Sailplane and Glider

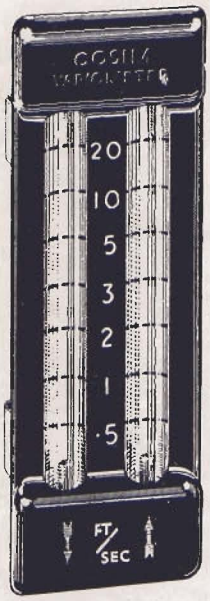
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THE FIRST JOURNAL DEVOTED TO SOARING AND GLIDING

NOVEMBER 1952 ★ Vol XX No 11

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COVER PHOTO :

'T.21 B' in a cloudstreet lift at Dunstable. By Alex Aldott, Contax II. 8.5 cm lens, 1/125 f8, orange filter.

Editorial

AFTER our Editorial in last month's *Sailplane* about the need for cheaper gliders and gliding, we came across an article in *Weltluftfahrt* by Fritz Stamer, one of the pioneers of German and of world gliding. For nearly twenty years before the war he was in charge of the organisation for beginners in German gliding, and no one has more experience on this side of gliding.

Referring to a previous article by Georg Brutting he states : "I have recently had the opportunity of hearing the views of the fringe of the soaring world, and wish to air these views in order to allow them to play a democratic part in forming the future of the Movement. We do not wish to be subjected to a dictatorship from any side.

We have 40,000 members in the D. Ae. C. These consist of model enthusiasts, power pilots, balloon pilots, parachute jumpers, inactive friends and sponsors, and about 10,000 people who soar or *wish* to soar. These 10,000 people are in 850 Clubs=10-12 active members per club.

These require about 300 winches and 800 sailplanes. 1 Winch equals 8,000 DM (£800). 1 average sailplane equals 8,000 DM. Total cost 1,800,000 DM *not* counting trailers, vehicles, petrol, repairs, etc.

This will not do, not even in rich countries. This path means soaring for the *few*, or to professionalism of the very few pundits.

Clubs possessing a winch and one or two sailplanes must charge for every flight and also earn money by dear passenger flights. The young man who in his thousands represents the future and who should fly, counts his pennies and must realise that he cannot afford it.

This was alright as long as old pilots were still renewing their licences.

The German team in Spain did quite well—nearly the same old hands did well at Klippeneck—so they should. But how can an Ab Initio get his Silver or Gold 'C' today ?

In the past it was different—we could sponsor a Nehring, a Kronfeld, a Groenhoff and a Dittmar and train them to the highest class. We had the possibility to allow talent to the front (using State subsidies—Ed.). The top class was however the apex of a pyramid based on the masses—based on *gliding* flight. Gliding and Soaring were intimately connected."

Thus far we agree, but we do not agree with Fritz Stamer when he goes on to state that gliding, meaning slides and hops, was the full satisfaction for the mass, although we agree that there is still a great satisfaction and thrill to be obtained from flying and soaring the 'SG-38' and the open machines such as the 'T-21.' He goes on to say "Gliding allows home construction of simple gliders ('Daglings,' 'SG-38's,' etc.), without expensive workshops and specialised workmanship or capital.

We have concentrated far too much on two-seater training. Where is the economy in two-seater training if every launch costs 3-5 DM (6/- to 10/-). What two-seater does not have repairs after 3-500 launches which swallows up all the previous income ?

Every club can build a glider itself at an expense of 800 DM. 800 gliders equals 640,000 DM. Add to this cost of bunjy and accident insurance for the pilot and insurance for the glider becomes impossible (and even more so for the sailplane —Ed.).

In 800 clubs 10,000 members would then be active and new Ab Initios would appear. We will then have a movement of 'A' 'B' or 'C' pilots who will fly themselves and not just watch the pundits with jealous eyes. If we have to have National Competitions they should be for Ab Initios and elementary.

At the present time I would much rather see 300 flights—straight glides of 1 km. length than one flight of 300 km. by a pilot who I know is capable of doing it anyway."

Well, with most of this we agree, but we do not think it goes far enough. As we stated last month we would like to see the cost of gliding brought down, by the provision of much cheaper and simpler machines and launching devices, but not so that the masses can merely glide. We would like them to *soar* for more hours than they can now because of the costliness of everything and its consequent scarcity. One hour's soaring for 20 hours' groundwork is not enough. One for one possesses the incentive to put in the hour's work. But it means many more gliders and people, and this we shall not get until we have solved the problems of building cheaper machines and obtaining more efficient and cheaper launches. However, this problem is being tackled all over the world and in time we shall see results.

IN MEMORIAM

Karl Erik Ovgard : 600 kms. in 4 Hours

By Dr. JOACHIM KUTTNER

Translated by Walter Neumark

From "SWISS AERO REVIEW"

(By courtesy of the Swiss *Aero Revue* we publish Dr. Joachim Küttner's account of his historic 600 km. flight from Bishop to Williams, being the first real long distance flight in a series of standing waves and in what might be described as a jet stream after a climb into the stratosphere. Readers will be aware that Dr. Küttner was among the first pilots to make a standing wave flight in the Moazagotl and wrote the first and still classical papers on the Moazagotl and standing waves throughout the world in *Beitraege zur Physik der freien Atmosphaere*, Volume 25; *Moazagotl and Fohnwelle* and *Zur Entstehung der Fohnwelle*.

We congratulate Dr. Küttner on this flight and are particularly glad that he has succeeded in remaining the foremost pioneer of wave soaring from the Thirties to the present day.—*Ed.*).

FOR a long time we had planned a 300 km. goal flight of three sailplanes from Bishop (California) to Boulder City (Nevada) near the well-known Boulder or Hoover dam. My companions were to be Bob Symons, the Wave-King of Bishop and Larry Edgar, research pilot of the Sierra-Wave-Project. Both had great experience in wave soaring and had in turn won from each other the two-seater world altitude records, on most of these occasions I was sitting in as second pilot. We intended to go off on the cross-country with three sailplanes and an aeroplane tug, all in radio telephony contact in order that none should be lost in the desert. We still remembered the three day search for our friend Ovgard. We each had the same air maps with a numbered grid in order to be able to pass positions to each other.

This attempt was wrecked on the 18.3.52, which we had selected for testing our equipment because on that day a great wave grew over the





TOP : *Lee Wave of the Sierra Nevada on the 19th March, 1952. View from Bishop towards south. On this day the biological height was 13,600 m., and the distance flight took place.*

BOTTOM : *The East slope of the Sierra Nevada (view towards the west across the Owens Valley). In the centre is the 4,500 m. Mt. Whitney, highest mountain in the U.S.A.*

Sierra Nevada and this enticed us to combine the equipment test flight with the actual cross-country flight. Besides, this extraordinary powerful wave was very difficult as the cloud gap between ' Fohnwall ' and Moazagotl (lenticular) closed completely between 9,000 and 11,000 m. while we were operating with five sailplanes at the same altitude. Lift of up to 22 m/s was measured.

No difficulty seemed to be spared us; the radio failed, Larry's and my rate of climb indicator failed between 9,000-11,000 m. Larry's airspeed indicator iced up and his oxygen regulator burst at this height, all our cabins iced up so completely on the inside that we were hardly able to see out of the doubly glazed windows. Larry made a successful forced landing in Death Valley, a salt desert below sea level about 160 km. S.E. of Bishop, while Bob Symons who was launched last, under the impression that Larry and I had already gone off cross-country, made a straight glide of 270 km. to Las Vegas, only 30 km. short of our goal. (This demonstrated the radius of action in straight glides from such heights). After several visits to an assembly point 90 km. south of Bishop I returned after a 4½ hrs. turbulent flight to Bishop in order to repair the deficiencies of our equipment. We had all three of us used war-surplus two-seaters, formerly intended for training by the U.S. Navy but flown as single-seaters. Larry Edgar flew his ' Laister-Kauffmann,' Bob Symons his ' Pratt-Read ' (seats side-by-side—the type used in the Sierra Wave Project) and I a ' Schweizer T.G.3.'

19th March, 1952.

At last, shortly before 13.30 P.S.T., my ' T.G.3 ' was aero-towed by Ray Parker, chief pilot of the Sierra-Wave-Project (who with John Robinson had once reached 12,800 m.) flying a ' Vultee BT-13 ' (450 H.S.) from Bishop airfield. There were only four hours until nightfall. I designated Boulder City (310 km.) as my goal.

It might be of interest here to mention the equipment and preparations before describing the flight itself. The equipment was selected on the basis of the experience gained in the Sierra-Wave-Project. It consisted of the following :—Two independent Oxygen systems for 4 and 5 hours respectively with a Pressure supply facility (with oxygen under pressure one may remain for a short period at heights between 12,000 and 13,000 m.) ; Pressure oxygen masks with a built-in microphone ; Leather flying overalls with fur boots ; gloves attached to the sleeves ; protective goggles for parachuting in low temperatures ; parachute oxygen supply (10 minute bottle) ; a parachute with manual and automatic and pressure actuated release (set at 5,500 m.) ; a Plexiglass cockpit cover without rivets (to avoid cracking) and freely built in to allow contraction in low temperatures of up to 2 cm. ; 3 doubly glazed windows (to avoid interior icing) ; cotton wool and strip heat insulation of the cabin ; a ventilation tube ; a radio transmitter receiver with a 25 m. trailing aerial on 3105 K.C.S.

Map studies of the route up to 500 km. had been made together with observations from previous car and aeroplane journeys. Statistics from the downwind test flights of the Sierra-Waves-Project showed that the gliding angle in relation to the ground was mostly greater than 1:30 when one flew above 6,000 m. (The training two-seaters which we used were not high performance sailplanes. Their gliding angle was little better than 1:20. They are, however, quite fast, 70-120 km./h is their useful speed range). Minimum starting altitudes were determined for each mountain range on a basis of a gliding angle of 1:30 (over ground) so that an airfield on the next mountain range could be reached with an altitude safety margin. For the start of the downwind flight from a point south of the 4,500 m. Mt. Whitney (approx. 100 km. south of the take-off point at Bishop) a minimum starting height of 10,000 m. had been determined and a height of 9,000 m. for the next mountain range, the 3,400 m. Panamint range alongside Death Valley.

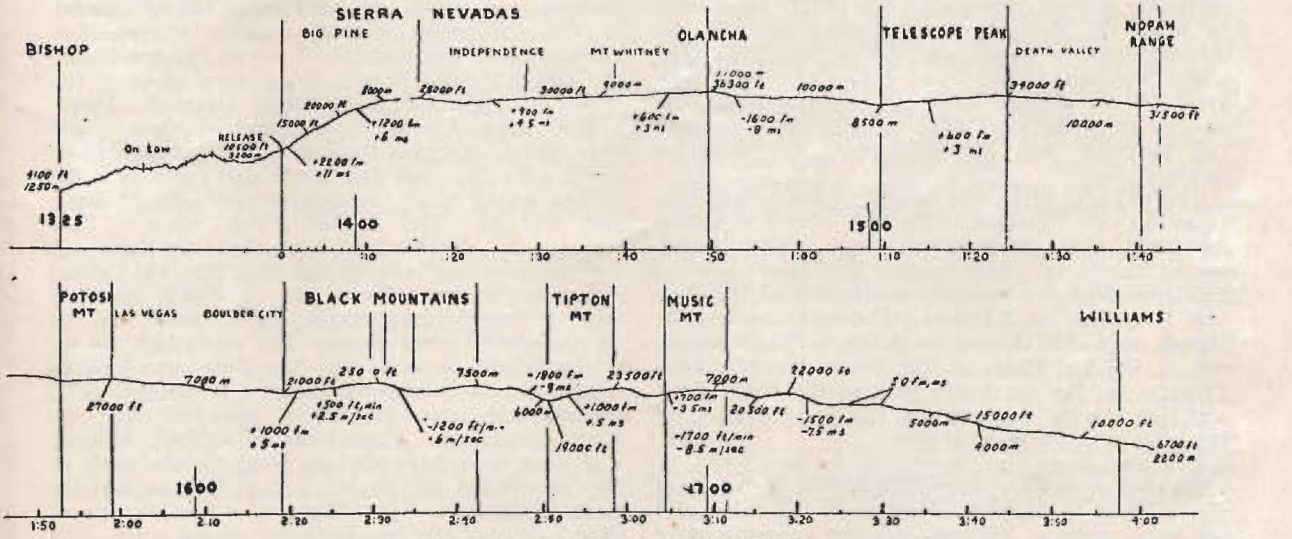


FIG. 2. *Barogram of the distance flight, March* 19

These high altitudes are necessary in Western America in order to avoid a forced landing in the desert, which extends for thousands of kilometres, is dotted with rock outcrops and experiences heavy sandstorms in winter. It is nearly hopeless to search for a sailplane in the desert and to find shelter. One therefore flies as far as possible within reach of roads.

For this reason there was an emergency pack on board consisting of a signal mirror, torches, first-aid pack, water, sugar, fruit juice, chocolate, matches, fur coat, etc.

A scale of best airspeeds in wave down currents was fixed to the variometer. (See the author's paper 'Optimal cross-country speeds in wave flights' read at the National competition at Elmira, 1951). It is based on other formulae than those for best airspeeds for thermal distance flights. Maximum gliding angle over the ground as opposed to maximum average ground speed were chosen in order to make quite certain of reaching the goal on the first attempt even if it would take longer. The resulting best airspeeds in down draughts are considerably slower than those one is used to for thermal cross-country soaring. This is due to the important effect of the wind which is not considered in the usual best air speed formulae for thermal flight. Well, now the actual flight.

