flying by the more advanced cadets and for instructors' training and practice flights.

Since the end of 1949 all schools have been equipped with one two-seater glider, the 'Slingsby Sedburgh,' a medium performance training glider with side-by-side seating. These gliders are used at the moment for teaching turns, but it is hoped that before very long a new two-seater will be approved which will be issued to each school as a replacement for the 'Kirby Cadet Mk. I' gliders to make possible full dual training.

In all forms of flying sound maintenance and inspection is essential. A.T.C. regulations in this respect are similar to those of the R.A.F. Every new glider passes through the normal R.A.F. production procedure. At schools all gliders are inspected daily before flight and test flown by a qualified gliding instructor. These flights are keenly sought after, as they permit the instructor to 'let off steam' before getting down to the serious business of the day. Every year each glider receives a major overhaul by skilled R.A.F. technicians. This is supplemented after every two months by a minor inspection at the school.

A.T.C. gliding schools normally operate during the week-ends. About seven cadets receive training on Saturday afternoons and ten to twelve on Sundays. Cadets are chosen from squadrons attached to the gliding schools, and are nominated by the cadets' own commanding officers. Any cadet keen to take a gliding course notifies his squadron adjutant that he is desirous of doing so, so that his name may be sent forward to the gliding school. A course usually runs from eight to twelve week-ends, depending on the weather.

INSTRUCTORS GIVE UP HOLIDAYS

At some schools where there is living accommodation, officers and instructors have given up their holidays to run a continuous week of gliding for cadets. This has proved most successful and popular, and with reasonable weather some fifteen cadets can be put through from first slide to proficient and F.A.I. Certificate 'A' in a week. At other schools accommodation has been organised so that with late work on Saturday and an early start on Sunday a full week-end's gliding can be achieved.

The object of the training is not necessarily to teach the cadet to fly—which is the job of the R.A.F.—but to give him a rudimentary idea of how the controls of an aeroplane work, and an opportunity to try them out for himself. The experience gained of being airborne and of judging height, speeds up the pupil's reactions and proves of the greatest value should training be continued further. (*Contd. page 132*)

SOARING IN FRANCE

By **GUY BORGÉ**

COURSES AT BEYNES

AS in recent years, the Beynes Soaring Centre is organising courses open to Foreign pilots between April and the end of September, 1951. The costs are as follows:—

One hour's soaring—2,000 francs (in single or two-seaters).

For aero tows in single seaters there is a special charge of 100 francs.

For distance flights the charges for retrieving by road are:—

Distance (calculated on Maps).	Price of Retrieving.
0-25 kilometres	600 francs
25-50	1,200
50-75	1,800
75-100	2,400
100-125	3,000
125-150	3,600
150-175	4,200
175-200	4,800
200-225	5,400
225-250	6,000
250-275	6,600
275-300	7,200
300-325	7,800
325-350	8,400

Retrieves by air will cost 5,000 francs per hour of flight.

Bedding and feeding accommodation is 500 francs a day (without wine).

A special insurance fee of 550 francs during the course is asked.

Candidates must write to:—*Centre Inter-clubs de Vol a Voile de Saint Cyr-Beynes, Beynes Thiverval, (Seine et Oise).*

INTERESTING DETAILS

Beynes is an excellent centre and is well known for distance flights. Results attained in 1950, when the meteorological conditions were not extremely favourable, are very impressive.

In 1950 the Centre recorded 15,831 launches, 3,434 soaring hours, 44 'B' badges, 25 'C' badges, 16 altitude legs of Silver 'C', 11 duration legs of Silver 'C', 9 distance legs of Silver 'C', 1 altitude leg of Golden 'C', 4 distance legs of Golden 'C', 2 goal flights of Diamond 'C', 1 world record (Mrs. Choisset, feminine goal and return).

Total of kilometres of cross-country flights, counting only the distances greater than 50 kilometres, 9,110.

In 1951 the Centre hopes to record some long distance flights toward Bayonne and to see one of its pilots to win the 'Coupe Izarra.'

GLIDING ASSOCIATION'S EXPEDITION TO FRANCE

A ROYAL Air Force Gliding and Soaring Association party recently visited St. Auban, in the French Lower Alps, where it carried out an investigation into standing waves. The leader was Group Captain G. J. C. Paul, D.F.C., Chairman of the Association, and the party also included Wing Commander W. H. Ingle, A.F.C., of R.A.F. Station, Heslington, York, and Squadron Leader A. R. Williams, of the Air Ministry.

The objects of the visit, in which the Director of the Meteorological Office interested himself, were to do as much flying as possible in the famous standing wave at St. Auban, and to study French methods of research into the wave. The expedition was, in fact, a pointer to the rapidly-growing interest in the mechanics of standing waves, as yet only imperfectly understood.

The R.A.F. party took its own high-performance glider, a 'Weihe' equipped with electrically-operated blind-flying instruments and oxygen.

Unfortunately, only one full wave occurred during the visit, but the party carried out 35 hours' flying and heights of up to 17,000 feet were reached, including a certain amount of flying in fairly turbulent air. Many interesting aspects of gliding were studied, such as a funnel shaped valley which deflected the wind upward in such a way that it was possible for the 'Weihe' to remain at 6,500 feet for three hours, although there were no thermals and the nearest hill was several miles away.

On the day before the party arrived, the Chief Pilot of St. Auban and the holder of the present French altitude record both reached 26,000 feet in a wave. After getting into the wave—a difficult process—their rate of climb was 39 feet per second, dropping evenly to zero as the top of the wave was reached.

The French technique of wave flying was studied in detail, and much meteorological information on waves was obtained from the French meteorological officers stationed at St. Auban. These two officers, like all the French flying personnel with whom the party came into contact, were most helpful and made available all their records and files.

What the party learned in France has put the standing waves of the Pennine Chain, the Lake District and Scotland into a new light. There is nothing peculiar to the St. Auban situation which is not also present in many parts of the United Kingdom. The U.K. standing waves, if properly used, can produce spectacular heights equal to those obtained in France, and the R.A.F.G.S.A., fortified by its experiences at St. Auban, intends to continue its research as far as funds allow this summer and next winter over Northern England and Scotland.

GLIDING IN THE A.T.C.—continued.

Between thirty-five and fifty launches are given to each cadet during a course, and are divided roughly into one-third ground slides and two-thirds low and high hops. He usually makes his first airborne flight after about twelve ground slides.

At the end of a course the average cadet is competent to carry out satisfactorily the exercise of taking off, climbing to a height of approximately 100 feet, gliding and landing, and if the glide has been of not less than 30 seconds' duration he has qualified for the F.A.I. 'A' Certificate.

TWO-SEATER ADVANTAGES

With the introduction of two-seater gliders, the number of launches required by a cadet during this training has been reduced. In addition it has been possible to train a number of selected cadets up to a far higher standard.

Each gliding school has a commanding officer, adjutant and two commissioned officers, in addition there is a number of civilian instructors. Most learnt their gliding in the A.T.C. All are carefully trained in A.T.C. work and examined and graded. Their unpaid duties bring them to the gliding school nearly every week-end, winter and summer, often from many miles away. Their only reward—apart from the satisfaction of a job well done—is a circuit at the end of the day's training and the opportunity of giving up a week of their summer holiday for an advanced course of gliding on a site where soaring is possible.

When all schools have been completely re-equipped with two-seater gliders which, owing to the financial limitations will not be for some years yet, this task will be easier and more pleasant as they will have many more opportunities for flying.

However, these men are among the most hard-working and enthusiastic of the A.T.C. officers and instructors. The past achievements of A.T.C. gliding owes everything to them. Its future is also in their hands.

SURREY CLUB MUST QUIT REDHILL

AS most members have already heard, the number of aircraft operating at Redhill has become too great. This has led to considerable restrictions on our flying, but we have tolerated this because of the outstanding advantages the club enjoys at Redhill. Now the operators of the aerodrome have reluctantly told us that we must quit Redhill at the end of this summer.

The selection of an alternative site will be most difficult. A number of sites have been suggested, and their availability is being investigated. At present only aerodromes are being considered, because of the enormous cost of land, and of erecting buildings. In addition, any aerodrome with runways, or otherwise suitable for development, is likely to be required for R.A.F. use.

SOUTHERN BIRD GOES NORTH

By H. R. LASCH

Gold 'C' and Diamond

I WAS over in Switzerland during 1949 and it was then that Olle Hakansson and Lizzie, his wife, put the idea into my head to make an effort to go to Sweden to compete in the World Soaring Championships during 1950. I must say that at the time such a plan seemed too fantastic but as 1950 came rolling along and I had to do some business in Europe, I took the bull by the horns and began to prepare to go to Orebro.

