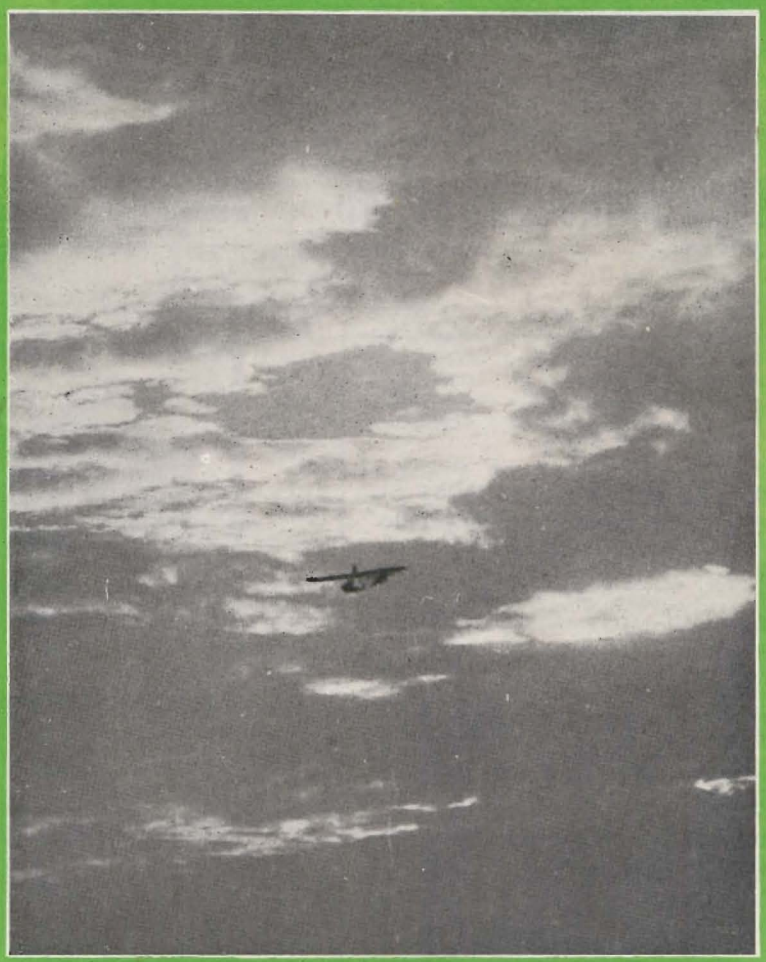
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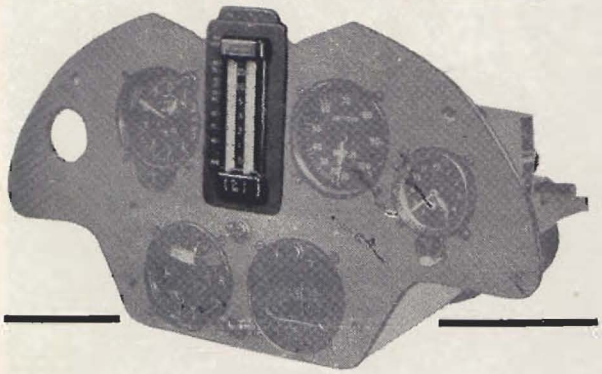


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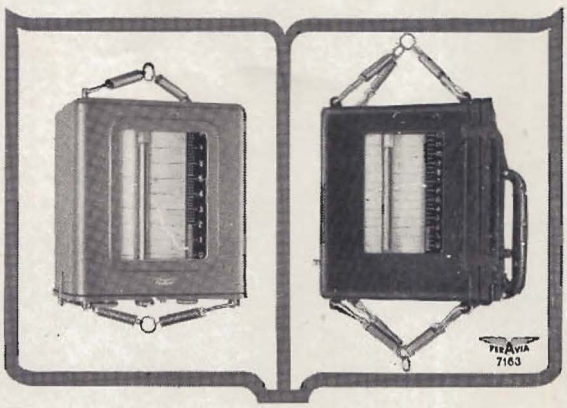
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THE FIRST JOURNAL DEVOTED TO SOARING AND GLIDING

AUGUST 1951 ★ Vol XIX No 8

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COVER PHOTO:
Training flight in 'S.G. 38' at Sunset. D. B. Minterne. Ex.WD. F. 24. Deep yellow filter.

ENTER THE 'SKY'

THERE were several events at the recent National Championship Meeting which gave us great pleasure.

The first was the success of Fred Slingsby's latest high performance machine—the 'Sky'—and the second was that G. H. Stephenson—a non-professional glider pilot—was flying one of them and at last able to do himself justice. Several reflections arise from the results. First, with due deference to 'Steve' and 'Jock' Forbes—and they would be the first to admit it—some at least of their success is due to their machines. If this is so, we clearly have a machine which out-dates the 'Weihe's' over whose possession there has been so much controversy these past few years. Second, would not 'Steve' have put up as good performances as the pilots in the 'Weihe's' in previous years if he had had the opportunity? We believe he would and we believe that it is now doubly confirmed that his omission from the Team which went to Sweden last year was a piece of pure jiggery pokery, and if you don't believe us, look at the results in Sweden and this year.

Nor can we express adequately our satisfaction that the Championship by whomever it may be won, has been won in a British machine which is National from the drawing board to the completed machine. No doubt Slingsby still has his ideas as to how the 'Sky' may be improved—just as Richard Johnson went on improving the 'RJ-5' for years—but performances so much superior to that of other machines of the standard shape are bound to attract foreign attention. What is more the design is proved, and the result of careful step-by-step advance on a known road. There have been no chances taken, and the aircraft offers those features of stability and fly-ability which is so marked a feature of the Slingsby product. So also is the finish. We are sure that the 'Sky' will continue on the path to glory it has so brilliantly begun and will be an International Competition machine next year.

It was unfortunate that the organisers of the Championships were unable to include a triangular course contest in the series, the main reason being the difficulty of recognising aircraft at the turning point unless they came down to 2,000 feet, which for most competitors would mean the loss of the effective and flyable height they might have at the time. One wonders however, if something could not be thought out on the lines of the Recognition letter, the knowledge of which was taken as proof of arrival over Derby airfield on the last day's contest of an out-and-return. It seems extremely likely that such contests will be featured at the next International Contest at Monflorite, Spain, next year.

The 'Met' this year was an outstanding feature, put over in a manner at once informative and humorous. F. H. Ludlam's remark that there being an inversion at 6,000 feet, 'although the base of the cloud would move up during the day, the cloud tops would be no higher,' being an apt illustration, as was his demonstration of a permanent artificial horizon and a thermal creator on the last evening. It was interesting to hear him remark too, that he and Dr. Scorer had learned something in the week, one of the things being that soaring pilots know more than the 'Met' team about practical meteorology.

50 YEARS OF FLYING

The Daily Express are to be congratulated for having put on such a fine show at Hendon. It ran for 3 days—the 18th, 19th and 20th of July—and included a large static exhibition as well as some interesting flying.

There were 113 machines on view, from the 'Bleriot XI' (1909), via fighters of the 1914 war through the years of peace to the 1951 Miles 'Aries.' It was good to see the 'Flying Flea,' the Westland 'Pterodacty,' the Sopwith 'Triplane,' the 'Chilton,' the 'Cygnet,' and so many others among the pioneers that most of the younger generation will never have seen 'on the ground' before, but I am sure more early gliders would have been welcome too.

The flying programme was small, fascinating to the real enthusiast, though I doubt if it was spectacular enough on Thursday and Friday to appeal to the non-airminded. We saw the 'Bleriot' and the 1911 'Deperdussin' actually take off and stagger across the field—the 1912 'Blackburn' monoplane did a very creditable circuit, while the Sopwith 'Pup' and 'Bristol Fighter' put up a delightful aerobatic show which must have surprised the young moderns—I'll wager Pegg enjoyed flying the 'Bristol Fighter' far more than the 'Brabazon'!

We then had some rotating wing aircraft—the 'Cierva,' 'Auto Giro,' the Westland 'W.S.51' and the 'Bristol' helicopter, always fun to watch.

The gliding section was a little disappointing—some very low hops in the primary from a bungy launch, scarcely gave the public time to appreciate what was happening. The 'Prefect' followed up on a winch launch, as did the 'Olympia'—perhaps it was the very calm air which caused the pilot to overshoot and write off a wing tip, but it was a pity. Crashery at an Air Display is always bad propaganda, especially when unnecessary. Luckily very few people saw it, and the finale, polished aerobatics by Marmol after an aero tow in the 'Krajanek,' probably cancelled it out.

The commentary by Charles Gardner was most excellent and added greatly to the evening's pleasure.

VERONICA PLATT.

THE NATIONAL CHAMPIONSHIP CONTESTS, 1951

BRIEF REPORT

(Owing firstly to the B.E.A. strike, the Editor was marooned in Milan and therefore unable to be present on the opening days as intended. Veronica Platt was also prevented from being present until Thursday. Our reports therefore are compiled after the event, but the results were copied from the official lists).

THERE were 35 entrants for the 1951 Competitions, of which 7 were individual and the rest Team entries. The R.A.F. were represented by 10 machines, the R.N. 2, and the Army 1. Of the R.A.F. machines, 3 were ' Sedberghs ' entered by the A.T.C. The types of aircraft included 16 Eon ' Olympias,' 1 German ' Olympia,' 3 ' Weihes,' 1 ' Rhonbussard,' 1 ' Mu 13A,' a ' Petrel,' a ' Grunau,' a ' Gull IV,' a ' Kranich,' a ' Prefect ' and 2 ' Skys.'

The organisation improved on the high standard of recent years, except in the matter of an extra telephone, in which the Post Office were still un-cooperative.

The ' Met ' this year was largely in the hands of Dr. Scorer and F. H. Ludlam, of the Royal Meteorological Society and the Imperial College of Science, and was most accurate.

On the whole the weather was fortunate, at least from the point of view of the public, who enjoyed the warm sun and the cool breeze, as well as the beautiful and graceful spectacle of so many pedigree sailplanes cavorting in the air, with the sun shining through their irridescent wings revealing to all what flimsy things they really are, and thus contributing to the vicarious thrill of seeing them dare the high heavens.

Here is a brief summary of the results each day :—

Saturday, 21st. Not an official contest day, but a special prize for the greatest altitude was won by G. H. Stephenson, flying a ' Sky,' Slingsby's latest high performance achievement, in which he reached 7,300 feet.

Sunday, 22nd. The ' Met ' conditions were not favourable to much achievement from 1,000 foot winch launches, as the ground temperature would not be high enough until late in the day. There was some upper air turbulence but it was difficult to reach it. A ' Goal Flight ' was the set task for the day, the goal to be chosen by the pilot. The ' Rhonbussard ' (Frank Foster) went farthest—87 miles to Thornaby, but ' Steve,' with the greater altitude of 13,000 feet won most points with a 76 mile flight to Catterick. Lorne Welch reached Sherburn—37 miles—Nick Goodhart was a few hundred yards short of Yeadon which Wills also missed by 5 miles. David Ince got to Ripon, 63 miles.

Monday, 23rd. An inversion in the form of low stratiform cloud hung over the site all day so there was no competition.

Tuesday, 24th. Yesterday's task—a goal speed flight to Dunstable—was carried out today. The distance was 100 miles and ' Steve ' got there first in 2 hours 35 mins. at 42.6 m.p.h. Jock Forbes landed 1 minute later. They were lucky to get away, as later launches were blocked by a thin layer of cloud which effectually blanketted the suns rays from the earth and prevented radiation. The ridge became congested with machines soaring in a N.E. wind so that some competitors were kept on the ground.

Wednesday, 25th. The task today was a 73 mile out and return flight to Boston. The weather forecast was favourable to the outward flight but a 15 knot head wind on the return set a premium on the machines with a greater penetration. Only ' Steve ' reached the goal and in addition he made 19 miles of the return journey to Cranwell. Unfortunately, his barograph failed, and he missed the marks he would have obtained for the climb of 6,000 feet and these marks were vital as later events confirmed. Lorne Welch followed with 67 miles, Jock Forbes 42 miles, Wills 31 miles, and Ince 29 miles. Tony Goodhart contacted the Standing Wave at Great Hucklow, reached 4,000 feet and then made 28 miles in a downward glide on his course.

Thursday, 26th. The task today was a goal flight to a point chosen by the pilot in which Lorne Welch succeeded in a brilliant cross wind flight which aimed at Lympne but reached Manston. Still 187 miles on a day when others were flying down wind to the East Coast, was no mean feat. The day's best flight was by S/Ldr. Smyth of the R.A.F. G. & S.A. was to Bridlington (85) and 21 miles back in a ' Gull IV,' followed by Foster who was a mile short of Smyth, Forbes in his much discussed ' Photo ' Goal Flight to Flamborough Head and 8 miles on the return.

Friday, 27th. The morning here was unpropitious and of the 13 machines visible airborne at 11 o'clock 4 had landed together in the bottom a few minutes later. The task was a Goal Flight. Jock Forbes reached Market Weighton (62 miles), ' Steve ' made 56 miles (7,800 feet), and Tony Goodhart made 70 miles to Grimsby, Frank Foster made 69 miles, Godfrey Lee made 61 miles (7,100 feet). At the end of the day's flying ' Steve ' had 719 points, Forbes 665, Welch 632, Foster 603, Wills 566 and the prospects for the last two days were most intriguing.

