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APRIL 1948

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THE FIRST JOURNAL DEVOTED TO SOARING AND GLIDING

APRIL 1948 ★ Vol XVI No 4

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The *Sailplane and Glider* is published on the 15th of every month. Price One Shilling and Sixpence per copy; 19/- per year posted. Advertising Rates on application.

Published for the licencees, Glider Press Ltd., by the Rolls House Publishing Co., Ltd., Breams Buildings, Fetter Lane, E.C.4, and Printed by The Mendip Press Ltd., London and Bath.

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Front Cover: *E. Desmond and L. Beck (in cockpit) of the "Merlin" (Australian Gliding Association News).*

Editorial

RECENTLY our usually accurate and erudite senior contemporary "FLIGHT", official organ of the Royal Aero Club, published a short paragraph headed "Instructional Gliding Contests" and went on to give publicity to an appeal from the "British Gliding Association, Redhill Aerodrome" for the sum of £3,000 to finance the visit of the proposed British Gliding Team to Switzerland. The names of the proposed team were given as—P. Wills, O.B.E., Senior Pilot; Christopher Nicholson; Charles Wingfield and Lorne Welch. Reserve pilots D. F. Greig, Ron Claudi; F/O. Forbes and P. A. Pressland.

There was enough in this report to qualify it as accurate but it was unfortunate to say the least that the appeal should have been announced in this fashion. It is the function of the Press to report the news and to comment on it. On occasion it tries to point the finger of truth and reality to the trail of events and ideas. This is such an occasion. The only other news about this appeal, received in "SAILPLANE" office was a personal one addressed to the Editor.

Now the whole of the above circumstances are symptomatic of the ills which beset Gliding in Great Britain to-day. These ills may be traced to the set up of the B.G.A. As the Annual General Meeting showed (reported in last month's "SAILPLANE") the B.G.A. is in debt and its administration has been taken over by the Royal Aero Club.

It is our belief that the fundamental idea of the B.G.A. as an Association of Clubs is wrong in principle and in practice. It leads to the affairs of Gliding in the country being left in the hands of a few—so much the same few that they are in danger of becoming a clique—which is both un-British and undemocratic. In practice too, Clubs never have any money, but individuals have. The B.G.A. is "broke" and that is the proof of the pudding. The pre-War constitution of the B.G.A. as consisting of Clubs and private members was an attempt to get the best of both worlds, and it did not succeed either. The time appears ripe, therefore, for the B.G.A. to consider changing its basis. The basis must be one which would give the B.G.A. the opportunity of a much wider financial net; if, say, membership of a Club were made conditional upon, say, a 5s. 0d. membership of the B.G.A., in addition to fees for certificates and Badges. A larger obligatory subscription might carry automatic insurance—in itself a great circulation builder.

There could still be a Council of Clubs to consider their special interests, but the body politic of the Association would be its Members with a Constitution which permits of any subject of interest being debated on the spot, instead of being prevented by a clumsy Constitution, as were the Yorkshire Clubs resolutions at the last A.G.M.

It is humiliating to have to appeal to all and sundry for the money to send a team to Switzerland. Had some of the leading personalities in the B.G.A. Council been different there is little doubt but such an appeal would not have been necessary. In our opinion this appeal has been badly handled and a fresh start should be made. An appeals Committee should be organised (in which "SAILPLANE" will gladly help), and it should be entrusted with the Public Relations aspect of the British angle in these Contests.

One last point. How do the organisers justify a sum like £3,000. In view of the numbers of would-be acceptors of the offer of Thomas Cooks of a 16—day tour, fare, accommodation included, for £39, it would appear that on a basis of 13 cost-free gladiators, the cost ought not to be much more than £1,000—a sum about the level of possible achievement.

We quite agree that items such as insurance, transport and spares, might be paid for by public subscription, but we see no reason why the team and helpers should not otherwise pay their own living expenses, especially as these are covered for the period of the contest proper in the £200 entrance fee.

ROBERT KRONFELD

20 YEARS OF GLIDING

By WOLF HIRTH

(Exclusive)

(Translated by Keith Turner)

Robert Kronfeld was born in Vienna, on the 5th of May, 1904. In the early days of the present century when the Wright brothers in America were making their first short hops in powered aeroplanes when mankind in general did not know or even suspect that the age of human flight was beginning.

Like all fathers, Dr. Kronfeld the dentist, undoubtedly hoped that his son would become a great man—a scientist maybe, or a professor of medicine. Little could he have dreamed that he would be a pioneer of the science and sport of sailflying—for it was to be years before such a thing would even be given a name in the language.

In his early years little Robert showed few signs of his future greatness. He seldom smiled or asked for food, and always looked unwell. The change began when at the age of fifteen he paid a four month visit to Holland. Suddenly he started to put on weight and became strong, possibly due to the plentiful Dutch butter and fresh milk, a drink that he continued to prefer above all others during his later years of great achievement.

At school his favourite subjects were the sciences, and his hobbies radio and photography. But like a true Viennese he loved music, and with his violin he was already dreaming of experiences as yet unknown to his waking consciousness.

His first sporting activities were on the slopes of his native mountains. Here he became an enthusiastic climber and skier, and on these two subjects wrote numerous articles in the technical and daily press.

But it was more particularly in another kind of sport that Kronfeld first became known—canoeing. This sport enabled him to fulfil his desire to travel. His first long canoe trip took him in seven weeks from Switzerland down the Rhone to the Mediterranean, where he came to grips with the notorious Mistral wind which has cost the lives of so many sea-going sportsmen—and also aviators. With a great effort Robert managed to reach a small island before it was too late, and had to remain there with the light-house keeper for three days while the storm blew itself out. Later he made another adventurous journey, this time to Spain, following the Ebro from the mountains right down via Saragossa to the sea at Barcelona.

Finally he turned to what was to become his life's work, gliding. In 1927, the Aero Club of Austria selected three people to visit Rositten which had recently come into the news through the duration flights of Ferdinand Schulz. Kronfeld remained there much longer than had been arranged until at last, in the depth of winter at a temperature of minus 6° centigrade, he obtained his " C " certificate. Next spring he went to the Wasserkuppe, the highest of the Rhön mountains, which was then the Mecca of all sailflyers. Rapidly the young pupil developed into a popular instructor, and then in the summer competitions revealed himself as an undoubted genius.

On 6th August he won the out-and-return prize by flying to the Himmeldankberg and back in three hours, on the 10th he won the junior distance contest with 41 km., and finally he won the prizes for greatest duration (7 hrs. 54 mins.) and also for greatest aggregate duration (24 hrs.). His sailplane was the " Rhöngeist," the prototype of the Professor type designed by Lippisch of the Rhön-Rossitten



Gesellschaft. The most significant feature of these flights is that he was using for the first time a *variometer*, that instrument which in the next few months was to make possible his pioneering use of cloud lift. The use of the variometer was originally suggested to him by Lippisch.

Early in 1929, Kronfeld made an expedition to Austria to explore the possibilities of soaring in the upcurrents on the lee slopes of steep mountains. Although the main object was not achieved, he made a number of notable flights in difficult conditions, including a few descents from the mountains down into the valley. Finally he made the first soaring flights near Vienna when on 27th February he was launched from the Kahlenberg.

Back at the Wasserkuppe he climbed on 14th April to 1,275 metres above his launching point, or 2,225 metres above sea level. Then on 15th May

he won a prize offered by the newspaper " Grüne Post " for the first distance flight to exceed 100 kilometres. This flight was made with the help of cloud lift across the Teutoburger Forest in his new sailplane " Wien " (Vienna), which was to make such history in the next few years. On this occasion, Kronfeld said, he really enjoyed flying for the first time: up till then he had always had to work too hard.

During that year's Competitions, of which he was the winner, he twice beat his own world distance record. On 27th July he utilized a thunderstorm to fly 143 km. to Hermsdorf near Jena, and on 30th July he climbed blind in a cloud to 2,160 metres above take-off and reached 150 km. This memorable year of 1929 may be said to mark Kronfeld's aeronautical maturity, and brought with it the honour of being awarded the German sporting trophy known as the " Adlerplakette."

In between these great and sometimes tiring flights the Viennese pioneer carried on the humdrum life of a gliding instructor. Great pilots are not necessarily good instructors, but Kronfeld was both, and came to be much loved by his numerous pupils.

He showed practical wisdom by his insistence that the nervous energy expended on difficult flights should be won back by rest and healthy living. He was able to sleep at any time of day—and often did so, so that a person seeking his company on the Wasserkuppe was liable to get the disconcerting answer: " Sorry, I must get some sleep." Thanks to this habit he was able to keep awake for long periods when necessary.

1930 brought another busy summer. Although he was preoccupied with the building of his giant sailplane " Austria," he accepted with delight an invitation to England where on 17th June he made a cross-country flight of 112 km. from Itford Hill to near Portsmouth. After this he made many exhibition flights at Weymouth, Folkestone, Scarborough, Dorchester and Ivinghoe, where he had the especial honour of demonstrating to the Prince of Wales and Prince George.

Returning to Germany, he again won the Rhön competitions and with them the Hindenburg Cup presented by the President of the Reich. Again he broke the world distance record, this time flying 162 km. to Marktredwitz.

In 1931 he again competed with success in the Rhön, but from now on his interests became more and more international. On 20th June he won the motorless " race " across the English Channel, crossing from the Continent in dirty weather and returning by night. Gliding people tend to belittle this performance: admittedly it was not a soaring flight; but it was a fine piece of airmanship all the same. He continued in tow to Brussels where he demonstrated his art to the Belgian King and Queen before returning, still in tow, to England again. Here he made several fine soaring flights over London from his base at Hanworth Air Park, and these helped to spread into wider British circles the interest in gliding which had hitherto been confined to a stalwart few like Gordon England, Lord Sempill, Ashwell Cooke, Buxton, Needham or Lowe-Wylde. That autumn he took part in the competitions at Vauville (France) and at Balsdean, in addition to numerous flying meetings and various experimental flights. The giant " Austria " continued to absorb his attention, which at last after many difficulties took the air under unusual circumstances. The towing aircraft was found to be insufficiently powered for the take-off, so a second tow rope was hitched to a lorry. The system worked !

From the earliest days Kronfeld had great faith in winch-launching. In January, 1932, he took part



in a research conference at Berlin during which various forms of mechanical launching were tried out. Here he made what were probably the first complete circuits on tow behind a car, flying with opposite bank while the car drove round in circles.

At the 1932 Rhön the great " Austria", the " Elephant," broke up inside a cloud. Kronfeld just managed to escape by parachute, which he had been the first to adopt for use in gliders in 1929. Short as was the giant's life, it had not been in vain: from disaster the wise may often learn more than from smiling fortune.

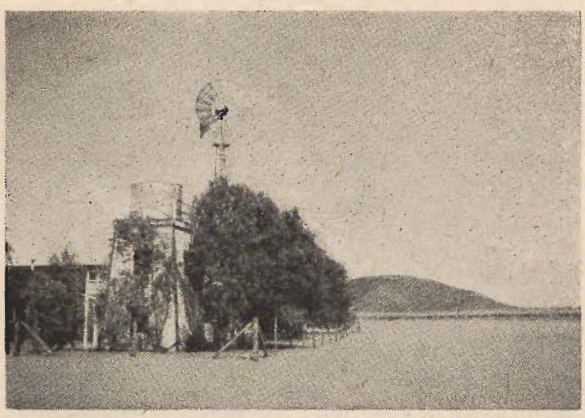
(*Continued on page 6*)

VISIT TO 29 PALMS

By WILLIAM LIDDELL

ARRIVING at Los Angeles in August, 1947, I had no thoughts of gliding; however, my nephew Jimmy Carr was most anxious to have me fly. He drove Jackie Leathem and me the 140 miles through the most amazing hills to the landing field between 29 Palms and Joshua Tree. It was a pity we arrived late because we carried a barograph for Miss Mikey Browning who had just flown her grandmother in a " Pratt-Read " 2-seater to 14,000 feet. This eighteen-year old girl and (we hesitate to call her) " Granny " had motored in from Florida !

Next morning was very hot and at noon Ray Parker took me with him on a trial flight and accepted my thermal " technique." By noon the wind was



The Windmill Pump at the Junction of the Runways, 29 Palms.

increasing steadily. Mikey took off on condition that we made a rendezvous and make our Silver " C " distance together.

Ray piloting the plane and Mikey in the " Pratt-Read " went off into a very strong breeze and soon Ray returned telling me to get off as soon as possible and land on the dry lake two miles away as the wind was getting too strong and across the runway. Away we went, the tow plane literally dancing from wheel to wheel and I confess to nervousness not having been aero-towed for several years. Two miles away was a 600 feet ridge and just crossing it the Nylon tow-rope parted. It was a case of landing on the dry lake or using the ridge. The next fifteen minutes were hectic. The strong wind and thermals off the ridge stood the machine on its nose uncomfertably close to the rocks and it took two hands and sometimes both sticks to pull her up. Thankful eventually to get clear, a thermal with a Joe Louis wallop took me to 6,000 feet but over the hills and the desert about which Ray had said : " if you come down within 60 miles in that desert we just can't go for you." Each time at 6,000 feet I scalded back for home but too low to set off on the course at 45° to the wind. There is a line of dry lakes running for miles and the Silver " C " " milk run " but Ray forbade us to go off below 8,000 feet and at 6,000 feet the tops appeared to blow off the thermals. The thermos flask and sandwiches were some comfort, but once out over the ridge and the desert it seemed a long way from home.

Mikey's arms were too tired after an hour so she landed and I followed. How that young girl controlled the big 2-seater in such turbulent conditions is a miracle. In the strong wind we tethered the machines on the dry lake and Ray flew us home in the plane.

Next day conditions were identical and thermals more difficult to find. Mikey frightened us by landing on the dry lake. Nobody saw her coming down and we were afraid she had blown away into the desert. Once more at 6,000 feet I found the tops leave the thermals and when Ray and Jackie Leathem came up to take movies I was having a most uncomfortable time. On three occasions the bottom fell out of everything and the rudder jammed hard over until we appeared to reach more solid air and the rudder came unstuck again. Ray added to the fun by treating me to a burst of slip-stream as he flew past taking pictures.

Down near the drome the windmill pump was jumping from one direction to another and three times I had to circle up again to come in on the correct runway as the wind changed 45° at the last minute.



Mikey Browning, Ray Parker and the " Pratt-Read."

Conditions as we had them were unusual and great heights can be obtained usually directly above the drome. Anyone who wants Golden " C " height and a long cross country should visit 29 Palms. From 4,000 feet steps of dry lakes can be seen at intervals to the horizon.

Possibly I may have another chance in 1948. Bill Putnam is resident host at 29 Palms; Ray Parker (No. 3 in the 1947 American National Contests) the chief instructor. Add to these the companionship of Jimmy and Jackie, two Irish boys of some glider experience, and, not least, Mikey and her grandmother, who are now safely back at Sanford Municipal Airport, Florida, and you have all the ingredients of a perfect soaring week-end.