Coming from a country as far away as South Africa, you will realise that the planning of the journey is almost a greater job than flying in the Championships themselves. It is, of course, necessary to choose your car to do the towing, to make a sturdy trailer to house the bird and then begin with carnet de passage, triptious and last, but not least, the numerous visas. You must also be vaccinated against smallpox and yellow fever because travelling through central Africa or touching at its ports, the certificates which prove that you really have been vaccinated carry as much and sometimes more weight than your passport.

One cannot imagine the enormous amount of hustle and bustle going on during the last few weeks before the Championship, to get planes and equipment ready, and the same applied, of course, to me except that it all took place at an earlier stage in order to allow six weeks for the journey. Once you know the accurate sailing date of your ship your 'D' day is set and all your timing is relative to this date. The last four weeks were hideous because the work on the trailer had not as yet been started and you will find, living in Africa, that you cannot just get the right sized rivets or bolts or plate, or 'what-have-you,' to make everything fit, and as you go along building you have to modify, improvise and make changes in design to get your trailer on its feet.

The bird was under the care of Hans Wurth, and such items as oxygen equipment, new instrument lay out, and complete check of air frame and good surface finish had to be done. Hans suggested that coming from Africa I must have the cockpit lined with leopard skin because he thought the chaps would like this over there. So Ken Newman, who was O.C. operation leopard skin, worked flat out the last two nights fitting the hide of this attractive looking animal. This operation really developed into a phenomenal pantomime as Ken is allergic to cats and you should have seen him crying, sneezing and coughing while he tried to fit the skin to the cockpit. Once the cockpit was fitted out with the skin it smelt terrifically strongly of cat, in fact this strong smell was almost unbearable and the general consensus of opinion was that Helli would only be able

to fly with oxygen on full time, as it was hoped that the smell would not penetrate the oxygen mask. I am happy to say that the smell wore off as it had six weeks thorough airing during the journey to Sweden. Although we only thought of the leopard skin for looks at the beginning, in the end it proved that there is great method in this madness of fitting skin to a cockpit because it has the most wonderful insulating properties and I believe that I was the only pilot who came down after several hours of flying without being frozen semi-stiff. I strongly recommend to anyone who goes to higher altitudes to line his cockpit with an animal skin. (The Canadians with mink).

Sunday, May 21st. The operations were finished at 13.15 and the journey began at 13.20. First destination, Bloemfontein 400 k.m.'s distant in the direction of Cape Town, to catch the ship. We, of course, anticipated making some trial runs with the trailer but there just wasn't time for such frivolities and so my wife, Hansli (who must have gypsy blood in him as he cannot resist a journey of any kind), the Ford, the bird in its trailer and myself, set off and to our surprise the bird trailed so well that we made Cape Town by Tuesday night, a haul of 1,700 k.m.'s. The ocean liner was a small Swedish cargo ship and we cast off on Saturday evening the 27th. Hansli had gone back to Johannesburg as he only came along to have a quick look at our beautiful Cape. We arrived at Gothenburg on Friday, the 30th, after being at sea for almost five weeks. The journey was interrupted at Lomé on the slave coast of Africa, where we called to load cocoa and unfortunately a mosquito took a liking to me and gave me the most frightful malaria. This necessitated us running up to Las Palmas to get doctors and medical supplies and I was most fortunate to be fit enough to walk off the ship in Gothenburg as I had visions of going to hospital instead of Orebro.

It was wonderful to be met by a considerable collection of Swedish gliding bods who had heard that we were coming on the ship and the reception and kindness of the Swedes was quite overwhelming. Bengt Miorander, who was to be one of my crew, set off with us the next morning en-route to Orebro via Karlstad, where we stayed the night.

I, of course, looked and looked, as is a sailplane pilot's habit, for landing fields all along the way and what did I see—beautiful trees and little lakes and no landing fields, and I must say that I was in a somewhat depressed frame of mind. At Karlstad we met Ann Douglas, Phillip Wills, Lorne Welsh and Peter Mallet of the British team and found them in an equally depressed frame of mind for the same reason. The next morning the (*Continued page 137*)

Report on a Flight Investigation of Lee Wave Disturbances near Melbourne

by U. RADOK

Concluded from May issue

VERTICAL MOTION

FOR the purpose of comparison the two sets of traverses were plotted together in fig. 4, where the numbers represent the net vertical velocities in ft./sec. Near the obstacle there is good agreement, but further away the two sets of 'waves' appear to get out of step, especially at the 5,000 ft. level; so that the length of the wave was smaller on February 5 than two days earlier.

It seemed of interest to test whether any of the theoretical treatments of the lee wave phenomenon

could account for the vertical motion observed, and possibly even for minor differences such as the above. As the results of these studies are not, as a rule, given in a comparable form and the accuracy of the present set of observations hardly warranted detailed computations, only a few rapid tests were applied.

(a) An account of the first analytical treatment of the lee wave problem, not previously available in this country, has recently been made available by its author (Lyra, 1943). This assumes a constant wind velocity \bar{u} and a constant vertical temperature gradient δ , and derives in non-dimensional form the field of vertical velocities set up by a rectangular obstacle of width equal to λ and $\frac{1}{2}\lambda$, respectively. λ represents the length of the waves at some distance from the obstacle and is a function of the temperature at the level in question, the difference between the actual and the adiabatic lapse rate, and the wind velocity.

In the present case the actual temperature gradients were mostly small, so that no appreciable variation in wave length need be anticipated over the height range considered. For the conditions of February 3 λ turns out to be 3.2 miles, as against 3.3 miles for February 5.

VERTICAL VELOCITIES

Lyra's further results can be directly applied to the present case since the obstacle is fairly well represented by a rectangle of $\frac{1}{2}\lambda = 1.6$ miles width. The corresponding field of vertical motion as taken from the dimension-less diagram in Lyra's paper has been drawn in fig. 4. This represents a reasonable approximation to the observed vertical velocities near the obstacle at about twice its height; however, the node line above that level and the reversal of phase at still greater altitudes is in contrast to theoretical expectations.

(b) The most complete study of the lee wave phenomenon (Queney, 1948) was briefly discussed in the note which led to the present research programme (Desmond and Radok, 1949). The assumptions are again that of a constant wind velocity throughout, but now the vertical stratification is represented by $s = \text{const}$, where s is given by $\sqrt{(g/\theta)} (\partial\theta/\partial z)$ ($\theta = \text{potential temperature}$).

Queney found that for a given obstacle three critical velocities exist which lead to waves of very different dimensions. In the

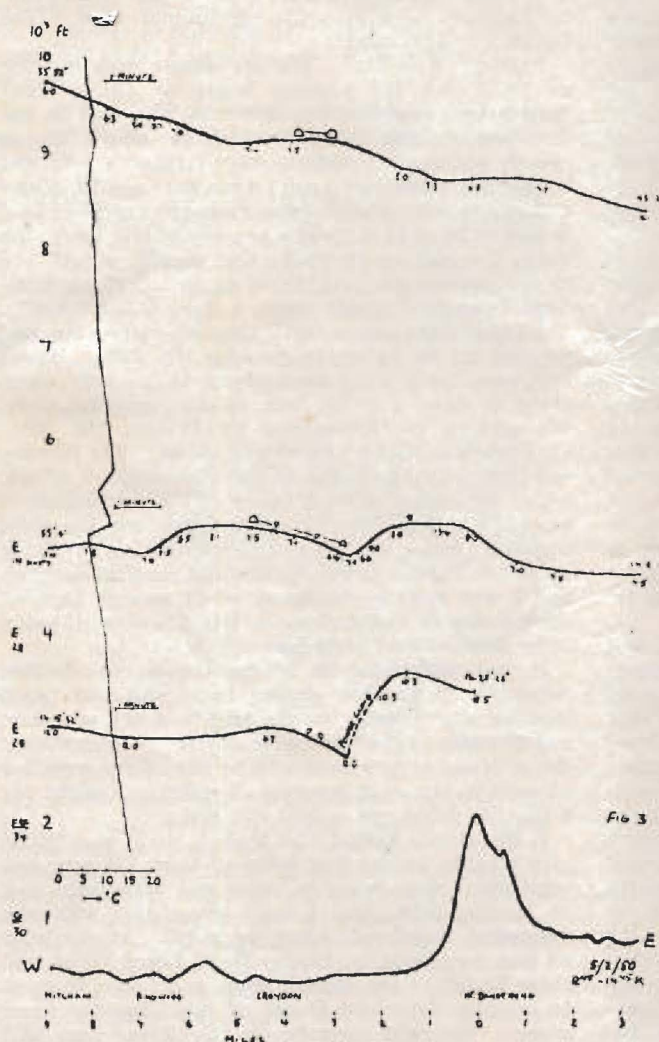


Fig 3

present case the obstacle resembles Queney's 'typical' mountain $z = b(1 + (x^2/a^2))$ (where b is the height and a the half-width) but requires a ratio b/a of $\frac{1}{2}$ or more, which prevents the theory from being strictly applicable.