Saturday, 28th. An out and return flight to Booth Ferry Bridge, near Goole. 45 miles. The best return was made by Jock Forbes, Goal (plus 25). Ince (plus 20), Wills (plus 16), Stephenson (plus 15), Goodhart (plus 13), Irving (plus 12), Foster (plus 11), Gates (plus 8), Dowdall (plus 5), Archbold and Smyth (plus 1), Mallett, Welch and Alexander reached the goal.

Sunday, 29th. An inversion at 6,000 feet which will probably continue, made the task (a return flight to Derby), not an easy one. In the event Deane-Drummond who was first away made the best time of 2 hours and 10 minutes for the 60 mile round trip. ' Steve ', who started almost last, some 3 hours later, landed at Buxton but Jock Forbes managed to complete the trip, so also did a ' T.21 ' in he

(Continued on page 188)

NEWS FROM U.S.A.

RICHARD JOHNSON—CHAMPION

THE 18th National Soaring Contest is history, and with it a new U.S. national distance mark is made a matter of record.

Richard H. Johnson, Palm Springs, California, was awarded the Richard E. du Pont Memorial Trophy, symbolic of the National Soaring Championship, at the Annual Awards Banquet held Thursday evening, July 12, in the beautiful, rustic Administration Building at Harris Hill, Glider Capital of America, site of the 1951 National Contest.

Mississippi State College student, Dick Johnson, 1950 National Champion, soared to his second national title in two years with a 360-mile cross-country flight from Harris Hill at Elmira, N.Y., to the Norfolk Municipal Airport at Norfolk, Virginia, contributing a total of 360 points of his contest total—579.

Closely following the national champion in second place was the 1933 National Champion, Stan Smith, Tonawanda, N.Y.; and third place holder, steel salesman Bill Coverdale of Chattanooga, Tennessee.

Although the first two days of contest flying were rained out, Friday, July 6th, the first day of contest flying proved to be the greatest single day in Elmira soaring history. The best flight was Dick Johnson's 360-mile flight with Bill Coverdale's 213-mile flight to Egg Harbor, N.J., adding to the impressive total mileage for the day. On this same day, eight other flights were made in excess of 100 miles, and a total of 2,710 miles were flown.

Over 50 soaring pilots flying 43 sailplanes made this 18th National Meet one of the largest in American soaring history.

Run upon the same rules as the International Championships, this year's contest set several other records, one of which was the launching on July 6th of all contestants at an average of less than three minutes per ship.

Record crowds were attracted to this year's meet—over 15,000 visited Harris Hill on Sunday, July 8th, to witness contest activities and participate in the ceremonies honouring the officers and men of nearby Sampson Air Force Base.

F.A.I. ANNOUNCEMENTS

44th Conference Communique—Extract

1952 World Competitions for Spain

Motorless Flight-Gliding

THE Gliding Committee made a final review of the sports code for Gliding which will be issued as a booklet called *Regulations for Records in Gliding and for the award of Gliding Badges.*

The Committee adopted rules for the world Gliding Championship Cup for single-seater gliders and, in order to encourage the development of two-seater gliders, decided on another World Championship Cup for this class to be competed for under the same rules as those for the single-seaters.

The Competitions for the World Gliding Championship will be held in Spain in 1952.

The Lilienthal medal was awarded to William S. Ivans, Jr. (U.S.A.), for his glider height record of 12,832 metres which was judged to be most outstanding glider performance in 1950.

Richard Johnson, U.S. Champion, is to make an attempt on the world's distance record of 465 miles at present held by Mlle. Klepikova of U.S.S.R. dating from 1940. He will be using the 'R-J 5' described in last month's issue.

38,650 FEET UP

Two-Place Altitude Wave Flight Record Broken

By BOB SYMONS

(At the time of going to press we had not heard whether the F.A.I. had officially homologated this flight.)

CUMULUS shaped 'roll' clouds down the valley were few on this particular morning. A few thin lenticulars showing to the north. From the Pibal reports, the wind velocities over the mountains were fair, at about 30 to 40 knots, and out of the westerly quadrant.

Dr. Joachim Kuettner arrived at the airport about 11.00 hours and after talking over conditions, I decided that the clouds did not look good enough to warrant making a single place flight in an attempt to better Bill Ivan's record of 42,000 ft.; it did not look good enough to the east either to try any extended distance.

Joach suggested that we make a two-place flight, so that I could show him more about the 'wave' in this country, so he could compare it with those of Europe.

The 'Pratt-Read's' oxygen tanks were topped, the nylon tow rope was laid out and the ship moved out to the runway. For extra clothes I put on a woollen electric 'bunny' suit, without the electricity, of course.

I chose to wear this type of suit because the arms and legs could be easily unzippered so that it was not too hot at low altitudes. I took along a leather jacket which I put behind the seat, in case I needed it. Joach wore his down lined pants and jacket and sheepskin boots, in which he suffered quite a bit, as you will learn later.

Take-off was at 12.26 and climb was made south of the airport in the vicinity of Black Mtn., partly in thermal and partly in mild wave conditions. We climbed to about 16,000 ft. before we started towards the 'roll' clouds just to the south of Big Pine.

We flew through four lift and downdraft regions before getting into the first 'wave.' The turbulence in this area was not very rough this day. While flying through the turbulent zone, I had my oxygen mask on so that I could direct the tow plane by radio (my microphone was in the mask). I had both hands full, one on the stick and the other on the spoiler control.

Out of the corner of my eyes I could see Joach first wiping the perspiration from his glasses, and then wiping his forehead and face. He would put his glasses back on and in just a few seconds would

have to start the whole procedure again. I motioned him to try to unzip his down-lined pants and jacket, but he did not get the idea.

We released at 15,000 ft. indicated, at approximately 13.00 and shortly afterwards were in a very good downdraft. I drove towards the Sierra, which were only about a mile away, and soon found good lift which pegged both rate of climbs at their limits, which was 2,000 ft. per minute.

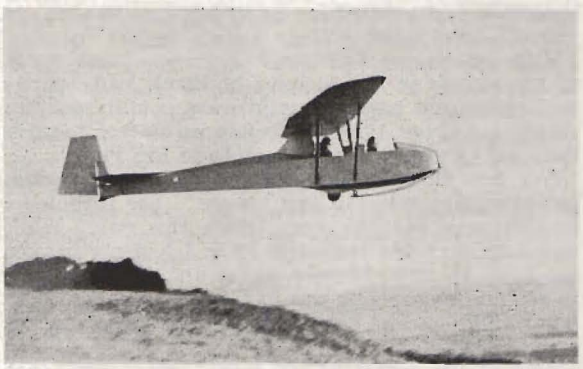
This fast rate of climb showed at 22,000 ft. where we arrived at 13.07. The outside air temperature was –26 degrees Centigrade. (All temperatures given are in Centigrade).

I now opened the door of the cockpit so that Joach could cool off a little. The climb continued at about 1,000 ft. per min. without special attention to try to stay in the region of maximum lift. We arrived at 25,000 ft. at 13.09½; the outside air temperature was now –32.

The climb now slowed a little and we arrived at 35,000 ft. at 13.30 with the outside temperature at –56, but it still was surprisingly warm inside the cockpit. I had missed getting my flying boots, or rather my one boot, in the ship before take-off, and during some of our passes up and down the wave my foot would be in the shade and would start to get cold, so then I would just park it up on the instrument panel in the sunshine and warm it up a bit. At times, it is quite convenient to have one wood foot, as you only have one to keep warm.

Everything in the cockpit that was in the sunshine was warm to touch. Joach was now doing the flying, while I was making notes of our compass headings, temperatures, air speed and position over the ground and other data. Our canopy over our heads now started to ice up just a little, and when Joach rubbed the plexiglass a little to see better out the side, all but the nose section rapidly iced up. Evidently wiping the frost scattered some ice crystals through the air which served as nuclei for more frost to form. The ice on the canopy never got more than 1/8th inch thick at any time, in the thickest places, which were directly over our heads.

From 35,000 ft. on up, the climb slowed, arriving: 36,000 ft.—13.34— –60; 37,000 ft.—13.41— –61; 38,000 ft.—13.47— –63.



The ' T.31,' the Slingsby new two-seater trainer at Camphill. The basic adaption from the ' Tutor ' can be seen clearly.

We stopped going up at 38,200 ft. indicated by our altimeter at 13.49, with the outside air temperature at –65 degrees Centigrade, which is 85 degrees below zero, Fahrenheit!—and we were still warm inside of the ship. I did not even need to put on my leather jacket.

The insulation in this particular ' Pratt-Read ' is the aluminum foil, filled with batting, variety, and seems to be the best, perhaps because the foil reflects a lot of the heat from the sun back into your body.

At this high point we could drift slightly downwind and enter the base of the upper lenticular cloud. The top of the lower lenticular ' roll ' cloud had been at approximately 33,000 ft. When drifting into the lenticular edge the lift would increase, but as our bank and turn failed to work, we could not safely enter the cloud.

We worked down towards Lone Pine and then back towards Coyote, without finding any areas of extra lift. We were able to maintain our altitude without much effort, and after radio contacts with the tow plane, we flew to the north over Coyote and found mild turbulence at 37,700 ft., –62 degrees, at 14.40. We also ran into some more lift at this point, but my plans before take-off had been to go only to about 38,000 ft. high, and as everything had worked well so far, I did not see any reason in stretching our luck.

After all, temperatures as cold as –65 degrees Centigrade impose severe strains on the fabric, and the steel spar fittings on wood spars, as well as many other things, so I thought it better to finish our flight and inspect the ship before encountering any colder temperatures.

At this point there was no lenticular cloud downwind, so I flew downwind to see what kind of lift there was in the second and third wave position, and explore that.

We found quite a bit of sink going downwind; sometimes as much as 2,000 ft. per minute, and did not get into any good lift until arriving just downwind of the crest of the White Mtns., where we got good lift at 35,000 ft. We stayed there only a few minutes as the airport radioed that some photographers were all set up on the runway to take pictures of our landing.

I started down with the spoilers open and flying at about 70 miles per hour, at 15.00. We landed at 15.22 without finding much turbulence on the way down.

It gave me a great deal of satisfaction to have Dr. Kuettner along on this flight. It was very fitting that we should break a two-place altitude record (subject to homologation) in the ' Wave.' Dr. Kuettner has studied and flown in wave conditions in all the European countries and is considered the top man in that field in Europe. I discovered the ' wave ' here at Bishop in 1929, and since that time I have made more than 300 flights in it.

The barographs both calibrated out at 38,650 ft. above sea level.

A year ago this day, March 5th, I soared the ' P-38 ' for over an hour with both engines stopped and the propellors feathered, to over 30,000 ft. I wonder what next March 5th will bring.

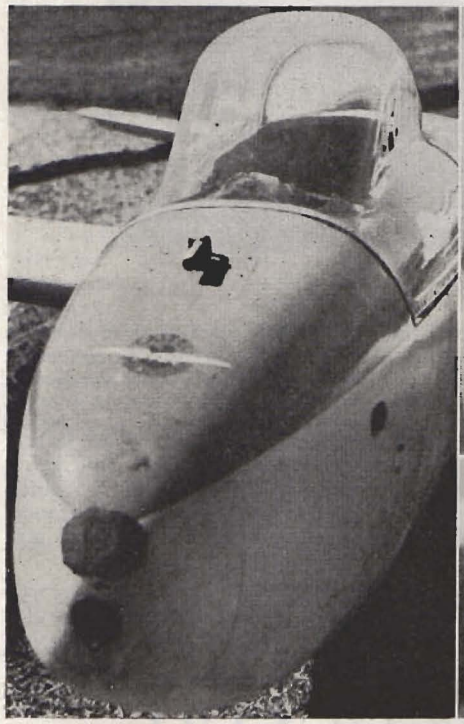
SOARING IN FRANCE

New Aerobatic Sailplane

By GUY BORGÉ

FOUGA 'CM8-13 AERO'

PHOTOS BY BORGÉ



The canopy gives excellent visibility in any direction. Look above the fuselage the new pitot head set sideways; at right, its static head.



Top—Cockpit with special features: Up—release of the canopy; special bank indicator for inverted flying. Middle—trim of rudder bars. Down—normal bank indicator, altimeter, accelerometer. Left—A.S.I; right, variometer and release knot; at extreme right, elevator trimmer. The special joy stick, tap-rooted at its upper part is also noticeable.
Bottom: The new very efficient airbrakes.

AEROBATIC sailplanes are not to be found in large numbers.

The best known model was the German 'Habicht,' immensely strong but of which some specimens exist to-day.

FRENCH NEED

After the war, in France the need for a special aerobatics sailplane was apparent, and the 'CM8-13 Aero' was designed by the Fouga factory.

The machine does not seem very attractive with a 'square appearance,' but it is really efficient in the hands of a qualified pilot. We have especially wondered at the magnificent shows of Mr. Legrand the test pilot specialist of sailplanes at Brétigny, the French Farnborough.

