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The First Journal devoted to Soaring and Gliding

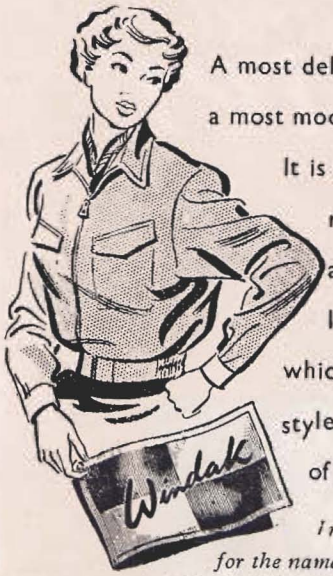


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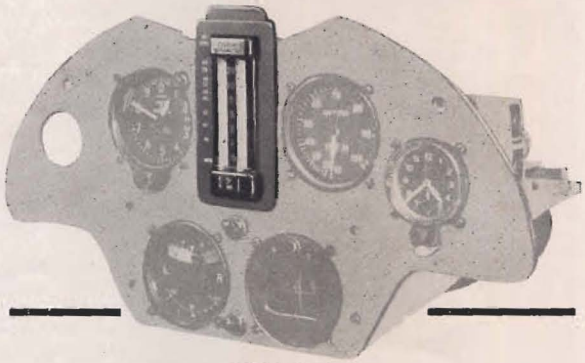
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THE FIRST JOURNAL DEVOTED TO SOARING AND GLIDING

JULY 1950 ★ Vol XVIII No 7

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Editorial

THIS month marks the largest assembly of International Soaring contestants the world has ever seen, in Sweden at Orebro. Among the pilots engaged in what has been described as the World Championship Contest, (although we in Britain view it as a National Honour rather than a personal one) are some of the most skilful and experienced in the world, including many National Championship holders. Whatever the result, we are sure that what will emerge from the Contests will be further evidence of the great friendship which exists between all the members of the Soaring Fraternity wherever in the world they may find themselves.

In our October issue of last year, we permitted ourselves some comment on the strange anomalies which exist in regard to some of the world gliding and soaring records. Why are some Russian records recognised by the F.A.I. and yet Jachtmann's duration record ignored ? We were answered by the Secretary of the F.A.I. to the effect that it was a British proposal that such wartime records be not established. Accordingly we were silenced. But on the occasion of these International Contests, and the Ostiv Meeting, we again wish to raise the subject and with it the plea that Gliding and Soaring may once more be allowed in the Allied Zones of Germany, as they are allowed in the Eastern Zone. We are sure that an expression of opinion on this point at this historic Meeting will go far towards helping such an aim, and we hope the matter will be taken up by all the contestants and a firm expression of such opinion given to the world and the Governments concerned.

We are not alone in this attitude. We have pleasure in giving below a translation of a letter received from Guy Marchand, holder of the present world's duration record, and we commend Guy Marchand for his brave attitude and the stand he has taken, which must be very hard for a Frenchman.

" My relations with German Pilots."

" On March 16-18, 1949, I had the occasion to acquire a title of world record holder for duration. I had stayed in the air for 40 hours 51 minutes although I had wished to make 60 hours. A radio breakdown prevented my realising my ambition. It will be recalled that the F.A.I. did not recognise war-time records and amongst those is the record of Jachtmann with 55 hours, 52 minutes, 12 seconds.

But as no sportsman could ignore a record better than his own I went to Germany to make the acquaintance of Jachtmann to apologise for holding a title which in fact he possesses. Since then we have become firm friends and we have toured Germany together making Gliding propaganda. I must say that wherever we have gone I have received a marvellous welcome, and I have devoted my best efforts to get the ban on gliding removed. World Soaring owes much to German Soaring and it is with pleasure that I will see again German pilots in competition in the most beautiful sport in the world. But many people may say to me, as they have already done, " Gliding allowed the Germans to create an Air Army with which to make war." This argument is irrefutable, and I myself have known the consequences with the Gestapo. But such a fear covers not only the gliding pilots, who are the tools of war, but also potatoes, which serve to nourish soldiers. These are only material which are dangerous in so far as their environment is dangerous. This ambient environment can lead a nation to war or peace. Let the Allies create a pacific ambience in which German youth can profit by the infinite joys of soaring, the most beautiful school of self control and grandeur of soul. I consider that one ought not to lead a people backwards on pretext of forbidding them an attitude which one sometime holds oneself. One ought to give to all youth the possibility of living with their epoch. And after all the adventures, happy and unhappy, that befell me during the second world war, I am certain that people hate because they do not know, and that the only thing which prevents the creation of atmosphere favourable to Peace is not gliding pilots but frontiers. In fact, more than any science, soaring cannot support frontiers. Is it without international co-operation that this science has arrived at so great a degree of perfection ? And personally, I have had the opportunity, recently, of travelling not only in France, but in Italy, India and Germany, and everywhere I have encountered the same faith which enthuses every man who has engaged in gliding. It is with this International co-operation that Gliding and Soaring can show again such astonishing possibilities.