Using a ratio of $\frac{1}{2}$ the half-width becomes 3,400 ft. and the length of the lee wave approximately 4 miles—the critical velocity being 30 knots, against 23 knots observed on February 3.

Queney's paper shows streamlines only, so that a comparison with Lyra's field of vertical motion (derived from a different obstacle) is not immediately given. Inspection of the streamlines shows that the observed marked descent of the air at some height above the obstacle is given by the theory, also the rapid decline in the amplitudes at similar levels with increasing distance from the obstacle. However, the reversal in the phase of the waves occurs at a much higher level than that observed here.

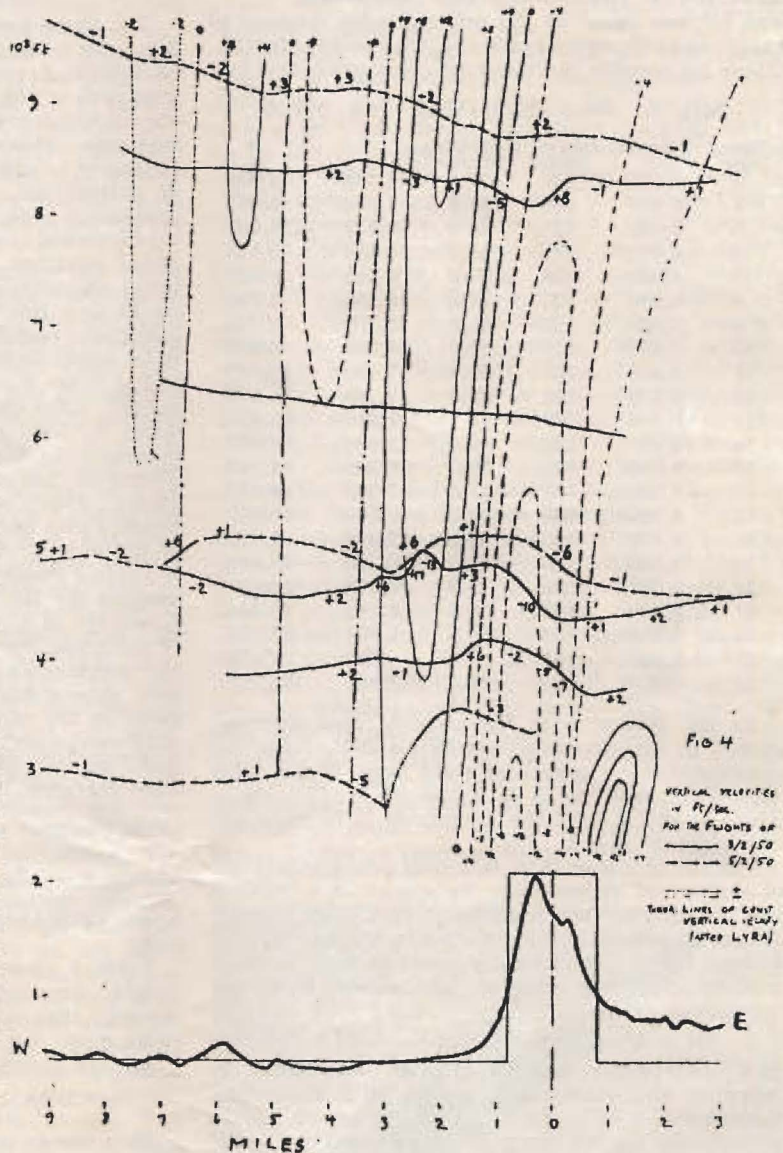
A DISCREPANCY

It thus appears that both Lyra's and Queney's results do not agree in important details with the vertical motion observed in the present case. The fact that the flight path did not run at right angles to the ridge (cf. fig. 1) is insufficient to account for the discrepancy between the observed and the computed wavelengths; but it must be remembered that on neither occasion were the assumptions of constant wind velocity and constant lapse rate (or s) strictly justified.

(c) This leaves finally a third recent treatment of the lee wave phenomenon (Scorer 1949) to be considered, which promises to be especially relevant to the present study of waves at comparatively low altitudes.

In this approach both vertical wind shear and lapse rate discontinuities are taken into account. The principal result indicates the occurrence of lee waves when a certain dynamical characteristic, l^2 , of the air stream is constant in each of two or several layers, while the value of the constant decreases upward from layer to layer. l^2 is given by $\gamma\beta/U^2 - U''/U$, where U is the component of the wind velocity at right angles to the obstacle, $U'' = \partial^2 U / \partial z^2$, z the altitude, and $-\beta$ the vertical lapse rate of the logarithms of the potential temperature.

The difficulty of verifying Scorer's theory is at once apparent from the fact that the most important term in the equation for l^2 contains the quantity $\partial^2 U / \partial z^2$ —rarely determinable with precision from



routine meteorological observations.

The theory has, however, considerable attraction in the present context, yielding as it does under certain conditions a node line at low altitudes, and above all in making responsible for the occurrence of waves the detailed flow conditions, rather than the exact shape of the obstacle or the velocity of an idealized flow only. Some effort was therefore made to verify the theory for the flight of February 3 which offered the practicable maximum of supporting meteorological data (including a radar wind flight).

The crucial step in this verification was the computation of the quantity l^2 defined above as function of altitude. For this purpose the wind observations as given in fig. 2 and table 1 (shown in May issue) are clearly useless. Instead the computation of both U

LEE WAVE DISTURBANCES—continued.

and U^* was based on the original radar readings of range, azimuth, and elevation at one minute intervals. These are given in the first three columns of table 2.

Table 2. Basic Radar Wind Data, 3/2/50.

Time t min	Range R yds	Azimuth d degrees	elevation ϵ degrees	X yds	H ft
3	2,100	132	27.8	1,746	2,938
4	2,900	126	27.2	2,513	3,977
5	3,400	126	29.5	2,871	5,023
6	4,100	128	28.0	3,474	5,775
7	5,000	128	27.5	4,263	6,926
8	6,000	127	27.2	5,155	8,228
9	7,000	125	26.0	6,130	9,206
10	7,800	121	25.0	6,982	9,889
11	8,400	121	25.0	7,520	10,649
12	8,750	121	26.0	7,758	11,508
13	9,000	120	27.4	7,912	12,425
14	9,200	120	30.0	7,890	13,800
15	9,250	120	32.2	7,752	14,788
16	9,500	121	33.3	7,842	15,647
17	9,700	123	35.0	7,800	16,692
18	9,500	125	38.1	7,282	17,585
19	9,100	130	42.8	6,349	18,548
20	8,700	136	48.8	5,235	19,638
21	8,400	141	55.0	4,214	20,644
22	8,200	156	62.8	2,604	21,879
23	8,250	191	68.8	569	23,075
24	8,700	222	69.0	-2,930	24,367

In the present case the obstacle runs approximately in the direction from 22° to 202° ; thus the displacement component at right angle to the ridge was determined as $X = R \cos(\alpha - 112^\circ) \cos \epsilon$. These values X and the heights $H = R \sin \epsilon$ are also given in table 2.

The set of values $X(t)$ was next fitted with a set of orthogonal polynomials, by means of a method used in statistics which allows at each stage a check of the degree of approximation achieved (cf. e.g. Fisher, 1941). Thus for the readings from 4 to 13 minutes after the start of the balloon flight the polynomial.

$X_1(t) = 5,641.6 + 898.8(t-\bar{t}) - 21.3(t-\bar{t})^2 - 14.8(t-\bar{t})^3$ where $\bar{t} = 8.5$ minutes, was found to represent the observed X values with a residual variation of 0.3%. From $t = 14$ minutes to $t = 16$ minutes the motion along the X axis was small and variable, and X was therefore taken to be constant. The top layer from $t = 16$ minutes to $t = 24$ minutes yielded another polynomial, this time of the fourth degree, and a residual variation of 0.1%.