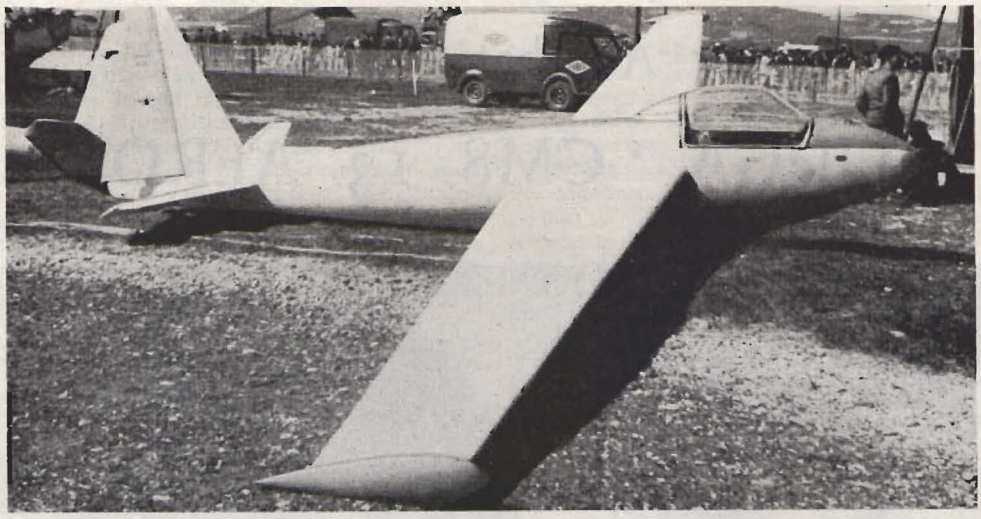
In the 'CM8-13' he executes with perfection stalls, loops, spins, rolls and inverted flying close to the ground. The characteristics of the 'CM8-13' seems interesting because of its small size as well as its excellent performances.

CHARACTERISTICS

Wingspan, 42 ft.; aspect ratio, 13; wing area, 144 sq. ft.; empty weight, 495 pounds; total weight, 740 pounds; mimimum sinking speed, 2.62 ft./sec.; maximum gliding ratio, 27; security factor, 12; aerobatics, unrestricted.

SPECIAL FEATURES

It has special features, certain being already used in the other Fouga sailplanes. The canopy is designed for an excellent around visibility in any



General view of ' CM8-13 Aero.'

direction. The instrument panel has the normal instruments of a sailplane such as the altimeter, A.S.I., bank indicator, variometer, compass, and also some new ones for aerobatics, an accelerometer to appreciate stress endured by the machine and an inverted bank indicator for flying upside down.

For better comfort, especially favouring the tall pilots, the joystick is tap-rooted at its upper part. The towing hook is also new and has an automatic release when the angle of the wire is too pronounced, it has a special ring, ' T ' shaped.

The A.S.I. contains 2 completely separated heads, one just above the fuselage for measuring the total pressure, and the second one laterally disposed for static pressure. This arrangement is interesting because the heads are better protected and cause less drag. The airbrakes are the new Fouga style consisting of separated sectors under and above the wing.

Wing tips are bordered by some special lateral keels which improve airflow in this place. De-rigging is provided for by sliding bolts as in the ' Weihe.' The horizontal tail, of somewhat crude appearance, is de-rigged in two separate parts, starboard and port.

By the novelty of its design and equipment the Fouga ' CM8-13 ' appears to be very interesting and it will certainly become a regular performer at the principal meetings.

KOCKUMS FLYGINDUSTRI

(SWEDEN)

by R. A. G. STUART, M.A. (Cantab.)

THE present firm of Kockums Flygindustri, a subsidiary of the large Kockums metal-working concern, was formed at Bulltofta airfield, Malmö, as successor to the firm of A.B. Flygindustri of Halmstad.

Their first original product was the ' Fi-1 ' single-seater sailplane, designed by T. Lidmalm in 1943. Though classified as an intermediate type, its performance is much better than most intermediate sailplanes. It was with this type that K. A. Rasmussen recently set up a Danish goal flight record by flying 321.8 km. from Ry to Karlshamn in Sweden in spite of the fact that his machine was far from new.

Its high safety factor makes the ' Fi-1 ' suitable for aerobatics and cloud flying and it is also stressed for high-speed towing. Six of these gliders were built but three have since crashed. The ' Fi-1 ' is of the pod and boom layout and, as might be expected from the firm's associations, the pod is of welded steel tube construction, covered with a moulded wooden nacelle. The circular tail-boom is of stressed-skin wooden construction. The wing has a single wooden I-section spar with diagonal plywood covering in front and fabric aft of it. The two-spar tailplane is of similar construction and all control surfaces are fabric covered. Dive brakes limit the vertical diving speed to 115 m.p.h., but the terminal diving speed without brakes is 195 m.p.h.

The ' Fi-2 ' was a project for a 6-seat high-wing transport glider with single-strut wing bracing. It was never built but was developed into the larger ' Fi-3 ' with accommodation for two pilots and ten other troops or 1,000-1,100 kg. military load. The front fuselage is again of welded steel tubes with moulded wooden covering, and the rear part of stressed-skin wooden construction.

There is a knock-out panel with four portholes on each side of the fuselage. The wings and tail are of

wooden construction and all control surfaces are fabric covered, the ailerons being aerodynamically balanced.

Dive brakes are fitted to upper and lower surfaces of the wings. Owing to its clean design the ' Fi-3 ' has a better performance than most cargo gliders, having a best gliding angle of 1:15. It was designed by J. Weibull with T. Lidmalm as project engineer. Five were built to the order of the Royal Swedish Air Force (Flygvapnet) in 1944 but the contract was cancelled at the end of the war.

There was talk of adapting them to civilian use but nothing came of it. During a recent visit to the works at Bulltofta, they could be seen in a hangar with wings removed. Beneath the dust their Flygvapnet camouflage could be plainly seen.

No original types are now being built. Production is centred on the L.H. 22 ' Baby-Falken,' a re-design of the ' Grunau Baby ' by L. Hemminger.

By mid-1949 eighteen of these had been produced as well as 100 ' SG-45 ' primary gliders, and ' Weihe', ' Olympia ' and ' Kranich ' sailplanes. There was also a project for a re-design of the ' Olympia ' with new wings.

The ' Baby-Falken ' prototype first flew in 1946. It has a fabric-covered chrome-molybdenum steel tube fuselage of better aerodynamic shape than the German design, enclosed cockpit, double pneumatic landing wheels and two tow-points, one in the extreme nose for aero-towing and the other under the nose for winching.

Two small windows in the floor allow the pilot to see the tow-line and tow-points, a refinement not often found. The wing, braced by a single streamlined strut, is of similar construction to the firm's other products, the fin is of steel tubes, the tailplane of wooden construction and control surfaces fabric covered.

Kockums Flygindustri also make obechi floats, 4-5 m. long, of single-step, flat-bottomed type with a chine only in front of the step. The design and construction of the first pair cost 45,000 kr. and the floats are sold at 6,200 kr. per pair. They are attached by means of N struts and braced to each other at the front and rear attachment points of each N.

Four pairs have been supplied for ' Piper Cubs ' and two for ' Luscombe Silvaires,' for which the firm acts as agent. Repair and maintenance work is undertaken too ; among the more unusual types observed in one of the hangars was a ' Spartan Arrow,' still airworthy.

DATA : ' *Fi*-1.' Span 46 ft. ; wing area 156 sq. ft. ; aspect ratio 13.9 ; wing loading 3.68 lbs./sq. ft. ; wt. empty 397 lbs. ; wt. loaded 574 lbs. ; min. rate of sink 2.33 ft./sec ; best gliding angle 1:24 ; stalling speed 32.3 m.p.h. ; dihedral 2.5°.

' *Fi*-3.' Span 16.5 m. ; length 9.7 m. ; height 3.3 m. ; wing area 32 sq. m. ; aspect ratio 8.5 ; wt. empty 790 kg. ; AUW 1800 kg. ; max. towing speed 250 km./h. ; max. diving speed 350 km./h. ; best gliding angle 1:15 @ 175 km./h. ; landing speed 80 km./h. Gross wt. can be increased to 2100 kg. if towing speed is reduced to 200 km./h.

' *Baby-Falken*.' Span 44.2 ft. ; wing area 159 sq. ft. ; wt. empty 330 lbs. ; wt. loaded 550 lbs. ; min. rate of sink 2.6 ft./sec. ; stalling speed 30 m.p.h. ; best gliding angle 1:19.

ICE ACCRETION

Meteorological Office Discussion

THE first discussion of the 1950-51 series, held at 11, Carlton House Terrace, on October 9th, 1950, took the form of a review of recent American research into ice-accretion problems. The opening speaker was Mr. G. A. Corby.

The work considered comprised the results of the Harvard-Mount Washington Icing Research Project[1]* obtained during the 1946-47 winter and also the results of flight researches carried out during the 1945-46 and 1946-47 winters by the Ames Aeronautical Laboratory for the American National Advisory Committee for Aeronautics (N.A.C.A.)[2,3].

Mr. Corby explained how the problem of forecasting the occurrence and intensity of aircraft icing had always been hampered by the lack of data available about the quantities most fundamentally involved, namely the liquid water content and the size of the droplets in clouds. This gap in our knowledge accounted for the apparent paradoxes which were common in reports of aircraft icing. Application of a theoretical treatment of droplet trajectories, due to Langmuir and Blodgett[4], had made possible the measurement of the liquid water content and drop size of icing clouds. The technique consisted in the analysis of the rates of accretion obtained on an assembly of cylinders of various sizes after exposure to the icing cloud. The method yielded also an approximate indication of the type of distribution of drop sizes about the mean effective diameter.

An aircraft icing standard had been adopted by the United States Weather Bureau for work of this type, and, on this standard, one unit of icing intensity was defined as accretion at the rate of 1 gm./cm.^{2}/hr. on a 3-in. diameter cylinder moving through the cloud at 200 m.p.h. with its axis perpendicular to the direction of motion. Icing intensities of 1, 6 and 12 on the standard were defined as the boundary values between trace, light, moderate and heavy icing.

Application of Langmuir's work enabled the icing

* The index numbers refer to the list of references on page 177.

rate on the aircraft standard to be calculated once the drop size and liquid water content were known and a graphical representation of the relation between the three quantities was used to demonstrate how a particular icing intensity might be caused by a wide variety of combinations of drop size and liquid water content, and how apparent paradoxes arose in the past because of the lack of knowledge of these quantities.

A comprehensive series of measurements of liquid water content, drop size (mean effective diameter) and the derived variable, icing rate on the aircraft standard, had been made from the summit of Mount Washington, New Hampshire, U.S.A., which is enshrouded in cloud at temperatures below freezing for much of the winter. The mean values obtained for liquid water content, mean effective drop diameter and icing rate were 0.472 gm./m.^{3}, 13 microns and 4.09 gm./cm.^{2}/hr. with standard deviations of 0.269, 5.1 and 3.66 respectively. A statistical analysis had revealed real positive correlations between the icing rate and both the liquid water content and the drop size, but Mr. Corby felt that these correlations had little practical meaning since the icing rate was analytically related to the other two quantities.

The broad relations found between the icing rate and the synoptic situation were mostly peculiar to North American winter conditions, and in any event would be of little value for forecasting owing to the wide variations of icing rate within each situation. Although no connexion had been found between the icing variables and the lapse rate, Mr. Corby considered that such effects had probably been masked by the changes in the physical state of the clouds caused by the forced ascent at the mountain.

An investigation of errors in the rotating cylinder measurements caused by loss of some of the intercepted water before freezing (' run-off ') and loss of fragile rime due to the action of the wind (' blow-off ') had shown that neither cause had significantly affected the Mount Washington results but that ' run-off ' errors might be large at aircraft speeds.

It had not been possible to confirm or deny from the icing observations at low temperatures the existence of the —41°C. limit identified by Cwilong[5,6] and others as being the critical temperature for the effectiveness of sublimation nuclei in the atmosphere, and no temperature limit could therefore be set below which aircraft icing would be impossible.

Substantial reductions in the liquid water content of clouds had been brought about on some occasions by the introduction of dry ice into clouds covering the summit. A method was demonstrated of estimating from a representative tephigram ascent the maximum possible liquid water content of clouds formed by local convection and low-level turbulence.

The flight researches carried out for the American National Advisory Committee for Aeronautics comprised 557 measurements of the drop size and liquid water content of icing clouds by means of the rotating cylinder method. The ranges of values of these quantities were, generally speaking, consistent with the Mount Washington data.

The idea of forecasting icing intensity on the aircraft standard by using a value of the liquid water content, estimated from radio-sonde data, in association with a mean value of the drop diameter for the cloud type (14 microns for layer clouds and 17 microns for cumulus clouds) had been examined with promising results. In addition, a set of tentative qualitative forecasting rules had been evolved.

In considering the problem of defining the worst icing condition likely to be encountered in a given area, for use by the designers of de-icing systems, two distinct aspects had been recognized : the probable maximum icing condition irrespective of its extent or duration and the maximum continuous icing condition with which de-icing equipment might be expected to deal indefinitely. Values for these two conditions applicable to the United States were quoted. The problem had also been dealt with from a statistical viewpoint and the results specified in the form of the worst icing condition likely to be encountered once in a given number of icing flights over given flight path distances.