AUSTRALIAN GLIDING

Christmas Camp

THE camp has surpassed all others in every way. Benalla proved to be an excellent soaring site, the aerodrome being comfortably large, with a good surface. Thermals under 10 ft./sec. were considered paltry and hardly worth using.

Living quarters obtained from the Dept. of Civil Aviation were adequate enough and comfortable. The hangar space supplied by the R.A.A.F. eliminated the worry of weather damaging the machines, and the use of showers was a boon to tired and dusty members.

Much of the credit for the success of the trip is due to the hard worked executives who ran the show. Rob Dowling as " O/C Troops " deserves a particular mention for the patient (but firm) manner in which he carried out his difficult task. Frank Dowling, equally important in the eyes of most members, did an excellent job as chief cook and provisions officer.

METREOROLOGICAL RESEARCH AT BENALLA

The club during the Christmas period co-operated with the Aeronautical Committee on Flight and Ground Loads, in some research on gusts and thermal upcurrents. That this research work was to be undertaken was not announced in these pages before the camp began because the arrangements were not completed until after the December edition of " Earbash " had gone to press.

The final decisions were hurriedly put into action during the week before the camp began. Instruments, including a barograph designed and built by the Council for Scientific and Industrial Research for this purpose, were procured. Club owned parachutes were checked by the R.A.A.F., and a " Tiger Moth " hired from " Hire and Fly Yourself Air Taxi Services Pty. Ltd.," for the duration of the camp.

At Benalla the research operations were under the direction of Mr. U. Radock of the University of Melbourne, and Ted Desmond, who is a Trainee Weather Officer at the Melbourne Weather Bureau, renewed his Commercial License in order to do Meteorological ascents in the " Tiger Moth."

A " Met " Flight was made every morning in the " Tiger Moth " to approx. 15,000 feet with a meteorograph slung between the port interplane struts. This instrument recorded temperature, pressure and humidity simultaneously on one chart. From the records, an upper air diagram (pseudo-adiabatic chart) was plotted after each flight and some idea of the conditions likely to exist during the day obtained. The meteorograph was also carried on the starboard strut of the Blue " Grunau " on a specially built fitting, and the barograph, in the barograph box of the Grey " Grunau."

With the recordings from these instruments it is hoped that official recognition may be obtained for various " Silver C." legs obtained by some pilots, besides providing some useful information to the research workers.

One of the most interesting records obtained, was that of a Met. Flight through a dust squall, made by E. Desmond, with J. Darbyshire on 30th December, 1947. Jim carried the barograph on his knees in the front cockpit, besides the meteorograph which was slung in its usual place.

It is believed that this is the first flight of its kind performed in Australia, and some interesting results may be forthcoming.

GOAL FLIGHT: BENALLA—ALBURY, 63 MILES

By E. J. Desmond.

Friday, 2nd January, 1948, was the first really promising day we had struck for beginners to set off cross-country. The " Met " flight forecast strong instability, with cloud base about 6,000 feet, and as the morning progressed, fair weather cumulus forming about this height quickly dotted the sky. The winds were southerly, and before I was launched, I decided to try and make Albury Aerodrome (N.S.W.), this for two reasons, namely the assurance of assistance on landing, and ease of retrieving by aero tow.



Winches at Benalla. Note shades necessary in hot Australian Sun.

Taking off at 12.57 hours I was aero-towed to 3,500 feet by Norman Hyde and released upwind of the field at 13.06 hours. I released in 10 ft./sec. lift, and circling with about 10 degrees of bank rose quickly to 5,500 feet above the field, being then about 200 feet below cloud base. I drifted northwards under this cloud exploring for more lift, but although up and down a few hundred feet, I could not get above 5,500 feet. Over Mokoan Swamp at this height I decided to try and make the next cumulus which was building a few miles north of me. At 13.30 hours I set sail towards it as 45 miles per hour and between the two clouds experienced 20 feet per second sink. By the time I reached the edge of the cloud I was down to 3,000 feet. I pushed on underneath it looking for lift and finding nothing.

At this stage I began looking for places to land should I fail to find any lift, all the time pressing on northwards. My persistence was rewarded by a patch of no-sink under the cloud and having explored this I flew northwards again, to run into a terrific thermal, which jammed the green ball at the top of the tube, and by 13.48 hours I was up to 6,000 feet. Still circling under the cloud, on the northern edge, I reached cloud base at 14.00 hours over the hills due west of Wangaratta, at 6,400 feet. This stretch of " tiger country " had to be crossed, the range lying from N.W. to S.E., so I decided to drift across under this cloud and then make an attempt to fly eastwards to get back on the track to Albury. As I cleared the hills I saw another Cu. developing between my position and Wangaratta, and visibly pushing up its round head. I flew to the eastern extremity of my cloud, struggling to gain as much height as possible, and then set out for this Cu. Once again I experienced the 20 ft./sec. sink, but this time I did not have to fly so far before the cloud was above me and flying cross wind I went under it on the downwind (northern) side. I ran from 20 ft./sec. sink into 20 plus ft./sec. climb, and circled lazily up to cloud base, which I reached at 14.15 hours. I was now about 10 miles north west of Wangaratta.

Here I had an opportunity to enter cloud as I rose into the base at 20 ft./sec. But as I settled down on the instruments, I discovered that the turn-bank had packed up and dived smartly out of it again. Unable to make the turn-needle work, I switched the instrument off, and scooted away towards the north east, at 60 miles per hour maintaining height at cloud base.

Leaving this cloud I experienced a series of ups and downs, as I flew towards Springhurst, and showed a gradual loss of height. The clouds here were less frequent, and the thermals much more patchy. There seemed to be no half measures. Either I was rising at 20 feet per second turning with about 70 degrees of bank or sinking at 20 feet per second. The transition from up to down was almost instantaneous, and made things very rough. When circling in the lift I had to fly at 40-45 miles per hour to maintain control in the rough air.

I arrived at Springhurst with 5,100 feet, at 14.31 hours, but the steady loss of height continued and I sank fairly quickly as I tried to progress northwards. I decided that I might have to land, and determined to reach Chiltern, so set out for this town. Just north of Springhurst I found more patchy lift, and lived a lift-time in some of the roughest air I have experienced in the " Grunau," trying to maintain height, as I drifted towards Chiltern. I chose the race-course as the best spot to land, and flew on over the town to have a look at it. I arrived there at 15.00 hours, at 2,700 feet.

I found no-sink over the town, which became 6 inches lift then, one, two, three, feet per second. Soon the green ball was at the ten mark, and I rose in a smooth thermal to 4,200 feet. I decided to attempt to cross the next strip of timbered country, and headed for Barnawartha.

I arrived at Barnawartha at 15.10 hours, at 3,400 feet, and seeking lift, flew northwards from the town. About a mile north of the town I ran into another thermal, which started at 10 feet per second, and in which, on doing one or two figures of eight, I discovered 20 feet per second lift. I rose in this lift to 6,200 feet by 15.20 hours, and was then at a point 4 miles north of Barnawartha. A cloud formed above me from this thermal, but I did not reach its base.

At 15.25 hours I was over the Murray River, and decided to try and run the 16 miles cross wind to Albury. I set out at 50 miles per hour, and found lift all the way along the river. I found this a most exhilarating sensation, throwing a lazy circle or two in patches of 20 feet per second lift and then continuing on my way. Arriving over Albury at 15.35 hours, with 3,100 feet, I headed out over the airfield and set about getting down. At first to show an



The "Merlin" two seater.

appreciable sink, I had to fly to 55-60 miles per hour and raced round and round the circuit, as I lost height. I landed at 15.42 hours and was met by members of the Aero Club there. I had covered 63 miles in 2 hours 45 minutes. The Aero Club chaps gave me every possible assistance, hangaring the machine for me, phoning Benalla, and providing a welcome cup of tea and some cake. In due course Norm arrived with the " Tiger," and aero-towed me back to Benalla, where we arrived just before dark.

Robert Kronfeld—*continued.*

The days of record-breaking were now over ; but Kronfeld's enthusiasm for sailflying remained, and with it his activity in many fields. His classical book " On Gliding and Soaring " was published in the autumn of 1932. He made numerous research and demonstration flights in France, Italy (where in May, 1933, he soared over Vesuvius in eruption), England, Belgium and other countries in Europe and America. He often made long journeys in towed flight, and by August, 1933, had already logged 10,000 km. of this form of travel.

After twenty fruitful years of devotion to the cause of human flight this great and good man has been granted an airman's sudden splendid death. His name, like his deeds, will never be forgotten.

Robert Kronfeld lives on in every soaring flight.

BRAMCOTE—DUNSTABLE, 22/6/47

GOAL FLIGHT, 56 MILES. "WEIHE," P. A. WILLS.

THIS was a very odd flight indeed. The weather was grey and the air apparently stable. A light wind from West of North drifted across Bramcote airfield from the smoky regions of Birmingham, Lichfield and beyond. Occasional drops of rain showed, however, that instability existed in the upper air, and this had been forecast. In fact it sounded as if, if one was lucky and hit a means of getting above say 3,000 feet, something might be done.

Various other competitors on this, the first day of the 1947 National Gliding Competition, had been aero-towed up, but had all come down again, one or two a few miles away.

When I took off at 16.30 hours there was no special reason to hope for anything better, though occasional irregularities in the cloud overhead, and patches of watery sun, were to be seen.

I asked my tug pilot to tow me straight upwind to 2,000 feet and on the way up we passed through only very mild patches of lift. At 1,800 feet over Nuneaton, I thought we struck a rather better patch, and released. I soon found I had been optimistic and turned downwind to fly back to the airfield. Not a wrinkle in the sky all the way back, and I crossed the upwind boundary at 600 feet, and circled to land.

At the last moment I came on a slightly brighter patch, where the sun was struggling weakly through the overcast and shining on the mown hay over the starting point, and the tea-tent in the spectators' enclosure. And then I saw a couple of hundred feet above me a "Weihe," just winch-launched, and circling !

Simultaneously my variometer shook itself, the red ball dropped for the first time and the green ball opened one eye, gave a sort of elfin hiccup, and flopped back into its seat again. At 400 feet I started to stooge about in an erratic circle after the green ball. She's up—she's down—up again—no she isn't—yes she is.

After a few circles the altimeter showed a slight gain, and the " Weihe " above me a bigger one.

We struggled round and round, and the tent enclosure drifted away gradually upwind 600 feet—700 feet—900 feet—and it looked as if we had a hope.

At 1,000 feet I saw, above the other " Weihe " and further downwind, an " Olympia," perhaps 1,500 feet up, and still circling. If only I didn't fall out of the bottom of the thermal !

At 1,700 feet I was nearly up to the other two machines, when the " Olympia " went off South, and the other " Weihe " E.S.E.

Away in this latter direction were distinct signs of a rain-cloud of fair dimensions, so a little later I followed, and Bramcote soon disappeared. Down at 1,200 feet I caught up with the other " Weihe," circling under an outpost of the larger rain-cloud, and I followed suit. Shortly after the other machine went off Eastwards towards the large cloud, but I felt suspicious, and hung on to what I had got for some time longer. At 2,200 feet I saw a quite hopefully gloomy-looking chunk of murk to the South East, and although I didn't know where I was, my goal was Dunstable, so this was the right direction, and I set off for it.

Rugby wireless masts soon hove up through the greyness, and the greyish blackness above it was emitting bits of drizzle. When I reached it I found gentle lift, and circled up into it.

Inside lift was neither strong nor constant, but with the splendid stability of the " Weihe " and my specially damped turn-and-bank indicator, I found I could chase round in ellipses or figure-eights almost as well as in clear air, and so climbed to about 6,000 feet. Further efforts seem to produce as many downs as ups, so I straightened into my course of 150 degrees and set sail for Dunstable.

Bits of ups and downs were met, but for about 20 minutes nothing was to be seen, then I came out of actual cloud at around 4,500 feet and dimly could see the ground through the grey haze, not however well enough to locate myself.

I was again in a patch of watery sunlight, and now away to the East saw something that looked quite active, and greyish and messy mass of cumulus rising from the mist below. This was off my course, but I didn't actually know that I was on the darned thing anyway, so set off for it. At one point I could detect a kind of cauliflower, at which I steered.

Ten minutes later I flew into the side of the cloud, on a compass course for the cauliflower, and shortly afterwards rattled through the usual down currents into quite good lift—for the day. Broken lift of 10/12 feet/sec. took me up to 8,000 feet, and then it got pretty rough. I couldn't manoeuvre back into smoother lift, so again set course. As I had flown East of my track, I added 10 degrees for luck, and hung on to 160 degrees. Such is sailplane navigation !

After a while I came out again, to a very drear scene. Below was grey haze, and a very faint shadow of the earth. Behind and to one side was a mess of cloud, and above a sheet of stratus. No sign of sun or life anywhere, and the air as dead as ditchwater.

It wasn't the sort of day a chap expects to find himself around in a glider at all.

I sailed on again, sticking to 160 degrees for want of anything better, and soon saw ahead a large grey column of cloud appearing out of the haze below, its top disappearing into the stratus overhead.

I tooled inside and after a few minutes struck good lift. By fiddling around I reached 20 feet/sec., and the altimeter started to wind itself up in a forthright manner. At 9,000 feet a bit of ice started to form, and in a fit of optimism I put on my oxygen mask (1947 improvement) and turned on the gas.

But at 9,900 feet I again entered rough air and although persevered in fairly brisk ups and downs, made no more height, so set off again.

Even on the " Weihe," holding a course on a magnetic compass and a turn needle is not a very exact proceeding, so when a while later I again came out above the haze and below the stratus, I hardly knew which sheet of my map I had better turn to.

I sailed on however, and when down to 6,000 feet came to the edge of a sheet of stratus *below* me.

(*Continued on page* 9)

SOARING IN FRANCE

By
GUY BORGÉ

The new High Performance Sailplanes " Air 100 " and " S.A. 140 "

THE project of the performance sailplane " Air 100 " was studied before the war by Messrs. Lescure and Clamamus, members of the Soaring Club " Groupe l'Air."