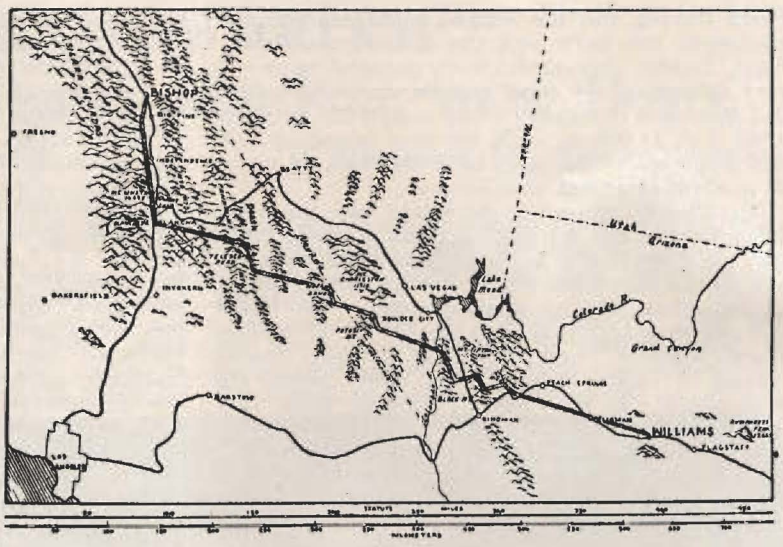


FIG. 3

OVER MT. WHITNEY.

Pilots who make routine wave research flights are generally accustomed to aero-tows in very severe turbulence. But this tow was quite exceptionally uncomfortable and the temptation to release prematurely was great. When the tow plane banked vertically or even disappeared completely from sight or when the nylon tow rope coiled towards the sailplane like a lasso. The roll of insulating tape which was not to be found before the flight now appeared and floated about the cabin and the four oxygen tubes became quite independent whenever the sailplane was thrown about by negative accelerations.

The prospect of finding oneself at low height in a turbulent down current of 20 m./s. over a desert of rocks and cactus far from one's base helps to decide one to 'hang on.' After a short half hour's tow we finally reached the wave lift south-west of Big Pine and I released at 3,200 m. The sailplane rose in smooth wave lift behind the 4,350 m. Mt. Palisade, one of the Ice giants of the Sierra Nevada, with 11 m./s. on the windward side of the rotor cloud and I at last had time to dry the sweat pouring off my brow with the cool air pipe.

For the next four hours no further gusts or turbulence were encountered. With the high rate of climb I had to hurry to disentangle the tubes and not until reaching 5,800 m. was the oxygen system working satisfactorily.

Figs. 3 and 4 kindly drawn for me by Betsy Woodward (the present American Women's Soaring Champion) serve to illustrate the account of the flight. Fig. 3 shows the route flown from Bishop to Williams and Fig. 4 is a cross-section of the topography along the air route as well as showing the height of the flight path A.M.S.L. (in ft. & m.) the four scales along the top edge of the figure show the distance in miles and kilometres, the ground speed (m.p.h. and km./h.) the gliding angle over the ground and the time from the moment of release.

Facing towards the cascading cloud waterfall (Föhmauer-Föhnwall) of the Sierra Nevada the climb was very rapid. At 7,500 m., reached after 8-9 minutes, the rotor cloud had been surmounted and wide vistas opened on all sides. The Sierra Nevada was covered by a snow-white sea of cloud at about 6,000 m. over which one could see to the west as far as the Californian coastal ranges between San Francisco and Los Angeles. Towards the south east one could already discern the silvery mass of the 3,400 m. high Panamint range alongside Death Valley and in the far south beautiful wave clouds over the outrunners of the Sierra Nevada and Mojave desert. To the east and north-east stretched the endless wastes of the mountainous deserts of Utah and Nevada. The higher Föhn wave's base lay at a considerable height. Fortunately there was a large cloud gap between the rotor and wave cloud in contrast to the previous day on which not only this but also the gap between the Föhnwall and the lee wave were often closed. The altitude 8,500 m. was sufficient to leave the Big Pine area and to commence the southward course. At 14.08 P.S.T., the sailplane began to drift to the left along the Sierra escarpment. I now switched to 100% oxygen. The most favourable starting point for the jump to the mountains of Death Valley lay as already mentioned south of Mt. Whitney in the vicinity of Olancha about 100 km. from the release point. But

I had under-estimated the wind velocity and in a careless moment had drifted back behind the rotor cloud out of the lift area, a common misadventure in wave soaring. Fig. 5. Temperature Wind Velocity diagram explains the cause. One sees that the wind strength lay at 175 km./h between 6,000 and 13,000 m., while it decreased both above and below these heights. In order to return to the lift area an indicated, air speed of 140 km./h (220 km./h true air speed) was necessary if one did not wish to lose too much height. This unnecessary manoeuvre cost 600 m., and 15 minutes. Henceforth I flew with 120 km./h indicated, climbing at 4-5 m./s. and reached cloud base at 9,000 m., in the test area of the Sierra-Wave-project south of Independence. I arrived over Mt. Whitney, 4,500 m., the highest mountain in America at the flight planned 10,000 m. altitude and switched the oxygen supply to ' Safety.' The light additional pressure at this setting caused my spectacles to mist up. I now drifted quickly over the large white Owenslake, a nearly dried up salt lake where the wind raised mighty dust clouds which drifted, I was interested to note, against the prevailing wind direction towards the west. One could now recognise the Pacific ocean to the south west.

The jumping off point at Olancha was reached at 10,500 m., 33 minutes after leaving the Big Pine area, so the first 105 km. of the climb were covered with a ground speed of 190 km./h. But this leg did not lie in the direction of the general track and contributed only a little towards the whole straight line distance. The top of the highest wave clouds lay somewhat higher. At 11,000 m., still climbing with 3 m./s. I could see over them towards the east. It was now 14.40 P.S.T., somewhat late for starting an overland flight in winter. The outside temperature had reached -70°C., and a few explosive sounds from the sailplane showed that extreme contraction took place. The controls were, as is customary at these heights, difficult to move but this was scarcely necessary in the very smooth air. Even though a good ground speed had been attained during the climb from 3,000-11,000 m., greater haste was necessary as the distance to Boulder City was nearly another 280 km.

At 14.41 I turned towards Telescope Peak (3,400 m.) beside Death Valley and 80 km. away. The inside of the cockpit cover was now completely iced up with the exception of the three double windows (one in front, one right, one left) which were only half iced up. The window on the sunny side was always better. An attempt to de-ice with the fresh air intake tube was in vain. At the top of the cockpit cover the hoar frost was 15 m.m. thick. From time to time some dropped down my neck and produced a small snow storm in the cockpit. This hoar frost deposit is mainly due to exhaled water vapour and is not so dangerous in a large two-seater cabin as in a cramped single-seater where from 9,000 m. upwards it presents a hopeless problem even when double windows are provided. Over 1,000 m. all high altitude problems become vastly more critical. One of many reasons for this is the very rapid decrease in temperature in the upper Troposphere. On this day however visibility was good enough for all practical purposes.

Thanks to the satisfactory clothing one felt quite comfortable, particularly my feet, usually the main victims of such flights, were quite warm. The oxygen system functioned very well.

No wave clouds were visible on track but every mountain range across the Mojave desert to the south showed beautiful lenticularis clouds in the lower layers. Good lift and high humidity existed apparently over the windswept desert.

After flying over the top of the highest Föhn cloud of the Sierra Nevada at 11,000 m., the variometer showed 8 m./s. down and I flew at the appropriate best air speed according to the scale. One must really force oneself while using these new wave flight tactics, to fly slower than one is accustomed to when thermal cross-country flying in order to allow the jet stream to carry one forward. In the second wave I made a large flat 360° circle and continued the eastward flight.

Twenty minutes after leaving the Sierra Nevada the sailplane reached the wave lift of Telescope Peak at 8,500 m., and after a 180° turn the variometer showed 3 m./s. Resting on the wave I tried to judge the possibilities of the situation; the gliding angle over the ground was 1:42, the ground speed (including the 360 degree turn) 270 km./h. This was much better than expected.

As all good waves extend sideways one can always use the ascent to effect track corrections. Today the wind seemed to have a light south component and I therefore made a correction to the south (see fig. 3).

The east slope of the Panamint mountains is just ideal for waves. This 3,000 m. high massif drops to below sea level at Death Valley, which is one of the most interesting places of America. In summer the highest temperatures in the continent (over 60°C.)

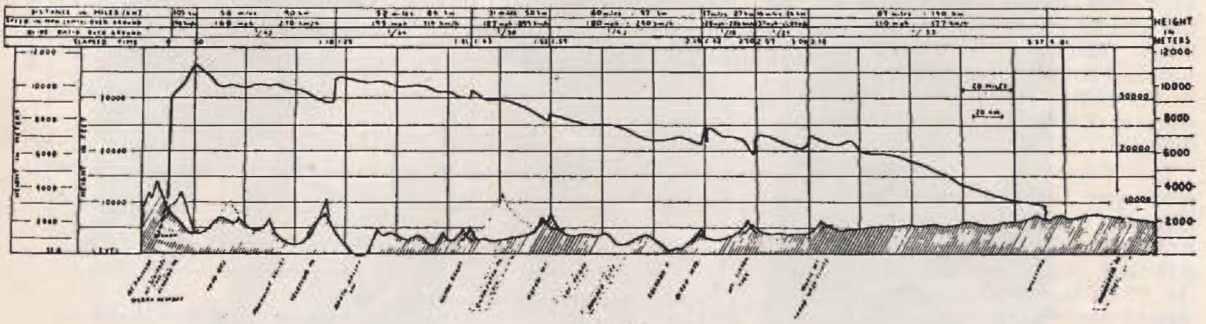


FIG. 4

are experienced. The salty ground hardly permits any vegetation but several large date plantations have been created with artificial irrigation. This valley of death, avoided by humans has however its own indigenous fauna (Kangaroo rats, white donkeys, etc.). Here Paul McCready had once made wave flights to over 8,000 m.

I only remained 14 minutes in the Panamint wave and broke off the climb at 10,400 m., to attack the most difficult stretch, the 135 km. gap to the next range the Charleston Peak (3,600 m.). It was already 15.15 P.S.T. One could already recognise the great lake Mead of the Colorado river above the Hoover dam about 250 km. to the east, so also the Pacific ocean about 300 km. to the S.W.

One of the characteristics of Wave long distance flights is the time spent in the wave lift; on a good day such as 19.III.1952 one requires just as much time for the ascent as for the down wind flight. Thus one's groundspeed is halved.

The ground between Death Valley and Charleston Peak is a most depressing waste. The names of the landmarks are not really encouraging : Funeral Peak, Skull Mt., Devil's Workshop. I hastened to leave Death Valley and its surroundings.

Accordingly the sailplane developed a ground speed of 315 km./h. for the next 84 km. The gliding angle in relation to the ground became 1:69. After 16 minutes gliding flight the Nopah range 50 km. west of the Charleston Peak massif was reached flying at 9,000 m. This small but long stretched line of rocky cliffs is less than 2,000 m. high and only 1,000 m. above the valley floor yet my sailplane climbed at 2.5 m./s., and reached 9,500 m. in a few minutes, also permitting a small track correction.

At 15.34 I continued eastwards and crossed the frontier between California and Nevada. It was surprising how quickly the mighty snowy Charleston Peak massif grew closer. The 3,600 m. high peak lay somewhat north of track. With the present reserve of altitude from which Boulder City could be reached in a straight glide it was unnecessary to make a detour towards this peak. Instead I steered for the long stretched range of Potosi Mountain (2,600 m.) where I arrived after 10 minutes at 8,000 m.

Due to the down current encountered on this leg the gliding angle was reduced to 1:30 while the ground speed was scarcely 300 km./h. The wave lift field of Potosi was used mainly for track correction to the south and was left after 6 minutes at 8,300 m., without further delay.

Las Vegas like a beautiful but poisonous Desert Orchid (luxury gambling den, divorce centre of the Holywood film world and the collecting point for sightseers for the atom bomb tests in Nevada), slipped past to the north at 15.55.

GOAL CHANGE—ARIZONA.

There was no doubt that I would arrive over Boulder City at 16.00 at 7,000 m. What sailplane pilot will land at his designated goal if he reaches it at 7,000 m.? There were however more problems : darkness, oxygen and above all terrain : the wildest wastes of the U.S.A. lay to the east, the rocky desert of Grand Canyon.

There was only one reasonable possibility of continuing the flight and that was to push further to the south-east where roads and airfields existed in the mountainous deserts of Arizona. I knew this route very well but it was rather doubtful whether one could maintain this track in the face of such a strong wind. One or two hours remained until nightfall. An ample supply of oxygen and beautiful Moagagotl cloud formations over the ranges to the south-east made it easier to decide to continue.

I now steered S.E. and passed about 20 km. south of my 300 km. goal Boulder City at 16.00 hrs., and 7,000 m., 1 hr. 20 min., after leaving Sierra Nevada and 2 hrs. 10 mins., after release. I contacted Air Traffic Control at Las Vegas on R/T and changed my Flight Plan destination from Boulder City to Kingsman, Arizona, 110 km. further to the S.E. During the whole flight I could listen in to R/T communications between aircraft and airfields. With the crossing of the sea-blue Colorado river the border between Nevada and Arizona was passed.

On the east bank of the Colorado river and south of the Hoover Dam, lie the long-stretched Black mountains (about 1,500 m. high). The wave cloud over this range was compact and dark with a base of about 4,500 m. In its shadows a wild rotor cloud cooked. I was anxious about the height at which I would arrive there and how strong the lift would be. The distance from Potosi Mt. was nearly 100 km.