The Director, opening the general discussion, drew attention to the difficulties of measuring drop-size distribution, and asked how this quantity had been measured by the U.S. workers. He was surprised that, in view of the work of Cwilong and others on sublimation nuclei, the American work revealed no clear connexion between icing and altitude at great heights. As the duration of an icing instance decreased with the intensity, he wondered whether it was possible to identify a maximum ' dosage ' of ice deposit.

Mr. Corby explained briefly how the size distribution of the droplets was approximately determined in terms of a set of defined distributions having various degrees of departure from uniformity. It was possible to fly in icing layer cloud more or less indefinitely and this would rule out the possibility of establishing a maximum icing ' dosage.'

Mr. G. F. W. Oddie quoted a case of icing encountered by the ' Comet ' jet airliner at a temperature of —60°C.

Mr. Best queried whether it was possible to fly in a supercooled liquid cloud without ice forming. He was doubtful whether the relation between temperature and icing found at Mount Washington would apply to aircraft icing owing to the mountain results being obtained at a fixed altitude. He regretted that the descriptive terms for icing intensity were related to accretion on a fixed-size cylinder.

Mr. Corby felt that reports of no icing in supercooled cloud might well be cases of intensities too small for visual observation.

Mr. Bradbury pointed out that in most pilots' reports icing appeared to be associated with turbulence.

Mr. Corby thought this was because turbulence was common in convective clouds which also gave rise to most significant icing cases.

Mr. D. D. Clark said that icing must vary considerably with the type and speed of the aircraft, and wondered, therefore, how the results were affected by the aircraft and also by the de-icing system in use.

Mr. Corby explained that the type of aircraft and its de-icing equipment did not affect the results

which were obtained from the rotating cylinder measurements and not from the accretion on the aircraft itself.

Dr. Frith quoted from his own experience to substantiate the contention that rotating cylinders pick up snow crystals as well as supercooled water droplets. The amount of ice was not the only important factor since variations in the shape of the deposit affected the aircraft performance in various ways. He thought that the apparent lack of icing in some supercooled clouds might be due to the kinetic heating effect.

Mr. Gloyne explained how Langmuir's theoretical work on droplet trajectories and the rotating cylinder technique were being applied to meteorological research into agricultural problems, e.g. insecticide spraying, etc.

Dr. Palmer (Clarendon Laboratory) showed how the reports of icing at very low temperatures were not necessarily inconsistent with the results of Cwilong's work on sublimation nuclei. An insufficiency in the free atmosphere of the nuclei operative at —41°C. would account for the existence of liquid clouds at temperatures below that limit.

Mr. Wallington drew attention to the fact that aircraft in congested areas might be forced by Air Traffic Control procedures to fly for long periods in icing conditions. He quoted an instance of two Viking aircraft encountering very different icing conditions in the same cloud layer at almost the same time. In reply to a query, he was told that there was as yet no method of predicting the maximum liquid water content of clouds other than cumulus and strato-cumulus.

Mr. B. C. V. Oddie thought that caution would be necessary in applying the results to forecasting in the United Kingdom since they were determined for American winter conditions.

Mr. Corby, replying to a question by Mr. Sawyer, said that errors due to run-off losses must have been considerable in some of the aircraft measurements but no particular investigation of this was mentioned in the N.A.C.A. report.

Dr. Sutcliffe asked whether current Meteorological Office publications were affected by this new work, especially as regards the forecasting of the icing index.

Mr. Corby said that some modification in the guidance given for forecasting icing index would be necessary in the light of the American work.

Mr. Absalom mentioned that this had been allowed for in a new *Meteorological Report* on icing to be issed by the Meteorological Office in the near future.

Points raised by other speakers concerned the connexion between icing and the appearance of clouds, the occurrence of rain ice and the limitations of the rotating cylinder technique as a method of measuring the icing variables.

The Director, in closing the discussion, welcomed the advances which had been made in the complex subject of aircraft icing and commented on the great practical difficulties of the experimental work involved.

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(*By kind permission of the Meteorological Magazine, December*, 1950).

SILVER 'C' HEIGHT, DISTANCE and DURATION IN ONE FLIGHT

By S. R. DODD.

ON three occasions I have had to decide whether to attempt Silver 'C' distance, or to return to base. The first time was in a 'Grunau Baby' in the last hours of a special course. This latter fact and my poor gain of height compared with distance downwind decided me against the attempt, and I eventually worked my way back to the airfield. The second occasion occurred in a 'Gull I' in similar circumstances, and I landed two miles short of the home airfield. On each of these two occasions

the wind strength was about 25 m.p.h. at ground level and my maximum height just over 2,200 feet some three miles downwind of the airfield.

The ' Gull I ' flight was very unpleasant, for having made my decision to return, and having turned upwind, I found sink which increased to 20 feet per second before any appreciable distance was made. There was no consolation in muttering ' Where there's a down, there's an up close by,' as in this case there was insufficient time (or height) to prove it. I was very worried as I watched the angle between me and the airfield reduce rapidly towards zero. Wriggling to port or starboard did not help. Choosing a field which looked grass-covered, I made a landing which had enough drift in it to be termed an arrival. The grass was in fact full grown clover, and here I sat and thought about this, my first landing in a strange field. I felt lonely, shaken and a little miserable as I watched Steve fly over downwind. Thinking back it occurs to me that Steve was riding a cold front, and my excessive ' down ' was probably coming from the cu-nim, so that in flying upwind I was getting the worst of it.

The third occasion occurred in the ' Gull IV ' on the 26th July, 1949. Conditions looked very favourable : a light westerly with 3/8 cumulus cloud cover at about 4,000 feet. My first launch was spoiled by a cable break, but the second attempt at 12.36 hours gave me sufficient height to try a circle or two at the top of the launch away from the ridge. The thermal I had hoped for was not there, and before long I was doing a ' goldfish in the bowl ' act along the ridge. After 50 minutes of this, during which my maximum height was 800 feet I decided that if this was the total result of my concentrated effort, then someone else could try. On my approach towards the lynches at 250 feet with a hand on the air spoilers lever, I felt lift, and after a quick look out tried a gentle turn, using excess speed to increase height. The first circle showed a gain, so did the second, and so it went on. Subsequent inspection of the barograph chart showed a climb at two feet per second to 1,100 feet, a descent to 800 feet a climb at four feet per second to 2,600 feet ; a return to 2,200 feet, then a steady four feet per second to 4,400 feet. This last ' ladder ' made up my mind for me, and course was set downwind by cloud shadow to 130 degrees, with a hope that the ' snakes ' would be little ones.

By now I was over Luton Airport, and as I circled I remembered the many times when I had sat in my office below and suffered the sight of a sailplane meandering across the sky. There had been the ' Minimoa, a ' Weihe,' ' Krajanek,' a ' Viking ' and an ' Olympia ' from Cambridge that just made 50 km. with 400 yards to spare. Cloudbase was now close above, and still climbing I switched on the turn-and-bank. This was to be my first attempt at flying in cloud. On entering I reduced bank instinctively and asked myself how one used a turn-and-bank indicator. Hearing no answer, I contented myself with keeping the A.S.I. reading constant and the black ball central. A glance at the turn needle showed zero ; then the light dawned in two ways : I flew out of my first cloud. From then on I alternated between circling and straight flight on course 130 degrees just below cloud base. Steve's tips on thermal flying given in his lecture were tried out and seemed most effective. An interesting point which revealed itself here, and was substantiated later, was the difficulty I experienced in co-ordinating mentally while flying, the relationship between the A.S.I., the rate-of-turn needle and the slip indicator. I had the feeling, that I had experienced during my ab-initio training when co-ordination between the elevator, the ailerons and the rudder was difficult. Using two controls correctly at that stage came fairly quickly, but the introduction of the third control was liable to bring complete confusion. The same applied to me when I attempted to obey three instruments. Frank Foster's subsequent lecture assisted me a great deal in explaining the way in which the three instruments should be used.

However, let us get back to the flight. To the south I saw the reservoir near Chingford and further away the smear that was the Thames. A little later to the east the coast appeared and Southend sprang to my mind. Only at this stage did I wish for a map to show me if Southend lay north or south. Ahead lay a broad indentation in the coast with a town, which I later identified as Malden, inland. To the south lay a large coastal town with an airfield and a pier. Southend it must be. Now I was steadily losing height, and for the first time I went off course to look for lift. An aerodrome to the north seemed the best bet, and the sight of a lone tractor with driver proved decisive. If lift was not there, then at least there was someone to direct me to the nearest phone. However the lift was ' at home,' and took me up from 2,500 feet back to the cloud base. With 4,500 feet I turned south towards Southend which now lay about 15 miles away.

Devil ' Doubt ' now began to worry me : I felt certain that there must be a snag somewhere ; probably the barograph was not inking, and I remembered that the ink had dried in one during the recent hot weather. What about the five hours duration ? Did I need a barograph record for that ? How much longer did I need to fly ? At what time was I launched ? Was the watch still going ; its tick was not audible above the outside soft whistle. If it was right then by 17.15 my five hours' would be completed. Later another half an hour was added for luck, and it was just as well.

The last two hours were spent around Southend, practising cloud flying, and I made my highest yet climb to 5,500 feet above Dunstable level. Over Southend the lift seemed poor, but I was tired and very thirsty ; so after a high speed circuit a return was made to earth with the welcomed hospitality of the Southend Flying Club. Indeed, a most enjoyable finish to a flight of five hours and nine minutes which, with such a fine aircraft in such good conditions may well be called a ' gentleman's ride."

Editor's Note : Lest we confuse our readers, we should stress that only two legs for a Silver ' C ' can be claimed for any one flight. Dodd's barograph had in fact been working, and he made another flight of five hours at a later date to complete the requirements of his Silver ' C.'

Ridge Wind, Thermals and Standing Wave all in the same day

Sailplane—' Minimoa.'

Pilot—O. L. Simpson.

Site—H.Q., B.A.F.O., G.C., Scharfoldenforf.

Wind—N.E. 8-10 m/s.

AT 7 a.m. on the morning of Jan. 18th last year a north-east wind of 8-10 m/s produced perfect examples of standing wave lenticular roll clouds, extending the entire length of our twelve mile ridge, and successive clouds down wind at about seven mile intervals denoted that we had a ' real McCoy ' of standing waves. The visibility was perfect and although the temperature was way below zero the sun was shining and there was no other clouds in the sky. Unfortunately it was 10.30 a.m. before I was launched in our red ' Minimoa,' the main difficulty being to keep the winch warm enough to launch (if left switched off for a few minutes it had to be run for fifteen before warm enough again). By now the roll clouds had begun to disperse—but nothing daunted I pressed off down the east side of our ridge, armed with Gold ' C ' height sized barograph.

Even a 8-10 m/s wind produced ridge lift of only +1 m/s at 50 metres (which was the height I arrived on the ridge proper with . . . and this only up to 200 metres) . . . which looked like very stable conditions, and certainly not liable to produce thermals. After gaining a couple of hundred metres I flew up-wind over the valley to contact the wave, but even by flying at 40 km.p.h. I got nothing better than zero, which after ten minutes changed to extreme turbulence and 4 m/s sink ! It appears that one has to get out on the field at the crack of dawn to catch standing waves off our east ridge ! ! So, rather disappointed we flew rather rapidly back to the ridge, where I cruised up and down till about 12 noon . . . when I noticed a barn-cum-house catch fire in the east valley. As the pall of smoke reached my level I flew straight into it on the odd chance of getting a bit of lift—I flew straight into +3½ m/s. ! Putting the ' Mini ' right on her side I managed to stay in this very narrow thermal up to 500 metres—where flying anywhere in the vicinity of the smoke only produced zero. On the way up I had quite a job to keep the speed constant, as this artificial ' thermal ' was very gusty indeed. About now the sky was beginning to fill with fair-weather cu., which seemed to be forming in streets off a coal mine a few miles up-wind. On returning to the windward side of the ridge I lost three hundred metres in the downdraught, but immediately made for the smoke again, where I was joined by the C.F.I. (Flt/Lt. Osland) in a ' Kranich ' and Cpl. ' Andy ' Gough in a ' Weihe,' All three sailplanes circled madly in the smoke, which was rather nerve-racking for me to see every now and then through the smoke a ' Kranich ' or Weihe ' tail flashing across my bows ! This time we reached 700 metres, underneath a very vicious-looking boiling black cumulus cloud, which I judged to be about 50 metres above me. As by now the pitot head and venturi were completely iced up, and frost was forming inside the cockpit on the perspex, I didn't enter it, but flew up-wind under a cloud street for several miles . . . with an airspeed of 80 km.p.h. We were getting zero all the way, which indicated a good Silver ' C ' cross-country day (unfortunately we had no pilots available that day to take advantage of it).

All the rest of that day thermals were very plentiful off all the villages in the valley, and at 3 p.m. cloud base lifted to about 1000 metres. From this time on the thermals began to weaken to +2 m/s. and finally died out about 4 p.m. The main trouble was that throughout the day one had to stay below 700 metres, as the icing risk was very great—but for January the thermal conditions were exceptional, and although I took off too late to contact any useful wave lift, an excellent day's thermal soaring was some compensation. The burning barn was eventually put out by the local fire brigades, but while it lasted provided a good chance to indulge in some blind flying—if one didn't mind half choking to death in the smoke ! One can imagine the barn's owner shaking his fist at us soaring madly in the smoke while his beloved barn burnt to the ground . . . perhaps it wouldn't be policy to write and thank him . . .?