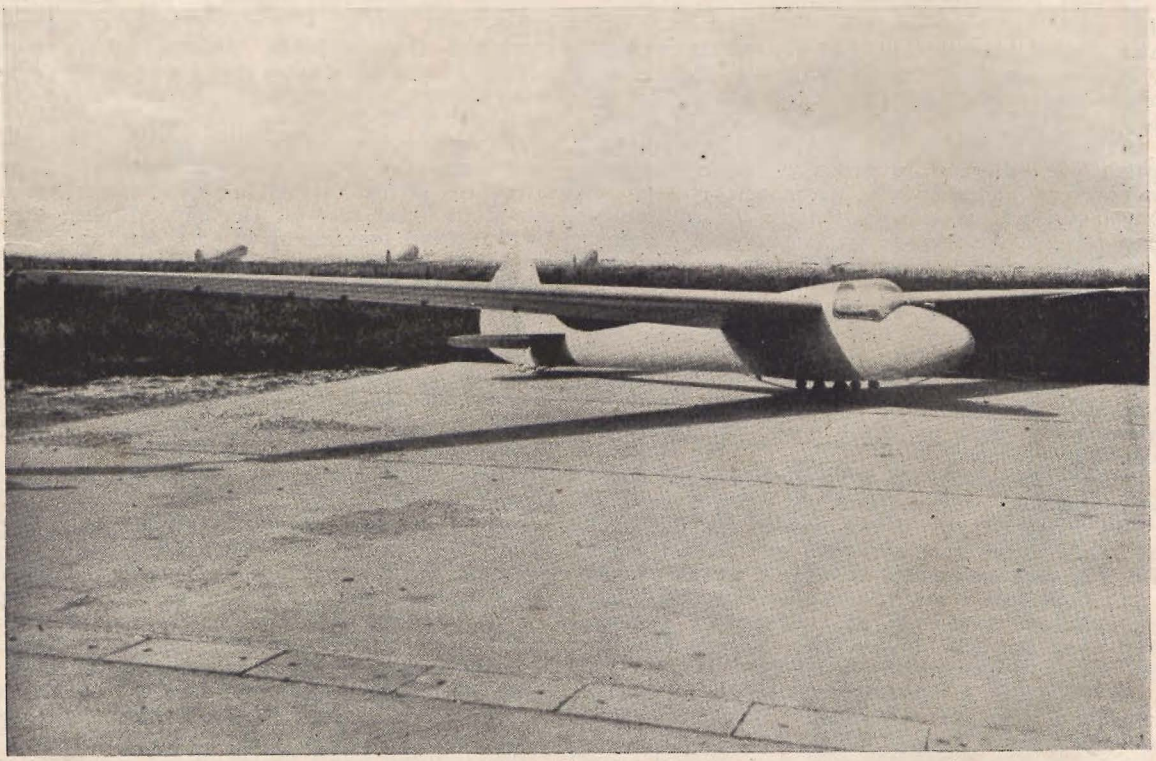
This study was undertaken again in 1945 at the Chatillon Air Arsenal. The Wichita Falls Competitions were in view, and the Arsenal joiners worked night and day to complete 2 prototypes in time. After 3 hours' test the two sailplanes seemed right, and without modification they were immediately embarked to the U.S.A.

" Sailplane " has already given the results of the Wichita competition, during which the two " Air 100 ", flown by Nessler and Valette, completed the best average speed : 36 miles/hour along 2,790 miles. One " Air 100 " was left in America and loaned to a young pilot, Dom Pollard. Among 38 competitors, he won in it first place in the Elmira Contests with 477 points, gaining the best altitude : 6,707 feet ; the best duration : 7 hours 14 ; the best distance : 205 miles. The pilot getting second place behind Pollard had only 133 points ! After these outstanding flights, the U.S. Navy asked the French Embassy if they might borrow this machine and test it.

60 " Air 100 ", of which several are for Export, are under construction at the Chatillon Arsenal plants to-day.

Here are given the characteristics of the " Air 100 " :

Wing span : 59.2 feet.
Wing area : 193.6 square feet.
Aspect Ratio : 18.
Length : 26.3 feet.
Empty Weight : 533 pounds.
Full Weight : 742 pounds.
Load Factor : 12.



" Air 100 "

Best gliding angle (speed 40 m.p.h.) 1 : 30.
Minimum sinking speed (speed 35 m.p.h., gliding angle 1 : 28.7) : 1.8 foot/second.
At 63 m.p.h., vertical speed 5.2 feet/second.
Maximum speed with opened brakes 137 m.p.h.
Stalling speed 29 m.p.h.

All the structure is wood built. The wing has

a 3 degrees diedhral, and a 7 degrees wash out. Other noticeable features consist of :

Root airfoil : Gottingen 549.
Tip section : Gottingen 576.
Slot-ailerons built in two parts.
Metal air-brakes with a comb shape.
Controls adjustable in flight.
Wing box monospar at 35% of the chord.
Ribs spaced at 1 foot.
Each wing rigged by 4 identical duralumin fittings : 2 under the monospar and 2 at the leading edge.
Undercarriage : either a skid with some *droppable* wheels, or a built-in wheel with brakes.

The " Air 100 " received the latest instruments made by the " Aera " firm, founded by M. Badin in 1911. Especially the new " Aera " ultra-sensitive variometer-inclinometer, where a tap, acted by a button, puts into immediate communication the bottle and the atmosphere. It swings back to 0, and its use is interesting :—

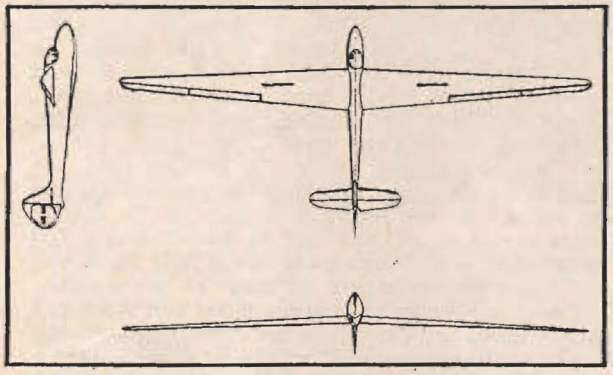
(1) When the up or down ratio is very great and gives risks of damaging the instrument.

(2) After an abrupt climb or descent (after the winch cast off, for instance), so that one need not wait long for the needle to come back to its normal position.

The instrument dial has a diameter of 3 inches, and is fixed to the variometer bottle and the inclinometer vessel.

The new " Aera " air-speed indicator was not ready in time for the " Air 100 " at Wichita. This instrument has 2 ranges of graduation : the former between 0 and 150 km/hour, the latter from 150 to 250 km/hour. It is so sensitive that it may play the role of a variometer by its absence of lag.*

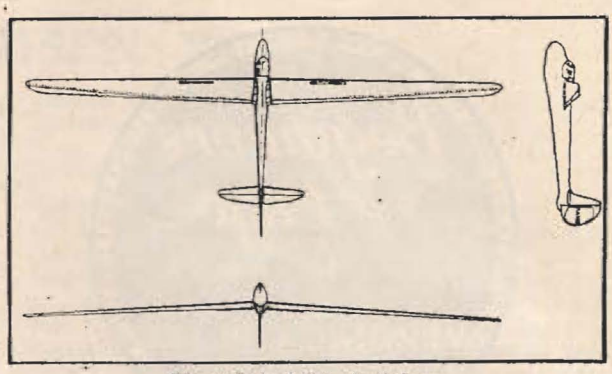
The " Air 100 " has been created by a very well-known sailplane designer : M. Raymond Jarlaud, designer of almost all the pre-war machines Avia



The " Air 100" Sailplane

(40 P ; 41 P sailplanes, 50 and 60 motor sailplanes), Delanne, Caudron (C.800 Two-seater ; C.810 Trainer ; C.850 Performance . . . .). At the Arsenal Plants he is developing an extremely efficient sailplane to-day, the " S.A. 140," of which the foresaid performances look very attractive for long distance flights.

**See diagram*



The "S.A. 140" Sailplane

Wing Span : 63.6 feet.
Wing area : 161.4 square feet.
Aspect Ratio : 25.
Length : 24.5 feet.
Empty Weight : 562 pounds.
Full Weight : 892 pounds.

Maximum Gliding Ratio : 32 at 50 m.p.h.
Minimum vertical speed : 2.2 feet/second at 43 m.p.h.
At 63 m.p.h., miminum vertical speed : 4.2 feet/second.

The " S.A. 140 " has dive-brakes, auxiliary flaps, helped by the ailerons, which when used for increasing the lift, allow one to circle at low speed in the narrow thermals.

The machine is of wooden construction, but the wing monospar is duralumin made and can be filled with water to increase the weight, thus improving the indicated performances at great speed.

In a special version of the " S.A. 140," designed for stratospheric flights, the pilot will be prone in a pressurized cabin. With this idea M. Jarlaud has already tested with good results the prone position in a special " Emouchet " sailplane.

The " Air 100," and later the " S.A. 140," are the French hopes for the international competitions and Soaring Records.

BRAMCOTE—DUNSTABLE—(*Continued from page 7*)

Just under this edge I thought I could see through the haze faintly white geometric lines, which I took to be the concrete roads of the outskirts of a largish town.

This I thought could only be Luton, no other town of this size being near my course. So I turned, in order to avoid the sandwich of clear air ahead between the top and bottom layers of stratus, and circled down until, at 3,000 feet, I came to the lower level of the stratus, and there, sure enough, was Luton, in the haze below.

It was like a conjuring trick. Nothing up my sleeve—absolutely damn all.

After that of course, it was easy. In dead still air I flew to Dunstable arriving at 1,800 feet and circled down, landing at 19.25 hours. The inmates were as surprised to see me as I was to be there.

(*Also appearing in " Aeronautics "*)



THE skilled sailplane pilot who can best take advantage of thermals is the one who is most in training. The fact that one person's name crops up again and again in spectacular flights is not necessarily because he is exceptionally lucky. It is more probable that he never loses a chance to fly, so that when the right moment arrives he is in perfect trim to get the best out of it.

It may seem a waste of time and money to have launch after launch and never catch a thing, but really it is all good training. Perfect turns help enormously when it comes to tight circling in a thermal, while the ability to bring off a perfect spot landing may make all the difference between being aerotowed home after a long-distance flight and coming ignominiously in a trailer with a pile of wreckage. So please don't give up going to your gliding club just because it is winter time or looks an unpromising day. Keep on practising and practising again. It is impossible to be too good—though it is possible to get stale or " browned-off."

That is the moment to vary the straight flying with some aerobatics, especially if you are having aerotows. Make sure first that your parachute is in order and your machine strong enough, then take her up and throw her about a bit. Begin with a straight stall—stick back gently but firmly, and hold it back while the sailplane lifts her nose in silence, drops with a sudden rush, and swings her nose up again till she is in level flight once more. Make the stalls steeper and steeper till you are almost vertical on the upswing; the drop will then be so acute that the machine switches back a little and for a brief moment the ground appears to be overhead. But keep the stick steadily back and she will come up to normal again at once.

When you are sure that you have full control in a stall and can come out straight and facing the same point you were facing when you entered (directly upwind, by the way; keep your eye on a smoking chimney), try a loop.

To get enough speed for this you will have to dive. The exact speed depends on the machine and the weight of the pilot. A Grunau Baby needs about 100-110 kilometres (I make that about 60-70 m.p.h., but check it !). At first you will find diving quite a mental hazard. It seems all wrong and much steeper than necessary. But go on steadily till the speed is reached, then pull the stick firmly back—as far back as it will go—and hold it there. The nose will rise, you will so-to-speak fall over the back of your head, and there you are back to normal again, having looped. If it was a perfect loop there will have been no pull on the straps, as the centripetal force will tend to keep you in. But if you made it badly—too slowly or too angular—there will be an uncomfortable moment when you are hanging in the safety straps, so it is most important to see that they are well fastened and somewhat tighter than usual. Check them well before you take off.

Loops can be made either up-wind or down-wind, though the latter are slightly more difficult to make elegantly. And there is no need to stop at one. With the same speed gained on coming out of a loop another can be started. The record stands somewhere in the eighties—but remember that you lose height with every loop and keep a safe margin, enough to land back in the field.

Another pleasant manoeuvre is the stall turn. This is a device for changing direction without loss of height, and looks very effective from the ground. The sailplane is first dived to gain speed, then pulled up till nearly vertical. At this moment full right rudder and right stick are applied and she pivots in a nearly vertical plane round her tail till she is again nose down but facing in the opposite direction. Here the stick and rudder should already be straightened and the stick held back till the dive is corrected. The aim is to make the 180° turn as exact as possible, and it is a great help if one can practise over a straight road, hedge, or railway line.

Spinning is another exercise that should be practised whenever convenient—but always, of course, with plenty of height. Some machines will spin more easily than others, and the lighter the pilot the simpler it is for him to enter, even without applying rudder. Stick hard back and to one side, flying as slowly as possible, and over she goes. Straighten the stick and apply slight opposite rudder, and out she comes. Easy. A heavier pilot will need to use his rudder to enter as well as to straighten up again. A very heavy pilot may not be able to enter a spin at all, but will go instead into a fast spiral dive at ever-increasing speed, and must pull out before the strain gets too much for the machine.

From an aerotow of between 2,500 and 3,000 feet it is possible to follow quite an interesting acrobatic theme that covers almost all the basic training you might need. Start with three turns spinning to the right and another three spinning to the left. Then a loop and stall turn upwind, followed by a loop and stall turn downwind; three steep turns to the right, three steep turns to the left; side-slip right, sideslip left; and come in to a spot landing. A little of this during winter, and summer's thermals will find you ready to make the best flights of your life, because you will by now have absolute confidence in both yourself and your machine.

KEEPING IN TRAINING

OERLINGHAUSEN "GEN."

TRAINING FROM PRIMARY TO OLYMPIA.

OUR rather thorough training programme is designed to teach people to fly *well*, not just to float round the sky in any old thing, being a menace to themselves and everyone else.

Let us, then, consider the training of a new member to this Club, who has never flown before in his life, and to whom the air is a strange and somewhat frightening element.

After his initial flight in the " Kranich," which is primarily given as an Air Experience, since the pupil will be too engrossed in looking about him to be receptive to instruction, he is sent to the Primary school. Here he is given a short talk on the theory of flight and shown the effect of controls. When the instructor is satisfied that he has grasped the basic principles, he is sent off on his first ground slide. When he is able to keep his wings level, the other two controls are brought into use until he is able to climb to 150 feet and glide straight ahead.

Up to now he had only been using his controls to correct the attitude of his aircraft; that is, if one wing drops or the glider swings off course. Now he is taught to make a positive movement of the controls in order to effect a turn, and proceeds to circuits in the nacelled " Primary," or " Boat," as we call it.

It is useless to convert him to the intermediary sailplane (in our case the "Grunau Baby") until he is quite competent at circuits and turns, since the next stage, which might be called a Baby Conversion Course, is not designed to teach him to fly, but to familiarise him with the handling differences and better performance of the new type.

So back he goes to do a couple of hops in the " Baby," using spoilers on the second one. Then he proceeds to do circuits and turns until his instructor is satisfied that he can handle the new type. Then he is given his first Centre of Gravity launch and can start looking for lift and attempt to get his " C."

After his " C " the pilot continues perfecting his turns and spot landings until judged fit to attempt Silver " C " conditions. This question of spot landings is very important, and on no account will anyone be allowed to attempt a cross-country if he is consistently erratic in his landings.

He may have eight hours or eighty hours on the " Baby," but only when he is consistently sound in all aspects of his flying, including sideslipping, will he be considered for conversion. Normally he will have fourteen or fifteen hours in the " Baby " before conversion; this includes several trips with a covered cockpit, to familiarise him with that " shut-in " feeling, and the completely different feel and sound of the Covered " Baby."