At 16.10 hrs., after 20 minutes of straight flight, I turned at 6,500 m., into wave lift at 5 m./s. The ground speed on this leg was better than expected

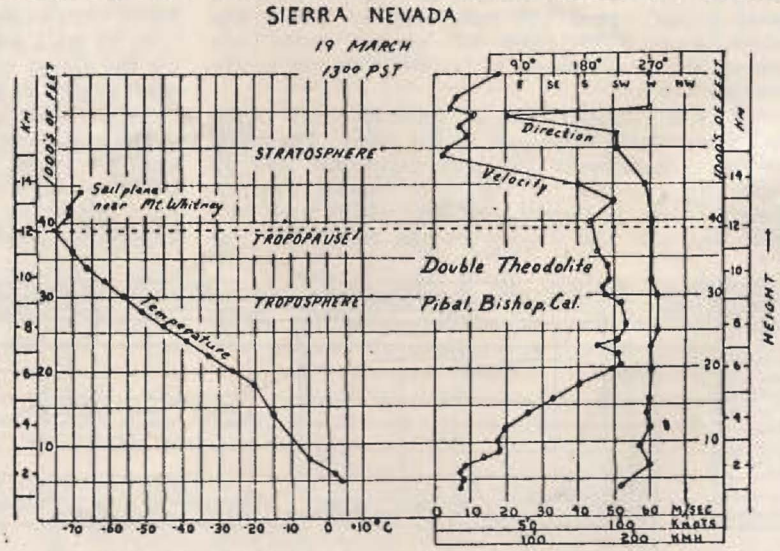


FIG. 5. LEFT : *Temperature Chart observed from sailplane.*
RIGHT : *Wind velocity and direction up to 18 km. height. Pilot balloon observed with double theodolite.*



Lee Wave of the Sierra Nevada on the 18th March, 1952. View from Bishop to the South. RIGHT : *Sierra Nevada covered with the Föhncloud. Wind from the right, maximum lift 22 m./second.*

[*All photographs by courtesy of 'Thermik.'*]

290 km/.h. and the ground gliding angle 1:53. Riding southwards on the wave I enjoyed the marvellous sunset over the clear blue lake above Davis dam. 10 minutes later I awoke with a start to find the variometer showing zero close above the wave cloud and about to drift into the down current. For the second time I had to pay for my carelessness with 1,000 m. altitude and 13 minutes' time while flying at high speed into wind with 6 m./s. down. The wind was still very strong.

I finally left the Black Mts., at 16.33 hrs., at 7,500 m., which was as soon as I could actually soar over the cloud top towards the east. I was yet to regret this delay of 23 min. One should put the clock forward one hour in Arizona where local time was already 17.33 hrs. I should have noticed from the low position of the sun that sunset was a half-hour earlier than at the take-off point Bishop. However I could only think of the ' 1800 hrs. limit ' at which time we had to land in Bishop due to darkness.

Only 27 km. separated this range from Mt. Tipton (2,200 m.). It should have been an easy jump especially as the clouds indicated a good wave. It lasted only 8 minutes. But on this small stretch I encountered the worst down current of the flight at 9 m./s. which caused me to reach the lowest point so far, 5,800 m. The wind of the lower troposphere seemed to be much weaker, at least in this district and the ground speed was reduced to 200 km./h., and the gliding angle to a miserable 1:16.

THE RÖHNGEIST TAKES A HAND.

At 16.41, 2 hours after departing from the Sierra Nevada I was in the 5 m./s. lift of Mt. Tipton and after 7 minutes I had regained the 7,000 m. level. An inspection of the oxygen equipment showed that 170 of the 500 contents indicator scale divisions still remained. I now switched over to the full second container to ensure that it was functioning properly. Kingman airfield was now visible 25 km. to the S.E., but the Röhngeist whispered in my ear ' who would land at the nearest airfield from 7,000 m. ? ' So I again changed my Flight Plan destination over the R/T from Kingman to Peach Springs which was about 500 km. from Bishop. At 16.48 I left Mt. Tipton on a N.E. course for a well developed wave cloud over the 2,000 m. high Music Mountain. Evidently the last three ranges must have been in resonance as the wave stood over the windward slope of a large plateau, the Grand Wash Cliffs possessing no lee slopes. The intensity of the wave was surprising as the ridges scarcely reach 1,000 m. above the absolutely flat desert.

On the 26 km. stretch to Music Mountain I encountered an ugly down current of 8½ m./s., and lost approximately 1,000 m. In spite of this the ground gliding angle improved to 1:24 and the ground speed to 220 km./h. After 7 minutes and at 6,000 m., I entered the 3½ m./s. lift zone.

At 1,700 P.S.T. (18.00 local time) I sat at 7,000 m. on the ' Music-Wave ' and told myself that I must stop gazing at the colourful sunset and desert and make an end to this whole extraordinary experience. Darkness stole into the valleys and it was high time to choose a landing place. Peach Springs did not come into question as it was now only 25 km. away and covered in cloud. I reported a new destination, Seligman, about 535 km. from the release point and another 75 km. from my present position.

The last glide was started at 17.01 P.S.T. at 7,000 m., 2 hrs. 20 mins., after leaving the Sierra Nevada. A strong second wave carried the sailplane 500 m. upwards in straight flight followed by a 7½ m./s. down current. As all other second waves encountered on this flight it was not marked by any cloud, an interesting phenomenon for theoretical examination.

Nine minutes later over Peach Springs at 6,500 m., I passed the 500 km. mark. Although it was very late it seemed advisable to continue to fly at a speed for best gliding angle over the ground rather than for best ground speed in order to retain sufficient height reserve in this difficult terrain. Soon Seligman appeared behind Aubrey Cliffs. For nearly 5 minutes the variometer showed zero sink. At 4,500 m. over Seligman where a deserted runway without hangars far from the town did not appear very inviting, the Röhngeist again persuaded me to continue and not to give away such a height. I was nearly ashamed to change my Flight Plan destination once more on the R/T. At 17.25 P.S.T., I finally decided on Williams, Arizona, another 65 km. away, where a well equipped airport was marked on the map. I believed that I could already see Williams on the horizon. What I did not notice was the altitude of the town (2,000 m.) which lies in a district populated by Indians not far from Grand Canyon.

In the last and fading light the mighty volcanic cone of the nearly 4,000 m. high San Francisco peak near Flagstaff, glowing with a rosy light came into sight and rapidly drew nearer.

After flying through a strong down current the town I had mistaken for Williams turned out to be Ashfork. I over-flew Ashfork at 3,000 m. A.M.S.L., without being able to discover an airfield. To my consternation the terrain now became higher and changed to mountains, forests and ravines covered with snow. There were another 30 km. to Williams. Flying along the road I vainly searched for sight of the town. Fortunately the variometer showed zero sink while flying under an extensive wave cloud. San Francisco Peak over which a mighty wave cloud invited one to another 10,000 m. altitude flight, was now so close that I could not doubt being very close to Williams. Suddenly it occurred to me that it was high time to remove the oxygen mask. It was a great relief. As the sailplane slipped round the slopes of the 3,000 m. high Bill Williams Mt., the lights of the town of Williams appeared. The first gusts were encountered here.

At 17.48 P.S.T., 3 hours 57 minutes after the release, I over-flew the town with scarcely 700 m. over the ground 601 km. from the release. The last glide was 140 km. long, completed at 180 km./h., ground speed in 47 minutes with a ground gliding angle of 1.32. I spent the next four minutes searching for the well-equipped airport 4 km. north of the town. Where it should have been everything was covered with snow. I quickly returned to the town and landed at its outskirts on a snow field at an altitude of 2,000 m.,

A.M.S.L., which I subsequently heard was an old airfield. The deep ' Harsch ' snow quickly brought the wheeled sailplane to a halt.

AMONG RED INDIANS AND MEXICANS.

Only now did I notice how dark it had got. It was quite possible that no one had noticed the sailplane land. It was impossible to leave the sailplane as a 60 km./h. wind was blowing drifting snow across the field. So I remained in the cabin, the phosphorescent instrument dials in front of my eyes thinking back over my adventure. It now really seemed incredible to me that only a few hours ago I had been in California and that the upper layers of the atmosphere had carried my sailplane here without gusts or noise. Only now on the ground did one notice the ' weather.' I thought of my home country and how this distance flight fitted into its scales. One's values of distance are easily lost in the huge American continent. Amsterdam—Zurich or Berlin—Innsbruck in just under 4 hours flight time would give the best concept of this new fascinating form of soaring flight. Only 45 per cent. of the oxygen supply had been used. Slowly I realised that my belated start at Bishop had made it impossible to contact the lee wave of the San Francisco Peak which certainly reached 10,000 m., and would have permitted a flight of nearly 1,000 km.

In spite of the howling wind outside it was warm and cosy inside the cabin. After a long time I saw some figures stamping through the snowy darkness. The group consisted of some Indians, Mexicans and an American vicar. All shivered with cold. Then some further shapes appeared who were connected with the airport and hoped for some business. They offered to obtain ropes and pickets for the picketing of the sailplane for which they were later to demand 45 dollars. It was midnight before the sailplane was safely picketed.

Roy Parker now had to drive from Bishop to Arizona with the trailer instead of the towing plane. He arrived with the ever helpful Betsy Woodward on the following night and covered the total out-and-return distance of 1,700 km in two days.

ANALYSIS.

This wave distance flight was made mainly between 6,000 and 11,000 m., in the upper troposphere. Seven mountain ranges with their standing waves were utilised according to plan. The average speed along the straight line distance was 150 km./h.

To judge whether these values are characteristic for wave distance soaring flights in general one must consider the following.

On the one hand the 19.III.52 was an unusually favourable day as fig. 5 will show. Such weather situations only occur three or five times in one winter.

On the other hand all possibilities were not exploited on this flight. Although well prepared, a distance flight of such length had not been contemplated. Rather it consisted of extensions from hour to hour, range to range, airfield to airfield. With an early start a 1,000 km. should have been reached. Further speed for best ground gliding angle and not speed for best ground speed was used for reasons already mentioned. In future one should fly at speeds for best ground speed where the terrain permits as the shortness of winter days and the nearly unavoidable late start (2 hours of preparation are necessary between the decision to make an altitude flight and the launch)—force one to rational flying. Very disadvantageous were the two mistakes, typical for wave soaring (drifting into the down current) which lost me 30 minutes of valuable flight time. But above all the sailplane which I used was no high performance sailplane but a training sailplane, however it did have a good ' penetration.' It would also have been better (on 19.III.52) to fly between 10,000 and 9,000 m., instead of descending to 8,000 and 6,000 m., as in the second half of the flight. In this way the second part of the flight from Olancha-Williams took 20 minutes longer than the first although it included a long straight glide.

From this it is apparent that even on short winter days flights of over 1,000 km. are quite possible.

CONCLUSIONS.

One should remember the following points which might easily be overlooked when considering wave flights.

1. The great advantage of wave as opposed to thermal distance flights lies in the superior range of action and higher ground speeds which are attributes of height and wind. This advantage is partially reduced by the fact that waves are stationary in relation to the ground and do not drift with the wind as thermals do. As soon as one can use moving waves this disadvantage will disappear entirely.

2. As already mentioned just as much time is spent in stationary lift areas as in one's down wind flight and this halves one's ground speed. (In the flight described the maximum down wind ground speed was 300 km./h., double the average ground speed).

3. Although one climbs more rapidly in the stronger lift of the lower troposphere one does not necessarily save time by flying at moderate altitudes. The very strong upper winds and the very high true air speed of the sailplane at great altitudes can far outweigh any such time saving.

4. It has already been mentioned that the considerable sideways extension of atmospheric waves permit course corrections by drifting sideways during the climb without loss of time. (Slow sailplanes will however find this difficult when the upper winds are very strong). This method was used on each of the seven mountain ranges encountered in this flight. One can obtain extraordinary high ' side component ' speeds by flying at high speeds to cancel out the lift. (The ' T.GB.' obtained a ' side component ' ground speed of 190 km./h.)

5. Just as in thermal cross-country flights it is important to fly with the correct airspeed through down currents in order to achieve optimum results. It has already been shown that the appropriate values can be obtained from formulae either for best gliding angle over ground or for best average ground speed. They can be fixed alongside the variometer scale. They lie as already mentioned

Artificial Horizon Gyroscopes for Continuous Circling

A NUMBER of erroneous articles have recently been published in several international aviation journals pointing out the limitations of artificial horizons when used in sailplanes circling continuously for long periods.

These arose through the various authors misunderstanding of the ' turning error ' and precession of these gyroscopes and the means employed in most erecting systems for cancelling out these errors after each 180° of turn or by experience with unbalanced second-hand (possibly even surviving instruments from crashed aircraft) and badly maintained artificial horizons.

Mr. G. O. Smith writing in *Gliding* very ably countered these aspersions and recently René Comte writing in the Swiss *Aero-Revue*, produced the results of practical tests together with a series of photographs of his instrument panel during continuous circling in his ' Moswey ' sailplane. The photographs showed a standard German electrical Horn combined artificial horizon, rate of turn and slip indicator together with the time shown on a large clock with the actual horizon visible through the windscreen. Thermal conditions were so good that Mr. Comte was able to continue circling at about 45° of bank for over 48 minutes in and outside thermals. Three photographs taken at the commencement of his circling flight, after 15 minutes and after 48 minutes all show the artificial horizon perfectly aligned with the natural horizon.

Comte then caged his horizon and released it while in circling flight. The artificial horizon naturally commenced a violent but periodic dance, the period coinciding with the time taken for a complete circle of the sailplane. The amplitude of the disturbance gradually waned and after 12 further minutes of circling the disturbance had ceased entirely and the artificial horizon again coincided exactly with the natural horizon.

Anyone still doubting the capabilities of modern gyro erecting devices may convince himself by placing an artificial horizon on a turntable and observe what takes place.

W.N.

Dublin Gliding Club

FOR the past two months our newly acquired ' Cadet ' has been fully occupied on an intensive course of instruction for about 20 new members. Apart from a broken tail skid, which was quickly repaired by some fine teamwork between one ex-R.A.F. and one ex-Luftwaffe member, things have progressed well. We are now awaiting the outcome of our application to the F.A.I. for recognition and permission to issue certificates.

During September a small party travelled north across the border to spend a week-end, at the invitation of Mr. William Liddell, with the Ulster Gliding Club. Three of our party were able to spend an hour or so each in the club's ' Tutor ' admiring the rugged beauty of Donegal and Derry from above the five mile ridge that they are blessed with.

In an effort to continue next year with our present low subscription per member and at the same time improve our facilities we are organising fortnightly dances throughout the winter. The first of these was held last month and from the financial and social aspect it was very encouraging. After the dance a farewell party was given for our deputy C.F.I., Jimmy Simmonds who is off to New Zealand on business for a few years. While regretting his departure we all wish him luck and trust that he is able to continue gliding and soaring whilst ' down under.'

At 3 p.m. a few Sundays ago we witnessed a rare example (for this country) of lenticular cloud forming over the Wicklow hills south of Dublin. A weak trough extending roughly North-South, the wind backing from West to South-West at 15 knots, and a clear sky resulted in a fine standing wave formation extending up to 8-9,000 feet. Unfortunately our ' Grunau ' is still unserviceable and all we could do was to watch until at 6 p.m. the wind veered again and the phenomena disappeared.