LOVELINESS FROM THE AIR



Church Stretton from S.E. end of the Long Mynd, site of Midland Gliding Club, Shropshire.
(*'T.21' at 2,300 ft.*).

The Home-Constructed 'Finibee'

By JOHN BRITTEN



Good front view of the 'FINIBEE'

THE Britten-Norman 'BN-1F'—the 'Finibee' was designed by Desmond Norman and the writer with several ends in view.

We wished to design and build an aircraft that would cost us the minimum in terms of money, labour and materials. Secondly, we wished to prove that an ultra light aircraft need not rely on a relatively gigantic wing area in order to get off the ground, for many ultra light types are land-bound for a large proportion of their useful lives simply because of too many over 20 m.p.h. winds. Also a smaller wing means a shorter fuselage and hence considerably less to build.

We soon arrived at our specification. This called for a minimum sized aeroplane with a straight-across wing, reasonable engine power, in order to make up for the increased wing loading, and using the simplest forms of fittings and construction. Inherent stability and safety were further essentials.

EXPERIENCE GAINING VENTURE

Final decisions on layout and general design were taken some two years ago and from that date the fun started, for it must be admitted that the whole project was treated from the beginning as an experience gaining venture that might or might not lead to a successful aircraft.

However, we were sure that at least if we could build it there was no doubt that others could do likewise, as we had no special tools or equipment and were unable even to achieve electric power. Ours is definitely an aircraft built right from scratch.

From a design point of view it might be thought that an ultra light aircraft of an elementary nature is a simple problem. However, there is scant applicable aerodynamic data available, and in certain components such as propellors it is essential to obtain the last per cent of efficiency in order to obtain a workable aircraft. Weight saving is of paramount importance and the designer soon finds himself in deep water.

Nevertheless it must be admitted that the 'BN-1F' turned out to be a fairly straight-forward proposition and a single carpenter was able to build the prototype in under seven months.

THE FIRST TESTS

This made its first tests last August but we soon found that we were wrong in our estimations in several respects. Both the engine and the undercarriage were unreliable and overweight for their performance and the rudder proved undersized. It was a case of 'back to the drawing board.'

We fitted a 55 b.h.p. Lycoming engine and a completely redesigned undercarriage. The fuselage was also rebuilt and a larger rudder added, the cockpit slightly enlarged and improved fuselage lines incorporated.

The first proper flight trials with the redesigned aircraft started at the end of May and we soon found that at last we were on the right track. It is now a matter of modifying and changing until we can finally

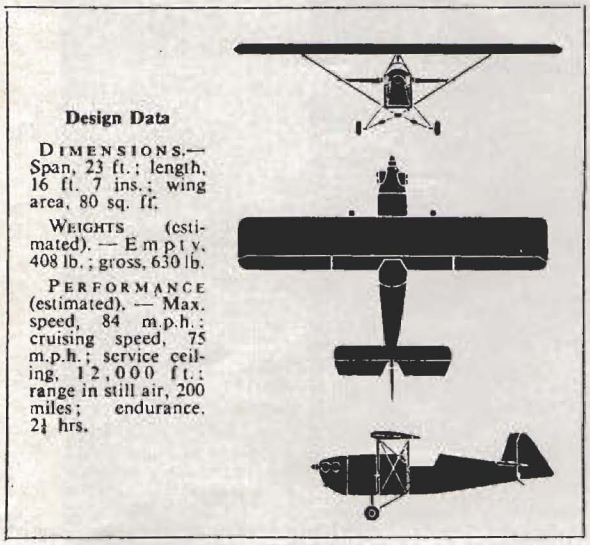
be satisfied that we have got the most out of the layout.

Then, perhaps, other people may care to build ' production ' machines to what should then be an approved design. For ultra light aircraft are most certainly one answer to the cry for cheaper flying and the building of them is a sport in its own right.

J.B.

CONSTRUCTION

In the layout of the ' Finibee,' the designers chose a parasol-type wing for good lateral stability without the complication of dihedral, a tail unit of generous area to cope with any likely C.G. positions. Wing



Design Data

DIMENSIONS.— Span, 23 ft.; length, 16 ft. 7 ins.; wing area, 80 sq. ft.

WEIGHTS (estimated). — Empty, 408 lb.; gross, 630 lb.

PERFORMANCE (estimated). — Max. speed, 84 m.p.h.; cruising speed, 75 m.p.h.; service ceiling, 12,000 ft.; range in still air, 200 miles; endurance, 2¾ hrs.

loading was kept relatively high (for an ultra light aircraft) to ease handling in gusts and strong winds; and to ensure keeping within the A.R.B. ultra light requirements for a stalling speed of not more than 40 m.p.h., flaps were included in the design.

Originally, the aircraft was designed around the 36 b.h.p. J.A.P. engine as being the only proven type available in any quantity. The airframe was stressed, however, for a power plant of up to 75 b.h.p., and a 55 b.h.p. Lycoming flat-four has since been installed.

To avoid the normal drawback of parasol wings in restricting visibility, the cockpit of the ' BN-1F ' was positioned well behind the wing. Vision during turns is, therefore, good. A parallel-chord wing was selected both for good stalling characteristics and, with its standard ribs, ease of construction. For the same reasons, the NACA 23018 aerofoil section, with its 18 per cent. thickness/chord ratio, was chosen. Its thickness enables plank spars to be used, and gives a shallow curvature for the ply-covered leading edge.

From the drag point of view, the extra thickness was considered to be negligible. A span of 23 ft., and an aspect-ratio of 6.4, provided a compromise between safe handling and minimum size.

The wing is strut-braced and has spars at 15 per cent. and 17 per cent. of the chord. Although plywood-covered, the nose, forward of the ½-inch spruce plank spar, is not considered as a torsion box, but it nevertheless carries a large proportion of the wing loads. Every third rib bay is ply-covered to form drag boxes between front and rear spars, thus obviating any internal diagonal bracing.

In effect, the wing is ' self-jigging.' The method of construction, which ensures precision, is for the halves of front and rear spars to be joined together by fishplates at the centre and, after the aileron spar has been placed into position, the ribs, complete with leading- and trailing-edge members, are slid on to the spars and glued into place.

The ply leading edge is then attached, except for the bays opposite strut pick-up points, together with the skin for the drag boxes. The portion of the wing behind the rear spar—consisting of the aileron spar, ribs and trailing-edge member—is sawn off, the pieces between the rear spar and the aileron span are cut away, and ply torsion boxes are built on to the flap and aileron spars. Wing tips are square cut, and Obechi blocks are used where any complex curves are required.

All hinges, throughout the aircraft, are simple U members, mounted on wooden blocks. Ailerons are cable-operated, with no differential, and are connected via a bell-crank in the centre section. The flaps are also cable-operated, with a rubber bungee return.

The wing is attached to the fuselage by six pylon struts and four main-lift struts of drawn 20 s.w.g. T45 tubes, with slightly flattened ends. All fuselage pick-up fittings are similar triangular plates, attached to two fuselage main frames.

FUSELAGE STRUCTURE

Construction of the fuselage, which is slab-sided, is conventional, and ply is used for covering. The decking of the rear fuselage is built up of formers and stringers, with a fabric covering. To the rear of the two main frames is the cockpit, which has a readily removable plywood seat for control adjustments.

The cockpit has an internal skin, and is neatly upholstered with red Rexine. Only a lap-strap is fitted as the ' BN-1F ' is in the normal category. On the port wall of the cockpit is the throttle, while on the other side is a flap lever in a standard ' Tiger Moth ' slot fitting. A tail trim lever below the throttle applies a spring bias to the elevator.

Basic flying instruments are mounted in a readily removable shock-mounted panel. The neat finish of the cockpit is completed by the control column, which has the luxury of chromium-plating. Harmonium-type rudder pedals are fitted and are mounted on the cross-beam of the undercarriage bay. All controls are cable-operated.

Originally, the undercarriage of the ' BN-1F ' comprised two cantilever legs with internal bungee springing, but this was redesigned after early trials. It is now an externally braced type, with rubber-cord shock-absorbers, similar in appearance to the well-tried undercarriage of the ' Piper Cub.' It has an airborne vertical velocity absorption of about 8.5 ft. per sec.

In front of the cockpit is a shaped aluminium fuel tank with a capacity of eight Imperial gallons and

gravity-fed to the engine. The firewall is of 26 s.w.g. stainless steel sheet, backed with $\frac{1}{8}$-in. asbestos.

The prototype ' Finibee ' first appeared with a 36 b.h.p. J.A.P. engine, but this has since been replaced by a 55 b.h.p. Lycoming flat-four engine. The new Coventry Victor engine of 50 b.h.p. may prove another suitable power plant.

From the four fuselage longerons, the engine mounting is carried from flat plate fittings. The mounting is of welded steel $\frac{3}{4}$-in. 17 s.w.g. tube, with rubber vibration dampers. Engine cowlings are 22 s.w.g. aluminium, with quick-release fasteners.

At the rear of the fuselage the fin is an integral structure and has a substantial kingpost for pilot protection in the event of the aircraft turning over. Together with the rudder, which was increased in chord by 5 ins. after preliminary tests had shown it to be too light, the fin has conventional fabric covering. All tail surfaces are of flat symmetrical section.

The tailplane is mounted on two mild steel fittings bolted to the top longerons and picking up the front and rear spar. A small strut braces the rear spar. The tailplane leading-edge is formed from 26 s.w.g. Duralumin sheet, and is then screwed on to the front spar.

Cushioning for the tailskid is provided by a rubber block, and the kingpost is strengthened by substantial metal fittings, attaching it to the two bottom longerons.

The ' Finibee ' would seem to go a long way towards fulfilling the requirements of a cheap and easily produced aeroplane having very low flying costs. Following the successful flight trials of the prototype ' G-ALZE,' it is hoped to market a kit of parts for the aircraft ; this will be in three sections, tail unit, fuselage and wings, which may be purchased together or separately. It is proposed to offer an



inspection organization for amateur construction which would be an inclusive part of the scheme for a small fee.

The tail unit kit will include the spruce, plywood, glue and all necessary metal fittings, hinge pins, etc., required for the tailplane, elevator, fin and rudder. It also includes the complete set of drawings and instructions for construction.

Besides all the necessary materials and fittings, the fuselage kit includes the undercarriage, and a semi-fabricated fuselage which obviates the need for any jigs. The final kit contains parts and materials for the wings and struts.

Total costs, exclusive of engine, are expected by its sponsors to be in the region of £173, which includes an inspection service. Four amateur constructors could complete the aircraft in, roughly, 14 weeks, working in a dry and warm room up to 25 ft. in length. Alternatively, the complete aircraft may be offered for sale, with the Lycoming engine, for £485.

The first International Meeting of German Sporting Aviation

(A Suggestion of the 'Aero')

INTERNATIONAL CONFERENCE OF ALPINE SOARING, 1951, IN MUNICH

A YEAR of laborious preparations has elapsed since the periodical ' Aero,' shortly after it had been founded, began to make a point of the exchange of all the rich experience in Alpine soaring flight gained by German scientists and glider pilots with the experts of other countries for the benefit of all people who are interested in this special field.

KEEN RESPONSE

The suggestion of the ' Aero ' found an equally keen response with the Committee of the Bavarian Flying Club of Munich, as it did with our foreign friends who reached out their hands for peaceful co-operation even during the ' time of prohibition.'

During the days when the German Aero Club was

founded on the Wasserkuppe, the idea of the ' Aero ' ripened into a decided scheme with the editor of the periodical, Hubert Zuerl, Georg Kantz, and the first soaring pilot who entered the stratosphere, Erich Klöckner. It has now materialized as the first international event in the German aviation world, showing the spirit of co-operation which unites nations and which we German aviators wish to cultivate.

SERIES OF LECTURES

The conference took place from June 29th till July 1st, and consisted of a series of lectures held in the university buildings. Under the protectorate of the Bavarian Minister of Justice, Dr. Josef Müller and with Wolf Hirth as president, the meeting was given an official character by a reception of the participants by the heads of the local administration.

There were several lectures on Saturday, June 30th, introduced with an excellent speech by Fritz Stamer, the Central Secretary. He said that the urge in man to lift himself out of the dreary every-day life up to the airy heights was the most profound expression of our search for the sublime and beautiful, and that for this reason he considered Alpine soaring as a branch of our sport the development of which should be at our hearts.

The technical lectures were opened by Dr. Fritz Höhndorf with a talk on thermal lift in the mountains, followed by Dr. Fritz Rossmann, another former member of the D.F.S. (German Research Institute for Soaring Flight) with his discourse on the dynamics of the High Föhn Wave. Dr. Rossmann also took charge of the scientific part of the conference with great efficiency.