Once on the " Meise " the pilot will have to do at least six safe landings before being allowed to take it away on a cross-country, and generally speaking, not before he had several hours soaring to his credit and preferably some dual on instrument flying in the " Kranich." On no account will he be allowed to enter a cloud until he has done dual on instruments to the instructors' satisfaction.

CIRCUIT AND APPROACH.

SEVERAL times recently it has been noticed that there is a gradual falling-off in the standard of circuit procedure at this Club. Once again, for the umpteenth time, we had a case of carelessness on the approach last Saturday which was followed by a safe landing only by a lot of luck. To refresh the memories of those who should know better, and also to inform those people who visit us from time to time from other Clubs in Germany, we reiterate our requests and reasons for carrying out a proper circuit here.

It may be thought that because a glider IS a glider, it can be landed anyhow from any direction. The elementary rules of flying, which are observed all over the world, have been formed over the years by the observation of the results of mistakes in flying by many pilots. A glider is an aircraft, and is subject to all the disadvantages of a powered aircraft, in addition to the fact that it cannot " go round again " if it gets into difficulties near the ground. We ask pilots here to make a proper circuit and approach for two reasons; firstly because a good circuit and approach will almost always result in a good landing, and secondly because we wish to conserve our aircraft as much as possible (and also prevent people from hurting themselves).

At any airfield at which powered aircraft can land it will always be found that a circuit procedure is laid down and followed by everyone using the airfield, whether flying a " Tiger Moth " or a " Constellation." If these circuit rules are disobeyed, a crash is almost certain to follow, with consequent loss of life.

Briefly, the circuit procedure here is as follows. At least three legs of the circuit should be made, namely downwind, cross wind, and final approach and landing. This should be carried out on every flight, without exception, as it is always good practice and will be extremely useful when a cross-country is attempted. During the thermal season last year, it was noticed that many pilots got themselves into awkward positions while thermal-hunting, and had to make dicey approaches in order to get into the airfield without overshooting too much. This is something on which we stamp very heavily In such a case one should have a definite plan, and if no thermal has been found by the time one has descended to, say, 150 metres, the attempt should be given up at this height and a proper circuit and approach made. After all, there will be more thermals, and you will get another trip, so why risk the aircraft (and your neck !) unnecessarily ? Remember, flying is always a potentially *dangerous* business.

ON THE WIND AND WEATHER

" NOW is the winter of our discontent." The chap who wrote that must have been a glider pilot at some time, for it sums up our present feelings

admirably. Several times recently members have arrived to glide in sunny weather and found that, for some obscure reason, there was to be no gliding. The weather affects us in several ways, which we should like to set down here to clear up any misunderstandings.

Firstly, strong winds and/or very gusty conditions. When a person is learning to fly, it is not much use sending him off on a ground slide or a low hop in gusty conditions, because he will not be able to cope with them, and secondly because he may get hurt if a gust comes along and tips over the glider. Nothing can be learnt under these conditions, so the " Primaries " do not fly. The more advanced people can fly, so long as the gusts are not too strong, for damage can be caused on the launch, or on landing, in these conditions.

Low cloud and rain are almost self-explanatory, but a word should be said about them. Obviously, low cloud will prevent flying, except for ground slides, as not enough height will be gained for a good circuit. Rain is rather more important, as it can get into the wood construction of the aircraft and in time rot the wood, thereby making the aircraft unfit to fly, even though the glued joints are as strong as ever they were. With the present type of glue in use, it is more likely that the wood will break than the glued joint; the glue is very strong stuff. And in any case, flying in the rain is SO unpleasant !

Recently, we have been unable to fly because of the field being too wet. It may be thought by some people that this is a rather poor excuse. The reason is that when our sandy field gets thoroughly soaked, through heavy continuous rain or by melting snow and ice, it becomes very sticky and soft. In this case the cable sinks into the ground when pulled by the Jeep, and the friction along its length is so great that the Jeep can only just pull it over the last 200 yards or so. The winch has to overcome this friction and also move six or seven hundred pounds of aircraft and pilot, and it is not powerful enough to do this without slipping the clutch or breaking the cable. At the best, the take-off becomes a long ground slide halfway up the field until the friction becomes diminished enough to permit the winch to speed up. The strain on the cable is colossal, and it is pulled out of its normal shape to such an extent that its life is shortened by as much as a half or a third or its normal span.

A case of this occurred last week, with a new cable. On the average, we get at least 300 launches from a cable before it becomes too bad to use. This one was used on wet, muddy ground, and was completely U/S. after 100 launches. A similar cable, put on one of the other winches and not used on wet ground, has given over 250 launches without any breaks as yet, and should be good for at least another hundred launches.

It is hoped that the foregoing will have explained the reasons for not flying, even though it seemed to be such a good day for it. We are lucky in some respects, for given two or three dry, warm days, the field dries up remarkably fast, whereas a grass field would still be a muddy mess after a similar length of time.

HOW GLIDING HAS PROGRESSED

(*First published in SAILPLANE, Nov./Dec.* 1939).

THE British gliding movement is exactly ten years old. But few of those who are in it know how it was born, so we have asked Mr. D. C. Culver, who took the leading part in that operation, to celebrate this important birthday by describing the event. Mr. Culver served in the R.N.A.S. and R.A.F. in the last war, and in August, 1918, was shot down near Dixmunde and made a prisoner of war. He obtained his " C " certificate with the London Gliding Club in July, 1931.

Soaring history was made in 1929. It was the year in which sailplanes finally threw off the chains which had bound them to hilly country. So it would be timely to give a list of the principal sailflying achievements of that year, which were responsible for the re-awakening of interest in Britain. Here they are :—

APRIL 3rd.—Johannes Nehring attempted to win prize of RM 5,000 (£250) offered by *Grune Post* newspaper for the first soaring flight of 100 kilometres. Soared along Bergstrasse (a range of mountains south of Darmstadt), but landed after 70 km. near Ubstadt while trying to cross a 12-mile gap.

APRIL 14th.—Robert Kronfeld, at Wasserkuppe, climbed to 4,183 ft. under a cumulus: unofficial world's altitude record (beyond range of barograph).

APRIL 25th.—Nehring tried again along same route, and got let down in the same gap: distance 72 km. (45 miles—world's record); height under cumulus 3,966 ft. (official world's record).

MAY 4th and 5th.—First soaring contest in U.S.A. at Long Beach, California: 8 machines.

MAY 9th.—Kronfeld tried for *Grune Post* prize along Teutoburger Wald, a line of low hills in N.W. Germany; let down in a gap after 35 km.

MAY 15th.—Kronfeld tried again and succeeded by using cloud lift to cross gaps; went 64 miles—just over 100 km.—and won the *Grune Post* prize.

JULY 18th.—Start of 10th annual Rhon contests on Wasserkuppe; 36 sailplanes entered.

JULY 20th.—Kronfeld made world's first *deliberate* thunderstorm flight; Wasserkuppe to near Jena: 89 miles (world's distance record), 7,084 ft. (world's height record).

JULY 22nd.—Wolf Hirth made out-and-return goal flight, 6½ miles each way, Wasserkuppe to Schweinsberg.

JULY 30th.—Kronfeld, flying blind in cumulus, reached 8,494 ft. (world's record) and soared from Wasserkuppe to near Bayreuth, 93 miles (world's record). Groenhoff, with passenger, went 22 miles and reached 4,183 ft. inside cloud; both world's records for two-seaters.

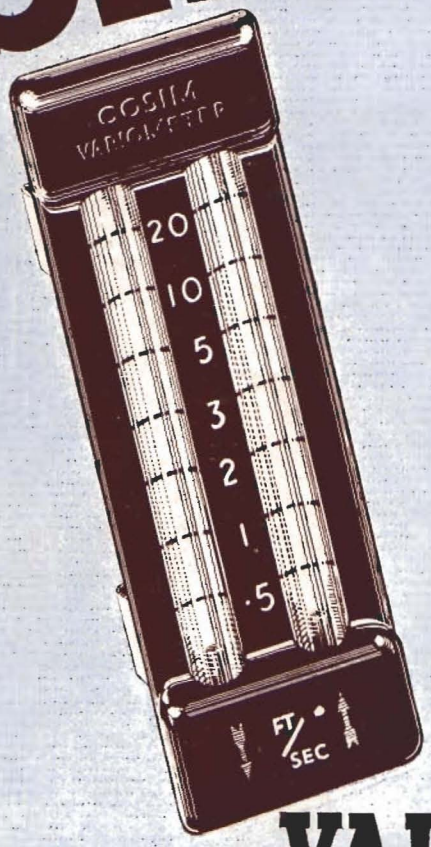
SEPTEMBER.—Russian contest in Crimea: 20 machines.

(*Continued on page* 13)

INTRODUCING

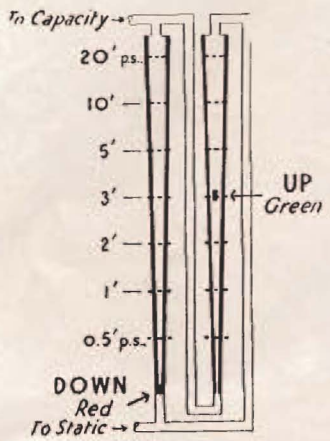
The New COSIM





VARIOMETER

GENERAL DESCRIPTION

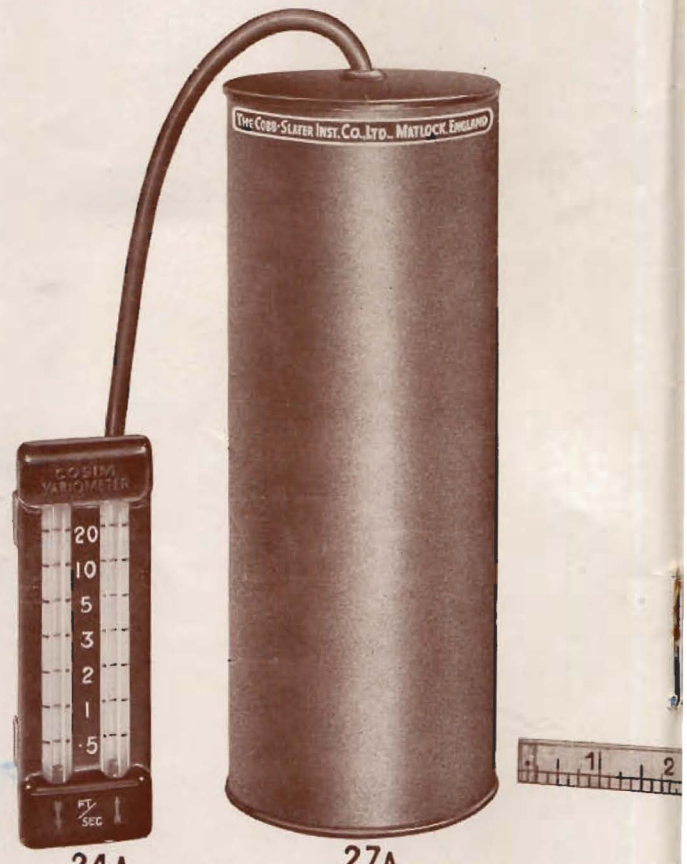


The new Cobb-Slater Variometer (Trade Mark "COSIM") is a scientifically designed instrument working as a flow meter measuring flow from or into a thermally insulated Air Capacity and calibrated to indicate rates of ascent or descent. The new instrument is a development of the original Variometer invented and developed by The Cobb-Slater Instrument Co. Ltd. in 1936. Many instruments of the original design are still in use and giving good service in many parts of the World.

The self-adjusting variable leak, giving instantaneous response to the smallest changes of rate of climb or descent, has been retained in the latest instrument, which is the result of many years' research. The very simple principle employed requires only two moving parts (See diagram). For simplicity, the tubes in the diagram are shown as having taper bores but in actual practice these bores are parallel. Improved methods of manufacture result in greater accuracy and reduce the required volume of the Air Capacity to one quarter of its previous size without sacrificing efficiency. This is of great benefit on installation, enabling the Air Capacity to be fitted directly behind the instrument panel and in close proximity to the Indicator, as will be seen in the photograph showing a typical installation on an Olympia (Meise).

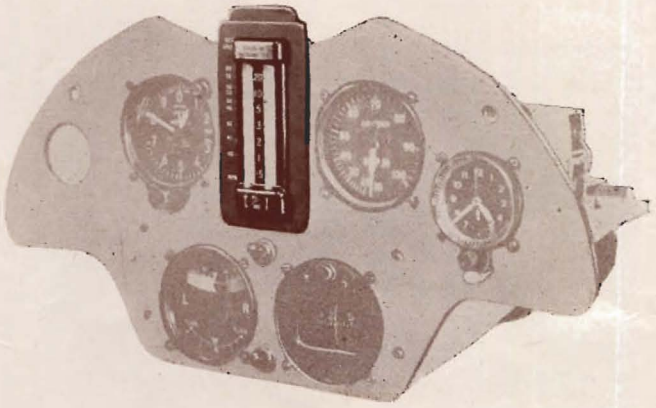
Compared with diaphragm and fixed leak types of Variometers the "COSIM" has a very small time lag. The instrument will register after a vertical movement of less than 6 ft. even at the slowest rates of rise or descent. (less than 6 inches per second). This extreme sensitivity at low vertical speeds is invaluable when contacting weak lift—and is achieved by carefully controlling the fit of each piston to its relative tube to a fine degree of accuracy.

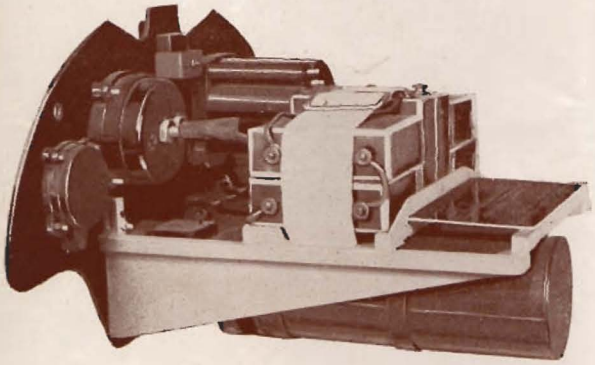
Reference to the theoretical diagram shows that for a given vertical speed, the piston takes up a position in the tube which is commensurate with the flow of air from the capacity, the leak being the annular space between the piston and tube. This method was used in the older types of Cobb-



24A 27A

Slater Variometers but in the new " COSIM " instrument the tubes have parallel bores and the variable leak is obtained by forming a tapering slot at the rear of each bore. This slot starts at a position on the tube just above the zero mark and runs up the tube increasing in width and depth in proportion to the leak required at any particular point. By carefully controlling this slot almost any calibration can be catered for. The result of this variable leak is a very rapid indication of the actual rate of ascent or descent, the piston taking up its proper position almost instantaneously on any change of vertical speed. For instance, assuming a rate of ascent of 20 ft./sec. suddenly changing to 5 ft./sec., the piston will indicate this change in less than one second. On the lower register where the scale is opened out, the lag is a little greater but for all practical purposes can be regarded as negligible.