With Jachtmann I went from town to town, from Press Conference to Press Conference, Meeting to Meeting, talking about aviation, and waiting for the time when we can together attempt the two-plane duration record. I can say that for Jachtmann this record presents no technical difficulty, but I dare not think of the red tape which must be overcome before this result may become tangible.

I end with the words to my friends which are dear to all German aviators, " Hals und Beinbruch."

GUY MARCHAND.

SOARING IN FRANCE

The French Team for the International Contests at Orebro, Sweden.

By GUY BORGÉ



Capt. Fonteilles.

FRANCE is entering at Orebro a team of three pilots : Paul Lepanse, Lambert and Fonteilles, with the " Arsenal 4. III," the " Bréguet 900 " and one " Air 100 ". It is possible that the " C.M. 8-15 " be flown by a fourth pilot but nothing is now official about this point. The three pilots are soaring champions and their biography needs a detailed study.

Henri Lambert knows meteorology which is his job : he manages the met. station of the big Paris-Orly airfield. He began to soar in 1928, an early date ; in 1945 he gained his Silver C by going from Beynes to Etampes. By 1948 he entered the Samedan meeting and held the first place during the early stages. In his " Air 100 " he climbed without oxygen to 22,000 feet (a gain of 15,448 feet) and on the next day he performed the best time on the Samedan-Altenheim track ; 70 miles in 1 hour 41 minutes. But he fell ill and his final classing fell away. At the end he was 6th.

Just after Samedan, he participated in the Beynes competition where he flew 193 miles and got his Golden circle, No. 16 (French list). In 1949 he went to Morocco for soaring research with an " Air 100 ". Back at his Chavenay airfield (he is the Vice-President of the important Gaston Caudron Aéro-Club), he broke the French return distance by 205 miles in a " Weihe " And in the " Air 100 " owned by the Met. Services he rose 16,200 feet in a big cloud.

Henri Lambert, 41 years old, has 425 hours of soaring. He will go to Sweden with an " Air 100 ", the sailplane that he knows so well.

Among the three French entrants, Flying Captain René Fonteilles is the latest recruit to soaring. During the war he was a reconnaissance pilot in " "Mustang P. 51s ". In 1947 he became interested by soaring and followed a course at Challes les Eaux where I knew him. In a short time he earned the B, C and Silver C badges, amazing the instructors by his fast progress. I remember when he was to circuit the " Avia 152 " nacelled primary ; just before this start, one instructor said to him as a joke : " Above all do not descend like an old brick ". Fonteilles thought he must remain in the air as long as possible, and just after the launch, instead of making the circuit procedure, he went straight away to the slope. He soon arrived beside " Grunaus " and " Emouchets " very surprised to meet a primary here. But he went behind the slope and disappeared from our view. The instructors, very worried, began to start up the " Morane " plane in order to discover his landing place, when we saw the " Avia 152 " lazily appear on the other side, come back to the field and land. On the following days I sometimes saw him at incredible low heights above the slopes but he always found some lift without which he would have " landed " against trees.

In a " Castel 310 " he executed a nice distance flight from Challes to Le Fayet Mont Blanc, a journey that had only been accomplished by Branciard in the " Minimoa ". After his course he was given the soaring instructor's licence and created the military soaring centre at Coblence (Germany).

Like Lambert, he was a Samedan competitor, and took the 7th place in a " Nord 2,000 Olympia," when all the other competitors flew high performance planes, " Air 100 ", " WLM 1 " or "Weihe". On the 21st July he was 7th in the 70 miles race at the average speed of 31 mph, excellent for an " Olympia " On the 26th July, he was one of only three pilots who succeeded in the East-West crossing of the Alps ; he landed at Martigny (140 miles).