WORLD DISTANCE RECORD POSSIBLE IN EUROPE

The unexpected possibilities of the Föhn were then revealed by R. Maletzke who astonished the audience with his thrilling exposition of the general weather conditions for advanced soaring on the north-side of the Alps. He stated that this was a possibility for us in Western Europe to break the world distance record now held by Russia. The special advantage of these general weather conditions is that they can be forecast several days in advance.

The programme of the afternoon was introduced with a report on Föhn-soaring near Innsbruck by the Nestor of Austrian gliding, Dr. Siegfried Homenleitner who is over 60 years of age and certainly one of the oldest active soaring pilots. Guy Marchand, the French holder of a world record, told the meeting about the grand possibilities of the Mistral in Southern France. The first glider pilot who climbed into the stratosphere, Erich Klöckner, also holder of an unofficial world record until recently, threw a clear picture of the practical aspects of the Föhn-wave from his own experience. His talk was supplemented by Mrs. Vieweg-Pielsticker's excellent lecture, supported by colour photographs of unique beauty and a quick-motion film. Especially the impressive colour photographs of the standing wave of the Cordillere de la Guaderama met with a very good reception.

Our Spanish friend, Colonel Olivares (Madrid), was prevented attending the meeting as well as Dr. Joachim Küttner (U.S.A.), who sent a most interesting report on wave soaring in California to be read out.

The social evening in the Hackerkeller became a powerful demonstration of international co-operation and understanding. The audience thanked the Borough Education Officer, Dr. Fingerle, with enthusiastic applause for his kind words referring to the connexion of the local administration with the flying sport and expressing the wish for an even closer co-operation in the future.

GERMANS TO BE HELPED

The representative of the Bavarian Ministry of Transport gave the assurance that the authorities had no intention to choke German aviation, now struggling upwards, by an excess of red tape. Guessing the thoughts of every upright flying man, Guy Marchand in his straightforward way said that it was time to forget what lies behind us and strive together at a common aim. Guy Marchand's words were underlined by the Minister of Justice, Dr. Josef Müller, the former chairman of the Munich Light Aircraft Association, who welcomed this first step towards international co-operation and said :— ' I could not talk in any different way before a meeting of French pilots.' Much applause thanked this old flying man for his assurance to continue doing everything in his power to support aviation.

The audience in the crowded hall was already in best spirits when Wolf Hirth, ' ex cathedra ' and as an ' official struggling with a chaos of forms and letters,' greeted the meeting and started chattering about the ' Moazagotl,' the first wave cloud discovered by him. Wolf Hirth, the president of the German Aero Club, gave special thoughts to the first foreigner who ventured to use his influence in word and print to advocate the permission of gliding in Germany, our esteemed friend, Dr. Walter Dollfus, chief editor of the ' Swiss Aero-Review,' as well as Guy Marchand and Dr. Slater who stood by their German friends in true Olympic spirit throughout the ' time of prohibition,' although their countrymen did not always agree with them in the beginning.

The third course of lectures on Sunday, 1st July, was introduced by Dr. Erich Keil with his survey of 25 years' Alpine soaring and a most interesting account of his crossing of the Central Alps. Then Alois Hasenknopf talked about Kufstein and the soaring in the ' Bavarian Wind,' so that some of us were reminded of the days when our Austrian friends gave us a chance to fly on the other side of the turn-pikes.

The additional requirements which Alpine soaring demands of the pilots were the subject of a very instructive report by Prof. Hermann Brocksch (Innsbruck). Mr. Aschbrenner made a few suggestions about wireless equipment for sailplanes.

Concluding talk was by Georg Kantz on the practical points of contact between Alpine soaring and Alpinism.

The hour of farewell arrived but too soon. Old and new friends parted, knowing that they had done

useful work and collected valuable material for further efforts. The Bavarian Aviation Club of Munich as well as the ' Aero ' are very pleased with the highest praise they could reap : Wolf Hirth's verdict—' Well done ! '

FRIENDS PREVENTED FROM ATTENDING

Unfortunately the date of the conference had to be altered several times, still leaving rather a short time for preparations. So it happened that many of our friends from Spain, Switzerland, France, Jugoslavia and especially our Italian friend Vico Rosaspina were prevented from coming. The accounts of Alpine soaring experiments in the Dolomites would have supplied valuable material for the discussions.

We wish to thank the Central Secretary of the Swiss Aero Club, Adolf Gehringer, again for the magnificient colour-film of Samedan which was received with great enthusiasm in the absence of our Swiss friends.

The International Conference of Alpine Soaring will become an annual event in the gliding world. This is what the ' Aero ' had in mind from the very beginning. It is to be hoped that next year *all* Munich gliding men will offer their kind hospitality in a spirit of fair sportsmanship.

P.S.—It may be of interest to our readers that the Bavarian Aviation Club of Munich will take over the complete publication in order to give this meeting a lasting value. Inquiries to :—

AERO-VERLAG, HUBERT ZUERL,
MÜNCHEN 15,
HERMANN LINGG STR. 9.

A Visit to Madrid

WHEN I was in Huesca a couple of years ago, the Commandant of the Gliding School of Monflorite told me I should find more gliding in Madrid ; but I wasted the greater part of my Easter week trying to track it down through the ' proper channels.' By pure chance and great good fortune we were able to short circuit the approach, thanks to spotting the ' C ' badge in the lapel of a young man in a furniture shop. So my last day found me taking the road to Valencia and turning off a mere 15 kilometres out of the City along a stony cart track towards a low hill. This is the Cerro del Telegrafo and the Chief Instructor proved to be an old friend, Lieutenant Nuñez. We were welcomed with open arms and in a few minutes were comfortably settled round a couple of bottles of Tio Pepe and a large plate of sandwiches. One by one the other instructors came in from their classes and I was able to take notes.

The school has room for 18 to 60 pupils. There is a large dormitory alongside the hangar on the other side of the field, and most excellent catering arrangements. The course lasts a month-and-a-half. This is only intended to cover the ' A ' and the ' B,' but if the weather is kind there is also time to take the ' C '—or they can return at a later date and spend their summer holidays on further training. The site is well chosen, for thermals can be caught off the winch at 150 metres, good thermals of from 1 to 2 metres per second. At 450 metres these increase to 5 metres per second and at 600 metres there is a beautiful standing wave in which Professor Nuñez has already climbed to 6,500 metres (where he had to come out for lack of oxygen). Height is no problem, in fact, for one can release at 300 metres and go right up to 3,000 in the same thermal.

Training is by primary, ' Grunau Baby ' and ' Kranich,' and there is not only no shortage of machines but a positive surplus. Never have I seen so many! Believe it or not, but they have 40 ' Grunau IIB,' all, like the ' Kranich,' made in Spain, and of most excellent workmanship. There are also 3 ' Weihes ' in which the instructors continue their own training.

This is now mostly on triangular courses and several machines go out at one time on set flights of a 100 to a 120 kilometres. Spain is rather an awkward country for distance flights, though they have several to their credit from Madrid ; Nuñez 265 km., Ramos 160 km., and Vicent 93 km. There are 8 Silver ' C's ' among the professors—Nuñez, Salinas, Villamor, Ramos, Alonso, Bermudez de Castro, Arranz and Vicent. So far there has only been one girl pupil to reach the ' C,' Carmen Gil Ochoa, now married to Professor Merino, but several others are coming along nicely.

While I was collecting this information Professor Nuñez was busy on the telephone, and he pleased me tremendously by saying that he had arranged that I should have a flight in the ' Kranich ' that afternoon, a great honour for me and one that I nearly missed, for I had to dash back to Madrid to keep a luncheon date and only returned just as the sun was setting. Too late for thermals but I had a most interesting flight. Professor Bermudez proved to be the perfect instructor—one who keeps his hand off the stick from take-off to landing, gives the absolute minimum of commands in the air and those very clearly, and keeps his criticisms for after landing.

It was a joy to fly in Spain again and the clarity of the language was delightful after the pseudo R.A.F. patter that disfigures most English-speaking flying fields. It would be grand to do a course there. The Spaniards are charming people and make the foreigner feel really welcome.

In case any reader is going to Madrid during the summer there is also a fine-weather school at Somosierra, 90 km. north of Madrid on the right of the road from Burgos. Here they have the most fantastic place for slope soaring, for there is a ridge 40 km. long of good land and very much more along the rocky top of the Sierras. The slope is 1,700 metres above sea-level and 600 metres above the level of the plateau. I saw the district but was unable to visit it as the Sierras were still under snow ; however, I hope to go back there again next year.

VERONICA PLATT.

THE 'HORTEN-PARABOLA'

By DR. REIMAR HORTEN, ARGENTINE

THE main trend in the development of sailplanes points towards a better gliding angle and a higher speed at which this best glide is achieved. Improvements in performance have been made along these lines by increasing the span and hence the aspect-ratio and by raising the wing loading. This development is particularly favourable for cross-country work and goal flights. Especially where goal flights in an upwind direction are concerned, the speed at which the best glide is performed is an important factor, apart from the gliding angle itself.

However, I can see a side-track in the development of sailplanes. It is the design of an aircraft for altitude flying only, without covering any distance, so that gliding angle and speed range lose their importance. The tasks that were usually set in the Rhön Competitions allowed for this development, because marks were given for height without distance if the climb exceeded 2,000 metres. This means that there was a chance to score in the contest without leaving the site, since it is quite possible to repeat these altitude flights several times on the same day.

This type of aircraft should therefore be able to utilize the centres of lift areas as soon as thermals begin to go up. In hilly districts, especially at the beginning of thermal activity, lift areas are narrow and broken up. Consequently, the most important requirement is manoeuvrability which cannot be obtained with the usual great span of a sailplane. On the other hand, a small span with the corresponding small wing area entails a high wing loading. This causes a proportional increase of the turning radius, if the degree of bank and the lift coefficient remain the same. Between these two extremes there is an optimum span with which the smallest circle can be flown. Taking the weights involved into account we find that this span is 40 feet.

Important factors for cross-country flying are the gliding angle which depends on the aspect ratio of the wing, and the speed at which this best glide is obtained. In this case, however, these requirements for cross-country work, i.e. penetration of down-draughts at a high speed, have been deliberately neglected. For this reason the shifting of the speed polar owing to the small wing loading, is acceptable, and the resulting small turning radii are most welcome. The aspect ratio is therefore much smaller than usual. When a sailplane is flown at its lowest sinking speed the induced drag forms a comparatively great part of the total drag, especially in the turns. An economical distribution of drag must therefore be achieved by the plan form of the wing and by using wash-out. Extensive calculations show that a parabolic variation of the depth of the wing with a parabolic V-shape and the corresponding wash-out are the best solution for the tailless type. We now arrive at the following constructional data :— Aspect ratio, 4.3 ; empty weight, 198 lbs. ; wing loading, 1 lb./sq. ft., allowing 175 lbs. for the weight of the pilot.

The designing of this parabola-sailplane began in 1935, and in 1937 it went into production. Unfortunately the aircraft could not take part in the Rhön Competitions of 1938 for technical reasons—the construction required 25,000 working hours. The outbreak of the war and the accompanying circumstances prevented the sailplane to be flown and tested, although it had been completed by then.

When the aircraft was built special care had to be taken to keep the weight down. So an empty weight of only 198 lbs. was reached, the wing area being 360 sq. ft. Its shape demanded that the main spar had to be glued on curved jigs, and the leading edge on similar supports. The ply cover of the leading edge varied between 1.0 and .6 mm. thickness. All other members were of a similar lightness.

The control system was of the type as used with the 'Horten-III,' with the addition that the outer flaps split along the trailing edge and opened up on every elevator or aileron movement and thus acted as a rudder (increase of drag on one side). So the flap which moved upwards was automatically opened up at a small angle in order to compensate for the yawing effect of aileron movements. By means of rudder-pedals any further splitting angle could be superimposed (rudder effect). This automatic splitting did not accompany elevator movements, when both the outer flaps were moved upwards. The inner flaps mainly acted as a depressed elevator. The transmission of the forces to the control surfaces, which were equipped with ball-bearings, was by rods.

The undercarriage was similar to that of the 'Horten-II' and 'Horten-III' where the front wheel was retractable.

The wing consisted of three parts. The structural parts of the centre section (8 feet wide) were made of steel tubing, the covering of plywood and fabric. The outer wings were entirely built of wood.

Data :—Single-seater ; Span, 40 ft. ; Wing area, 360 sq. ft. ; Aspect ratio, 4.34 ; Empty weight, 198 lbs. ; Weight loaded, 375 lbs. ; Wing loading, 1 lb./sq. ft. ; Minimum sink, 2.5 ft./sec. ; Gliding angle, 1 in 19 ; Calculated turning radius (as described by the centre of gravity) 20 ft.

(Translation from 'Thermik,' Feb., 1951, by G. S. Neumann).

A CONSIDERATION OF THE TWO-SEATER

By EGON SCHEIBE, Munich

QUITE a few people seem to agree that solo-training with primaries is inefficient and that it is therefore necessary to employ better training methods.

Above all it is the two-seater which deserves special consideration here, because it has the advantages of great safety and the possibility of thorough tuition. Especially in combination with the high winch launch, dual training can be made a very safe, thorough and cheap method.

Of course, there is the view that a two-seater is usually too expensive and therefore only suitable for a few groups. Now I think that the price of a two-seater of practical design need not exceed that of a single-seater of a similar performance by more than 20 to 30%. The first breakage of the corresponding single-seater in solo-training would already make up for this extra expense, and after a longer service the advantages of the two-seater become more and more obvious.