INSTALLATION

Installing the " COSIM " is quite simple as shown on page three. Full instructions are issued with each instrument.

SERVICING

A " return of post " service for standard spare parts as listed is available and damaged instruments forwarded to our works for repair can be returned within seven days. A list of components is shown on page four.

CALIBRATION

The " COSIM " is available with the following calibrations :—

In feet per second	...	o.5,	1,	2,	3,	5,	10,	20.
or	...	1,	3,	6,	9,	12,	15,	18.
In metres per second	...	o.2,	o.4,	o.6,	1,	2,	3,	4, 6.
or	...	o.5,	1,	2,	3,	4,	5,	6.

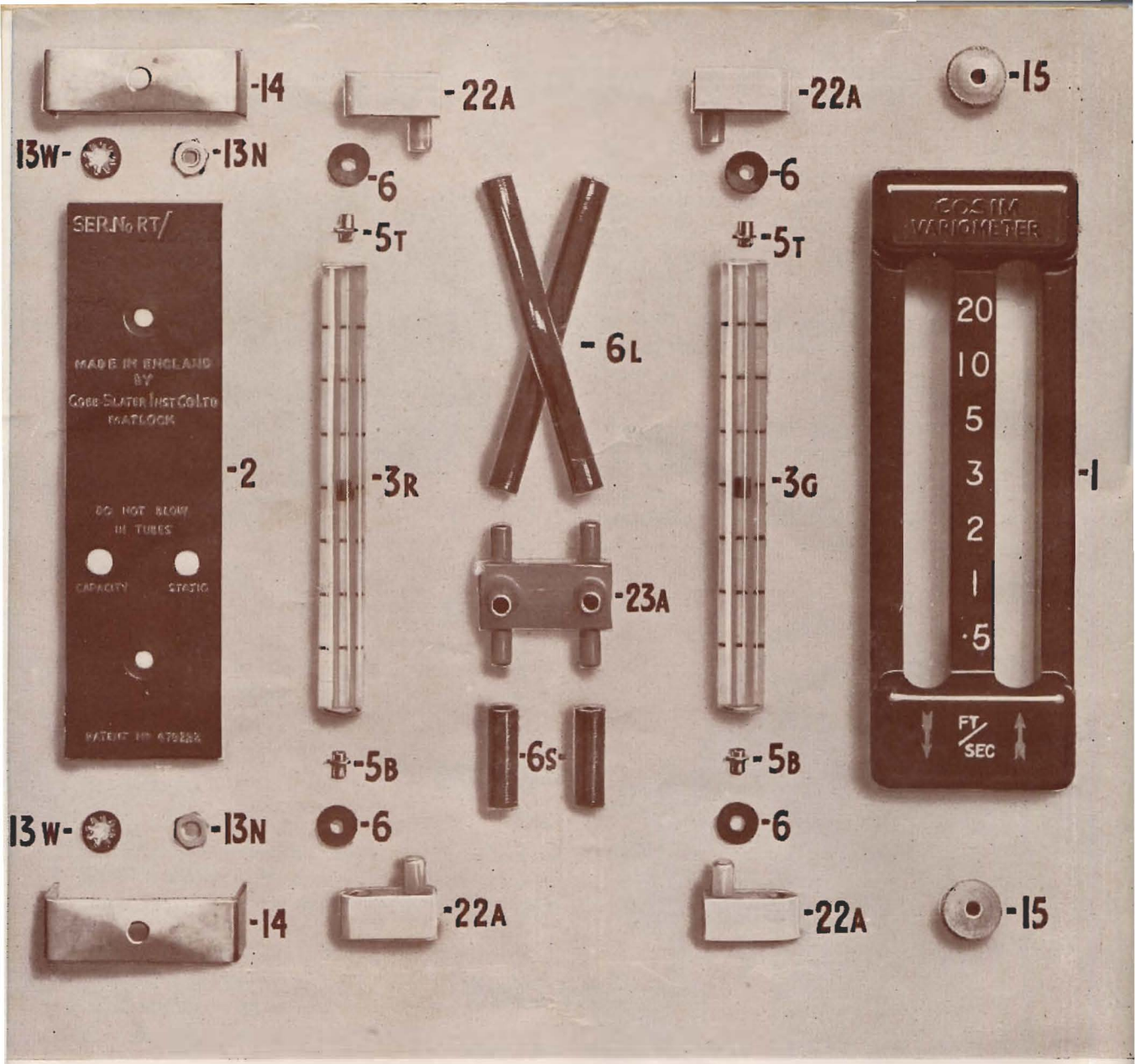
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INTRODUCTION TO A SCOTTISH STANDING WAVE

FOR many months now, the excellent report of Terence Horsley on his war-time Standing Wave experiences in the Edzell area, has simmered quietly in the minds of gliding folks north of the border. Many observed cloud conditions were believed to be indicative of wave formations of the kind he mentioned.

The constant recurrence of such cloud layouts, and the widely separated areas in which they have been seen, has led us to believe that such wave formations are to be met in central Scotland, much oftener than is generally realised, and a North-West wind is the most likely one to bring good results.

While training of new-comers to gliding has been No. 1 priority at Scottish Gliding Union Balado Airfield of late, eyes are often directed skywards between " Dagling " and " Cadet " launches, and cloud formations studied for signs of roll characteristics over the Ochil Hills lying several miles north of the 'drome.

On Sunday, 21st December, 1947, it happened. In a North-Westerly, blowing down from the slopes at about 10-15 m.p.h., the stationary clouds upwind and downwind of the 'drome were clearly seen to be operating, in that they were definitely rolling.

First efforts to contact the supposed lift were fruitless, and so training continued unabated. Then at 14.45, Davidson qualified for his " C " by casting off from the winch at 1,000 feet, and climbing very slowly straight ahead, where, upwind of the airfield, in a clear sky between the stationary clouds, he hung poised at 1,500 feet for 12 minutes, in smooth, widespread, and gently rising air.

The next three launches brought no results, although gulls and geese from Loch Leven were seen to benefit by the something which we were looking for.

On the last launch of the day, at 15.40, in the gathering dusk, Thorburn met with a violent introduction to a fast rising patch of air at 600 feet, and so on reaching 1,000 feet, he cast off and turned back downwind to find it. The " Tutor " boasted one instrument only, an ex-service Sensitive Altimeter which had often before been found useful in its rapid indication of change of height. The story it now told was interesting. The large hand swinging smoothly round the dial, registered 3,000 feet above ground level within three minutes of take-off.

At this altitude, due to the increased velocity of the wind, the " Tutor " just held station about 1 mile downwind of the airfield and behind its tail, formed rising wisps of haze which flowed steadily into the second stationary cloud, which at this level was seen to have an elongated shape across-wind, and a surface texture akin to lamb's wool. The rolling movement was quite marked.

By increasing speed in a slight dive, the " Tutor " was flown with difficulty about half way across the gap between this cloud and its neighbour about 2½ to 3 miles upwind, but no height was lost. At this point however some turbulence was met, and on turning back to No. 2 cloud, again the altimeter showed a rate of climb which seemed to be increasing steadily, even above the cloud tops, to what must have been much more than 20 feet per second.

3,500 feet saw the level of the cloud tops, and through the gaps in the haze forming below the " Tutor," the street lighting of Kinross, and Milnathort, twinkled brightly as a reminder of the growing darkness below.

The effect of extreme cold on un-gloved hands brought home the lack of preparation for such a flight, and so with nose down and wires shrieking, the glider was taken back to the middle of the cloud gap, where height was lost only with great difficulty, in a series of side-slips.

Judging by progress, the wind speed above 1,000 feet was about 30 m.p.h., and increased with altitude. On the way down, at 600 feet, a decided drop in wind was noted, and this reminded the pilot of the sensation experienced when moving from a gale of wind in the open to the quiet calm of the sheltered air in the lee of a large building.

Touch-down was made on the airfield in a gentle 8-10 m.p.h., breeze, only 21 minutes after launch.

These short flights encourage us in our belief that our sites at Balado and Bishop Hill, are nicely placed in the lap of a Standing Wave system, which if not a continuation of the one found by Horsley, can at least lay claim to being its " wee brother."

A modicum of soaring can now be expected from time to time, in what was generally accepted as the " off season." A more detailed study of the Met. conditions of the period, and charting of the most regular areas of " up " and " down " should bring easier and more frequent contact with the system, whenever it graces us with its presence.

HOW GLIDING HAS PROGRESSED—*(Continued from previous page)*

OCTOBER 7th.—In Allegheny Mountains, W. Klemperer soared 1 hr. 40 mins., went 16 miles and climbed 600 ft. : all three records in U.S.A.

OCTOBER 19th (3.19 p.m.) to 20th (6.3 a.m.).—Oberlt. Dinort soared at Rossitten, East Prussia, for 14 hrs. 43½ mins. : world's duration record.

NOVEMBER 2nd.—At newly-discovered site at Bezmiechova, Poland, Grzeszczyk soared 2 hrs. 11 mins. : Polish record.

DECEMBER 4th.—" Gliding Lunch " in London.

DECEMBER 10th.—W. Hawley Bowlus raised U.S.A. duration record to 2 hrs. 47 mins.

ULTRA LIGHT AIRCRAFT ASSOCIATION

AFTER several months' deliberation, Lord Nathan, Minster of Civil Aviation, has stated that it has been found impossible to implement the recommendations of the Straight Committee Report, at any rate in so far as payment of Government subsidies is concerned. In announcing this decision, Lord Nathan informed representatives of the Association of British Aero Clubs who met him recently that no funds were available for this purpose and that no financial support could be expected from the Government.

So now we really know where we are ! Without subsidies there is no chance of cheap flying becoming available at any of the normal type of flying clubs and, in fact, the last remaining hope of getting into the air at all at a price the ordinary citizen can afford now lies in the expansion of the communal flying idea. Even where conventional light aircraft are used, really cheap flying can be obtained under this system but when ultra lights are used—whether home or factory built—communal operation offers the very cheapest form of flying there is, not excluding gliding. It is to be expected therefore, that many more people will have to turn to ultra light flying as a result of the Minister's decision.

A considerable increase in our membership, either Individual or Group, is naturally very much to be desired. But, at the same time such an increase will inevitably raise problems of organisation and administration which must be solved well beforehand if inefficiency and frustration are to be avoided. We feel that this matter might well be a useful topic for discussion at the Annual General Meeting and as a basis for such discussion, we would draw our readers' attention to a letter from one of our members, Mr. D. F. Ogilvy, which appears in the Correspondence Section of this Bulletin.

The idea of organising U.L.A.A. on a regional or area basis—as implied by Mr. Ogilvy—is one which has already been discussed in general terms by the Executive Committee and the effective co-operation of a number of Groups in the same area had its birth in a joint meeting of Scottish Groups, actual and potential, which took place recently at Falkirk. Nevertheless it is most interesting to note that Mr. Ogilvy has arrived at similar general conclusions quite independently and we shall be glad to have members' comments on this matter.

We believe that co-operation between different Groups within the Association on matters of mutual interest must be the keystone of our development, just as co-operation between U.L.A.A. and other organisations catering for different forms of private flying must be the keynote when questions of common interest to all private fliers have to be decided. It is with great pleasure therefore, that we are able to announce the setting up by the Royal Aero Club of a special sub committee to, bring about the very necessary co-ordination of effort on the part of the various flying organisations. To be known as the Joint Co-ordinating Sub Committee of the R.Ae.C., it will be composed of representatives of the Association of British Aero Clubs, the Aerodrome Owners Association, the Air League of the British Empire, the British Gliding Association, the Society of Model Aeronautical Engineers and U.L.A.A. With the setting up of this sub committee a step has been taken which we have long believed necessary, and in the best interests of all concerned ; and we hope that from now on, British private flying, in all its forms, will be able to present a united front to the world.

CORRESPONDENCE

The Hon. Sec., U.L.A.A.

Sir,

For some months past I have been considering a scheme for the unity of Groups of the U.L.A.A., the object being that whereas the Groups should work independently for constructional purposes, they should come under the administration of local area headquarters for all matters of policy. Such a system would work, of course, only in areas with a number of towns within easy reach of each other.

Each Group would construct an aircraft suited to the available facilities such as a Luton Minor for a small or inexperienced band of enthusiasts, or a Chilton monoplane for a larger Group ; in this way a Group not large enough to construct a complete aeroplane could combine with another in a similar situation to build one between them. The Groups would operate from a centrally situated airfield, an idea which, in itself, offers many advantages, and so a small fleet of machines would be available to suit the requirements of pilots in every stage of training.

Individual member's subscriptions should be made the same for each Group and should be paid directly to the area headquarters so that the Group could be financed according to the nature of the work being undertaken. Tools and materials would be purchased by headquarters and distributed to Groups as required, therefore avoiding unnecessary duplication of equipment.

Final assembly of each aircraft would be carried out on the airfield, which in the circumstances could be reasonably well equipped with a hangar and small club-house, where, once organised, an efficient system of training could be arranged on a variety of aircraft types. The types chosen would vary according to requirements, but for an airfield serving five Groups, it is suggested that the fleet should comprise two elementary trainers, such as Luton Minors, two more advanced machines, probably Tipsy Juniors, and a Chilton, for the benefit of the skilled pilots. It might be argued that more initial trainers would be required but it must be remembered that many members would be ex-Service pilots who would derive little pleasure from hopping about in non-aerobatic machines of low performances.

I am very anxious to see this scheme in operation and I have arranged a detailed lay-out of the organisation needed in my home area but at the moment I am prevented from taking any active part in its

development owing to my Service commitments. However, I will be very pleased to hear from anyone who has any suggestions or criticisms to put forward, or who would like further details of the idea.

DAVID F. OGILVY.

Windsor, Berks.

(The idea of several Groups using a common airfield is particularly applicable to the London area where sufficient support may be forthcoming for several Groups in a district with only limited space available for use as an airfield. The possibilities of such an arrangement in the South London area are, in fact, being investigated by one of our members, Mr. C. F. Parker of Thornton Heath, Surrey, who has been aware for some time of the difficulties of every potential Group in this area being able to have its own airfield.

So far as Mr. Ogilvy's suggestions for a fleet of aircraft to be used by five co-operative Groups are concerned, we believe that two Slingsby Motor-Tutors would be a better choice than the Luton Minors he suggests).

DESIGN SUPPLEMENT

Contributed by G/C. E. L. Mole—Chairman, Design Sub Committee.

Two-stroke Aircraft Engines.

Note. In Bulletin No. 9 we discussed the pros and cons of two-stroke engines as compared with four strokes, for use with ultra light aircraft. We have since received the following interesting paper on the possibilities of two-strokes by Mr. R. G. Carr, designer of the 30 h.p. flat four cylinder two-stroke Wren aero engine, the prototype of which has proved successful and which is now undergoing development.