In 1949 he gained his Gold C by going from Coblence to Semur en Auxois (236 miles in 8 hours). Having announced this goal, he broke the French goal record. But he kept it only one day. On the next day another pilot improved on it by 9 miles. And on the day after this record was again broken by Lepanse. His Gold C is No. 28 (French list).

Fonteilles, 35 years old, has clocked 300 soaring hours today. At Orebro he will pilot the " Arsenal 4. III."

Guy Borgé.

COMPETITORS IN THE WORLD SOARING CHAMPIONSHIP AT OREBRO, 1950.

	Country	*Pilot*	*Type of aircraft*
1.	Denmark	H. W. Jensen	Hütter 28
2.		K. A. Rasmussen	Fi-1
3.	Egypt	Hassan S. Kamil	?
4.	Finland	K. Jorma Haltiala	Weihe
5.		K. J. Temmes	Weihe
6.	France	René Fonteilles	Arsenal 4111
7.		Henri Lambert	Air 100
8.		Paul Lepanse	Breguet 900
9.	Great	Robert C. Forbes	Weihe
10.	Britain	P. G. Mallett	Gull IV
11.		Lorne Welch	Weihe
12.		P. A. Wills	Weihe
13.	Holland	A. G. Kleyn	Fokker Olympia
14.		P. C. A. Malotaux	Fokker Olympia
15.	Norway	C. J. Haydn	Olympia
16.	Poland	J. Figwer	Sep
17.		T. Gora	Sep
18.		Irena Kempowna	Sep
19.		Z. Przyjemski	Sep
20.		A. Zientek	Sep
21.	South Africa	H. R. Lasch	Air 100
22.	Sweden	Sven E. Alm	Weihe
23.		Tage Löf	Weihe
24.		S. Arne Magnusson	Weihe
25.		Billy Nilsson	Weihe
26.		P. A. Persson	Weihe
27.	Switzer-	A. Gehriger	Weihe
28.	land	Fr. G. Legler	Moswey III
28.		Siegbert Maurer	Moswey VI
29.		Karl Ruckstuhl	Moswey III
30.		Max Schachenmann	Air 100
31.	U.S.A.	René Comte	Schweizer SGS-23
32.		Paul B. McCready	Weihe
33.	Yugo-	M. Arbaijter	Weihe
34.	slavia	M. Borisek	Orao II

National leaders are :	Denmark	—
	Egypt	—
	Finland	R. Winter
	France	M. Jarlaud
	Great Britain	Mrs. A. C. Douglas
	Holland	A. A. Leutscher
	Norway	—
	Poland	Humen
	South Africa	—
	Sweden	Sten Dalborg
	Switzerland	Eduard Lauber
	U.S.A.	Ralph S. Barnaby
	Yugoslavia	Pavle Crnjanski

As the regulations allow exchange of pilots, assistants and equipment before 12.00 a.m. on July 3rd, 1950, some modifications in the list may occur.

A LOCAL BRITISH OUT-AND-RETURN RECORD

By G. H. STEPHENSON.

SUNDAY, the 16th April, was one of the two days on which the London Gliding Club paid a return visit to the Surrey Gliding Club. The weather looked ideal for an out-and-return attempt because there was so little wind. At 11.00 hours British Summer Time, cumulus was building up rapidly and although on the ground the wind was deemed to be coming from the east, the clouds were drifting slowly from the north west.

My choice of turning point was Thruxton Aerodrome 63½ miles due west of Redhill. The distance, I noted was slightly greater than Charles Wingfield's flight to Welford and back, which it was my ambition to beat. The choice of direction was governed partly by a strong desire to get out-side the London control zone as quickly as possible, and partly by the fact that I thought I had heard of the name Thruxton in connection with some sort of gliding. The choice turned out to be a good one because the flying club there co-operated willingly and posted a Royal Aero Club observer to watch for me.

Before starting I was briefed about local flying rules and told not to go near cloud-base until I got beyond Guildford. This depressed me somewhat, but it turned out not to be such a hardship as I had expected. Keeping well clear of cloud saves a lot of time when conditions are good, as was the case today. My wife, who had volunteered to stand by with the trailer agreed to telephone Thruxton two hours after my departure.