There is another aspect of the two-seater which must not be overlooked. It makes passenger trips possible. This is an advertisement for gliding through the experience of flying itself, and it also helps financing the club.

Let us now consider the difference in expense for the two types of aircraft in detail. The fuselage of the two-seater (tandem seating assumed), has to be made about 2 feet longer, and the structure around the second pilot becomes more complicated. Additional costs arise with the second cockpit, the dual-controls, the longer cockpit-cover and perhaps a few extra windows. The undercarriage (or wheel) has to be made stronger to take the greater weight.

The increase in wing area is a question which depends on the performance desired. Up to now, designers have preferred considerably larger wings. However, if we admit a higher flying speed for dual service, the wing area will not have to be increased very much. 10 to 20% should be sufficient. The dimensions of the two-seater will then approach those of the corresponding single-seater, and there is only about 20% additional weight arising from fitting in the second cockpit and strengthening certain parts. Assuming the fuselage is aerodynamically clean, we arrive at an aircraft which, flown solo, has the properties of an ordinary trainer or high-performance sailplane, and flies with 10 to 15% greater speed and sink when used as a two-seater.

The costs of materials and labour for such a design of a two-seater should not exceed those for the corresponding single-seater by more than 25%.

The main problem of the two-seater is the arrangement of the second cockpit. The second pilot should sit in the centre of gravity or at least very close to it, i.e. exactly in the place where normally fuselage and wings are joined together. The second pilot should have a good view, be able to get in and out comfortably, and be as near as possible to the first pilot which is important for training.

Designers have tried to solve this difficult problem in various ways. The high-wing and shoulder-wing arrangement makes it difficult for the ' second man ' to get in, and in most cases block his overhead view (e.g. Milan, Mü-15).

With a mid-wing aircraft (Kranich), where the second pilot sits behind the main spar the visibility is rather limited by the wings. If we draw the wing-tips forward, the centre of gravity and thus the ' second man ' can be placed in front of the main spar, and most conditions are fulfilled. Some problems arise here with respect to stability (movements in the yawing plane in a stalled attitude), and the structure of a wing with a pronounced V-shape becomes more complicated.

Side-by-side seating as used with the ' Goevier ' is of course the most comfortable for the crew. The easy communication between instructor and pupil is of great advantage, especially in training. This, however, necessitates a width of almost 4 feet for the fuselage which means more drag and lower performance. The side-by-side arrangement is therefore not suitable for the high-performance two-seater. With this type of seating the second man sits in front of the centre of gravity and for solo-flying, ballast will have to be used. W. Hütter who built an experimental design during the war evaded this disadvantage. He obtained the right trim by moving the wing-tips fore and aft.

The two-seaters of the past, show that there are various possibilities. Taken as a whole, however, the

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problem of the two-seater has not been tackled as thoroughly as that of the single-seater. It is certain that the numerous designers who may deal with this question will still be able to improve on the known types where expense and shape are concerned.

MIDLAND GLIDING CLUB

A WEEK OF HIGH ACTIVITY

WE are pleased to report the outstanding success of the camp held between June 30th and July 8th at the Long Mynd.

A full complement of campers attended, most of them visitors to the site. We also had a party from the College of Aeronautics, Cranfield, with an 'Olympia' and 'Grunau IIb' making about 20 people in all.

The weather during the camp was exceptional, there being a west wind or good thermal conditions on all 9 days. It is not surprising therefore that the following flying achievements were made :

2 Silver 'C's' completed ; John Horrell and Mike Ramsden.

Legs for Silver 'C's' included :

3 Heights. 8 Durations. 1 Distance.

1 Gold 'C' Height (subject to confirmation), plus 3 cross countries amounting to 206 miles.

266 HOURS FLOWN FROM 367 LAUNCHES

On Tuesday, 3rd July, Alan Yates of the College of Aeronautics contacted a standing wave near the site and by working along it towards Shrewsbury attained a height of 11,100 A.S.L., thus gaining Gold 'C' height.

Several other pilots reached heights up to 7,500 A.S.L. on this day including John Horrell, the Camp C.F.I., who after 23 years of gliding and presumably waiting converted his height into a 32 miles distance by landing at Wolverhampton airport.

During the period under review the first task flying match was arranged from the Mynd on July 1st. This was between Alan Yates and David Ince, both flying 'Olympias.' The task was Lulsgate Bottom (Bristol G.C.), out and return (164 miles). Both pilots landed short of their goal. Ince at Chipping Sodbury, 70 miles, and Yates Abergavenny, 50 miles. The weather apparently deteriorated in the Bristol area. David Ince reports no difficulty in maintaining about 30 m.p.h. flying cross-wind.

R.A.F. Bridgnorth are now flying at the Mynd, they have a 'T-21' for training and a 'Prefect' will be following shortly.

NATIONAL CHAMPIONSHIP CONTESTS.—*cont. from p. 170*

hands of the A.T.C. When the marks came to be added up it appeared that if Jock Forbes could prove from his photograph that he had in fact reached Flamborough earlier in the week he could win about 4 points (877), as 'Steve' only had 873. As we go to Press this issue has not yet been decided. Welch is third with 804 points, Wills fourth with 800, Foster next 770 and then Ince with 677. The team championship was won by the brothers Goodhart for the Royal Navy.

A complete report of the Competition will appear in our next issue.

Weather Inquiries Trebled in Five Years

SINCE 1946 the number of inquiries from the public about the weather have trebled, according to entries logged at the Meteorological Office forecast section at Victory House, Kingsway, London, while the 5,165 inquiries dealt with last month (June) represent the greatest number received in any one month in the history of the Meteorological Office.

In 1946 there were 14,503 inquiries. Last year the number had risen to 43,612. In the first six months of this year 25,118 inquiries were received and, making allowance for the summer peak, it is estimated that the figure will be over 50,000 for this year.

The daily peak period for inquiries at the forecast office is generally around tea-time, and particularly on a Friday when Londoners consult the forecasters on the chances of a fine week-end in the country or by the coast. Sometimes inquirers ask the forecaster himself to recommend a place likely to have the finest weather, as was the case recently when two women asked : " We want to go and enjoy some sunshine within easy reach of London ; whereabouts should we go ? " They were advised that the East coast would be the best choice on this occasion.

The sports enthusiast is another constant caller and many people asked whether mackintoshes, or light summer suits and frocks, should be worn at Wimbledon this year. The organisers of the Tournament were also constantly in touch with this office, which provided them with information on which to plan programmes a short while ahead.

In addition, the office supplies special information for builders and tradesmen whose occupation is affected by the weather.

Also attracting great public interest is the Meteorological Office exhibit in the Dome of Discovery at the South Bank Exhibition. Prominent in this exhibit is a live forecasting unit, receiving continuous teleprinter broadcasts, via the Central Forecasting Office at Dunstable, of weather reports from Spitsbergen to North Africa and from the Urals to Canada. Festival visitors can watch the rapid collection and dissemination of weather reports and they can also see reports from a Weather Ship in the Alantic being received in the Dome ten minutes after the observations are made. From these reports, which are fully plotted on charts, are prepared, twice daily, souvenir weather reports and forecasts which are printed on the spot by H.M. Stationery Office and sold to the public. During the first fortnight 21,000 copies were sold. The average daily sale is 1,500.

Visitors show a keen interest in the preparation of these charts and forecasts and a large number of questions are put to the officials. Many visitors from home and overseas ask for the latest weather in their home town. A Philadelphian visitor was given such information in two minutes, after officials had consulted Dunstable on the direct telephone line.

(Photographs of the Meteorological Office exhibition in the Dome of Discovery are available at the Air Ministry for reproduction).

Air-Met Broadcasting Service

House of Commons—July 26th

MR. STEVENS (Portsmouth, Langstone, C.) presented a petition for the restoration of the Air-met broadcasting service. The petition was signed by probably the smallest number of petitioners —eight only—of any petition presented to the House. They were learned and expert societies which found that the Air-met service was of immense value, not only for the production of food but for the preservation of life. (Cheers).

The petitioners were aware of the difficulties of congested wavebands, but they believed, speaking with considerable knowledge, that by some rearrangement the introduction immediately of a 100 per cent. accurate weather forecast was possible, and certainly would be possible with a system of frequency modulation.

The petition was signed by senior officers of the Royal Meteorological Society, the Royal Agricultural Society of England, the National Farmers' Union, the Air League of the British Empire, the British Airline Pilots' Association, the British Gliding Association, the Institute of Navigation, and the Geographical Association.

The signatures mentioned above were supported by 231,000 members of whom 21,000 signed a preliminary request for the restoration of the Air-met service since it ceased in March, 1950. These figures were given by Sir Robert Watson-Watt, F.R.S., President of the Royal Meteorological Society, in an article in *The Times* of July 27th.

BREVITIES

NEW CLUB AT ABERDEEN

WITH the usual abundance of worry and difficulty has come the formation of another club in these Isles, that of the Aberdeen Gliding Group.

Site of the club is at Inverallachy Aerodrome, near Frasenburgh, where gliding began three months ago.

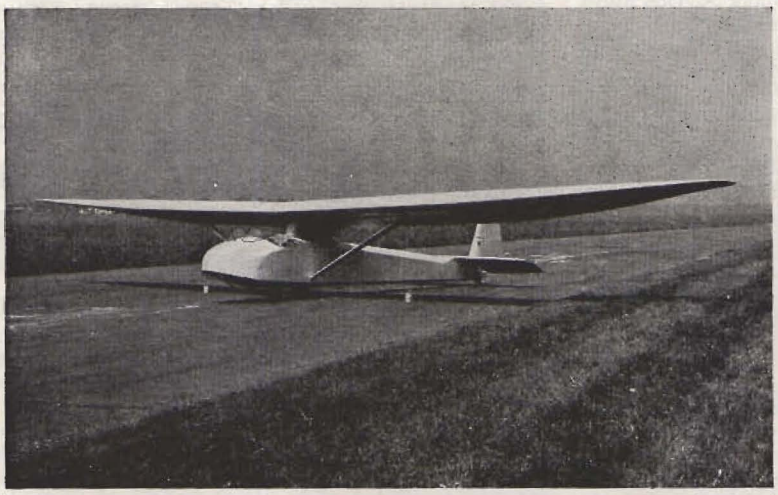
The winter was spent by the members rebuilding their only machine, a ' Hols der Teufel,' but a ' Cadet ' is on the way.

PUBLIC SCHOOLS A.T.C. CAMPS

SEVEN years ago, when *Sailplane* suggested landing strips in every village so that boys and girls could learn to fly ' Daglings ' in low hops, the Editor was called a sanguinary visionary.

Now the A.T.C., under Home Command of the R.A.F. have adopted an Elliott built ' SG-38 ' for low hop instruction of Public School Cadets in school playing fields. Too much book work and no flying do not encourage would-be aviators, and after much persistent work by Home Command under S/L J. C. Ward, the Air Ministry have approved the idea of elementary gliding at the schools. Five camps are to be held this year at which most Public Schools will be represented, with the idea of familiarising them with the ' SG-38,' rechristened the ' Eton T1 ' by Elliotts.

On Service—for The Service



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

Slingsby Sailplanes Ltd., Kirbymoorside, Yorks.



William Liddell, who does so much for the Ulster Club.

NEWS FROM THE CLUBS AND LETTERS TO EDITOR

It is regretted that matter under these headings has had to be held over until next month.—Editor.

F.A.I. NEWS ITEMS OF PRIVATE AVIATION

BELGIUM

WHEN nowadays one hears well-founded complaints on all sides of the cost of aircraft, one must applaud the initiative of two members of the Aero Club of Hainault F. Rousseau and A. Descamps who are building their own aeroplane the ' Turbulent.' This is the sort of activity which will save private aviation and revive the sport of aviation which is truly an individual sport.

The difficulties which face those who wish to build their own aeroplanes are immense but they are so because, up to the present time, there has been no general, concerted move in that direction ; everyone seems to have been petrified by the giant-regulations but, why should not the regulations be changed ? As one will read further on, in England also, certain private individuals are building an ultra light aeroplane there, why not elsewhere ? Let us start a revolution !

Gliding activities restarted on the 8th April by the Cercle Raoul Vilain XIII on the aerodrome at Nivelles where two ' Grunau Babies ' newly painted by Mr. Edouard Pardonche and other members of the club were ready for launching. There was no flying on the first day but a week later Mr. Pardonche and Adrien Van Eyle reached an altitude of 1,400 metres.

They climbed up in the same thermal but while they were keeping an eye on one another, they were surprised by a strong down draught and were forced to land in the country.

Everybody in the club was mobilised to bring them home—a job which took two hours and as a consequence, the thermal had disappeared when they returned. Since then flights have been made by other members of the Club.

The Zwaluw Club Overmere and the Aero Club Ixellois have struggled along under severe financial difficulties to continue gliding. Zwaluw having become ' possessed ' of a new member who, in his turn owns a glider, has been able to indulge in much more flying. In the Aero Club Ixellois a new group of pupils are starting a training course.

In spite of bad weather the Club has totalled 11 hours of flying with 150 winches and 11 towed launches.