Differentiation of these polynomials yielded formulae for $U(t)$. Next the times at which the balloon reached 1,000 ft., 2,000 ft.,—24,000 ft., were found by linear interpolation; inserted in the equations for $U(t)$ these gave the values of $U(z)$ which were in turn fitted with two further sets of orthogonal polynomials, of the second degree for the lower layer from 4,000 ft. to 12,000 ft. (residual variation 0.4%) and of the third degree for the upper layer from 16,000 ft. to 24,000 ft. (residual variation 0.05%), respectively. These two polynomials were finally differentiated twice to obtain $U''(z)$ and, in conjunction with $U(z)$, the values of I^2 as function of altitude z.

CHOICE OF POLYNOMIALS

The above procedure is open to several objections. Not only is the repeated fitting of polynomials likely to introduce cumulative errors, but above all the true path of the balloon would differ markedly from the smooth curve through the positions at one minute intervals. However, some smoothing is evidently necessary to arrive at values for U'' , and the choice of polynomials, while arbitrary, has advantages in connection with the required differentiations. While a polynomial could never be a solution of the differential equation defining I^2 , one would expect the latter characteristic, when computed in this way, to be at any rate approximately constant under the conditions postulated as necessary for the occurrence of lee waves by Scorer's theory.

The radar wind method yields no readings at close range. Thus the layer between the surface and the 4,000 ft. level could not be studied in the above manner. As the best qualitative guess at the conditions in that layer constant eddy viscosity (cf. e.g. Brunt, 1939) was assumed, in accordance with Scorer's own procedure in discussing the significance of the term U''/U .

Table 3 shows then the values of I^2 as function of altitude for the conditions of table 2 and figure 2. A number of gaps in table 3 arise from the necessity of excluding the endpoints of the ranges covered by the polynomials, where the latter are known to be poor approximations. The values of $U(z)$ are also given in the table, together with the corresponding wind components as computed from the radar wind flight in the customary manner. B was evaluated from the aircraft sounding and the Laverton radio-sonde Flight as $5 \times 10^{-7} \frac{1}{Fl}$. For the surface layer,

and as $6.7 \times 10^{-6} \frac{1}{Fl}$ and $5.0 \times 10^{-6} \frac{1}{Fl}$. For the layers 4,000-13,000ft. and 16,000-24,000 ft., respectively.

Table 3 shows only one layer in which I^2 was roughly constant (6,000 ft. to 10,000 ft.). If it is assumed that below 6,000 ft. I^2 throughout had the value given for 1,000 ft., Scorer's criterion for the possibility of waves reads:

$$I_1^2 - I_2^2 \sim 3.10^{-7} > \frac{\pi^2}{4 \times 5000^2} \sim 10^{-7}.$$

Thus waves could occur; but a consideration of their length shows at once, since with $k = 2\pi/\lambda$ (where λ is the wave length) $I_1^2 > k^2 > I_2^2$, that it should be between 1.7 miles and 2.6 miles, i.e. considerably below the observed values of 4-5 miles.

No other assumption leading to waves at low altitudes suggested itself. The test of Scorer's theory thus must be considered inconclusive. Moreover, similar difficulties are likely to occur in the majority of actual cases, owing to the spacing of the radar wind readings and their inaccuracy at low levels.

A verification of the theory may then be possible only for higher obstacles or under specially favourable circumstances. Hence also the prediction of disturbances in individual cases by means of routine observations is likely to require, especially at low altitudes, double theodolite (Continued page 138)

SOUTHERN BIRD GOES NORTH—continued

gallant British Boys rigged their ships to fly to Orebro and this procedure I decided against for two reasons: (a) I was a little weak in the knees and (b) I thought it would be better to arrive at Orebro with the 'Air 100' at least in one piece. We got to Orebro on Sunday night and went straight to the air field where a sprinkling of sailplanes and their pilots were found, including the British boys who had arrived safely. Our quarters were at the Stora Hotellet so we had at long last arrived at our destination exactly six weeks after leaving home.

Monday, July 3rd. Monday morning saw us at the air field, crews and planes rapidly drifting in from all sides as closing time was 12 o'clock. Olle Hakansson and Lizzie were there and how nice it was to see them again. The day was passed with inspection of equipment, flight test and meeting the various competitors as well as the Swedish officials, and everybody was just wonderful. All pilots, except the Swedes themselves and the Finns were shocked and horrified at the lack of landing fields we had all looked for on the way to Orebro and as the Swiss Sigie Maurer put it 'Sweden is a wonderful country and if you come here, don't come for gliding, but for hunting and fishing.' The Swedes assured us that it would look far better once we got up in the air and Tuesday, the day which was laid down for practice flying above Orebro, confirmed that there was something in what the Swedes said. I cannot say that I felt very happy looking at the countryside from above but then I suppose I am very spoilt flying in South Africa, where it is not uncommon to find vast tracts of land in form of fields and veldt where you can land without having trees looking at you.

Wednesday, July 5th. The game was on. The opening ceremony, the weather forecasting, the organization and the competitions themselves have been fully described in many aeronautical journals, therefore, I do not intend to repeat what has been said. But one phrase stuck clearly in my mind which Colonel Hugusson said 'Should you get below 300 metres without having chosen your landing field, the competitions will be over for you,' and how right he was I found out later. The day's flight was points for distance and altitude combined. I was so nervous that I decided to take off last after everyone else had gone, but Hayden, the Norwegian, had much the same idea, and being more stubborn than me, took off last. I flew like everyone else, to the South, and all went well until a little front came up between Lakes Vanern and Vattern, and not knowing the European conditions I was at a loss to know where to go. I would very much have liked to telephone Phillip Wills to ask him what to do, but unfortunately my technical aids did not include a telephone and so I had to make up my own mind. My choice was to circumnavigate the front either on the left or right hand side, and choosing the right. I went down the drain near Lidkoping and shared the same fate of all those who had made a similar choice. Nearly all those who chose the left route had to call it a day at Jonkoping except Swen Alm who was the clever boy of the day because he was a patient man and waited for two hours before the front so that it

might pass and the sun do her stuff later, with the result that he hit the sea near Gothenburg, an incredibly clever bit of flying.

Thursday, July 6th. Order for the day: Goal Flight. I chose Boras after consulting dear Uncle Hakansson the Meteorologist. By choosing this goal I felt that should conditions be good and I got to this district early, I could fly on to the south in order to make more points. I first sailed down to Skara making very good time, and Rene Comte kept me company in his 'Moswey 4.' Then I swung over to Falkoping and from there onwards I drifted down with fairly strong cross winds towards Gothenburg. I had been looking hard for Boras but could not see the place, in fact I got quite worried. Then in the distance I discovered a 'Weihe' and who should it be but Tage Lof. This pleased me very much because I thought he was also looking for Boras and so on we flew for about forty minutes when it dawned on me that Varberg on the coast must be his goal. After some quick calculations I decided to retrace my steps and go back to Boras as this would mean not much less in points than going to Varberg, but six hours more sleep because of the shorter way home from the retrieving point of view. In the end I saw Boras in the distance, and getting really close to it I could not see the airfield. As I was now running out of height I decided to cross the lake and land in a small hay field, and approaching this field and looking around trees to the left, I saw a minute air strip which I could just make. The 'Air 100' was soon surrounded by people and I was very proudly told that this was the first sailplane ever to land there. This I gladly believed as Boras sits surrounded by at least 60 k.m.'s of the famous Swedish pines and my advice to other gliding pilots is not to choose Boras as a goal. *(to be continued)*



Capt. D. R. Lane, Central African Airways; Chief Instructor Salisbury G.C., taking suitable refreshment after test flying 'H.17'

LEE WAVE DISTURBANCES—continued.

observations preferably at intervals shorter than one minute or with a reduced ascent velocity of the balloon.

CONCLUSION

The principal object of the flights described in this report was the testing of a proposed method of investigating lee wave disturbances. As a result of the flights a number of improvements, both instrumental and with regard to the supporting meteorological observations, could be suggested which would be essential for definite tests regarding the validity of various theories of the phenomenon. Of the latter, that due to Scorer still appears to be the most promising for waves at altitudes used in present-day commercial aviation; it is of interest to recall that Lyra's theory took its start from high altitude soaring flights, while Queeny's work aimed mainly at analysing waves of synoptic dimensions.