KEN J. MELLOR, C.F.I.

IN MEMORIAM—(*Continued from page 9*)

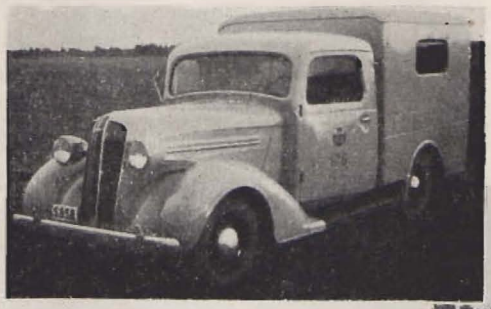
far below the air speeds required in thermal cross-country flying as the considerable wind effect is not introduced into the normal formula for best airspeed for maximum ground speed. (These formulae will be discussed at the next opportunity).

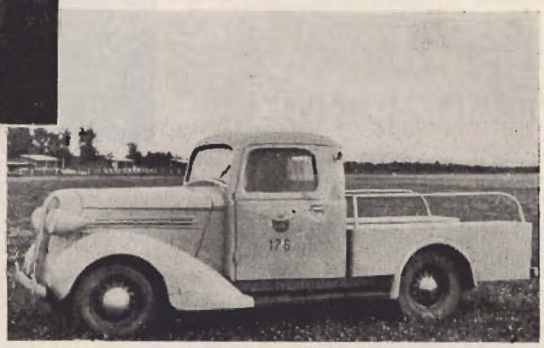
6. Although wave distance flights of over 1,000 km. can be expected soon it would be wrong to presume on the strength of the described flight which was comfortably performed without any difficulties that such flights no longer presented any problems. They will always remain exclusively a question of the *most thorough preparation and the most reliable equipment.* This is the fundamental difference to thermal cross-country flights which are performed in a normal climatic and atmospheric environment. Anyone under-estimating this will give soaring a set-back and sooner or later lose his life.

The main dangers lie in the following problems :— Visibility ; extremely low temperatures (up to —80°C.) ; heavy turbulence which can occur suddenly on the lower and upper limits of the laminar wave stream ; the possibilities of a failure of vital parts of the sailplane due to the combination of extreme cold and turbulence ; navigation ; radio communication ; altitude death due to lack of pressure or oxygen ; parachute jumping. Wave long distance flights are an outstanding experience but not simple recreation.

Our pioneer Karl Erik Ovgard's fate is before our eyes and the names of places flown over during this first wave long distance flight are a symbolic warning : Skull Mountain, Funeral Peak and Death Valley.

A Practical Vehicle for Gliding Clubs





A SENSIBLE organisation and a thorough standardisation of all material has been a strong contributory factor that Sweden has succeeded, during the last 10 years, in creating a soaring movement equal to the best. However it has proved impossible to standardise the vehicle park in a satisfactory manner.

When Värmlands Flying Club required a new towing-car the committee decided to create a type of car suitable for most club duties. The car was to be used for auto-towing for primary training, as a delivery van, and as a retrieving car for cross-country flights. In addition the car should be usable as a bus on long journeys. Therefore the vehicle would not be fitted with winching gear as it would then require too powerful an engine and a correspondingly high petrol consumption. The combination of these requirements does not present any great difficulties. A short description of the vehicle might therefore be of interest to all clubs.

THE VEHICLE AS A TOWING-CAR AND DELIVERY VAN

A Dodge van of 1937 vintage was bought from the Karlstad car chassis factory. At the time of the purchase the van body had already been removed and only the chassis and the engine cover remained. A lorry driver's cab with room for three alongside was mounted. The large rear window was made to open for (auto-tow launch) training.

Behind the driver's cab a two metre long and broad platform with half built up sides was constructed. This loading platform was built as low as possible and natural seats were formed over the rear wheels. A removable railing enclosed the platform. Behind the rear wheels a built-in cupboard is located for petrol cans and tools. The rear bumper was strengthened to take the auto-towing cable release and the trailer towing gear and safety chain attachment. The wire from the release gear runs unbroken through a straight tube to the driver's cabin, ends on the floor immediately beside the driver. By avoiding all bends the release operates very easily and safely.

THE VEHICLE AS A RETRIEVING CAR AND BUS

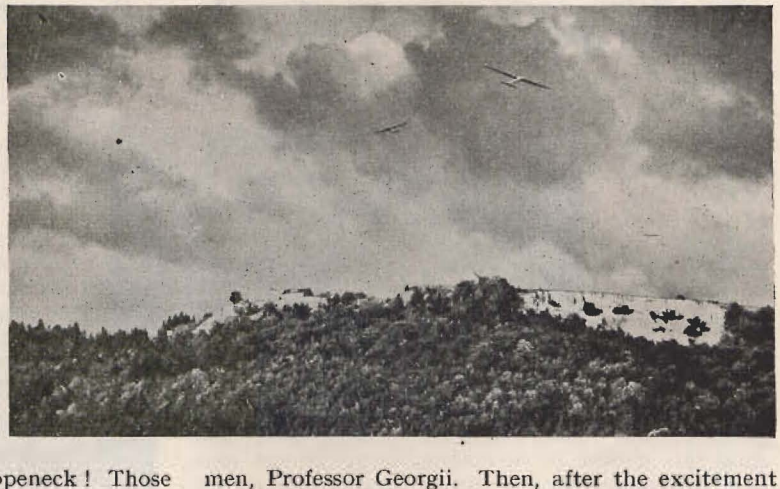
Experience has shown that long retrieves from cross-country flights are a very tiring affair and demands the utmost attention, not only during competitions but also in individual cases. The retrieving team are often under way for twenty-four hours at a time and then must go straight back to work in the morning thoroughly exhausted and incapable of doing a good day's work. One cannot therefore be astonished that some employers cannot muster a great sympathy for soaring. This is to say nothing of the risk which an exhausted driver of a large car and trailer presents to all other traffic.

To give the retrieving team a possibility of rest a 'sleeping cabin' with room for two bunks was built which could easily be lifted on to the platform by four men. Communication with the driver's cabin was assured by sliding windows in the front. Two mattresses 1.9 m. long with side boards as in a railway sleeper made it possible to sleep while under way. The sleeping cabin has a food cupboard between the two bunks and the driver's cabin and another above it for blankets, etc. When camping the cabin may be used as a small week-end hut. It is intended to provide the retrieving car with radio in order to maintain contact with the sailplane in the air. Lastly the vehicle can be used as a small bus with room for nine people.

Yes, but what does this marvel cost? Believe it or not but Värmland's club only had to pay 6,000 K. (£410). Of this the state pays 70%. Of course it is another question whether other clubs can establish the same co-operation with a neighbouring factory as existed between the Vârmland club and the Karlstad car chassis factory.

Wings of Friendship

By
FRED HOINVILLE



FIRST, Cuatro Vientos. Now, Klippeneck ! Those names will live long in my memory as epics of international comradeship and generous sportsmanship.

The wonderful selfless spirit of the vast Gliding Championships in Spain has found a smaller and so more intimate counterpart in the International Friendship-Flying Meet in the breath-takingly beautiful hills of Wuertemburg (Germany), where I met once again the good friends of happy Madrid memories.

My journey to Klippeneck was arduous, prolonged, and in the nature of a mystery hunt, for I had thought that the meet was at Frankfurt, and on arrival there, found a clue that sent me off again to Stuttgart, only to be re-directed to Spaichingen, where at last I ran the quarry down to sighting distance. There on the lip of a 1,500 foot cliff overlooking the long valley in which I stood, I saw the camp building and signs of activity. Three sailplanes were slope-soaring in a good stiff breeze, and then thermalling up to good heights. Others followed.

Carrying my heavy travelling bag, I approached three German youths and asked for an interpreter. There was none around—the first time such a lack had occurred to me in Germany, where English speech is very widely known. Nor was there a bus or taxi. It was 5 p.m., so I used all my German vocabulary (about ten words) and two hands well trained in sign language after several weeks in Spain and France, to indicate that I would have to stay at Spaichingen until I could contact my friends next morning. With an emphatic ' Nein ', my young companions seized my bag and pointed up the hill and started walking, and they refused to let me carry that bag until we had completed the steep 70-minute climb to the camp. Luckily I was feeling very fit.

As I came in sight, a car dashed over and Herr Kunz leaped out and greeted me eagerly, then a moment later Ruckstuhl of Switzerland was shaking my hand and offering me transport in his car for the duration of my stay, then came lusty yells of ' AUSTRALIA ! HOINVEEL ! ' and I was surrounded by the 19-man Argentina delegation, and affectionately hugged by that most lovable of men, Professor Georgii. Then, after the excitement had died down, I was driven out to the launching point and warmly welcomed by Hanna Reitsch and many other members of the German team. By then, it was pack-up time for the day, and we all packed up and returned to Spaichingen, the Argentines, Swiss, and myself going to the Hotel Osswald, where we were soon enjoying a superb dinner which somehow turned into a joyous international party, with toasts flying everywhere, back and forth and back again, especially the hilarious ' Ya me la tome ' of the fun-loving Argentines, and the announcement that Cuadrado and his fiancee would be married in Spaichingen. Here's to your happy future, Cuadrado, my friend !

When I announced that I could stay only the one full day before my departure for the homeward trip through U.S.A., there were many protests and insistance that I must fly in the contest, at least on that day.

And so to bed at 1.30, and out again at 7.30 and off to Klippeneck where I greeted again the great Wolf Hirth, who won the world's first Silver ' C ' and did all the Gold ' C ' requirements without a barograph long ago. Hirth does not hold the Gold ' C,' nor does he need to—his great pioneering achievements far transcend the value of any badge, and his name and fame will live as long as men fly.

A brief inspection of the ' Doppelraab ' 2-seater, the ' Kaiser ' V-tail 12-metre single-seater, a ' Habicht,' a Swiss ' S 21,' a ' Moswey IV,' ' Condor ' 2-seater, ' Minimoa,' ' MU 31 ' 2-seater, ' Grunau,' and ' Weihes,' and then on to a pilots' meeting where we were told that the day's flight would be an out-and-return to Hohenzollern Castle, about 19 miles north. Pilots would be allowed to do as many trips as they could by 5 p.m., and their best trip could be submitted. 400 points would be given for completing the distance, and 400 points for the fastest time, other distance and speed to be proportionate to the winner's points.

After the meeting, Hanna Reitsch—who won the Gold ' C ' before 1939 and has earned the right to be known as one of the great pilots of all time—came to me and insisted that I should fly her ' Weihe ' sailplane for the day, although this would

mean that she would miss the contest herself. She would not hear of any refusal, and went to great trouble to make it possible for me. It was compulsory that each pilot should be named on the insurance policy on the sailplane, and as the insurance officer was not present, Hanna saw that a message reached him, and he arrived and fixed the matter. By this time it was 2 p.m., and some of the pilots had already done one or two circuits of the course.

I was winched into the air with a snatch-launch, the strong steel winch cable having about twenty feet of thick nylon at the end, which removed the need for taking up the cable slack. I was shot suddenly but quite smoothly into flight and got about 800 feet. There was no wind on the slope but I found a thermal when down to 400 feet, and it strengthened rapidly to 10 feet per second. Soon I was at 5,000 feet and set off on the bearing of 020 degrees. I had not flown a ' Weihe ' before and did not know the country, so played safe for the first circuit, getting the feel of the ' Weihe ' and the weather, and learning the geography.

Lift was erratic, and I came to a dead area where I had the greatest difficulty keeping up at all. While concentrating hard on this problem I overshot the turning point, and glancing back towards Klippeneck I saw on the top of a commanding, isolated and forest-covered hill, a great castle of fairy-book splendour, with high ramparts and many towers and a road winding down to the farm country below. There could not be two such magnificent castles—this must be the Castle of the Hohenzollerns, where Wilhelm had lived and now rests in the royal tombs.

I turned back, found the official mark, two yellow strips on the ground, noted the design (which was changed at intervals) and the time, and barely managed to find a thermal in time to struggle slowly back from much too low for comfort. Then conditions improved rapidly as I neared Klippeneck, so I gained all the height possible before rounding the home turn, taking notes as before, and set off at speed on my second run. This time I knew what was before me, and after a high speed run to the vicinity of the dead area, I used the last strong thermal to the inversion at 6,000 feet before diving at the turning point, rounding it, noting the mark and time as before, and heading back towards the thermals at a better height than before. Even so, the dead area almost had me worried again, and I had to be content with the first weak thermal until I had enough height to seek a better one. Soon I was on my way again, and caught a good thermal which took me rapidly to 4,000 feet. Here I called it a day, as there was not enough time for me to do a third run before the time limit of 5 p.m., so I took careful aim at Klippeneck, barely visible 14 miles away, added ten degrees for drift, and set speed at 90 kilometres per hour, which was lower than I had intended to use in the light headwind, but was made necessary because the sink was too high for the distance at higher speeds.

Passing through lift areas at 62 k.p.h., and through sink at up to 130 I arrived at the boundary at 800 feet, turned around the mark at 400, and landed in 68 minutes for the second circuit. The first had taken over 100 minutes. It was then 4.30, and my time was the fastest reported up to then, and many premature congratulations were offered before two others came in later to report faster times. They were Cuadrado and Haase, with ' Weihe ' and ' Condor IV,' and they had done four circuits each, about 156 miles, since noon.

Then I learned that Ruckstuhl of Switzerland had decided to try for his Gold ' C ' in preference to competing, and had named Fulda as a Goal. He succeeded, but had to abandon his goal when he found that it was under 300 Kilometres, so went on to 320 Kilometres instead, landing near the Russian zone. So he got the Gold ' C ' and narrowly missed a Diamond too.

It had been a great day. Every contestant landed back at the field, which was important, as retrieving had to be avoided if possible. One Gold ' C ' had been won, and every contestant had had a wonderful experience. Only one sad note was struck, when I asked after Ziegler-Munchen, the German pilot who had crashed at Torresavinon at the end of the last contest day in Spain, and learned that he had died of his injuries.