In the design of any power unit, a desirable feature is continuity of effort (culminating in the pure turbine) since the mean effective pressure on the parts is small and they can thus be light and efficiently designed. This is advantageous from the point of view of weight, cost and bulk.

The two-stroke engine has twice the continuity of the four-stroke and hence it is a very attractive proposition as an aircraft engine. In fact, recent rapid development in turbine and two-stroke engines constitutes a challenge which the four stroke may not survive and as yet the cheaper two-stroke and the better power/weight ratio of the turbine are not very competitive to each other.

Existing two-stroke engines of conventional design give up to 45 h.p. per litre; yet there is still much misconception left over from the past and for which there is little justification to-day. At the moment there is a transition period but crystallisation has taken place in the form of three types of two-strokes. Firstly there is the normal deflector-head piston type wherein the gases are deflected in a loop round the cylinder; secondly, there is the so-called 'flat top' piston type in which the gas is transferred to the cylinder at high velocity by a plurality of jets; and thirdly, there is the uniflow type of engine—of which the Junkers is the classic example—wherein the gas flows from end to end of the cylinder, compression and expansion taking place between two opposed pistons in a common cylinder with wall ports governed by the pistons, which may be slightly out of phase.

Each of these general principles may also employ harmonic or cadenic induction (first used by Petter and later by the V 1) which has certain advantages and disadvantages which will be mentioned later.

A simple conventional engine must pay the penalty of some inefficiency, while the more efficient engine may require two crankshafts, etc., so that the degree of improvement must justify the extra complication. It is possible, however, to obtain directly a greater degree of efficiency from the 'flat top' two-stroke by simply increasing the compression ratio. This allows the combustion space to be a complete sphere (without hot-spots or pockets) which, in combination with a high degree of turbulence, promotes complete combustion in the shortest possible time and prevents detonation to a remarkable degree. The necessary high compression ratio cannot, however, be obtained by a hemispherical cylinder-head and a flat-top piston so the answer is to have a small sphere shaped partly in the cylinder head and partly in the piston, the surrounding annulus giving turbulence to the gas.

Engines made on this principle run with cool exhausts and no visible flame at the ports with compression ratios of 8 : 1. Comparative results have been obtained on the Cross and Aspin rotary valve four-stroke engines with compression ratios of 17 and 20 : 1. Thus it may be deduced that a two-stroke engine may have a very high 'upper' cylinder efficiency.

Attention may now be directed to the transfer and exhaust end of the cyle where the harmonic type of induction can effect some improvement. The idea is to open the exhaust port slightly earlier than normal and, when the mass of gas has obtained kinetic energy in the exhaust system, to open the induction port so that a large volume of gas or air will be induced to flow into the cylinder without any compression by the crankcase. Clearly, the higher the engine speed the greater will be the induction effect or, in other words volumetric efficiency will *increase* with engine speed and the net result may be an increase in output of as much as 100%.

The above is, of course, the briefest outline of the possibilities.

Suggestions for a Tandem Monoplane Wing lay-out.

We have received an interesting paper from Mr. R. C. Stafford Allen, well-known to us as the enthusiastic owner of a Tipsy single-seater. In his paper, Mr. Allen draws attention to the advantages of the use in ultra light aircraft of the tandem monoplane wing lay-out, which he considers has been sadly neglected. He describes such an aircraft as having a fuselage of conventional box structure parallel in depth, fitted with a tractor engine at the front. Cantilever wings of approximately equal span are mounted at each end of the fuselage, the front wing

being fitted above the top longerons while the rear wing is attached at the level of the bottom longeron.

The front wing carries a plain flap (used for trimming purposes) across its whole span while "elevons" (combined elevators and ailerons) are fitted to the trailing edge of the rear wing. The pilot's seat is situated between the spars of the rear wing, the cockpit being completely enclosed and forming the leading edge of the fin, which is suitably thickened to enclose the pilot's head and shoulders.

Mr. Allen claims that such an aircraft would have the following advantages:

(a) The front wing can be arranged to stall first, so that when stalled the aircraft merely drops its nose and so regains flying speed.

(b) Longitudinal and lateral control at the stall is assured because the elevons operate on the rear, or unstalled, wing.

(c) The aircraft has a high degree of fore and aft stability and tends to maintain any speed for which it is trimmed.

(d) A considerable C.G. travel is permissible, thus allowing the ample space amidships to be used for fuel, luggage or other disposable load.

(e) Its short span wings are lighter and stiffer than the longer span of the conventional lay-out.

(f) The main loads are carried on structural strong points, e.g., the pilot's seat is between the spars of the rear wing and the engine can be mounted directly on the main spar of the front wing.

(g) The fin post behind the pilot forms an admirable crash pylon in the event of overturning on the ground.

(h) Simplicity of control circuits is achieved by the proximity of the cockpit to the control surfaces.

Against these advantages, Mr. Allen allows that the four wing tips, with their associated vortices, will lead to high induced drag at low speed, with a consequent steep angle of glide.

Whilst the writer agrees with the advantages claimed above for the tandem wing lay-out, he doubts whether such an aircraft would gain appreciably over the conventional type in view of the following additional disadvantages.

(a) The aerodynamic shape of the fuselage would be poor owing to the width of the cockpit near the tail.

(b) The rear wing operates in the downwash of the front wing, which results in a reduction in the overall lift coefficient.

(c) Short wing spans of about 18 feet are likely, which might make the aircraft over-sensitive to disturbances in roll.

(d) The pilot's view forward and downwards would be restricted.

Summing up, it would appear that the lay-out described by Mr. Allen would make a very safe aircraft with a light structure weight but with a poor climb and glide performance and a reduced speed range. It would be of interest to obtain the opinion of other members on the merits or otherwise of such an unconventional design.

ARGENTINE NOTES

By

LEO FOLLMANN

MY vacations are over. I spent them at Merlo but there was little rest; many people went away on distance flights. Our only towing "Pelican" broke down (on the ground !) with two tubes of the fuselage broken near the tail skid, so I had to weld. Then we fixed a car, etc. Yesterday I welded the engine mounting of Chourrout's "Moth"—they managed to get a brand new Gipsy Major 130 H.P. engine and are going to use it as a tow-plane as our "Pelican" has to undergo general overhaul now and there are no more towplanes left.

Recent performances were:

Jan. 24 Ortner—Saladillo, 140 Km.
Moreno ,,
Murchoi ,,

Feb. 1 Chourrout ("Viking")—Punta Indio, 155 Km. When towed back he released over La Plata and landed at Mar Chiquita, 350 Km.

Feb. 11 Chourrout ("Condor I")—El Ortondo, 285 Km.
Joe Ortner ("Viking")—San Nicolás, 200 Km. On the return trip Ortner released over Arrecifes and landed near El Ortondo at Sancti Spiriti, making another 200 Km. This turned out to be a real hardship for poor Joe, as there was no tow pilot and he had to get back to Merlo by rail, pick up a sailplane pilot, and tow "himself" back as well as Chourrout.

Feb. 13 Montechiarini ("Spalinger")—Bolivar, 280 Km. (Back in triple tow).
Conde ("Buzzard")—Lincoln, 260 Km. (Back in triple tow).
Murchio ("Viking")—Cazón, 130 Km. (Back in triple tow).
Dobel ("Grunau Baby")—Comodoro, 175 Km.
Blasco ("Grunau Baby")—Gob. Ugarte, 130 Km.

We have also four new Silver "C's"—Hereter, Rosmarin, Montechiarini, and Moreno.

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SOUTHERN CALIFORNIA

SOARING Records are getting harder to make, yet too often the preparations are ninety per cent enthusiasm and ten per cent loss of sleep.

When altitude records were 6,000 feet it was possible to make a record attempt with only a sweater for extra equipment. Nowadays, however, we are not far from pressurized pods, radar, and the host of other technical details that flying deeply into the stratosphere will involve.

It is still possible to crack the distance record on a good day's sport flying. Soon, however, our fast sailplane must be improved from the present 30 to 1 glide angle to upwards of 50 to 1, since it looks as if the short span of daylight is soon going to cramp our distances even more than it doe snow. Landing lights, flares, radio and extra precautions for flights over the desert and mountains are probably going to spell the difference between record distance success and failure even in 1948.

With all of the above scientific effort involved, even now we see that it is necessary to do more planning to insure the *safe* completion of record attempts.

Soaring records from hereon will differ from those of 1935 just as distinctly as barnstorming in Curtis " Jennys " differs from regular transoceanic passenger service.

RECENT RECORD FLIGHT ATTEMPTS

Paul MacCready soared his " Orlik " to 21,000 feet above sea level at Bishop, Dec. 28, 1947. He telegraphed that the Lenticular clouds were good up to 45,000 feet, but his canopy started to crack in the extreme cold, forcing him to turn back. He has since insulated his cockpit and put a heater in his ship. He hopes to reach an altitude of more than 40,000 feet.

MacCready's preparations have been extensive. He has the latest Navy oxygen equipment, and has practised it in high altitude chambers. His " Orlik " is one of the cleanest gliders in the world. It is a Polish design, brought over in 1939 for the Polish Exhibit at the Worlds Fair in New York.

The present (unofficial) altitude record is about 29,000 feet above release, 39,000 feet above sea level.

Herman Stiglmeir made an attempt to surpass the American duration record on Monday, Dec. 29, 1947, at Palos Verdes. He was let down after 3 hours and 35 minutes. Fred Walters was with Herman in the Pratt Read " Crystal Ball."

Herman's take-off technique has not changed over the years. It is simple, effective, and requires only a minimum of effort. It is a demonstration of mob psychology and glider pilot's nerve. A section of road is blocked off. Motorists delayed by this act are required to aid in the assembly and launching of the glider (this means that the pilot need carry only a skeleton crew).

The same technique is employed in landing, except that the crowd considers the pilot a " survivor " and may hack off pieces of his glider for souvenirs.

On his launch last Monday (auto tow with 250 feet of line) the rope broke when the " Pratt Read " was only 25 feet high. The glider ducked amongst the trees and buildings until the cliff edge slipped under them, giving them sufficient " Paper Profit " altitude. Highest altitude obtained was 3,500 feet over the hill. The landing was on the old take-off site.

PILOTS—READ THIS TWICE

The safety of the pilot (and co-pilot) is the prime consideration of any intelligent attempt to set soaring records. Let us look at this again : The lives of those flying sailplanes are infinitely more important than the records which they hope to break. A soaring record does not (at least as far as we can see now) constitute more than a scientific-sport achievement. It does not change the life of the " man in the street " as might a new discovery in atomic fission or a successful medical effort. Consequently, there is no excuse for trifling with lives in the pursuit of longer distances, durations, or higher altitudes in this sport.

The problems connected with such attempts are seldom fully realized. It is true that each attempt and each location requires special consideration, but basic policies are clear for *all* attempts and *all* regions. These will be outlined below :

1. An Organizer and (preferably an assistant to this organizer), must take charge of all ground, air, and emergency activities. He must outline and set up in black and white, with carbon copies for every single person involved, a communications procedure, a list of equipment (even to *very* small details carried by the glider and by the retrieving crew). His duties also include a thorough study of the weather and the terrain over which the flight will be made. His is the responsibility for the fitness of the glider and its equipment, and the ability of its crew to use this equipment intelligently. The mechanical condition of the trailer and its towing auto must be good enough for emergencies. The launching device used must not fail in the pinch.

Furthermore, the Organizer *must* be a " worrier." He must visualize bad conditions that might occur, such as loss of the sailplane in a remote area combined with the fact that the fact that the retrievers are seriously out of action on the highway. It is obvious that an accident on the highway is possible, and that those involved will be cared for by passing motorists. But the fellows who are hanging by their safety belts near the top of a lonesome pine have nothing more to cheer them than the knowledge that, after some specified hour, search parties will be dispatched in an intelligent manner to try to locate them.

2. The ground-crew chief must know " soaring " from the ground up. He must be a good leader in the field and should be practised in the art of " first aid " to the injured. He should have an *experienced* crew. Those who " picked up " crews at Wichita Falls in '47 can testify on the soundness of this fact. This man must also know soaring weather, read airways maps and be alert to the many subtle factors involved in this work.

3. The pilot must be highly skilled—we are past the point where a 30 day wonder has much chance of setting a serious record. He will, more than likely, get his name written into the guest ledger of a hospital instead of the roll of soaring " Greats."

There, you have the gist of it now. Think well on these points, pilots, even when soaring on a week-end, and especially in contest work. Perhaps we have been a little lucky to date. Anyhow, with the performances we can expect in '48 and beyond, it will be criminal negligence not to think seriously of these points.

NATIONAL CONTEST FOR 1948

John Robinson reports that the National Soaring Contest will be held at Elmira, New York on the tentative dates: June 30, 1948 to July 11, 1948. There seems to be a general tendency for having the meets at Elmira in the " even " years ('48, '50, etc.) and elsewhere on the " odd " years. Dr. Klemperer is looking into the possibility that the Nationals might be in Los Angeles in '49 or '51. What do you think of this idea?

" MU 13 " MAY BE GIVEN TO S.C.S.A.

The U.S. Air Forces sent representatives to Herman Stiglmeier's Glider Yard to inspect the gliders sent to the S.C.S.A. under bailment contract. It was decided that authorization of the destruction of the " Grunau Baby " be requested of Wright Field, and that the D-28 " Windspiel " (Toy of the Wind) be used for study purposes, and that title of ownership of the " Mu 13 " be vested in the S.C.S.A.

The S.C.S.A., under the direction of Dr. Klemperer is engaged in writing up reports on noteworthy design features of the German sailplanes. These reports are to be sent to the U.S. Air Forces Material Command at Wright Field, Dayton, Ohio.

Herman believes that the " Mu 13 " can be put in flying shape for $100,000 worth of material and 300 man hours of skilled labour.

The U. S. A. F. officers, did not know anything about the Hortens at Northrop. It would be very good news if the S.C.S.A.'s fleet of sailplanes could be increased by the possible addition of the " Mu 13," a moderately high performance craft, and the " Horten 6," the world's highest performance sailplane. The " Horten 6 " has a gliding angle of 38 feet forward to 1 foot down.

INVISIBLE THERMALS

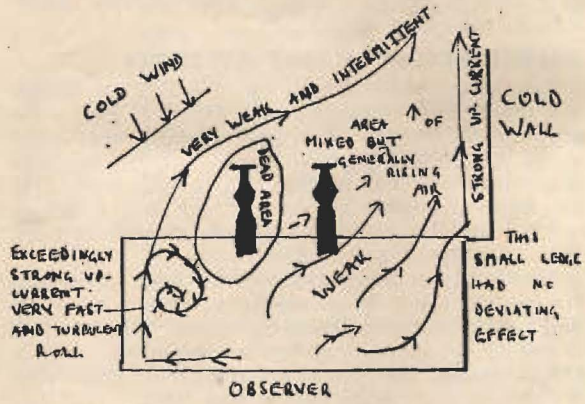
DEAR MR. EDITOR,

Sailplane pilots have often complained that thermals are too invisible. Experienced pilots flying always from the same slope sooner or later develop a private ' map ' of the relative position and intensity of thermals for known wind conditions, and though they pass this information on to the inexperienced as best they can their local knowledge and personal map will make up-currents and down-currents relatively " visible " to them in the light of their own experiences.