Finally it can be stated even at this stage that the disturbances in question appear to consist mainly, at altitudes roughly twice that of the obstacle, of a region of strong descending currents adjacent to the obstacle, with another region of ascending currents further downwind.

ACKNOWLEDGMENT

The writer wishes to thank Mr. J. Edwards who piloted the flights described in this report; the Royal Victorian Aero Club who made available aircraft at very short notice; Miss A. M. Grant, who drew the contour profile for the illustrations; and the radar wind team at Essendon who made available the original data of their flight of February 3. Department of Meteorology, University of Melbourne, 7th March, 1950.

From Commonwealth of Australia 'Weather Development and Research Bulletin.'

'GALÁNKA' GLIDER—continued.

rudder with fabric. The rudder departs from normal practice by having no torsion box. Diagonal ribs are used instead. The elevators have a trimming surface controlled by a lever on the port side of the cockpit.

Although landing is normally on the wheel, the fore part of the fuselage is protected by a skid extending as far back as the wheel, in case it should hit the ground first, as is liable to happen on uneven ground. The skid is sprung on rubber shock absorbers. A wheel brake is fitted, coupled with an interceptor control, so that when the lever is fully applied the brake is brought into use by a crank attached to a lever on the drive shaft of the interceptors. Adjustment of the brake is very simple and is carried out through an opening in the fuselage so that the control lever is shortened by means of a female screw.

Owing to their being affected by the change of humidity in long cables run over pulleys, the lateral control cables of the 'Krajánek' sometimes became far too taut, so it was decided to use cranks on the 'Galánka'. As, however, the rudder control cables do not run over pulleys and are relatively short, these were retained.

The elevator controls are a combination of cranks and cables and control of the trimmer is by steel cables running in tubes in the tailplane. In order to have the requisite force in the control system, springs were inserted.

The 'Galánka's' safety factor was considerably exceeded in the destruction tests. In order to permit higher performance soaring, the necessary instruments were installed: altimeter, ASI, variometer, compass and turn-and-bank indicator.

DATA. Span 12.12 m. (39 ft. 9 in.), length 6.38 m. (20 ft. 11 in.), wing area 13.5 sq. m. (145.414 sq. ft.). Wt. empty 160 kg. (353 lb.), AUW 250 kg. (551 lb.). Minimum speed 50 km./h. (31 m.p.h.), maximum winching speed 90 km./h. (56 m.p.h.), maximum aero-towing speed 130 km./h. (80½ m.p.h.), maximum speed with flaps 190 km./h. (118 m.p.h.), finesse 22 at 73 km./h. (45 m.p.h.). Minimum rate of sink 0.85 m./sec. (2.788 ft./sec.) at 62 km./h. (38½ m.p.h.).

CLASSIFIED ADVERTISEMENTS

FOR SALE

'Cadet' intermediate glider, immaculate condition, 12 months C. of A. £200. London Gliding Club, Dunstable, Beds. Tel. 419.

Pitot Head De-icer. Thermal type operated by dry battery. Fits 'Olympia.' No position error. 29/6. Write Box No. 271.

Ultra Light Aircraft, 'Aeronca Jap.' Nice little aircraft wants complete overhaul. Exchange only for low h.p. car. Box 272.

GOING GLIDING? Then be prepared, and go with the right clothing. Rubber Gumboots, Sweaters, Windcheaters etc., for sale. Best makes, lowest prices. Write to Box 273, *Sailplane*, 139, Strand, W.C.2.

WANTED

New or used Recording Altimeter, small or pocket type preferred.

Please advise price and particulars of instrument including air postage and cost, and availability of charts etc., so that these can be purchased at same time.

Also required:—

Airspeed Indicator to 100 m.p.h.

Replies to: C. R. New, Esq., 22, Regent Street, Mt. Lawley, Perth, Western Australia.

'Tutor' wing (Stbd.) wanted in either good or repairable condition. Details to Mr. B. Warner, 57, Gwydir Street, Cambridge.

SCOTTISH GLIDING UNION

Holiday Courses, 'A' and 'B' standard from June to September. For Brochure and full particulars apply to:—The Course Secretary, 1, Davidson Road, Edinburgh, 4.



BREVITIES

WELSH AIR DERBY—SATURDAY, JUNE 9th, 1951

THE Swansea and District Flying School and Club have inaugurated the above Air Race, which will be held this year in conjunction with the Festival of Britain celebrations.

The race will be flown over three laps of a course Fairwood Common Aerodrome, Whiteford Point, Burry Holms, Oxwich Point, Fairwood Common, approximately 25.38 miles.

SPECIAL feature of the 18th National Soaring Contest to be held at Harris Hill from July 4-12 is a \$2,000.00 travel fund set aside to help pay competitors' contest expenses, say the Elmira Soaring Corporation.

FARADAY MEDAL AWARD

THE President of the Institution of Electrical Engineers, Sir Archibald Gill, M.I.E.E., together with a large number of members, attended at the Marconi Works, Chelmsford on May 1, to present the Faraday Medal to Mr. T. L. Eckersley, B.A., B.Sc., M.I.E.E., F.I.R.E., F.R.S.

Owing to illness Mr. Eckersley was unable to attend a London function and, such is the esteem in which he is held by brother members, the unprecedented step was taken to hold the ceremony near his home.

JACK RICE flew in on Easter week-end complete with coloured slides and a projector. His show was such a success that he came again on the 7th with another batch. Both shows were immensely enjoyed and well attended. Thank you, Jack. Several members of the Leicester Gliding Club also came down.

BIRA earned a diamond for his Gold 'C' by climbing 19,500 ft. (without oxygen) in a wave near Cannes, South of France. Well done, Bira!

THE Kemsley Prize for flights during March was awarded to David Ince for his 100 mile flight from Long Mynd. John Currie and Geoffrey Stephenson received special commendation for their flights to Forest Row and Friston respectively.

THE 'SKY' FOR STEVE

SQUADRON LEADER J. FURLONG has lent his 'Sky', Slingsby new high performance sailplane to G. E. Stephenson for entry in this year's British National Competitions.

DUDLEY HISCOX, President of the London Gliding Club was recently presented with a son by his wife, Joan.

Is it true, however, that in his letter of congratulations Arthur Sweet, Secretary, enclosed an application form for Associate Membership for Baby Charles?

THE London Club will take part in the Hendon Air Display in connection with the Festival of Britain. The progress of gliding will be illustrated by the contrast between a bungy launch of a 'Dagling' (in period costume) and the aerotow of an 'Olympia.'

FINNISH GLIDER FOR CANADIAN FAIR

AT the fourth Canadian International Trade Fair, the Marine and Aviation Equipment section will incorporate new important developments from the U.K., Canada, U.S.A. and Finland. A firm from Finland will exhibit a glider which will be towed over the Fair at regular intervals to demonstrate what it can do in action.

NEWS FROM THE CLUBS—

MIDLAND GLIDING CLUB

START of the year has almost brought disaster to the Club with four of its aircraft grounded for various reasons. We were unable to recover the 'Kite' because of the abnormally cold and damp weather.

The 'Venture' was sent away for modification of the rudder and ailerons and is not flying yet pending the granting of a C. of A. The 'Olympia' was bent on Good Friday, and the repairs are nearly completed. An Artificial Horizon is being fitted whilst it is out of commission. The E.O.N. 'Baby' was bent last month and is at the manufacturers at the moment.

For all that some 340 hours were flown during the first four and a half months of the year.

January. Soaring was possible on only five days during this month but 31 hours were flown, this total being helped by the return, to the fold, of Charles Wingfield's Blue 'Olympia,' which is now owned jointly by Dr. O. J. C. Cotton (and Children), D. E. Ince, D. H. G. Ince, and one of the authors of this epistle, J. H. Hickling.

February. A dull, miserable month with only four mediocre soaring days, and the month's total of thirteen and a half hours did nothing to cheer us up. Thank goodness it is the shortest month.

March. At last the soaring season has started. The Cambridge University Gliding Club arrived at the beginning of their vacation and settled on the

NEWS FROM THE CLUBS—continued

club in their usual manner, and started to pile in the hours for us. Easter arrived and on Thursday, 22nd, 'Rick' Prestwich hooked on to the wave and rose to 6,000 ft. A.S.L., and arrived at Mother Earth with visions of the Brunt Trophy.

John Holder, who arrived that evening, and doesn't believe in letting Cambridge University have it all to themselves, got up early on Saturday morning and reached 6,100 ft. A.S.L., for Birmingham University at 07.30 hours.

Not to be outdone Prestwich clambered into the Cambridge 'Prefect' and went off to Malvern (46 miles) to complete his Silver 'C'.