A quieter dinner that night was followed by a good sleep, and in the morning I said reluctant farewells to all my good friends, and prepared for the homeward trip. I found that my hotel bill was already paid, Oberregierungsat Christian Biser, of the Air Ministry, having decided that I must be his guest for this visit. Mine host of the Osswald Hotel then got out his car and insisted on driving me to the railway station and supervised the purchase of the correct ticket for me and got all necessary information lined up.

I knew little of Germany when I left home, and had not known what to expect there. In each country, I have seen many differences of custom and temperament, from the demonstrative affection of the Spanish people who took me so instantly to their hearts in mutual joyous liking, to the misunderstood reserve of the British, which hides sincere friendship and goodwill behind the lonely mask of tradition.

I found throughout Germany something approaching the sunny warmth of the charming Spanish, and the same universality of instant welcome, courtesy, hospitality, and sportsmanship.

Auf Wiedersehn, Klippeneck.
Hasta La Vista, Madrid and Buenos Aires.
Au Revoir, Paris and Berne.
Farewell, Europe and Britain,
and, Dallas here I come !

THE Swedish Royal Air Force have presented the following machines to gliding clubs in their country :

5 ' Weihes,' 15 ' Kranichs,' 13 ' Grunau Baby II B 2's,' 27 ' S.G. : 38,' and 11 ' Focke Wulf Stieglitz ' (tow-planes, which were used in Orebro). A large number of trailers and winches are also being given.

9th POLISH NATIONAL GLIDING CHAMPIONSHIPS *By* R. A. G. STUART, M.A.

THE 9th Polish National Gliding Competition was ceremonially opened on June 1 by the Minister of Road and Air Transport.

The ceremony was followed by an air display which included individual and group parachute drops, aerobatics by ' Jastrzab ' sailplanes, formation aerobatics by Góra and Szymanski on ' Zlin 26 Treners,' message-dropping and spot-landing.

First event in the competition proper was a race from Kobylnica (Poznan aeroclub's airfield) to Ostrów Wielkopolski, about 100 km., on June 4. In 5/10 to 10/10 cumulus up to about 3,500 m., the winner was Stanislaw Skrzydlewski (Katowice), with a speed of 91.2 km./h. Pilots were allowed to cross the starting line when they liked and Skrzydlewski attributed his success partly to the fact that he waited for favourable conditions before doing so. Many competitors, fearing a deterioration in the weather, did not wait. Skrzydlewski was the only one to exceed 90 km./h.

The next day there was fine weather with c. 1/10 Cumulus humilis and a wind of 15-20 km./h. There was limited inversion at 700 m., up-currents were about 2-3 m./sec., up to 1,800-2,000 m. Task for the day was again a speed flight, this time round a 102-km. triangle Kobylnica-Ilowiec-Sroda-Kobylnica. The victor this time was Jerzy Popiel (Wroclaw) with a speed of 52.3 km./h.

After two days set aside for rest and training the competition recommenced on June 8 with a 305-km. flight from Kobylnica to Maslów. Cloud was 6/10-10/10 with base 1,000-1,200 m., but there was a strong tailwind of 30-40 km./h. Many of the pilots covered 200 km. in 2 hours, but only 7 completed the course, the best one being Jerzy Wojnar (Kraków), last year's winner, with a speed of 77.1 km./h. Owing to the small number of competitors who finished (7 out of 24), it was decided to repeat the event on June 10. Wojnar again won, his speed being 85.8 km./h. There was 6/10-9/10 cumulus and strato-cumulus with base 700-1,000 m., and lift under clouds c. 2-4 m./sec.

WOMEN'S RECORD GOAL FLIGHT.

This time 18 competitors completed the course and Wanda Zajaczkowska set up a Polish women's record for goal flight. On June 13 conditions were not good, so another speed flight to Ostrów Wielkopolski was decided upon. Zbigniew Kirakowski (Katowice) won this event at 60.7 km./h. This was the last event of the competition proper, but there was also a competition for correctness of pilotage which was won by Andrzej Zieminski (Warszawa), with Stefan Makne (Poznan) 2nd and Wojnar 3rd.

Winner of the championship was again Wojnar with 32170.5 points, Popiel was 2nd with 32155.6, Tadeusz Rusek (Kraków) 3rd with 31327.3, Ryszard Bitner 4th with 31081.4 and Adam Witek 5th with 30869.9. These were the only competitors to obtain more than 30,000 points.

Wojnar is only 21 years old and Popiel 19. The

Continued from previous column

oldest of the first five is Witek who is 25, the other two each being 22. The successes of these pilots at so young an age gives promise of great performances from them in the years to come. Throughout the competition aero-towing was provided by ' CSS-13's ' which are Polish-built ' Po-2's.'

JET ASSISTED TAKE-OFF

WITH reference to Warren J. Merboth's article in the February, 1952 issue of *Sailplane*, we were pleased to receive a communication from Professor M. Z. v. Krzywoblocki, of the University of Illinois, U.S.A., drawing our attention to a theoretical analysis of the problem published by the Professor in Lemberg (Lwow) as early as 1936 and again in the *Polish Engineering Review* (Oct.-Dec., 1945) Canada, and *Aero-Digest*, Dec., 1946, U.S.A., which agreed well with the Merboth experimental data. We in our turn would like to remind our readers that the first successful rocket-powered glider take-off or the first take-off of a piloted rocket plane was made by Fritz Opel on September 30th, 1929, at Frankfurt a.M. F. Stamer having flown a rocket-powered sailplane launched by bunjy in 1928. We have never been able to examine the records claiming this distinction for a fourteenth century Chinese dignitary.

ULSTER GLIDING CLUB

WE have completed our season. Sixty-six soaring hours have been flown between the ' Tutor ' and the ' Gull.' Not much, and yet how difficult to achieve.

September 20. We were delighted to welcome eight members of the Dublin Gliding Club, including the Hon. Secretary, William Fitzsimon to Magilligan. In a strong West wind Beck and Liddell operated the ' Tutor ' to demonstrate soaring on this site. During the evening we showed Mackie's movies taken from the air in 1937.

September 21. After mid-day, tide and fresh N.W. wind were in our favour. Beck and Murphy of Ulster Club and Mellon and Simmonds of Dublin each soared for an hour, then Quinn flew, but too far out from the cliff to soar. Liddell stooged around for 2½ hours in ' Gull.' A grey overcast with occasional showers and cloud base at 2,500 feet but much lower in places, made conditions interesting. All day long, Binevenagh, that capricious minx, would draw a veil of cloud about her beauty, then temptingly would raise the mantle just enough to stir the pulse of sailplane pilots flying near, who rushing in would find her once again ensconced in shrouds of mist. Near nightfall, tiring of the game, and lest her beauty be unsung, she threw the curtain wide and taking ' Gull ' into her gentle arms she raised him high until the beauty of the land was evident on every side.

If ever you have soared this site and sat in awe-bound gaze above Binevenagh, the Fairy Mountain, then need you not of standing waves nor records in the sky. To have been there and to have seen, it is enough

Yorkshire Gliding Club Rally

LOOKING back on our Rally, one thing astounds us all . . . Our amazing luck with the weather . . . Flying was possible on every one of the nine days, though lack of strong thermals kept pilots for the most part on the hill. Short cross-country flights were made by Hugh Kendall, John Rushton and John Cotton; two Silver 'C' five-hour duration flights were made by John Reussner and our hard-working visitor from Denmark, Jorgen Blom; and 'B' Certificates were gained by Lockwood and Froud during the week.

We are very grateful to our visitors Philip Wills and family, Mr. and Mrs. Hugh Kendall, Dr. Cotton and party from the Midland Gliding Club, the Bros. Goodhart and our friends from the Newcastle Club, who not only came long distances to Sutton Bank, but worked so hard on our behalf.

This being our first Rally since the war, most of us were completely inexperienced in such matters and not knowing whether to expect 20 or 200 spectators, the 3,000 who visited us during the first week-end, left us speechless. Thanks to every one of our hard-working helpers, our friends the army and perspiring police, everything went according to plan.

The scene near the hangars on the first Sunday afternoon was more reminiscent of Blackpool Pleasure Beach than Sutton Bank . . . The sun beat down, the loudspeaker blared, a queue formed for even the static-trainer-on-tripod. A masterly running commentary by George Hinchcliffe (who must have swallowed quarts of dust) from his station on the hangar roof, linked up direct broadcasts from the air by two-seater pilots or passengers (thanks to the kindness of Messrs. Pye Ltd., who lent light-weight radios) a feature much appreciated by the crowd. The two 'T.21.B's' made endless short passenger flights until dark, the last two take-offs being signalled by car head-lights.

We are indebted to the Newcastle Gliding Club for the loan of their 'T.21.B' until its unfortunate accident on the Wednesday (no-one seriously hurt), and to the Derby and Lancs. Club who so nobly came to the rescue at short notice, with their 'T.21.B' and pilots Gerry Smith, Thomas and Armstrong, to help to cope during the second week-end, with crowds who would otherwise have been disappointed.

One of the most encouraging results of the Rally is the amount of interest and enthusiasm it has stirred up, and the number of new members we have gained. Our list of ab-initios undergoing training with C.F.I. Allan Pratt, now numbers 14.

CLUB NEWS

At our A.G.M. on September 28, we regretfully accepted the resignation from the Committee of Bill Sharpe and Chairman A. M. Verity who have done so much for the club in the past. The year ending March 1, 1951, was financially disastrous, but we hope that with more members, more flying



and the impetus of the Rally, we shall do better this year. The new Committee was asked to spread the running of the Club over more members and a flying and a social sub-Committees are to be formed. The meeting was well attended. Every seat (even the newly acquired ex-bus seats donated by a member) were taken. Enthusiasm runs high. One problem urgently awaiting the attention of the social committee is the provision of better dormitory accommodation. Last week-end, Henry (of mattress-cover-sleeping-bag fame) found the Lounge taken over as a dormitory for the 'Fair Sex' and his favourite pink settee-in-front-of-the-fire-bed lost to him. He made do in the icy male dorm with a couple of flying jackets, one worn trouser-wise, and complained bitterly of a cold mid-riff. Something must be done.

On September 20 and 21, we were happy to welcome Betty Gayes and Chris Hughes of the Derby and Lancs. Club, and hope, that as our facilities improve (we now have a gramophone so a vocal orchestra is no longer needed for square dancing), we shall have many more visitors.

S.P.

British National Absolute Altitude

Madrid: 11th July, 1952:—Philip Wills' flight in Spain during the World Championships in June (22,430 feet) has been homologated by the F.A.I., and established a new British National Absolute Altitude Record.

Mr. A. Lennox-Boyd, Minister of Transport and Civil Aviation was an unexpected visitor of the Southdown Gliding Club on Sunday afternoon, October 12th.

Motoring past the club with his family he noticed some sailplanes in the air and decided to investigate. He found himself a passenger in the 'T-21' and was involved in a discussion on the Government's attitude to gliding clubs.

Derby and Lancs. Gliding Club are holding their Christmas Party on December 20. Surrey and Imperial College Club hold their party at Lasham on December 13.

THE HINKLER CLUB HITS THE JACKPOT

★ "THERE'S MONEY IN GLIDERS" *By Grace Hoinville*

TWO-MAN TEAM FOR SPAIN

THE sun stumbled over the edge of the world in a rash of rippled red on Monday, 9th June. It wasn't just the reflected glory that shone on the faces of nine members of the Hinkler Soaring Club in Hinkler Hall at Camden that night.

We were weary but blissfully happy. We'd just finished counting up the takings from our two-day glider pageant. We'd counted twice and still it came to £156 8s. 6d. That meant the Hinkler Club had filled in the last gap in the funds to send the Australian two-man team to Spain for the World Gliding Contests.

The pageant was organised in a hurry, with less than three weeks to publicise it, compose and roneo programmes and arrange all the many details which go to make a successful pageant. We had no idea of the sort of crowd to expect, we were doubtful about the weather as we'd been having westerly three-quarter gales, and club funds are so lean that we couldn't afford to gamble anything on publicity.

We got it free; we sent out news items to forty suburban newspapers and they all published the item in full. The *Sydney Sun* gave us a Saturday paragraph, the *Daily Telegraph* a Sunday morning write-up, composed by none other than Bob Muller, a staff writer and one of the mainstays of our club. The *A.B.C.* and *2GB* put us in their news bulletins.

Sixteen members of Camden branch of the Rotary Club offered their services as collectors at the gate; they were grand chaps, absolutely invaluable to us, experienced at the job and freeing us for other vital work.

The Sydney Soaring Club agreed to fly on both days and the Illawarra Gliding Club offered to bring their 'nacelled primary' from Fleurs airstrip, ten miles by air. After exhaustive inspection by Fred Hoinville, our 'C.F.I.' and Bob Krick, of this extremely rugged and sturdy glider, it was aero-towed over, Fred flying his 'Tiger' and Bob flying the 'primary.' As Fred and Bob, together with Bob Muller and Kevin Moloney, are undoubtedly the most experienced glider-towing team in this country, we make no apologies or excuses about aero-towing a 'primary' glider. All pilots at the pageant agreed that this particular 'primary' is probably stronger on tow than a 'Grunau Baby.' It's a great credit to the boys who designed and built it.

OUT OF THE RED

Saturday found us at Camden, working hard. Sunday morning we were out early planting big signposts along the main highway and in Camden town. The first cars began to roll in about 11 a.m., though we weren't scheduled to start until 1 p.m. We counted heads surreptitiously—'nine bob in that car'; 'eighteen bob's worth there.' By noon there were enough people to cover hiring of the public address system for two days, by quarter past noon we figured we had enough customers to cover all other costs, too, so at least knew we weren't going to finish in the red. By 1 o'clock we were beginning to think we were going to make at least £20 out of it.

Exactly at 1 p.m. the pageant started before three or four hundred spectators. The weather was most kind, with a westerly wind allowing us to take-off right in front of where we had to place the crowd; just enough lift to enable us to demonstrate thermal-soaring in the early part of the show.