That experience helps enormously when soaring in mountainous territory is obvious from the results of the Swiss 1947 competitions; and judging by Mr. Wall's article in the Surrey Gliding Club Year Book slope winds did not always behave as he expected them to. Cross winds in the deep narrow valleys upset his calculations, whereas the Swiss, with local knowledge, were able to take full advantage of known conditions. Would it be possible, do you think, to make a model of this year's site and study the currents with steam? I ask because of something I noticed the other day.

Lying in a very hot bath in a bitterly cold and draughty bathroom I watched for an hour a most comprehensive and consistent thermal system. The bath ran North and South, the wind was North West. From where I was the effect was of a long narrow valley between precipitous cliffs, something on the line of Samedan, but of course much simplified. I will draw you a plan.

What I would like to stress is that the formation remained absolutely constant throughout the hour I was watching. There was always a steady wide updraught on the East slope, stronger right against the wall but quite definite for three quarters of the way across the valley. On the lee there was a very violent upcurrent of at least twice the speed, curling over at the brow of the hill into an exceedingly turbulent whirling downcurrent. I now quote from Mr. Wall's article: " perhaps the most unpleasant feature of the strong downdraughts is their extreme turbulence "; and again: " in order to get lift off the slope it is necessary to fly close to the face, and at a good speed to allow for local turbulence." And from the Briefing given to foreign pilots: " Thermals sometimes combine with the hill lift and roll up the mountain side, and sometimes rise straight up the valley, depending on the wind strength, the steepness of the slope, and the lapse rate."



It would be interesting to know if reproducing some of these conditions in model form with steam would be of any practical help to a pilot flying for the first time in mountainous areas.

Yours sincerely,

VERONICA PLATT.

NEWS FROM THE CLUBS

SHOREDITCH TRAINING COLLEGE GLIDING CLUB

Good news from Shoreditch Training College Gliding Club following a long but not inactive silence since January.

The club now possesses an S.G. 38, thanks to a generous gesture on the part of the London Gliding Club who allowed us this damaged machine at a fantastically low price. We, as a college club, poverty stricken but enthusiastic; would again like to express our gratitude and have it known throughout the gliding world.

Although our financial assets are limited, our material ones are boundless—Shoreditch is one of the finest craft colleges in the country both in wood and metal-work and already the various tutors and students are planning the rebuilding of our machine. Jerry Hull, maintenance engineer to the club, has the responsibility of planning and drawing the various alterations. His hobby before the was, was building sailplanes, and during the war he had an active time as a parachutist. We have two " B " licence power pilots in our midst, Roy Yates and Jerry Dawson who use their weekends imparting air sense to our rawest members with circuits in Tiger Moths.

Our training programme in the past has been purely on a theoretical basis including a grounding in the useful field duties, from wing tip holding to winch operating, and the value of these winter lectures was clearly defined in a recent visit to Dunstable when eight students were smoothly absorbed enabling the London Gliding Club to indulge in a happy afternoon's soaring.

Optimistically perhaps, we hope to commence training up to " A " and " B " stage before the summer vacation, and with this object in view the club are planning a future for these " B " pilots who will proceed to Dunstable fully armed with a first-hand knowledge of thermal flying and hill soaring plus an " anti-black " course on the peculiarities of the " Bowl " also on the care and judgment required in the landing approach to the London Gliding Club's field. This final item on the club syllabus will be a task allotted to Louis Leith who recently obtained his five hours' duration at Dunstable and is the club's Official Observer.

An ambitious programme ! but gliding club No. 13, the baby of the B.G.A. is beginning to kick and tug heartily at the trouser legs of her smiling and encouraging big brothers.

LONDON GLIDING CLUB

February.

Apology. As R. Pasold points out, our statement in the December " SAILPLANE " that no cross-country flights have been made from Dunstable during the months of December, January, and February, was only 66. 2/3% correct. Reference to the " SAILPLANE " for March, 1939, shows that four machines left the site during the week-end, February 18-19th of that year. On Saturday, February 18th, Stephenson landed 8 miles away at Hemel Hempstead, in his " Blue Gull " and L. C. Withall took the Club's Bussard 21 miles to Barnet. The following day Hiscox went to Luton Airport and R. Pasold flew his Bussard 38 miles to Chigwell aerodrome—cloudbase appears to have been 3,700 feet and the landing was made at 16.40 hours, about 2 hrs. 40 mins. after leaving Dunstable. We are deeply sorry if our error has given the impression that there is a conspiracy afoot to discredit the Pasold family, and hasten to point out that we did not subscribe to the claims made last summer, in ill advised circles, for the first sailplane flight to the Isle of Wight. We were fully aware that this honour rightly belonged to Rolfe's younger brother, Ingo Pasold. The machine in which both these flights were made, a lemon coloured Rhonbussard, is still going strong, and is further distinguished by a natty-fitting cockpit cover which completely encloses the pilot.

Having made it quite clear (we hope) that cross-country flights can be made from Dunstable in the month of February; we regret there are none to report this year. However, a pretty useful 112 hours' flying was put in, and it is interesting to note that this compares favourably with 137 hours flown during February, 1939, which provided fairly good soaring conditions throughout the month. By contrast, 102 hours of this February's total were flown in the first nine days of the month, after which we had a period of East winds.

Flying commenced before breakfast on Sunday, February 1st, and both Leith and Scarborough were launched for 5 hour duration attempts. Their luck was out, however, both being forced down after 2 hrs. 51 mins. and 2 hrs. 22 mins. respectively, when the wind dropped and backed. Nevertheless, a total of 21 hours was put in that day, chiefly by the high performance class.

Tuesday, February 3rd, saw Leith having another shot at his 5 hrs. only to be forced down this time after 20 mins. The next day, February 4th, conditions were good and five members turned up to put in 6 hrs. 20 mins. between them. Leith did not turn out because he says he had an adverse report from Met. On Friday the 6th, however, he was finally launched at 10.50 hrs. and landed 5 hrs. 20 mins. later, having ridden out a cold-front, complete with rain, hail, snow, and 45 m.p.h. breeze. Under these conditions he occasionally disappeared from sight, although flying at only 800-1,000 ft. Monday the 9th, was also quite interesting, providing good conditions in the afternoon which took Scarborough, on his first flight in the Club " Gull," to 2,000 ft. After 15.30 hrs. the wind dropped from W/15 to W/5 and even less, and we were able to fly the " Gull " from the " Rifle Volunteer " to the far side of the Zoo in some of the smoothest slope lift we have encountered for some time.

It is, therefore, surprising that under these extremely smooth conditions, one had to report being

struck by a most sudden and violent piece of air which fairly jolted the spine. The blow seemed to fall (judging from the sound) about half way down the fuselage, and left the impression that, contrary to the usual feeling of the machine passing through a bit of turbulance, this disturbance had passed through us! We should have given quite a lot to have had the air rendered visible at that moment, and have little doubt that it would have revealed a vertical current of extremely small cross-section. But why, in otherwise silky smooth conditions? Cadman flying No. 4 Tutor about the same time, remarked on a similar experience.

The only item of crashery this month concerns the ground-hopping Dagling, which hopped into a hedge and split open the nose of its nacelle, fortunately without any damage to its occupant. We now have a "control waggon". The original idea was to provide a covered trailer as a receptacle, at the launching point, for all the loose equipment which is usually just thrown on the ground and forgotten. The idea seems to have been developed to incorporate a cash-desk and sales counter, with all-weather protection for the time-keeper.

Summary of flying for February:—
Launches 278.
Hours Flown 112.
Certificates "A" 1, "B" 1.
Silver "C" Duration 2.

SOARING ASSOCIATION OF CANADA

We send you a photo of the Club Trophy of the Soaring Association of Canada.

Presented for the first time this year (1947), it was won by the Toronto Gliding Club.

In addition, may I advise you that following the annual general meeting of the SAC a few days ago in Montreal, the officers for 1948 ~~are as~~ under:—

Wing Commander
D. M. Holman — *President.*
John D. Agnew — *Vice-President.*
Barrie Jeffery — *Director.*
B. S. Shenstone — *Director.*
J. A. Simpson — *Director.*

Further, the annual report prepared by the retiring president (B. S. Shenstone) revealed that Canada has now 238 certificated glider pilots consisting of 116 "A", 88 "B" and 34 "C". There are 43 gliders in Canada, about five more being built, and of the 43 one is an Olympia EON, brought with great red-tape-dodging from the U.S. and owned by the Gatineau Gliding Club of Ottawa.



The Club Trophy.

Another trophy presented for the first time in 1947 was the British Aviation Insurance Co. trophy, designed in the modern manner by the well known Canadian sculptor Emanuel Hahn. It is made of stainless steel, aluminium and lucite, and was won by John Ames of the Toronto Gliding Club. It is offered for the best flight of the year—altitude or distance. Ames won it by a gain in altitude of 3,740 feet. Both trophies, by-the-way, are challenge trophies, held by the winner for a year.

(*B. S. Shenstone is the new Chief Engineer of B.E.A.—Editor.*)

DERBYSHIRE AND LANCASHIRE GLIDING CLUB

February yielded a total of 116 launches and 23 hours 39 minutes soaring. One "A" and one "B" Certificates were gained. Not a very impressive total but in February, 1947, we couldn't get into the hangar never mind get a machine out. The weather has not been either completely good or completely bad. Usually, between Christmas and Easter we

have one or two bright cold days with a stiff north west breeze which gives us good smooth lift up to 2,000 feet. This year we seem to have had rather more soaring of the rather less satisfying kind. We are still short of serviceable training machines and the "Tutor" has been taken out of commission for C. of A. overhaul. As the machine was in excellent condition, we have undertaken to complete the overhaul ourselves and save a small fortune. The members who fly the "Tutor" have tackled the job enthusiastically, supervised by Basil Meads.

Sunday, February 1st.

Wind S.W. 15 m.p.h.

At first it seemed as if we were to have a good day, the sky cleared rapidly and the sun was out just as we were ready to start. After one launch, however, the clouds started to form on the edge at 500 feet and prevented circuits for some time. This was not exactly a bitter disappointment to Barbara Richards and J. W. Smith who had the "Cadet" to themselves for the rest of the morning. Barbara, unperturbed by her previous experience with the "Cadet," put in three or four high hops. Smith, a new member with power experience had several high hops and a circuit to polish off his "A".

The "T.21" was brought out later on and half-a-dozen members were taken up for circuits. During the afternoon, the "Olympias" were able to reach Eyam on the South slope and to soar there at anything from 700 to 1,000 feet.

Totals—40 launches, 6 hours 19 minutes, 1 "A".

Sunday, February 8th.

Wind W.S.W. 25/35.

Too strong for training. Stan. Armstrong, Charles Faulkner and Eric Taylor brought out their "Olympias" and managed 1 hour 36 minutes between them.

Saturday, February 14th.

Wind S.W. 20.

Saturday soaring for the first time this year. A good south westerly breeze made it worth while to bring the two-seater out. It was a short and rather awkward beat on the corner of the hill above Great Hucklow but conditions were good enough for novices. Winkley from the Midland Club had his first experience of soaring over Camphill with Gerry Smith. Southorn who has previously flown with the A.T.C. and has had no soaring experience to speak of, also handled the two-seater quite competently.

Freddie Coleman and Heck Booth also flew their "Olympia."

Totals—8 launches, 2 hours 4 minutes.

Sunday, February 15th.

Wind W.N.W. 15/20.

By all the signs this should have been a good day but perhaps on account of the cloud, conditions were most disappointing. Stan. Armstrong was first away in the two-seater with Derek Roper as passenger. Thereafter the "T.21" was launched throughout the day for a total of 18 launches, but no flight exceeded 15 minutes. Four "Olympias" were out, also the "Grunau" and the "Cadet." Heck Booth had the best ride in an "Olympia" with 1 hour 33 minutes. Midwood held the "Grunau" up for 26 minutes. It is doubtful if any machine exceeded 500 feet at any time.

Total—53 launches, 13 hours 26 minntes.

Sunday, February 29th

No wind, poor visibility.

The "Cadet" did 8 flights and the "G.B." did four. Jack Lello did two circuits in the former to obtain his "B" Certificate.

Total—12 launches, 24 minutes, 1 "B."

VICTORIAN MOTORLESS FLIGHT GROUP. January 1948.

Christmas Camp—Berwick Airstrip 26/12/47 to 4/1/48.

It is pleasing to report a successful Christmas Camp, with 200 flights and no crashery. The number of flights may not seem very high, but, although 14 pilots flew at various times, only 10 were able to attend for the entire period and 3 of these had their own sailplane to handle. So we were somewhat shortcrewed at times. Trainees attending the Camp were able to make good progress; Graham Wycherley had his first skids, Nance Iggulden is now doing high straights, Jack Scully "S" turns, Keith Meggs and Alan Patching are circuiting the "Rhon", Mike Bruce, John Day and Viv Drough have gone on to the "Coogee." Only non-flying day was the 30th. After 9 flights in the "Rhon" it became too windy for either training or soaring. Later in the day, gusts up to 90 m.p.h. were recorded. The Beaufort Club chose that day to arrive with their two-seater, having been held up by work on their new winch tow-car combination. By the time they pulled in, the sky was lurid with red dust from inland and the air was very gritty. Len Travers, John and Mrs. Wallis and Goug Lyons availed themselves of the VMFG's offer of a cuppa tea. I'd like to place it on record that I've never seen so much tea drunk before. Positively fascinating sight. One expected to see tea trickle from their ears any moment.

After the hard work the Beaufort members have for years put into building first their two-seater then their winch, it was certainly gratifying to see the machine put in some excellent flights.

Australian Two-Seater Altitude Record. On 4th January, Bill Iggulden, President of Victorian Soaring Association, with pupil Doug Lyons of Beaufort Club, was winched to 500 feet and climbed to 4,050 feet, 55 minutes airborne. Scenes on the ground are worth describing. As it became obvious that the "Phoenix" was going up, expressions were frankly incredulous, gave way to amazement, then to a joy that was almost delirious and was shared to the full by the VMFG pilots. Bill and Doug, incidentally, suffered from the intense cold, being clad in very light clothing. A propos of this after more good flights had been made, and while Ron Roberts with passenger Mrs. Bill Iggulden, was on his way to 3,700 feet (30 mins.) Len Travers was heard to remark that the Club would have to make it a rule that anyone flying "Phoenix" must be warmly clad. Although, at the time, Len's remark brought him a lot of ragging, there's no doubt that he's right. With the conditions we can expect at Berwick, it looks as though the "Phoenix" will have no trouble in bettering her record and probably doing some good cross-country flights. I think I speak for all

of us when I say there's no one we'd like better to see doing it than the Beaufort people.