Having watched him out of sight we turned our eyes to the West and saw a 'Wiehe' in the sky which hadn't been there before, P. A. Wills had hill-hopped over from Prestatin to see if the weather was any better with us.



Court of Enquiry—The Long Mynd

A cracking good day with sixty-one-and-a-half hours being flown by ten aircraft during the daylight hours.

Tuesday 27th, The wind was almost dead along the hill, N. to N.N.W. 20. Kts. but Dick Watson of Surrey managed to do his five hours, and quite a large percentage of the time he was below the hill! These flat site boys certainly have something.

OVER 100 MILES

David Ince got tired of the Mynd and went to join Dick and do a bit of hill scraping; after an hour and a half at it he was to be seen no more, and was next heard of at Sutton Veney on Salisbury Plain, after a flight at an average speed of 40 m.p.h. of just over 100 miles, which he described as being done in good summer conditions and which earned him the extended Kemsley Winter (?) Cross Country Prize. The hours for March were 228!

April. This month provided a contrast between days of unstable West winds and thermals off the Winch in North and East winds.

April 14th. The wind was just North of West and very unstable, so John Hickling declared Dunstable as his goal and set off in the Blue 'Olympia.' Unfortunately he fell short and landed at Barford St. John about 75 miles away. His best height was

6,000 ft., A.S.L., and his average speed was 50 m.p.h. The total for the month was 64 hours.

SUMMER CAMPS COMMENCE

May. The first two week-ends of this month have been noticeable for their drab polar North winds. During Whit week-end we started an ab-initio Camp and we hope these will become an annual feature.

P. A. Wills came with his 'Wiehe' to spend the week-end with us. On Whit Monday the 'Wiehe' was seen sharing a thermal with Alan Pickup in the 'Kite.' He went to 3,000 ft. A.S.L., but the 'Wiehe' came down to earth, and left by road to Maidenhead. J.H.H.

ARMY GLIDING CLUB

A recent period of intensive training for the summer season has resulted in a much more even distribution of Members between the various Club machines; consequently flying-time is increasing by leaps and bounds, and soaring is fast becoming as frequent as the regulation circuit and bump.

The first of our Courses for the year was somewhat marred by poor weather, but the old hands amongst those attending had polished up their flying appreciably before Saturday arrived, and an encouraging start was made by a number of new members.

Unfortunately our best runway for auto-launching is temporarily out of commission, and we have been obliged at times to revert to winch-launching.

VISIT BY RECORD BREAKER

On Whit Sunday we were visited by Flt.-Lt. Bedford, whose recent flight to Newcastle provided him with two further British records. He dropped in,—literally— in the 'Kranich,' and we envied him both the machine and the tug which he was able to whistle up with such alacrity.

We hope we shall soon have more visitors at Lasham, and hasten to add, in view of the preceding paragraph, that a Gold 'C' is not an indispensable condition of entry. R.L.P.

ULSTER GLIDING CLUB

8th April. A gala day for 'circuits.' Considering that the glider was auto-towed for 1½ miles on billiard table surface to 800 ft. which allowed a long glide after release with maximum safety in landing, a 'circuit' is an over-estimate.

The Magilligan tide behaved in our favour and 25 flights were achieved as follows: Liddell 2, Osborne 6, Lt. Stubbins 6, Sansom 6, S/L Sanders 2, Beck 3. This was the opening of Club flying in the 'Tutor' and everyone had a good day and 'got their eye in for a future soaring wind.

William Douglas was instructor in charge, and we were pleased to see S/L Sanders making his first glider flights over this famous site.

9th April. As the result of Aldergrove's forecast of a soaring wind, the temptation was too much for Liddell who sneaked away from work and was launched at 5 p.m. in a 25-knot cross wind. Once

over the cliffs the 'Gull' shot up to 2,000 ft. where it flew backwards when at minimum speed.

Meantime with a fast incoming tide the tow car stuck in soft sand and Liddell had to 'pole-squat' for an hour and wonder whether tide or car would win. At 6 p.m. the 'Gull' was at 2,800 ft. and the car's future looked hopeless; so with no place to land, no prospect of retrieve, and with friends at Ballykelly, the 'Gull' was turned inland and arrived at Ballykelly Aerodrome, 10 miles from Magilligan with plenty of height.

The hospitality was proverbial and included dinner and drinks from the Duty Officer F/Lt Shepherd, and the 'Gull' was safely tucked in a hangar for the night.

Meantime on the Magilligan beach with the aid of a spade and sacks, the tow car was rescued in the nick of time and the trailer retrieved to Downhill.

15th April. Wind was South West and seemingly unsoarable. Beck was brave enough to tow up and try the West slope but without success. Then a rain storm appeared over Donegal and the wind veered enough to get Sansom (R.N.A.S. Eglinton) into the air. He flew along the West face to Eagle Hill and round the Hell's Hole corner and there met lift and was soon at 1,600 ft., where in constant company of the protesting Raven he stayed for 20 minutes.

This site must be known to appreciate what a splendid flight this was. To reach the S.W. corner of Eagle Hill flying a 'Tutor' in a S.W. wind is rare indeed and this was Sansom's second soaring flight.

SOARING IMPOSSIBLE

Lt. Stubbins and Osborne both made similar attempts, but the wind had gone and soaring was impossible. We are hoping that Lt. Stubbins will

soon have the good fortune to get a soaring wind and his 'C.' He has put in great work for the Gannet and Ulster Clubs and he deserves a better break.

28th April. Strong North wind and bright sunshine. This was the kind of day for which Magilligan is famous as a soaring site. Liddell launched at 12.45 p.m. before the tide came in and had three hours credit when Osborne (1 hr. 5 mins.) took off in the 'Tutor.'

Sansom then flew 1½ hours, to be followed by S/L Sanders on his first taste of the Magilligan ridge. Everyone in turn reached Benevenagh (the Fairy Mountain) and Sansom reached 2,100 ft. After 5 hours, at 6 p.m. Liddell decided to come in, but on flying out to sea found lift to 2,800 ft. and thought of the possible long cliff soar to Ballycastle, so he set off partially up-wind across the four mile Bay to Portstewart.

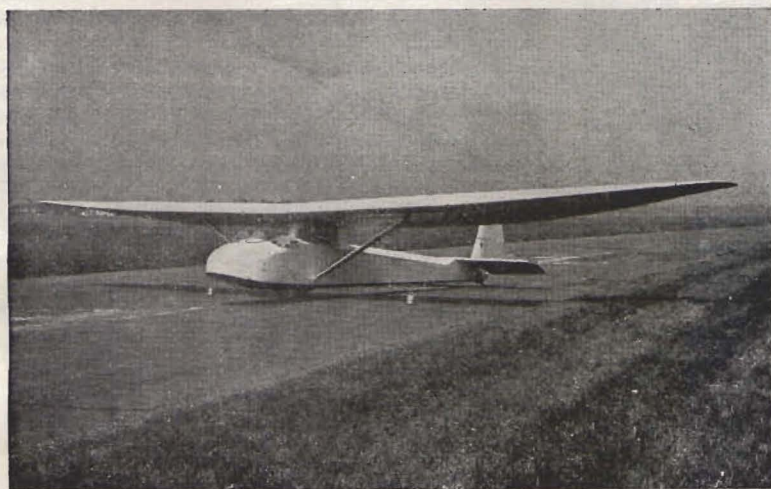
From there in rapid sink he crossed Portrush at 600 ft., flew along the sand-hills and reached the White Rocks at road level 100 ft. To the apparent surprise of people standing on the road, the 'Gull' worked up the cliff face until at 800 ft. it was possible to circle above historic Dunluce Castle.

Now came the two mile wide Bay at Portballintrae to reach the cliffs at the Giant's Causeway; however, crossing Runkerry Point the 'Gull' was too low and landing was made in front of the Causeway Hotel—14 miles from Magilligan.

Another 100 ft. and the rest of the flight to Ballycastle would have been easy. This trip had been planned for a long time and failure was disappointing, but the tea at the Causeway Hotel was worth it.

29th April. Another magnificent day with a strong N. wind and small clouds at 2,500 ft. We

On Service—for The Service



The T21B, 2 seater is now in quantity production for the Reserve Command Royal Air Force as well as for export to foreign governments.

Slingsby Sailplanes Ltd., Kirbymoorside, Yorks.

NEWS FROM THE CLUBS—continued

were delighted to see Carl Beck soaring again. His heart may be with the Midland Club, but his face showed great pleasure after 2½ hours over this beautiful site.