With no time to rehearse acts, we had no set programme, but we intended to keep something happening in the air all the time. In the last eighteen months, as part of the Hoinville aerobatic act (the bit that stays on the ground and talks over the mike) I have been to a great many pageants all over the country and there are three points which strike me as being very important. Start right on time—keep something in the air all the time, even if it's only a joyriding plane—have something on the public address system all the time, because a 'dead' mike gives people the feeling that nothing is happening. With the latter in mind, having been elected compere by the boys, I made sure something was happening on the mike all the time, even if I was only nattering about the joyriding 'Proctor.' Music goes well with sailplanes, so we put some over every now and then. When I had to feed F. D. H. Junior, Bob Muller or Allan Ash took over the mike.

What a joy it was to do the commentary for the boys; they flew joyously, with verve and precision and gracefulness, with that brilliance which springs from having heart and soul in the job.

HIGHLIGHT OF PAGEANT

Highlights of the two days were Kev Moloney's wonderful act, which he worked up without practice, a fact I confided to the crowd as Fred was towing him up, giving them a lively interest in waiting to see if Kevin's loop-off-the-release was going to work out as he planned. Fifteen hundred feet above us, Kev and Fred demonstrated steep turns on tow, then climbed on to 3,000 ft.

After getting into a good position for the crowd, Fred dived gently, increased speed to 80 m.p.h., whereupon Kev released, going straight off the tow into a loop, and then another. It went over splendidly and looked most spectacular. A few aerobatics, then Kev went into a streamer-cutting act, slicing each streamer at least once, with outstanding skill and judgment. An ex-Raaf pilot, General Manager of Aircraft Owners' and Pilots' Association of Australia, Kev has had time to fly only once or twice this year, had tried his streamer-cutting act at Parkes Aero Club Pageant in January but hadn't flown since then, so his flying was even more impressive to those of us who knew this. The crowd loved it.

Apart from the tow-planes, the only other powered act was Fred's aerobatics, and, with clever hard-

★ *This article has been unavoidably held over for several months owing to pressure on space.*

working little ' Brolga ' (whose prop was stopped only once each day and then only for re-fuelling) pouring out her smoke trail, Fred went onto a brilliant display of outside loops, vertical flicks, square loops, inverted reverse, vertical barrel rolls, boomerang whirl, streamer cutting, tumble whirl, and the usual one or two which left me saying, ' uh, uh, darned if I know *what* that was—well, you saw it, anyway.' Unchallenged aerobatics champ of Australia, Fred never fails to delight and entrance the crowd and, most important point, to leave them happy and laughing. He never flies over them or at them and always has ample air space between ' Brolga ' and the ground. He believes that if a pilot frightens one spectator he has failed in his aim to make friends for aviation, which is what pageants should do.

Bob Krick, Ray Ash, Bob Muller, aerobatted ' Grunau ' and ' Olympia ' and were able to use weak lift to illustrate thermal soaring, always ending their flights with superb spotlandings. With Keith Colyer flying ' Tiger Moth ATH ' and Tom MacLaurie flying ' Brolga,' Fred and Merv Waghorn in Hinkler and Sydney Soaring Club ' Olympias,' did a double take-off, formation tow and, after release, dual aerobatics. We all felt mighty proud of Wag and Fred, the Australian team.

On the ground, Allan Ash and Don Matts, aided by members of the Southern Cross Club, did a grand and unselfish job of organising and seeing that everything ran smoothly. With only two ' Olympias,' one ' Grunau,' one ' primary ' and two tow-planes, we kept the show fast and spectacular.

Three joyriding planes helped to keep the sky with a busy look. The ' Grunau ' was put out of action midway through the first day when the tiny dual wheels caught in a strong tussock of grass, tore off the skid and forced the wheels up through the fuselage. Sterling work had it back in action ready for Monday's performance.

The Illawarra club's ' primary ' was the answer to a commentator's prayer for something to talk about in odd slack moments. It was always in action at the far side of the field, demonstrating auto-towed training flights. At the end of the day, Kelvin Gore flew over and landed sweetly and gently in front of the crowd. At the conclusion of both day's programmes, the gliders were brought to the edge of the tarmac and the crowd invited to inspect them and ask questions, which they did eagerly and most appreciatively.

We had the winch on display but didn't use it, as winching ties up too many people when you have only a small crew and there is also the ever present possibility of cable breaks with resulting delays. We found that aero-towing was completely satisfactory in all ways.

Wives of several members of the Southern Cross Gliding Club did a wonderful job selling boiling water for 6d. a billyful. Ted Macarthur Onslow, Vic Shuback and Tom MacLaurie helped out with aero-towing on the Sunday, and Ted aerobatted the silver ' Olympia ' too.

Highlights of Monday's performance—Kevin's act again, better than ever ; ' Brolga's ' aerobatics and streamer cutting, ' Brolga ' had the crowd shouting with laughter when she flew vertically up under a streamer, gobbling it into fragments as she climbed. Merv Waghorn and Bob Krick doing the dual take-off and dual aerobatics (Fred had no relief-pilot for aero-towing on Monday, so we couldn't repeat the ' Australian team for the world contests in dual flight ') and Frans van der Kreek's bright idea of doing a normal Sunday afternoon browse around in weakish lift, to show the crowd that sailplanes do not always fly in loops, spins, stalled turns and other erratic paths.

Don Morrison, good friend from the Dept. of Civil Aviation, came along as pageant controller, became very cold from standing around without a single red gun to fire.

TWO NOTED INCIDENTS

Only two incidents, mentioned only for the benefit of other clubs organising glider pageants, were noted as to be avoided in future. Once when two ' Olympias ' were making their approach together, the pilot of one continued stall-turning so enthusiastically that he forced the pilot on the outside into a position where he had to land in a very rough patch outside the fence, roughly half the size of a tennis court. The commentator is rather proud of the fact that, despite ' Seeing It Coming,' she remained calmly at her post yarning chummily to the crowd while one only ' Blue Olympia ' containing half the Australian-team-to-Spain, entirely disappeared down a dip where all sorts of fearful hazards were known to lurk. It was purely coincidental that she discovered one hand chewed off to the wrist by the time Bob Muller considerately galloped back to report breathlessly that one ' Olympia,' one half Spanish team, and one husband, were intact. By the simple expedient of lifting a locked gate off its hinges, the ' Olympia ' was back in action in no time at all, everyone acting most casually, hoping the spectators would overlook the general air of pallor surrounding Hinkler Club members.

The other worrying incident occurred when a visiting ' Tiger Moth ' was flown at approximately ten feet right across the centre of the crowd. It was undoubtedly thoughtlessness which caused this incident but thoughtlessness of a kind which simply should not be tolerated at pageants, where the lives of spectators depends on the commonsense and airmanship of participating pilots. Had the motor of that particular ' Tiger ' failed at a given moment, a number of people would have been killed, a number badly injured and many more left with a very horrible picture scarred deep into their minds. It is a great pity that pilots who do things like that can't see the expressions on the faces of the people they do it to. I think they might feel pretty bad about it and take good care it didn't happen again.

A THOUSAND SPECTATORS

We had upwards of a thousand spectators for the two days, despite a great many counter holiday attractions. They were a grand crowd ; they did what was asked of them and although we had no police and no barriers, they stayed off the landing

NEW GERMAN TWO-SEATERS

Translated by G. S. NEUMAN

THE ' Doppelraab ' was designed and constructed by Fritz Raab immediately after the lifting of the ban on gliding. The firm Wolf Hirth, G.m.b.H., is now willing to undertake the serial production of the aircraft at a price of about 6,500-D.M. Kits for club-construction may be supplied. The ' Doppelraab ' is an intermediate single-seater sailplane which can also be flown with two up. The flying qualities are said to be very good.

Span	42 ft.
Length	22 ft.
Wing area	189 sq. ft.
Aspect ratio	9.2
Weight empty	330 lbs.
Maximum load	375 lbs.
Maximum weight loaded	705 lbs.
Wing loading	
one up	2.75 lbs./sq. ft.
two up	3.67 lbs./sq. ft.
Gliding angle	1 in 18 (approx.)
Minimum sink	3 ft./sec. (approx.)

The ' Horten XV ' was built and first flown by Dr. Reimar Horten in the Argentine. The ' Horten XV C ' is an adaptation to conditions in Germany ; it has the same span (60 ft.), but a smaller wing loading, and the seats are side-by-side. The aircraft is being constructed in several places. A larger number of drawings will be available after the flight tests.

Hans Jacobs has made his come-back with a new design, the ' Kranich III.' The Focke-Wulf company has taken on its production. Price about 11,000-D.M. The aerodynamic shape of the wings has been adopted from the ' Weihe.' The fuselage is made of steel tubing. As the aircraft is still at the stage of development, the alteration of technical data is reserved by the Focke-Wulf company.

Span	60.4 ft.
Length	30 ft.
Wing area	218 sq. ft.
Aspect ratio	16.5
Weight empty	505 lbs. (approx.)
Load	440 lbs.
Weight loaded	945 lbs. (approx.)
Wing loading	
one up	3.6 lbs./sq. ft. (approx.)
two up	4 lbs./sq. ft. (approx.)
Gliding angle	1 in 27 (approx.)
Minimum sink	2.2 ft./sec. (approx.)

The construction of the two-seater ' ES-49 ' by Edmund Schneider was already described in *Thermik* 1951, pp. 17 and 65. In the course of extensive tests by the aircraft manufacturer Alex Schleicher, Poppenmausen/Wasserkuppe the appearance and structure has considerably changed. The empty weight has been reduced. The flying qualities are now said to be exactly equal to those of the ' Grunau Baby.' This fact is a strong argument for the training value of the ' ES-49.'

Span	53 ft.
Length	28.5 ft.
Wing area	235 sq. ft.
Aspect ratio	12
Gliding angle	1 in 24 (approx.)
Sinking speed	
one up	2.2 ft./sec. (approx.)
two up	2.6 ft./sec. (approx.)

From *Thermik*, 1952, No. 4.

Continued from previous page

and take-off area. Another point for intending pageant organisers—don't bully the crowd ; explain why you are asking them to keep clear ; tell them about the D.C.A. bloke and his reason for being there, to keep the pageant safe for both pilots and spectators. Ask them to help you make his job easy. They never fail to respond to a friendly voice making them feel they can help the pageant to be happy and successful. Even the most irresponsible crowd responds when you tell them the controller will have no option but to close the pageant if they don't do as requested.

The Hinkler Soaring Club is doing some solid thinking. (The C.F.I. is going scarlet in the face trying to restrain himself from screaming that for years he's been agitating for financial independence through pageants and the principle of standing sturdily on our own feet and to hell with subsidies). Our share of last year's Government subsidy —£, net proceeds from one hastily organised and not at all high-pressure-advertised pageant—£135. We'll let you know the result of our cogitating soon.

One thing we can tell you right now ; the Hinkler Soaring Club will be organising more pageants. A great number of people anxiously asked us on both days when the next pageant would be on. The boys have a mighty gleam in their eyes as they mull over new acts they're going to try out. The commentator is looking for a stand-in to take over the mike while she gets in with an act she's thinking out. Even the youngest member expressed his willingness to be in it when he yammered silently at the microphone from his commentating mother's arms, then remarked with great audibility 'oh dad dad dadda, ho, brruuum, aboo ' and stared profoundly at the sky.

FAME



Photograph of an envelope received from Wolf Hirth

Orographic Cirrus Cloud

IN the October issue of the Quarterly Journal of the Royal Meteorological Society, Mr. F. H. Ludlam of Imperial College, London, has published a paper on Orographic Cirrus Cloud. A similar paper by the same author appeared in the October issue of *Weather*.

He describes observations illustrated by photographs taken at Dunstable last year, showing that cirrus cloud formed both continuously and intermittently at certain specific locations and then drifted back with the wind. By theodolite measurements, combined with radio sonde temperature, dew point and wind velocity with height information, he has been able to locate the positions of these points of cirro genesis as either over or just in the lee of the highest point, in the Cotswolds, Chilterns and Black mountains and on one occasion with the Mendips and Exmoor. The heights of these mountains are small (mean 1,000 ft.) and the cirrus formed at between 20 to 30,000 ft. and showed that quite small hills were capable of producing wave lift in the cirrus levels.

British soaring pilots may yet reach the stratosphere in wave lift in winter without leaving these shores for the Sierras or Alps. The variometer and the idea of circling alone opened up thermal cross-country soaring. A new instrument or combination of existing instruments, together with new techniques, are required to exploit the invisible wave.

Southdown Gliding Club

OUR open day, on Sunday, September 14th, was a very successful affair. John Furlong brought his ' Sky ' along and managed to pick up some small thermals over the field. He also soared over the East slope, over East Dean. Dave Parsey put up a very good show, by taking a ' Tutor ' along to the same slope, and holding it at nearly the same height as the ' Sky ' for a few minutes. In the morning the ' Olympia ' was taken to Firle for the first time, and Ray Brigden very soon decided that conditions were good enough for a cross-country attempt. He relied chiefly on slope lift with a few thermal climbs where necessary (one to 2,700 ft.) to cross the gaps at Lewes, Brighton, Bramber, etc. He eventually landed at Storrington, 27 miles away, which was just insufficient for his Silver ' C ' distance. Hard luck, Ray. After Ray had gone away, ' Tutor 2 ' was taken to Firle, and it did several soaring flights. ' Tutor 1 ' operated at Friston, along with the ' Sky,' throughout the day ; the ' T-21 ' was unfortunately U/S. There were many visitors, including our President, Sir John Salmond, and all were entertained to tea in the club-house. Joan Cloke and Kitty Morris acted as ' Official Purveyors of Beverages ' and about 150 Beverages were Purveyed, together with delicious cakes and pastries.

On the previous day most people went to Shoreham to the Air Rally, and Ken Fripp gave a first-class Aerobatic display in the ' Olympia.' Later, five of our members had aerotows. Bill Jordan threw in a few loops for good measure, Bill thinks they were good 'uns, Kitty thinks they looked horrible !

The following week-end was classed as ' Normal ' with no soaring to speak of, but a good total of Circuits.

On Saturday, 27th September, a high wind kept all but ' Olympia ' pundits on the ground. Soaring was good, for those who flew.