For the information of those who haven't seen the " Phoenix," she has a wingspan of 54 feet, chord of 5 feet, wings stand about 5 feet 5 inches from ground at tips. Fitted with two wheels side by side, behind the skid. Weight 800 lb.

Mr. and Mrs. R. G. Casey and their son, Don, were given flights in the " Phoenix " and expressed keen interest and pleasure, not only with their flights, but with the general activities throughout the period of the Camp. Mr. Casey and his daughter spent many hours rolling and mowing the strips.

Best thermal flights in the " Coogee " were to 2,850 feet and 2,980 feet, 20 mins. and 38 mins., pilot, G. Roberts. The " Coogee " seems to have a performance of about 1 in 17. A few mods, have been found necessary and it is expected that when these are completed she'll serve the Group well.

The Victorian Soaring Association obtained permission to continue flying at Berwick. This is the best news we've had for a long time. Berwick, besides being adequate for both primary training and sailplane soaring (Ron Roberts reports smooth lift of 15/20 f.p.s. which he had to leave because of proximity to cloudbase, " Phoenix " not being fitted up for cloud-flying), is also in very pretty surroundings. It looks as though we've reached a point where we can start building for that bigger and better future which is now within our reach.



Mr. R. G. Casey late Minister of State for Burma watching his son being harnessed in the " Merlin."



Grace Roberts (our contributor) gives sister Nance Iggulden the " gen "

THE YORKSHIRE GLIDING CLUB—NOTES OF ACTIVITIES SINCE 1st Jan., 1948.

Those people who buy this journal merely for the sake of reading the news from this club will have noticed our absence for some months. To both of them our sincere apologies. In this part of the country, when one has nothing to say, it is as a rule heartily recommended by all and sundry that it should be said quickly, and not mentioned again ! Things have indeed been slow mainly due to unsuitable weather conditions, to the dearth of members with cars *and* long-suffering wives—to the fact that since the loss of the " Kite " last year there has not been anything very attractive for the more advanced types to fly. Much is now heard on the subject of private-owner syndicates and the day is almost upon us when at least two of these will be formed, equipped and in the Air—just like that ! The Newcastle-dwelling members started this thing when they bought Clarence Jowett's old " Kite " from under certain noses. Our chief instructor needs no introduction although he has become rather a stranger at Sutton Bank of late. He is said to be doing some serious stink-flying at Croft ; his instrument flying is now so good that he gets under the hood before they open the hangar door. There has been soaring on only three occasions this year ; Bill Sharpe has been in charge as acting C.I. so that Barker may hunt the grouse (and of course polish up his instrument flying) without let or hindrance. On the first of February, the first three launches of 1948 took place ; South wind ; Bill Sharpe and Hastwell essayed a few delayed descents. On the 7th, in a gusty, 40 m.p.h. S.W. wind O'Grady wrestled with turbulence for a valiant 20 minutes. On the next day, Fidler, O'Grady, Pick, Sharpe and Varley made 3 hrs. between 'em : O'Grady landed just before we were enclouded, and the retrieving party located him by sound only ! On the 15th February, Bill Sharpe tested a " Tutor " for five minutes—which concludes flying to the end of February. Everything seems to have come very nicely through the Winter without too much weather-beating. The Clubhouse building was rather badly knocked about at one end by the February gales, but fortunately we were insured and Mr. Lloyd came to the rescue ! The subject of the clubhouse reminds us that certain members have been very far from idle—especially the Hon. Treasurer, Donald Sharpe, who has not only sponsored, but built up a fund to fit-out the clubhouse—(over £100 has been given and lent to date, with many valuable gifts in kind and offers of work and services). Anyone who has helped in this matter and not received a note, or word, of thanks, we should like to thank very sincerely in these notes. The fund is still open and any offer in cash, in kind, or in

service, will be accepted gratefully. The A.T.C. has done little at the Bank this year, and we get slapped (as usual) if we natter about their other activities !

It is tempting to ramble on about this and that but in truth, these columns are for relating achievements, not for our dreams and forecasts—for which see Old Moore's Almanac ! This year we shall do our best to get all the best we can out of the equipment we have and the weather we get, and to avoid taking unwise chances with our aircraft. If we find ourselves with enough " hard-earned " we shall enlarge our fleet—unless we can get hold of something in return for a tall story instead.

Letter to the Editor

Dear Sir,

I have recently visited some of the principal Gliding Clubs, and have had the utmost difficulty locating the actual sites. In the course of my wanderings I have collected quite a lot of local dialect and blistered heels, but helpful as the local people were, I invariably found that their knowledge of the location of the Clubs were limited to " Up in they thar Hills."

It would be most helpful to everyone if the Secretaries could send in to the ' Sailplane and Glider ' a guide that could be clearly followed by persons not living in the locality. I suggest that this information could be collected by the journal and published in one issue, thus forming a ready reference to interested persons. I feel sure that this would help clubs bring out those hidden potential members who do not have the time nor inclination to ferret out the information, but who would on the spur of a fine week-end make the journey.

Many people too who are members of a distant club when in the locality of another club may wish to call in on them, but are not sure where they are, and have not the time to try the hit and miss method, which if successful seems to always leave one unable to get to one's destination the same day. I can think of more pleasant ways of passing the time than keeping hostile dogs at bay whilst one tries to convince a landlord that you are not in the blackmarket, but merely want accommodation for the night.

Such a guide would, to quote Richard Murdoch " fill a long felt want."

Yours faithfully,
R. SWINN

" The Anford,"
76, Central Drive,
Blackpool.

NEW AUSTRALIAN GLIDING RECORD

Trainee meteorologist and former Royal Australian Air Force pilot, Mr. E. Desmond, broke the Victorian (Australian) height gliding record by reaching 9,000 feet. In a " Grunau baby " sailplane, Desmond left the launching ground at Reservoir and remained in the air for 39 minutes. The previous Victorian height record was 7,600 feet.

ROYAL AERO CLUB GLIDING CERTIFICATES

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

GLIDING CERTIFICATES: "A" .. 188 (7747-7935).
"B" .. 72
"C" .. 24

SILVER "C": 3 (124-126 inclusive).

Note—A. Malaney's Silver "C" Badge, No. 124, had been withdrawn, as a result of an error on the part of the applicant.

No.	*Name.*	*A.T.C. School or Gliding Club.*	*Date taken.*
FEBRUARY, 1948.			
	"B" CERTIFICATES.		
3957	Allen Frank Robinson	43 G. S.	18.1.48
5917	Raymond Eric Stevens	148 G.S.	4.1.48
6431	George Brown	146 G.S.	24.1.48
6436	Ronald James Austin	146 G.S	24 1.48
6469	Joseph Mills	R.N. G.U.	19.10.47
6470	Nigel John Ovenden	R.N. G.U.	19.10.47
6508	Peter John Pearce	Scottish G.U.	1.2.48
7162	William George Seymour Logie	London G.C.	18.1.48
7182	James Paton	Scottish G.U.	15.2.48
7371	Frederick Ernest Walter Phelps	Handley Page G.C.	15.2.48
7409	John Fox	29 G.S.	9.11.47
7544	Cyril Coupe Harrison	Cambridge G.C.	22.1.48
7544	Cyril Coupe Harrison	Camridge G.C.	22.1.48
7560	Edward George Moores	104 G.S.	10.2.48
7747	Edward Brian Smith	83 G.S.	18.1.48
7748	Cathcart Michael Wight-Boycott	146 G.S.	28.12.47
7749	Harold Herbert Desmond White	140 Wing G.C.	28.11.47
7750	William George Tinker	Air H.Q., B.A.F.O.	17.1.48
7752	Kenneth Savill	Southdown G.C.	3.8.47
7753	Reginald George Mays	Barntrup G.C.	1.1.47
7759	Peter John Wells	84 Group G.C.	8 10 47
7761	Anthony Cecil Lynch-Blosse	42 G.S.	31.8.47
7762	William Hubert Ingle	Air H.Q., B.A.F.O.	17.1.48
7769	Alfred Thomas Johnson	84 Group G.C.	4.8.47
7781	Jack Sowden	4th Armd. Bgde., G.C.	20.10.46
7783	Greenwood John Laurie	R.N. G.U.	6.4.47
7784	Colin David Hill	146 G.S.	24.1.48
7794	Anthony James Jacomb-Hood	Lubeck G.C.	23.4.47
7795	John Samuel Fay	Somerset G.C.	25.1.48
7798	John Wyndham Lowman	140 Wing G.C.	16.10.47
7801	Henry John Burrow	Condor G.C.	15.12.47
7802	Arthur William Stansfield	Derby and Lancs G.C.	28.7.47
7803	Humphrey Roger Dimock	163 G.S.	24.8.47
7808	Peter Daniel McCarthy	Air H.Q., B.A.F.O.	17.8.47
7817	Roy Norman Holland	Air H.Q., B.A.F.O.	25.1.48
7818	George Holt Lloyd	140 Wing G.C.	4.7.47
7820	Ivan Peters	Condor G.C.	15.12.47
7821	William Alistair Maitland Ferguson	R.N. G.U.	27.10.47
7824	John Wolferstan Villa	27 G.S.	8.2.48
	"C" CERTIFICATES.		
6481	Frederick John Foord	Southsown G.C.	1.2.48
6968	William Frederick Jordan	Southdown G.C.	1.2.48
7752	Kenneth Savill	Southdown G.C.	17.1.48
7753	Reginald George Mays	Barntrup G.C.	1.6.47
7762	William Hubert Ingle	Air H.Q., B.A.F.O.	18.1.48
7769	Alfred Thomas Johnson	84 Group G.C.	13.11.47
7794	Anthony James Jacomb-Hood	Lubeck G.C.	27.4.47
7798	John Wyndham Lowman	140 Wing G.C.	19.8.47
7808	Peter Daniel McCarthy	Air H.Q., B.A.F.O.	31.1.48
7818	George Holt Lloyd	140 Wing G.C.	29.7.47
7821	William Alistair Maitland Ferguson	R.N. G.U.	27.10.47
MARCH, 1948.			
	"B" CERTIFICATES		
1541	Gilbert Daynes	Luneburg G.C.	10.11.46
4395	Harold Eric Wilkinson	104 G.S.	1.2.48
5790	Ernest Perkins	Handley Page G.C.	29.2.48
6463	Derek Rex Clampin	145 G.S.	29.2.48
7174	John Watson Lello	Derby and Lancs G.C.	29.2.48
7334	George Brewster	Handley Page G.C.	7.3.48

The LONDON GLIDING CLUB Ltd.

Dunstable Downs, Beds.

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Full details may be obtained from:—THE SECRETARY, Oerlinghausen Gliding Club, c/o R.A.F. Station, Gütersloh, B.A.F.O., B.A.O.R. 15.

GLIDING CERTIFICATES—*Continued.*

No.	*Name.*	*A.T.C. School or Gliding Club.*	*Date taken.*
7392	Philip Turner Vaughan	102 G.S.	7.3.48
7628	Peter Kenneth D'Allenger	Southdown G.C.	7.3.48
7786	Robert Hellyar Perrott	Bristol G.C.	29.2.48
7832	Lionel Chatham Pitt	Bristol G.C.	20.9.47
7833	Geoffrey Francis Marshall	Oerlinghausen G.C.	15.10.47
7836	Dennis Edwin Varney	85 Wing G.C.	3.1.48
7838	Ronald Edwin Biddle	4th Armd. Bgde. G.C.	3.8.47
7839	Michael Frederick Green	84 Group G.C.	21.10.47
7842	Robert John Jones	151 R.U. (A) G.C.	4.8.47
7845	William John Agnew Wills	Cambridge G.C.	20.7.47
7850	Peter John Anson	Air H.Q., B.A.F.O., G.C.	25.1.48
7851	Brian Thomas Powell	Air H.Q., B.A.F.O., G.C.	29.1.48
7853	Alan Ewart Turnbull	Oerlinghausen G.C.	20.4.47
7854	William Ronald Flockhard	Scottish G.U.	15.2.48
7859	David Edward Parker	R.N. G.U.	26.10.47
7861	Anthony Franklyn Binks	B.A.F.O. G.C.	18.1.48
7865	Arthur Denis Hobson	B.A.F.O. G.C.	13.7.47
7866	Arthur Francis Winstanley	Scottish G.U.	29.2.48
7868	Eric Handley	R.N. G.U.	28.9.47
7871	Frank James Steer	135 Wing G.C.	7.10.47
7872	Peter Gillespie Mallett	B.A.F.O., G.C.	19.5.46
7875	George Djurkovic	B.A.F.O., G.C.	15.2.48
7877	Gerald Alan Cox	Bristol G.C.	28.2.48
7880	Geoffrey Richard Downing Fryer	B.A.F.O., G.C.	14.2.48
7891	Douglas George Collier	B.A.F.O., G.C.	29.2.48
7893	John Alexander Moir Wilson	Cambridge G.C.	14.2.48
7899	Donald Edward Brown	4th Armd. Bgde G.C.	3.9.47
	"C" CERTIFICATES.		
1541	Gilbert Daynes	Luneburg G.C.	29.6.47
7065	Ronald Frederick Shutes	B.A.F.O., G.C.	22.2.48
7681	William Arthur Marshall	Air H.Q., B.A.F.O. G.C.	1.2.48
7833	Geoffrey Francis Marshall	Oerlinghausen G.C.	30.1.48
7838	Ronald Edwin Biddle	4th Armd. Bdge. G.C.	19.10.47
7839	Michael Frederick Green	84 Group G.C.	4.11.47
7842	Robert John Jones	151 R.U. (A) G.C.	30.8.47
7850	Peter John Anson	Air H.Q., B.A.F.O. G.C.	31.1.48
7853	Alan Ewart Turnbull	Oerlinghausen G.C.	17.2.48
7861	Anthony Franklyn Binks	B.A.F.O. G.C.	1.2.48
7865	Arthur Denis Hobson	B.A.F.O. G.C.	18.1.48
7872	Peter Gillespie Mallett	B.A.F.O. G.C.	5.8.46
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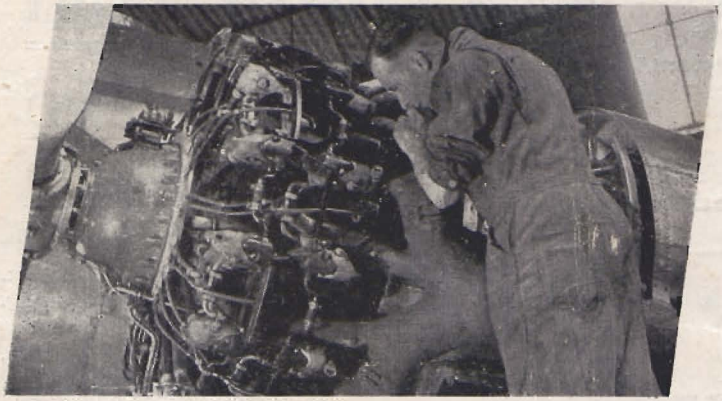
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