CANADA

From recent information received from Canada one learns that 34 Aero Clubs are affiilated to the Royal Canadian Flying Clubs Association. The Clubs are chiefly engaged in training and give young people in the country an opportunity to practice the sport of flying at a reasonable cost. The Clubs organise meetings and competitions to enable young people with restricted financial means to take part in them and develop their competitive spirit. The Clubs are busy in giving training for the Royal Canadian Air Force.

Gliding and Model enthusiasts all find their opportunities in the Clubs.

UNITED STATES OF AMERICA

From a recent report of the Civil Aeronautics Administration one might suppose that there are no more private pilots in the United States. In 60,000 aircraft with valid certificates of airworthiness, 57,800 are used in one way or another for business purposes while only 2,200 are used for pleasure. 35,000 are used for training, charter and survey work while 1,000 belong to ranchers and farmers, 3,000 to State and Federal governments, 2,800 to Oil Companies and 2,000 to air transport and survey companies.

GREAT BRITAIN

Extracts from the speech by the Chairman at the Annual General Meeting, 1951

The Kemsley Trust has approved loans to eight aeroplane clubs and to 15 gliding clubs. In addition, the Trust has been instrumental in placing a contract for the design and construction of a high-performance two-seat sailplane, the cost of which is being shared equally by the Trust and the Ministry of Supply.

In the field of ultra light aircraft, the development of an airframe fitted with a new light engine has been undertaken in collaboration with the Ultra Light Aircraft Association, and it is hoped this will fly this summer.

The Royal Aero Club is giving an Aviator's Certificate free of charge to each Cadet who qualifies under the Scholarship Scheme. Royal Aero Club Official Observers have been appointed at Service Stations throughout the country and, as a result, 668 Certificates were issued in 1950 (compared with 828 in 1949.)

The 100th Certificate was presented to Cadet-Sergeant Alan Smith by Lord Brabazon at a ceremony in Londonderry House at which representatives of various ministries and the Air League were present.

Although private flying activity was generally on a reduced scale during 1950, there was still a considerable rush to attend overseas rallies; Deauville and La Baule topped the popularity list; in all, some 600 Members and Associate Members joined the rallies.

We maintain chart coverage of the whole world where private aviation is permitted, with facilities for marking routes if desired by Members, and a Briefing Officer is employed full time to give assistance. Notices to Airmen from all over the world are available at Londonderry House. About twelve people use these facilities each day.

As another result of Royal Aero Club protests to the Ministry of Civil Aviation, Pilot's R/T Licences for the private owner without medical or technical examinations have been introduced. There have been two reductions in one year of C. of A. renewal fees for private aircraft, after continued action by the Club.

We have recently obtained a reduction in the price of I.C.A.O. topographical maps, scale 1/500,000 to 4s. 0d.

We are negotiating for a reduction in hangerage charges and have many other matters under consideration.

During April, 1951, the Club granted the following certificates :—

Aviators ..	..	..	74
Gliding : ..	'A'	..	83
,,	'B'	..	36
,,	'C'	..	18
Silver badge	'C'	..	7

HOLLAND

The soaring-centre Terlet, near Arnheim, of the Royal Netherlands Aero Club will have very shortly a new recreation room and a dormitory for 24 pupils. 60 schoolboys will be admitted to the free gliding courses, starting this vacation as a first grading for future pilots.

Eng. R. Abelin from Malmo will be chief-instructor at Terlet during the summer courses. Eng. R. Abelin is one of the best known Swedish glider pilots.

The Royal Netherlands Aero Club has ordered 9 Slingsby 'Prefect' single-seated gliding-trainers and 4 Slingsby 'Sedbergh' two-seated gliders to be delivered shortly. A new glider designed and built in Holland, the 'K.N.V. v. 491' is nearly ready for its first flight.

The Aero Club of Rotterdam which before the war founded the National Flying School for private pilots commemorated its 25th anniversary on June 23rd.

SWITZERLAND

The Annual Report for 1950 of the Aero Club of Switzerland shows a drop in flying hours for engined aircraft and gliders compared with 1949. A similar drop is seen for several other European Aero Clubs.

This drop is by no means astonishing when one thinks of the difficulties which face private flying in all countries.

The Secretaries found that :—

1. The difficult financial position of States and individuals; neither the one nor the other having sufficient money to purchase aircraft at present day prices, nor, in the case of private persons, having sufficient money to meet the added costs of petrol, housing and landing fees and incidental expenses.
2. In each country the taxes which have to be met by the private individual have increased by more than 100% on those prior to the war.
3. The price of petrol and the state tax on petrol has increased the cost of flying for pilots and for the clubs.
4. Increases in the cost of maintenance and in the cost of inspections for renewals of airworthiness certificates. These increases are due to increased wages and cost of materials and spare parts.
5. There are also increased landing fees and housing fees.

These facts make it clear that means must be found to lower the cost of the flying hour because only this will ensure that private flying will progress.

YUGOSLAVIA

The report of the Yugoslav Aeronautical Union for 1950 informs us that the Union has 64,000 members and 196 Aero Clubs; in addition, there are 85 schools. The total of aircraft and gliders is 350. 8 centres have been created in the large cities of Yugoslavia; they deal with training in all sections of aviation.

9 National records were beaten and 30 silver and 6 gold gliding badges were won.

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TEMPLE BAR 6451 handles dozens of calls a month and will help you if you have a problem.

ROYAL AERO CLUB CERTIFICATES

(Issued under delegation by the B.G.A.) JUNE, 1951

CERTIFICATES 'A' .. 101 (13204 to 13316 inclusive)
'B' .. 65
'C' .. 28
Silver 'C' 10
Gold 'C' —

'B' CERTIFICATES

No.	Name	A.T.C. School or Gliding Club.	Date taken
8505	Michael Jeffries ..	No. 105 G. S.	3. 6.51
9397	David S. Doggett	London G.C.	20. 5.51
10217	Ronald A. A. Gale	No. 2 G.S.	3. 6.51
11797	Peter G. Crosby	No. 23 G.S.	10. 6.51
11964	Stuart B. Allan ..	No. 5. G.S.	3. 6.51
12107	Henry O. G. Horne	No. 2 G.S.	3. 6.51
12154	James Thomson	Scottish G.C.	10. 6.51
12178	Iain D. W. Dalgetty	No. 2 G.S.	3. 6.51
12181	Grahame K. Gates	No. 89 G.S.	9. 6.51
12233	Ronald E. Greenland	No. 126 G.S.	10. 6.51

No.	Name	A.T.C. School or Gliding Club.	Date taken
12254	David W. Wilkinson	No. 23 G.S.	14. 5.51
12268	Jeremy L. Norman	No. 104 G.S.	22. 4.51
12376	David Percy	No. 2 G.S.	3. 6.51
12820	Peter J. Swatton	No. 89 G.S.	15. 8.51
12880	Thomas J. Church	No. 89 G.S.	14. 5.51
12935	R. J. Heaton	No. 45 G.S.	6. 5.51
12978	Terrence C. Parker	No. 49 G.S.	20. 5.51
13149	David G. Jardine	No. 89 G.S.	19. 5.51
13191	Gwendolen W. Fountaine	Coll. of Aer.	5. 6.51
13211	Michael B. Allaway	No. 123 G.S.	16. 6.51
13216	Harry Hammond	No. 22 G.S.	20. 5.51
13217	Philip Hemingway	Derby & Lancs.	3. 6.51
13218	Paul A. MacCarthy	No. 89 G.S.	13. 5.51
13219	Geoffrey J. Randall	No. 49 G.S.	22. 4.51
13220	Basil F. Baldock	No. 168 G.S.	22. 4.51
13221	Michael A. Colley	No. 168 G.S.	6. 5.51
13224	Richard E. J. Ibbotson	Cambridge Univ.	21. 5.49
13226	Anthony G. Ettridge	No. 105 G.S.	2. 6.51
13230	Donald K. Callaway	No. 123 G.S.	23. 6.51
13232	Douglas H. J. Lake	Portsmouth N.G.C.	2. 6.51
13234	William J. Hamphill	Coll. of Aer.	12. 5.51
13235	Keith R. Johnston	Derby & Lancs.	3. 6.51
13239	Edward C. Lambourne	No. 45 G.S.	3. 6.51
13241	Derek C. L. Chidell	Surrey G.C.	26. 5.51
13244	Herbert G. Hart	No. 26 G.S.	20. 6.51
13245	Albert Maslin	Bristol G.C.	27. 8.50
13247	Victor C. Doggrell	Halton App.	2. 6.51
13249	William L. Cochrane	Gannet G.C.	18. 4.51
13251	Stephen R. Wiltshire	Cambridge Univ.	14. 2.51
13252	J. R. M. Radok	Coll. of Aer.	16. 6.51
13255	Jonathan D. Yeandel	Bristol G.C.	19. 5.51
13256	Peter Bethell	Surrey G.C.	25. 8.50
13258	Malcolm C. Wilson	Coll. of Aer.	10. 6.50
13259	Michael J. Sharman	R.A.F. Bridgnorth	26. 5.51
13260	James A. Cuthbertson	B.A.F.O.	21. 1.51
13267	Harry Greenhough	No. 45 G.S.	27. 5.51
13273	Rodney S. Sneath	Derby & Lancs.	16. 6.51
13275	Alan D. Piggott	H.C. G. Inst. School	28. 2.51
13276	Philip C. Austin	B.A.F.O.	15. 9.49
13277	Herbert Page	Luneburg	26.11.50
13284	Dennis Kelly	Fassberg	2. 6.51
13286	Terry Walls	No. 23 G.S.	2. 6.51
13287	Kenneth L. Rowntree	Rufforth	10. 6.51
13291	Robert J. Trees	R.A.F. Coll.	6. 5.51
13292	Michael J. Armitage	R.A.F. Coll.	24. 2.51
13293	John R. Ayers	R.A.F. Coll.	13. 5.51
13294	George A. P. Chamberlain	R.A.F. Coll.	16. 6.51
13295	Peter R. Lockwood	R.A.F. Coll.	3. 7.51
13296	John M. Pack	R.A.F. Coll.	5.11.50
13297	Jack L. Bayley	R.A.F. Coll.	14. 5.51
13298	John A. Beadon	Coll. of Aer.	20. 5.51
13299	Peter Virtue	Scottish G.U.	10. 6.51
13300	Anthony D. Marshall	No. 166 G.S.	3. 6.51
13315	Graham F. Page	R.E. G.C. Hamelin	2. 7.50
13316	Eric P. Chaplin	Gutersloh	8. 5.49
	'C' CERTIFICATES		
3272	Ian R. P. Abel	No. 168 G.S.	27. 5.51
5502	Charles R. Brown	No. 105 G.S.	2. 6.51
6214	Alexander Grant	No. 5 G.S.	9. 6.51
9828	David J. White	No. 125 G.S.	3. 6.51
11580	P. E. Lovell	No. 89 G.S.	12. 5.51
11637	P. A. Taylor	No. 42 G.S.	20. 6.51
11936	Matthew Young	R.A.F. Coll.	12. 5.51
11940	Derek R. Atkinson	R.A.F. Coll.	16. 4.51
12058	Gerald Willis	R.A.F. Coll.	14. 4.51
12127	Donald W. Lowe	R.A.F. Coll.	30. 5.51
12521	Barbara J. D. Moseley	Surrey	21. 4.51
12738	Alan J. Selwood	R.A.F. Coll.	18. 4.51
12794	Leslie A. Boyer	R.A.F. Coll.	14. 4.51
12806	Disney T. Batterby	Fassberg	6. 5.51
12947	Seymour Evans	R.A.F. Coll.	14. 4.51
12949	James S. R. Salmond	R.A.F. Coll.	3. 6.51
13092	John A. Carter	Army G.C.	3. 6.51
13108	Robert M. Neill	Midland G.C.	3. 6.51
13200	David G. Wilson	Midland	3. 6.51
13224	Richard E. J. Ibbotson	Cambridge C.G.	4. 6.50
13251	Stephen R. Wiltshire	Cambridge	18. 3.51
13258	Malcolm C. Wilson	Coll. of Aer.	29. 4.51
13260	James A. Cuthbertson	B.A.F.O.	6. 5.51
13275	Alan D. Piggott	H.C. G. Inst. School	20. 3.51
13276	Philip C. Austin	B.A.F.O.	20. 5.50
13277	Herbert Page	B.A.F.O.	2. 6.51
13315	Graham F. Page	R.E. Gliding Hamelin	2. 7.50
13316	Eric P. Chaplin	Gutersloh	22. 6.49
	SILVER 'C's'		
320	P. Wood	Surrey G.C.	3. 6.51
321	D. E. Cooke	Cranwell	7. 6.51
322	P. W. Brooks	Surrey	16. 6.51
323	A. F. Farnborough	A.E.C.S.A.	20. 6.51
324	A. D. Piggott	Detling	15. 6.51
325	G. F. Pace	B.A.F.O.	15. 4.51
326	E. P. Chaplin	B.A.F.O.	9. 6.51
327	J. C. Allan	No. 89 G.S.	16. 6.51
328	H. Cork	Derby & Lancs.	24. 6.51
329	G. E. Miller	Bristol	3. 6.51

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