The next day, Sunday 28th, was really phenomenal. A good wind blew from the South, and all machines flew really well, soaring at up to 2,000 ft. Ron Tull exceeded this with 2,400 ft., over Beachy Head during a 5 hour flight. Barry Smith also completed his 5 hour trip. Congratulations to both. Everyone who flew went as far as Beachy Head. Squeege went further than that, to Eastbourne. Jack Godley had coffee in style, 2,000 ft. above Beachy Head Hotel (from a Thermos). Over 20 hours' soaring was put in before a downpour soaked everyone for the rest of the day.

October 4th and 5th constituted an ideal training week-end. ' Len ' Lennard soloed on Saturday, John Howard and Peter Crabtree did likewise on Sunday. At lunch-time on Sunday, Don Snodgrass, in the ' Olympia,' found a good thermal which took him to 2,700 ft., and a series of smaller ones enabled him to stay up for 1 hr. 25 mins. No one else was able to get up near him. This really was a beautiful day for both humans and gliding folk, and 76 launches were made without any tempers being frayed.

October 11th-12th. A reasonable sort of week-end, a little soaring was possible in a S.E. wind, and for the first time we had two machines soaring the shallow ridge between Gayles and the sea. The Rt. Hon. Alan Lennox-Boyd, Minister of Transport and Civil Aviation, and Lady Patricia Lennox-Boyd, paid us a visit with their children, and they showed great interest in our activities. The Minister flew with Ray in the ' T-21 ' and said he enjoyed it as much as a flight in the ' Comet.'

Last week-end was good for all grades. Soaring was possible over the West slope, the ' T-21 ' with Don in charge did 39 mins. in the morning although several ' C ' attempts were unsuccessful with the ' Tutors.' Later in the day conditions improved and at one time all four club machines, plus Ken Fripp's ' Kite ' were in the air at the same time. Ken was test flying his machine after its C. of A. inspection and various alterations.

Flying times for this year to date are 2,200 launches for 320 hours, the former an increase, the latter a slight decrease from last year's figures.

A Surrey Club ' Olympia ' team with friend Trotter in charge will be with us this winter.

Dave Parsey's Sunday morning training lark seems to be going fairly well, but he wants a few more trainees to stay overnight on Saturdays—' Now is the time for a vacant ' T-21 B ' he says.

Now that daylight is again scarce, it is important that we get started early on Saturdays, as soon as possible after mid-day. On Saturday, November 8th, Bill Jordan is going to start Saturday morning flying if enough members can turn up, so if you can come on that day please send a P.C. to me, or tell Bill on the field this week-end.

Wednesday evening work has, of course, ceased now that there is no daylight available. Many thanks to those who came along and did some invaluable work. The most important projects, now complete or nearing completion, were the water tank structure and system, organised and mainly constructed by Bill Jordan, which now supplies us with constant running cold (rain) water in the Kitchen, the new drainage system for the kitchen with its outsize soakaway, organised by Don Snodgrass, and the garden improvements organised by Roger Sweatman. There is still plenty of work to be done in the hangar and club-room, may I direct your attention to Bill's notice to this effect on the notice board ?

EGYPTIAN GLIDING

TO keep up with the rapid expansion of Gliding in Egypt a new School is to be set up at Alexandria, the ground equipment for which has already been purchased, and further new machines are being purchased from U.K. and Europe.

Two further Instructors will be engaged shortly to carry out the necessary training policy here and in Alexandria and at other places as the scheme goes forward. The School will then have three full time professional Instructors with Mr. Swinn as the Chief Flying Instructor, these together with Instructors who are under training on a voluntary basis will, we hope, enable the very large number of applicants to be kept pace with.

The wonderful backing of the Egyptian Government is amazing, and one feels very proud of them and their foresight in recognising Gliding as a means of making the young people of the country air-minded.

We for our part are doing our utmost to deserve this grand backing, and already our untiring work is showing very gratifying results. Training ranges from civilian personnel, Officer Cadets, Officers of the Army, Air Force and Navy and students of certain technical colleges.—R.S.

Egyptian Gliding School

Flight to Suez from Cairo—and return flight following day.

Glider :
'AIR 100' ('Arsenal 100'—French High performance machine).

Pilot :
Robert Swinn (Chief Flying Instructor—E.G. School).

Launch :
Car tow.

Date of flight from Cairo to Suez :
Saturday 27/9/52 (take-off 10.42 a.m.—landed 3.15 p.m.).

Date of flight from Suez to Cairo :
Sunday 28/9/52 (take-off 11.30 a.m.—landed 2.30 p.m.).

Distance :
130 by route taken. (Cairo/Suez.)

PERMISSION having been recently received for the School to commence cross-country flights which by the nature of the country must be across desert, I made a flight to Suez to see what the conditions would be like for our members making their Silver 'C' distance flights.

I took three car-towed launches on the R. Egyptian Airforce Aerodrome at Heliopolis and failed to find lift, on the fourth launch I had begun my approach to land and was at 100 feet when I contacted a small thermal, I worked this until I had 4,000 feet and set off across the desert in the direction of Suez. Apart from the severe buffeting the journey was uneventful, my height varying from 1,000 feet to cloud base, the odd dust devil roaming in the desert occasionally threatened to de-rigg the machine then and there, and two Pepsi-Cola bottles lying behind the seat, came up on one occasion to hit the canopy with a resounding smack.

I arrived over the town of Suez shortly after passing over the international kilo 99 barrier manned by English and Egyptian soldiers—my height over this barrier was too low for comfort and one could imagine those ack-ack guns being trained on the glider, and it suddenly struck me that I had made no arrangements about crossing over the forbidden territory.

Over Suez I was at a height of 6,000 feet, and it was yet only 2.15; it seemed a pity to land, so I flew along the red sea coast a little way, and out over the Ataka mountains which I soon left owing to the fierce vertical currents, touring along the Suez Canal, I idled the time away watching shipping, after a few miles of ship watching I returned to the town of Suez and looked for a suitable place to land. I had intended to land on the side of the Cairo Road, but looking down at the swarming hordes of natives playing around on the only possible landing site I had to hurriedly change my mind.

Diplomatic incident or not, it seemed that the Royal Air Force Aerodrome at Shallafu was the only place to land if we were to keep the machine in one piece.

After making a few circles watching the English Air Force personnel disporting themselves in the Station swimming pool, I touched down outside the Control Tower. A sentry having his afternoon browse so rudely interrupted, came over, and in the casual English way said "did you put this here," pointing to the sailplane. Having satisfied himself that the incident called for some action from higher up the regimental tree he rallied together many and varied officials, who were really very helpful, and how nice to hear English spoken again after my many months of exile, it made me feel quite homesick.

The retrieving trailer had not arrived, and despite many phone calls made to the frontier posts there was no trace of it. I made arrangements to return to Cairo by road. Half way back I found the trailer; the crew were having a little nap by the wayside. No good purpose would have been served by asking them why they had not come through to Suez, I could imagine the expression on their faces if I had.

'Is the Englisee mad, why drive when we can sleep, etc.'; and 'what was he worried about, had he not found them.' Still being a little east of Suez, one must accept things as they are. I returned with the trailer to Cairo, at the frontier post the Englisees were changing guard right in the centre of the road, my driver instead of stopping for this time-honoured custom swerved violently off the road and smartly round the outpost of the Empire to be followed by the Sergeant-Major's broadcast version of Egyptian drivers. The driver turned to me and asked me what he had said. In order not to strain international relations further, I told him the Englisee gentleman had said it was the smartest bit of driving he had seen for a long time. With a broad smile, the driver promptly added a further dangerous 20 kilometres

per hour to the already violently swerving outfit.

A gathering took place at my hanger early the following morning to set out for Suez to bring the machine back, everything went well until the Ghaffir (watchman) suddenly attacked one of the workmen, and in the time-traditional style, tore his clothes off him, leaving him as he was born. Two nude figures, after much effort on the part of all gathered there, were separated, one to be put in the local lock-up and the other to be fitted out with an old shirt and trousers of mine and installed back on the trailer.

Arriving at Shallufa airport, the front of the trailer broke. It now appeared that we should be lucky to get the trailer back empty and the idea of loading the glider on it had to be abandoned. I decided to try to fly the glider back, but owing to the strong head wind and poor thermal conditions this seemed almost impossible. The R.A.F. station staff who had gathered to see the Englisee from the forbidden Zone, thought so too. However, a length of cable measuring about 200 yards was found and the glider attached. I managed to climb to 300 feet, and caught a weak thermal, and by hanging on to it, struggled up to cloud base, setting course for Cairo. I was time and again blown back over the Ataka mountain range and received such treatment from them that I thought the machine would fall to pieces. After much anxiety and bumping from the dust devils which extended right into cloud, I saw on the horizon the Sand Dunes of Kanka a little over an hour later, and I was flying over them with my landing at Heliopolis assured. At 2.30 I landed.

CORRESPONDENCE

SIR,

I trust that you will have the integrity to print this.

In your September issue you reviewed my ' A.B.C. of Gliding.' Your reviewer, in damning it with faint praise, is quite within his (or her) rights, and is doubtless entitled to the views expressed.

I do most strongly resent, however, criticism of my use of the English language by one who could compound the following atrocity—(I quote)—' But in the Public Schools a plan, launched by the A.T.C., which aims at giving boys flying experience on their school playing fields, ' SG-38's' are still used, and this is the book for these beginner pilots.'

It is also my sincere hope that the use of the editorial ' we ' is merely conceit on the part of the reviewer, and not legitimate.—**A. Fox Geen, (21) Hamburg 39, Bebelallee 153.**

The Editor writes : I personally reviewed this book and as the author states ' Damned it with faint praise.' He is right in complaining about the clumsy sentence he quotes, but if the article ' a ' after ' Plan ' is replaced by a possessive inverted comma, the sentence becomes readable, and it was written though not printed thus. Still it ought to have been corrected in the proof reading, and his point is valid.

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IN WORLD CHAMPIONSHIPS

MADRID 1952

S/L. NEUBROCH



SQUADRON-LEADER H. NEUBROCH, who has recently been appointed O.I.C. Gliding at Headquarters Home Command, Royal Air Force, White Waltham, is seen giving instruction to an A.T.C. Cadet.

He took up gliding in Germany in February 1946. When he was secretary of the Air Division Gliding Club, Barntrup, obtained Silver 'C' No. 69 on August 11, 1946, entirely in a 'Grunau' and without any ridge soaring.

On his return to the U.K. he took a pilot's course (he had been a navigator), flew Lancasters and Lincolns, and took part (without success) in the National Gliding Championships, 1947, 1950, and 1951. He was Group Gliding Officer, No. 64 (Northern) Group, York, from 1950-51.

Posted to Headquarters Home Command after taking the Central Flying School course early in 1952, he has 175 gliding hours in 18 types of gliders, to his credit.

WANTED

ONE pair of 'Tutor' Wings, second hand in sound condition. The Moonrakers (RAFGSA) Gliding and Soaring Club, R.A.F. Compton Bassett, Calne, Wilts.

DFS 'OLYMPIA'

CHEAP for quick sale. Full instruments. Wheel. Current C. of A. First reasonable offer. A. Coulson, 5, Maudlin Place, Newcastle-on-Tyne 5.

ROYAL AERO CLUB CERTIFICATES

(Issued under delegation by the B.G.A.) SEPTEMBER, 1952

CERTIFICATES 'A' .. 204 (15374-15577)
'B' .. 194
'C' .. 39
Silver 'C' 5
Gold 'C' —

'B' CERTIFICATES

No.	*Name.*	*A.T.C. School or Gliding Club.*	*Date taken.*
5537	I. B. Richards	Bristol G.C.	28. 8.52
5893	J. A. Smith	Wessex G.C.	29. 8.52
9166	L. W. Arnold	No. 186 G.S.	13. 4.52
11231	B. T. Long	R.A.F. St. Athan	24. 8.52
12750	T. J. Ball	No. 43 G.S.	8. 6.52
12854	A. F. Murray	Scottish G.U.	30. 8.52
13893	W. H. Boundy	No. 31 G.S.	6. 9.52
13980	P. G. A. Machin	No. 104 G.S.	31. 8.52
14285	J. B. Christie	No. 183 G.S.	7. 6.52
14328	R. D. Barnard	No. 130 G.S.	23. 3.52
14377	G. F. Pike	No. 130 G.S.	16. 3.52
14558	A. Wylie	No. 48 G.S.	31. 7.52
14810	D. J. Dunu	No. 82 G.S.	14. 9.52
15294	Joyce G. Armstrong	Scottish G.U.	14. 9.52
15374	J. Carnagie	No. 2 G.S.	4. 7.52
15375	J. C. L. Fell	No. 166 G.S.	18. 8.52
15376	R. Kilvington	No. 23 G.S.	24. 8.52
15377	J. R. Morgan	H.C.G.I.S.	28. 8.52
15379	D. R. Bastow	R.N.A.S. Culham	26. 8.52
15380	L. W. Stone	No. 27 G.S.	10. 9.50
15381	P. T. J. Smith	No. 166 G.S.	18. 8.52
15382	D. V. Pieris	H.C.G.I.S.	22. 8.52
15383	M. J. Tidman	H.C.G.I.S.	29. 8.52
15384	R. A. Horne	No. 122 G.S.	21. 8.52
15385	J. C. Suttenstall	No. 23 G.S.	23. 8.52
15386	P. Johnson	No. 2 G.S.	20. 7.52
15387	G. C. Edwards	R.N.A.S., Culham	27. 8.52
15388	W. Stiff	No. 22 G.S.	24. 8.52
15389	D. C. Phillips	Bristol G.C.	22. 8.52
15390	I. Lachlau	R.N.A.S., Culham	26. 8.52
15391	M. A. Lovering	No. 166 G.S.	29. 8.52
15392	J. M. E. Smith	No. 102 G.S.	15. 8.52
15393	R. G. Parsons	No. 166 G.S.	28. 8.52
15394	D. A. G. Day	No. 106 G.S.	26. 8.52
15397	M. Harden	Army G.C.	23. 8.52
15398	D. P. Morris	H.C.G.I.S.	29. 8.52
15400	C. F. Bottoms	No. 106 G.S.	26. 8.52
15401	C. J. Webster	No. 106 G.S.	29. 8.52
15402	A. J. de Whalley	Cambridge U.G.C.	13. 7.52
15403	A. Reider	Bristol G.C.	26. 8.52
15404	D. O. Davis	No. 122 G.S.	22. 8.52
15405	R. E. Hamilton	H.C.G.I.S.	29. 8.52
15406	M. T. Vincent	No. 168 G.S.	2. 8.52
15408	P. J. Purnell	No. 166 G.S.	29. 8.52
15409	P. C. Berryman	Bristol G.C.	21. 8.52
15410	P. V. Clarke	R.N.A.S., Culham	27. 8.52
15411	P. L. Parrott	No. 123 G.S.	2. 4.52
15413	A. H. Hope	No. 123 G.S.	4. 6.52
15414	A. M. Williams	No. 43 G.S.	25. 8.52
15416	F. M. S. Pike	No. 166 G.S.	28. 8.52