The last flight before the tide covers the beach allows the pilot to stay aloft until the beach is clear again and Carl well deserved the privilege. Our Club is now 21 years of age and Carl is a founder member.

Osborne was next off and flew for an hour, furiously pursued by Papa Raven which flew so close above the tail as to appear perched on it, a hilarious sight to the 'Gull' pilot following above. Sansom then flew for 1¼ hours.

RAVEN AND A BEARD

We will let you into a little secret. Sansom had a beard, but so fervently was he pursued by the Raven the previous week we decided that either (a) the Raven wanted building materials or (b) it wanted to nest in the beard. This week for the first time since we have known him, Sansom arrived beardless and flew the 'Tutor' (on his third soaring flight from ab initio) to 3,200 ft.—a wonderful performance.

The problem now is, was it due to (a) less weight, or (b) less wind resistance. Probably it is because he has the makings of a very good pilot.

Liddell soared over 3,000 ft. for 4 hours in the 'Gull.' The pity was that clouds inland were too low to have a go at distance.

During April (week-ends only) the 'Tutor' has put up 10½ and the 'Gull' 14 hours respectively, more than three times what each machine flew during the miserable summer of 1950.

13th May. There was an early tide so no flying until late afternoon. As usual Aldergrove's prediction was correct and a 15/20 m.p.h. N. wind blowing.

Carl Beck in the 'Tutor' was first off at 5 p.m.

Clouds were low over Benevenagh so he did not venture across to the Fairy Mountain and kept below cloud base which was at 2,500 ft. When Liddell was ready to take off in the 'Gull,' the tow car developed a soft tyre.

After an hour Beck landed and the 'Gull' was launched at 6.00 p.m. Before the launch S/L Sanders spotted a standing wave over the Foyle so hopes were high. The wind seemed too much North for Benevenagh; however, the 'Gull' rose quickly to 2,000 ft., and crossed over Hell's Hole.

The sky was overcast with the exception of a 'V' with its point at Benevenagh, its right arm parallel to the West Cliffs and its left arm pointing toward the Donegal Hills.

The leading edge of the left arm looked full of lift. Within the 'V' there was lift to 10 ft./sec., and within 20 minutes of take off the 'Gull' was well above cloud at 4,000 ft. Here and there a dome appeared in the upper cloud surface indicating area of lift, but above the layer there was no lift.

Clouds stretched everywhere inland, and the wind was so strong that instead of circling, short figures of eight kept the machine in the lift area.

Liddell flew back to see Sanders launched in the 'Tutor' and lost height to 2,000 ft. over Castlerock,

then on the North face lift unexpectedly took the 'Gull' to 3,100 ft.

Meantime Sanders in search of his wave went to Benevenagh and flew about under the cloud.

The 'Gull' went across only to find a strong down draught and just scraped back to Eagle Hill at 1,500 ft.

Imagine the 'Gull' pilot's chagrin when he looked up to see Sanders far above. Sanders had reached 4,000 ft. in the 'Tutor,' a fine performance. To add to the dilemma, the Raven now appeared with its grey beak a few feet above the 'Gull' cockpit and made rude noises at the pilot; however, seeing Liddell's beardless face he left contemptuously.

Sanders landed after 1 hr. 30 mins., and then kindly instructed a new member to 'A' and a second to 'B' stage.

Both these pilots are ex-R.A.F. of thousand-hour status. The former is Cooper of Wooden Horse fame and the second Austin of Derry. To watch their revels the 'Gull' returned late evening to the N. face and once more ascended to 3,200 ft. It landed at 9.15 p.m., after 3 hrs. 15 mins., and we packed the two machines away before dark.

We are not yet sure whether the lift was an accumulation of heat coming in from the sandy country, reinforced by hill lift, or whether Sanders has at last found his standing wave. The main thing is that competition is keen and the fun is enormous.

BRISTOL GLIDING CLUB

SUMMER COURSES.

Following a successful season last year Bristol Gliding Club is once again running a series of weekly courses for beginners, at the Club training site at Lulsgate airfield, seven miles south of Bristol.

The courses give tuition up to 'B' certificate standard and normally solo training is used, though the Club two-seater is generally available for air experience etc.

The courses are run by a full time professional instructor and the numbers on each course are limited to ensure the maximum amount of flying for everyone. They normally last from Monday till Friday, but this year as an innovation, course pupils are invited to join in the normal week-end club flying.

The courses run continuously from the beginning of June until the beginning of September and the standard charge, including all flying, meals and accommodation at a nearby country hotel, is £12.

Further details may be obtained from the Hon. Course Secretary, 55, Belvoir Road, Bristol, 4.

J.N.C.

YORKSHIRE GLIDING CLUB

Situated on this escarpment we have had a terrific run of soaring winds, but it is soarable here in all but East winds. Our 'T-21' has done more work than any self respecting machine should be called

upon to do, yet we have not caught up with our commitments.

The convenience of our site is well known to those who have visited it, but as a recent arrival its ease of operation has amazed me. One just pops the machines outside the Hangar doors, hooks up and away over the 600 ft. edge.

In a matter of minutes the machine is several hundred feet up. None of those long treks home after flying for the day has ceased. Watching Pratt come in to land, one detects that longing look at the Hangar doors. Don't do it Allen, we don't mind putting them in by hand.

Gilli has treated us to some exciting moments recently by continually playing away when it comes to landing. He believes that all people with the necessary land are entitled to a visit.

He has popped down a fair selection of the Slingsby Group machines at odd points about the county for the farmer's inspection. Last Sunday found him 'playing away' to the Forestry Commission.

Despite club manoeuvres and much route planning Gilli could not be found until the Resident Instructor, doing the local woods, met him emerging from a wooded section, and learnt from him how he 'dun it again' in a bit of the Forestry Commission's up and coming. It is hoped that as time goes by he will favour us with a match on our Home ground.

Standing waves are almost a daily sight, but only an aero-tow could contact them. The club is now organising ab-initio instruction. These outnumber our facilities, but we will catch up.

A Sunday or so ago found Pick providing a diversion to the packed bar. He was seen going round lifting odd floor boards here and there with a large tyre lever, and uttering strange noises.

Gradually, as the English bystander will, a group of interested members gathered to watch operation Ostrich, a startled 'Gotcher' and a shaggy dog's head appeared only to vanish again.

Excitement mounted, more holes were opened, each manned by its hole attendant. Torches flashed in the subterranean cavities beneath the floor.

With one's head firmly wedged in a hole one could hear Pick's coaxing voice calling for a canine surrender in the dim underworld. I thought I had the wayward fellow lined up and flashed my torch only to be met with a withering glance from O'Grady who was holding his particular hole Eastern fashion with an expression of 'they shall not pass' which, when viewed upside down looked positively awe inspiring.

Gliding being what it is one can guess how the dog solved the problem. Operation Ostrich over, peace descended again on the club.

We extend our hearty welcome to the Newcastle club who have joined us.

R.S.

CENTRAL AFRICAN GLIDING

STEADY, but not outstanding progress, marred by a little graunchery is to be reported from S. Rhodesia. At the time of writing no news has

been received from Umtali, save by word of mouth, which is most unfortunate.

UMTALI G.C.

The club, which has been operating with a 'Slingsby Primary'—or most bits thereof—and an immaculate 'Kite,' for the last two years, has had a hard blow in that Harry Mason appears to have misjudged an approach and come off second best in the ensuing argument with the boundary fence.

He was unhurt, but it will be a year, due to the shortage of experienced constructors, before the fuselage is repaired. Another imminent blow is the closing down of the nearby municipal aerodrome and the opening of the distant Grand Reef Airport—where the club is not likely to be welcome. Meanwhile, the latest report is that a 'T/31' is on order.

SALISBURY G.C.

We too, have had our setbacks. Due to the inverted saucer shape of our airfield which forbids sight winch to aircraft, and all round finger trouble, Jimmy Harrold, perhaps our most experienced member, stalled the 'Cadet' down from 50 feet when the winch misbehaved itself.

He and Eric Bone were good in admitting joint fault—luckily only minor damage to the belly resulted, and the 'Cadet' is once more flying. Sam Barker and others took advantage of the lull in flying to fit a chain pay-on to the winch, and Douglas Elliott fitted telephones (Cable positive and Earth return) which are invaluable.

In January the great day arrived when my 'H-17' arrived—bent en route. My co-owner Barker soon fixed the trailer, and Captain Lane, our C.F.I. took little time to make as new the broken ribs.