'B' CERTIFICATES—*contd.*

No.	*Name.*	*A.T.C. School or Gliding Club.*	*Date taken*
15417	G. T. Wilkinson	H.C.G.I.S.	11. 8.52
15418	G. K. Bannister	No. 166 G.S.	17. 8.52
15419	P. R. Press	No. 104 G.S.	16. 8.52
15420	R. J. Everitt	Deeside G.A.	23. 8.52
15421	R. H. H. Corke	H.C.G.I.S.	14. 8.52
15422	R. W. Guy	No. 166 G.S.	28. 8.52
15423	P. T. Deegan	No. 123 G.S.	24. 8.52
15424	R. W. Chandler	No. 166 G.S.	30. 8.52
15426	B. D. Whatley	H.C.G.I.S.	28. 8.52
15427	W. N. T. Forbes	Scottish G.U.	29. 8.52
15429	S. Barcroft	Army G.C.	24. 8.52
15431	D. R. Taylor	Midland G.C.	5. 8.52
15432	A. M. Sinclair	No. 183 G.S.	17. 8.52
15433	P. E. Linford	No. 105 G.S.	15. 8.52
15434	J. A. Linford	No. 105 G.S.	15. 8.52
15435	P. L. Smith	Scottish G.U.	29. 8.52
15436	D. P. A. Mayoux	No. 31 G.S.	30. 8.52
15437	C. Clayson	No. 168 G.S.	5. 9.52
15438	B. D. C. Cogger	No. 168 G.S.	5. 9.52
15439	J. A. Ellis	Bristol G.C.	30. 7.52
15440	A. K. Findlay	No. 22 G.S.	17. 4.52
15441	P. L. Mitchell	No. 122 G.S.	20. 7.52
15442	W. Mason	Bristol G.C.	29. 8.52
15443	M. A. F. Ryan	No. 166 G.S.	18. 8.52
15444	W. J. Hill	No. 2 G.S.	30. 8.52
15445	P. L. Miller	No. 168 G.S.	5. 9.52
15446	D. J. Langley	No. 106 G.S.	29. 8.52
15447	G. G. Graham	No. 168 G.S.	17. 8.52
15448	M. Batchelor	No. 82 G.S.	27. 7.52
15449	W. J. Millard	Bristol G.C.	5. 9.52
15450	D. A. L. Bird	No. 106 G.S.	28. 8.52
15451	J. Percival	No. 146 G.S.	6. 9.52
15452	M. Wilkinson	No. 122 G.S.	22. 8.52
15453	A. J. A. Hills	No. 166 G.S.	18. 8.52
15454	C. R. Freeborough	No. 168 G.S.	5. 9.52
15455	R. A. Sims	No. 146 G.S.	6. 9.52
15456	M. G. B. Carpenter	No. 104 G.S.	15. 8.52
15457	K. L. Engerrain	No. 104 G.S.	14. 8.52
15458	C. Skinner	No. 166 G.S.	29. 8.52
15459	G. J. Baldock	No. 168 G.S.	5. 9.52
15460	R. Sandy	No. 45 G.S.	8. 8.52
15462	A. E. Badger	No. 122 G.S.	22. 8.52
15463	B. S. Spink	No. 166 G.S.	6. 9.52
15464	C. D. G. Bull	Bristol G.C.	5. 9.52
15465	D. S. Jackson	No. 168 G.S.	4. 9.52
15466	J. R. Gould Corney	R.A.F., Wahn	18. 4.49
15467	D. A. Borrowman	R.N.A.S., Culham	27. 8.52
15468	D. A. G. Maple	No. 89 G.S.	24. 8.52
15469	C. J. Compton	No. 106 G.S.	26. 8.52
15470	C. C. Norden	No. 105 G.S.	14. 8.52
15471	F. Cox	No. 183 G.S.	7. 9.52
15472	M. J. Martin	No. 168 G.S.	5. 9.52
15473	Beverley M. Grey	Army G.C.	6. 9.52
15474	B. Blenings	No. 166 G.S.	17. 8.52
15475	I. Weltman	No. 168 G.S.	4. 9.52
15477	G. H. Beggs	Deeside G.C.	8. 6.52
15478	J. M. R. Fleming	Scharfoldenfdorf	1. 9.52
15479	C. S. Fox	R.N.A.S., Culham	2. 9.52
15480	J. R. Barrows	Southdown G.C.	20. 4.52
15481	R. W. Golding	London G.C.	10. 9.52
15482	P. J. Hedges	No. 168 G.S.	4. 9.52
15483	R. H. Jago	H.C.G.I.S.	21. 8.52
15484	D. E. A. Rees	No. 168 G.S.	4. 9.52
15485	R. H. Shipman	London G.C.	10. 9.52
15486	J. Stevenson	No. 2 G.S.	24. 8.52
15487	J. L. Boak	No. 2 G.S.	24. 8.52
15488	J. B. Clifford Jones	No. 168 G.S.	4. 9.52
15489	C. R. Faulkner	Derby & Lancs.	7. 9.52
15490	D. R. W. Cowling	R.N.A.S., Culham	2. 9.52
15491	R. P. J. Hamblin	R.N.A.S., Culham	2. 9.52
15492	B. Plummer	No. 104 G.S.	13. 8.52
15493	D. J. Richardson	H.C.G.I.S.	22. 8.52
15494	W. E. S. Gamblin	Army G.C.	23. 3.52
15495	S. G. Brewer	H.C.G.I.S.	15. 8.52
15496	A. H. Burnage	No. 142 G.S.	12. 9.52
15497	A. J. F. Cronin	Surrey G.C.	14. 9.52
15498	A. E. Dann	No. 125 G.S.	6. 9.52
15499	D. H. Francis	No. 105 G.S.	13. 9.52
15500	J. R. Halfpenny	No. 123 G.S.	17. 8.52
15501	D. C. Hewett	No. 125 G.S.	13. 9.52
15502	T. A. Joyce	No. 141 G.S.	31. 5.52
15503	G. E. Ruck	No. 168 G.S.	5. 9.52
15504	J. R. G. White	No. 168 G.S.	17. 8.52
15505	K. Sedgwick	Midland G.C.	20. 9.52
15509	B. C. Branton	No. 104 G.S.	14. 9.52
15510	W. W. Smith	No. 2 G.S.	8. 9.52
15511	L. Waters	H.C.G.I.S.	28. 8.52
15512	D. Ryan	No. 23 G.S.	14. 9.52
15513	R. A. Smith	No. 168 G.S.	31. 8.52
15514	J. L. Dakers	No. 2 G.S.	14. 9.52
15516	R. Goddard	R.A.E. Tech. Coll. G.F.	14. 7.52
15517	M. C. Holman	No. 122 G.S.	22. 8.52
15519	D. D. Chalmers	No. 2 G.S.	14. 9.52
15520	H. E. Couch	No. 168 G.S.	5. 9.52
15521	R. B. Godwin-Austen	Surrey G.C.	16. 9.52
15522	T. R. Haley	Bristol G.C.	26. 6.52

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'B' CERTIFICATES—*contd.*

No.	*Name.*	*A.T.C. School or Gliding Club.*	*Date taken.*
15523	D. L. Pope	H.C.G.I.S.	23. 8.52
15524	A. J. Whitelam	No. 22 G.S.	3. 8.52
15525	B. W. Feasey	No. 106 G.S.	24. 8.52
15526	Simone A. Oudot	Scharfoldendorf	23. 8.52
15527	J. A. Atkinson	No. 123 G.S.	2. 4.52
15528	R. W. Biddle	No. 2 G.S.	1. 8.52
15529	K. E. Blake	Bristol G.C.	30. 7.52
15530	J. D. Dalgleish	No. 168 G.S.	1. 8.52
15531	G. Twell	No. 102 G.S.	15. 8.52
15532	L. J. Kentfield	No. 125 G.S.	17. 8.52
15533	J. J. Reeve	No. 48 G.S.	25. 8.52
15535	A. H. Burr	R.A.F., St. Athan	24. 8.52
15536	B. W. Cuming	No. 122 G.S.	20. 8.52
15537	R. A. Davies	No. 106 G.S.	29. 8.52
15538	R. Bedwell	No. 104 G.S.	24. 8.52
15539	N. C. Buchan	No. 2 G.S.	20. 4.52
15540	B. Cooper	No. 102 G.S.	15. 8.52
15541	J. P. Dible	No. 122 G.S.	24. 8.52
15542	D. C. Lawler	No. 104 G.S.	13. 8.52
15543	L. A. Macpherson	No. 130 G.S.	3. 8.52
15544	B. J. Phillips	No. 106 G.S.	28. 8.52
15545	N. E. A. Renner	R.A.F., G.S.A.	10. 9.52
15546	D. C. Roper	No. 104 G.S.	26. 7.52
15547	P. T. B. Ternan	No. 122 G.S.	22. 8.52
15548	M. A. Young	No. 166 G.S.	29. 8.52
15549	J. M. Holden	R.A.F., Sylt	4. 9.52
15550	M. B. Reed	Hamelin G.C.	17. 8.52
15551	F. E. G. Webb	R.A.F., St. Athan	24. 8.52
15552	G. P. Mead	No. 104 G.S.	14. 8.52
15553	L. A. Watts	No. 89 G.S.	25. 5.52
15554	P. R. Whichello	No. 168 G.S.	6. 7.52
15556	J. P. W. Gaskell	Cambridge U.G.C.	17. 8.52
15557	G. A. Walker	No. 2 G.S.	24. 8.52
15558	W. R. Thomas	No. 2 G.S.	24. 8.52
15559	P. G. Russell	Derby & Lancs.	24. 8.52
15560	J. A. O'Rourke	No. 125 G.S.	27. 4.52
15562	R. P. Brown	Surrey G.C.	14. 6.52
15563	S. Mabon	No. 1 G.S.	4. 5.52
15564	A. Coney	No. 122 G.S.	20. 7.52
15565	J. W. Turner	No. 42 G.S.	2. 8.52
15569	W. A. Gibbons	No. 2 G.S.	17. 8.52
15570	W. Mears	H.C.G.I.S.	28. 8.52
15571	M. B. D. Riches	No. 146 G.S.	13. 9.52
15572	E. Robertson	No. 2 G.S.	1. 8.52
15573	T. Martin	No. 2 G.S.	24. 8.52
15574	S. J. Double	R.A.F., Celle	21. 1.50
15575	P. F. Morse	No. 166 G.S.	7. 9.52
15576	R. A. Blake	No. 125 G.S.	27. 9.52

'C' CERTIFICATES

3863	R. G. Porter	No. 188 G.S.	22. 8.52
6201	S. J. Burt	Lubeck G.C.	25. 4.48
7566	I. E. Baker	No. 89 G.S.	15. 9.52
7774	G. H. Potter	No. 48 G.S.	2. 9.52
9432	A. R. Lewis	R.A.F., Cranwell G.C.	16. 8.52
10007	H. Knight	Hereford G.C.	2. 9.52
11909	W. J. Pearce	R.A.F., G.S.A.	13. 8.52
12360	P. J. Colbourne	Army G.C.	24. 8.52
12483	C. Chappell	No. 64 G.S.	4. 8.52
12866	A. Procter	No. 130 G.S.	20. 7.52
13439	D. S. Jones	No. 48 G.S.	26. 8.52
13688	K. R. Powell	Midland G.C.	10. 7.52
13689	M. Stratton-Brown	R.N.A.S.	2. 9.52
13817	J. C. M. Shepherd	No. 80 G.S.	6. 9.52
14288	J. L. Stevens	R.E. G.C.	29. 8.52
14317	M. J. Hemingway	No. 64 G.S.	26. 8.52
14362	L. E. Dandy	No. 23 G.S.	26. 8.52
14417	G. S. Taylor	No. 64 G.S.	26. 8.52
14541	D. N. Alcock	No. 64 G.S.	13. 8.52
14554	D. R. Anderson	H.C.G.I.S.	8. 8.52
14649	T. D. Wilson	Derby & Lancs.	22. 8.52
14668	D. A. Pape	Derby & Lancs.	21. 8.52
14887	G. R. Barrell	Derby & Lancs.	22. 8.52
15114	M. P. Challis	No. 64 G.S.	23. 8.52
15238	J. P. Davies	No. 45 G.S.	22. 8.52
15326	E. Dufall	Gannet G.C.	24. 8.52
15338	M. M. Hercik	London G.C.	31. 8.52
15402	A. J. de Whalley	Cambridge U.G.C.	20. 7.52
15414	A. M. Williams	No. 43 G.S.	26. 8.52
15431	D. R. Taylor	Midland G.C.	9. 8.52
15466	J. R. Gould Corney	R.A.F., Wahn	7. 9.52
15480	J. R. Barrows	Southdown G.C.	31. 8.52
15494	W. E. S. Gamblin	Army G.C.	4. 4.52
15526	Simone A. Oudot	Scharfoldendorf	14. 9.52
15549	J. M. Holden	R.A.F., Sylt	6. 9.52
15550	M. B. Reed	Hamelin	7. 9.52
15556	J. P. W. Gaskell	Cambridge U.G.C.	23. 8.52
15562	R. P. Brown	Surrey G.C.	18. 9.52
15574	S. J. Double	R.A.F., Celle	9. 6.51

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398	R. M. Cowburn	Scharfoldendorf	4. 8.52
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