By courtesy of the O.C. S.R.A.F. Station, Cranborne, we test flew from that airfield, using Barker's 'Mercury' and 1,000 feet of cable for auto-tow, and Derek Lane immediately broke the Rhodesian duration record with almost 2½ hours, reaching 11,600 without a vario, all on thermals.

He spent most of this time out of our site, circling Salisbury's perimeter—no mean feat when it is realised that Salisbury is slightly larger—if only in area—than Greater London.

Early in April the 'T-31' kit arrived at the coast, and we shall cease flying till assembly is completed. Meanwhile, in our hangar are no less than three aircraft—with the two-seater wings additional to these. If only they all belonged to this club!

BULAWAYO G.C.

Harris tells me that the Club has acquired a 'Chrysler' prime mover for the winch, and the installation of the 'Lincoln' powered winch is almost complete. The club owns the 'Granau' primary, purchased from Salisbury, has forty members on its books, and considering that the club started but six months ago, and has not yet called for subscriptions, the committee is surely to be congratulated.

It should have a first-class future. No gliding has ever been done in that part of Rhodesia—Matebeleland—but it appears to be similar terrain to Texas, so the possibilities are very great. R.M.

ROYAL AERO CLUB CERTIFICATES

(Issued under delegation by the B.G.A.)

APRIL, 1951

CERTIFICATES "A" .. 83 (13028 to 13110 inc.)
 "B" .. 36
 "C" .. 18
 Silver "C" 7

"B" CERTIFICATES

No.	Name	A.T.C. School or Gliding Club.	Date taken
1894	Derek A. Baker	London Gliding Club	3. 3.51
6805	Charles T. Harmsworth	No. 146 G.S.	15. 4.51
7686	Aaron H. Biram	Imp. Coll.	1. 4.51
9265	John W. Downing	No. 146 G.S.	15. 4.51
10039	Brian G. Allison	No. 84 G.S.	22. 4.51
10150	William J. McCurry	No. 203 G.S.	27. 3.51
11031	Oliver J. Dore	No. 123 G.S.	28. 1.51
11909	William J. Pearce	No. 168 G.S.	15. 4.51
12045	Barry A. Lester	No. 146 G.S.	15. 4.51
12373	George E. Simpkin	No. 23 G.S.	25. 2.51
12512	Stanley Whyte	Scottish Gliding	25. 3.51
12890	Nigel O. Roberts	No. 125 G.S.	29. 4.51
13027	David S. Hill	Scottish Gliding	22. 4.51
13028	Alan G. Ball	No. 166 G.S.	14. 1.51
13033	Charles G. Judge	Derby & Lincs.	3. 3.51
13034	Ramsay M. Brown	No. 192 G.S.	13. 4.50
13038	Alexander Black	No. 168 G.S.	5.11.50
13039	John K. White	Cambridge Univ.	29. 4.50
13040	John G. Wort	No. 123 G.S.	3. 3.51
13043	Cyril A. Chivers	Passberg	27. 9.50
13045	George E. J. Day	Lüneburg	24. 8.50
13049	Paul Minton	Imp. Coll.	25. 6.50
13050	Edgar J. Meddings	R.A.F. Detling	9. 6.50
13055	Gerald S. Whiting	Bristol	8. 4.51
13056	Joseph B. Cookson	Gutersloh	4. 6.50
13070	Lionel F. Coulshaw	Fulmar	14. 3.50
13076	Randolph C. Pocock	Detling	20. 3.31
13084	Brian R. Townsend	No. 126 G.S.	24. 2.51
13085	Terry J. Greenhill-Hooper	No. 84 G.S.	22. 4.51
13091	Ian G. R. Burdon Bailey	Derby & Lincs.	22. 4.51
13092	John A. Carter	Army Gliding Club	22. 4.51
13095	Christopher P. Dennison	Imp. Coll.	5. 4.51
13096	John W. Wisbey	No. 125 G.S.	29. 4.51
13105	Peter J. Whiteman	R.A.E. Tech.	21. 7.50
13106	Terence A. R. Hanney	No. 168 G.S.	15. 4.51
13108	Robert M. Neill	Midland	22. 4.51

"C" CERTIFICATES

1306	Lionel B. Tate	Newcastle	8. 4.51
1894	Derek A. Baker	London	25. 3.51
4023	Donald Baxter	No. 42 G.S.	28. 4.51
4429	Albert S. Johnson	No. 22 G.S.	22. 4.51
7686	Aaron H. Biram	Imp. Coll.	1. 4.51
10713	Jacob A. B. Cartmel	Coll. of Aeron.	5. 4.51
11508	John C. Waters	No. 168 G.S.	17. 4.51
11827	George E. Bristol	No. 22 G.S.	22. 4.51
12603	Richard L. Batten	Midland Gliding	25. 3.51
12642	Alfred C. Hennessy	London	4. 4.51
12839	Edward V. G. Scoones	Walmerheide Gliding	21. 4.51
13033	Charles G. Judge	Derby & Lincs.	25. 3.51
13039	John K. White	Cambridge	14. 3.51
13043	Cyril A. Chivers	Passberg	18. 2.51
13045	George E. J. Day	Lüneburg	10. 3.51
13050	Edgar J. Meddings	R.A.F. Detling	9. 6.50
13056	Joseph B. Cookson	Gutersloh	3. 3.51
13076	Randolph C. Pocock	R.A.F. Detling	12. 4.51

SILVER "C's"

302	J. F. F. Lathbury	B.A.F.O.	15. 3.51
303	A. B. Stevens	Surrey	14. 4.51
304	A. E. Rowley	London	25. 3.51
305	C. M. Harcourt	Cranwell	21. 4.51
306	T. J. Cresswell	Cranwell	21. 4.51
307	K. B. Newman	Johannesburg	1. 4.51
308	J. M. Hands	London	14. 4.51

THE MIDLAND GLIDING CLUB LIMITED

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Full particulars may be obtained from the Secretary, F. G. Batty, F.C.A., 2, Lombard Street West, West Bromwich, Staffs.

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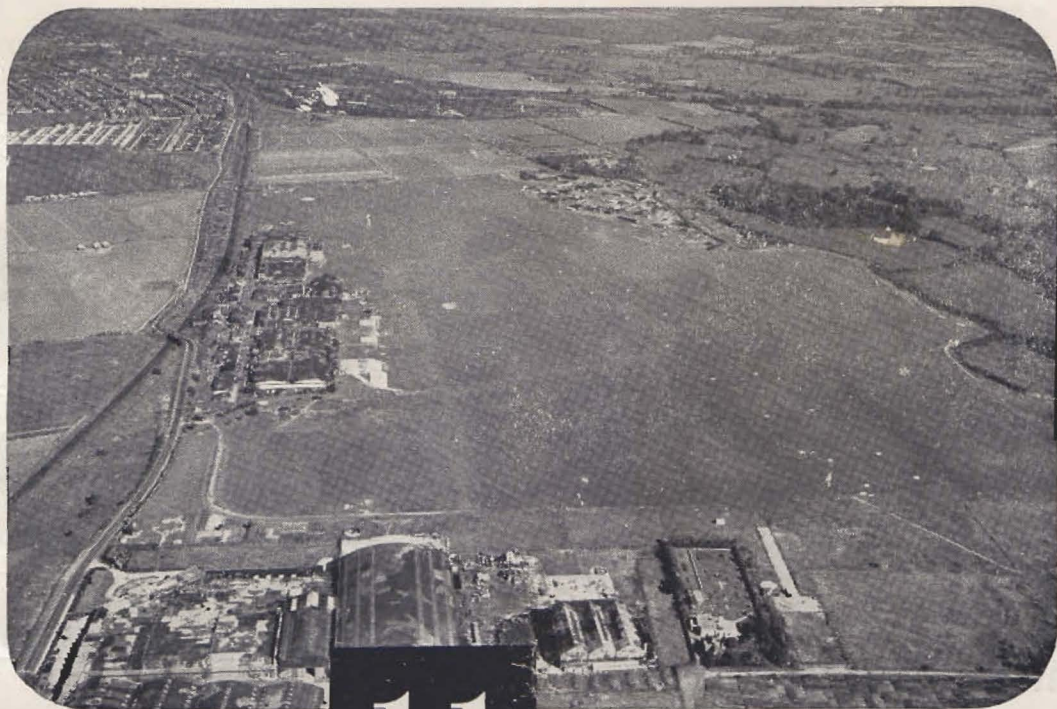
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