At 12.12 hours B.S.T. I was delivered by Peter Brook into the centre of a large thermal just north east of the aerodrome. I released at 1,800 ft., climbed to 2,200 ft. As cloud base was getting near, I pushed off and rounded the south side of the aerodrome. I continued to make brief use of the lift underneath the clouds and to alternate between 2,000 ft. and 3,000 ft. as the cloud base slowly lifted. I reached Guildford at 13.10 hours and about 15 minutes later started entering cloud at 3,400 ft. At 13.38 hours and 5,000 ft. I was over Farnham feeling very pleased with life. Twenty minutes later

I had little difficulty in recognising Alton because I was further south of my track than I had meant to be. No sooner had I got clear of cloud and started to eat my lunch (this always causes trouble) when it dawned on me that the sky had become completely overcast and dead looking. There was only one small patch of sunlight, about 10 miles away to the north west, just west of Basingstoke, and I decided to try and reach this.

There was no point in hurrying, as conditions were not likely to get any worse, so I settled down to a long slow glide for the next fifteen minutes. I stopped eating sandwiches and held my breath so as to reduce the sinking speed. I reached the leeward edge of the sunlight which was over the western edge of Basingstoke. The sink was reduced straight away and, after a lot of fishing about I found a bit of no-sink. At 1,200, and, after circling for about ten minutes (still holding my breath,) I actually began to rise.

Cloud had by now reformed and one could relax again. The only thing that worried me was the shortage of time. If I could not increase speed the flight was certainly doomed to failure. The only consolation was the fact that during the prolonged circling over Basingstoke I had drifted back probably a mile or more in ten minutes which showed that I should get more help from the wind on the way home.

The next forty-five minutes was fairly easy; but, when in sight of Andover at about 4,000 ft. the sky again looked blank. In view of the head wind and shortage of time, I decided to do a long dash to Thruxton. There was the further point that one had to be low enough to be observed and I fully expected to have to land there in any case. I therefore flew at 65 miles per hour, and as I passed over Andover there was not a ripple in the air. To the north of Thruxton I could see a patch of sunlight, so I resolved to do a right hand circuit so as to end up in this.

At 1,800 ft. and 15.20 hours I made a circle over the control tower on the west side of the aerodrome and then continued to sink whilst completing the circuit at reduced speed. The patch of sunlight produced nothing but slight turbulance until I reached the leeward edge at 1,400 ft., whereupon I circled frantically, expecting to have to land at Andover aerodrome. Gradually I started to rise, and eventually felt secure again because the sky looked better.

From Andover to Whitchurch, there was a narrow corridor of sunlight and the rest was in shadow. The clouds looked dead again, so I flew at reduced sink along this corridor. At the leeward end of the sunshine the lift became strong and I got in at the early stages of the formation of a big cumulus. At times the lift was 20 ft/seconds, and when the lift gave out I was able to re-centre and continue in quite a masterly fashion until 10,000 ft. was reached.

The next half hour was about the most exhilarating bit of soaring I have ever known. I did not see the ground at all, but passed from one large cumulus to another over the tops of smaller clouds. Most of the time I was flying roughly east at a steady 50 miles per hour. (The A.S.I. had iced up, but the trim told me the speed). I entered one cloud by the side entrance and it took me up to my greatest height ever; 10,300 ft.

I then ran out of the tall clouds and slowly sank. The canopy of the " Olympia " was iced up, but by opening the port window I could just see an aerodrome through a large hole in the clouds. This I recognised as Farnborough which meant that progress was much better than I dared to hope for and I really thought Redhill was in the bag.

Somewhere along the Hogs Back I came out into the open. At Guildford, the altimeter said 3,000 ft. The next cloud was over Dorking. There was a nearer one a good way to the north of my track and I now think that I should have gone to it. Instead I pressed on full of optimism and very nearly came unstuck.

I reached Dorking at 1,200 ft. and what followed was enough to satisfy my emotional needs for a long time to come. For five minutes I circled, over the ridge on the west side of the Dorking gap. I was making no height and did not dare to shift my circles by more than about 100 yards at a time. The centre of the large cloud was a little further on still, but already there were drops of rain falling on to the canopy I was alternately looking for a landing field and looking longingly towards Redhill Aerodrome. By shifting my circles a little bit at a time I established that it was safe to move a little way towards the cloud and when I did this the lift very slowly built up to a good 8ft./second. I climbed almost to cloud base at 3,500 ft., breathed a sigh of relief and pressed on at a speed which started at 60 and gradually increased to 90 miles per hour as the likelihood of getting home became a certainty.

I landed at 17.15 having been airborne for 5 hours 9 minutes and having covered 127.3 miles. The wind speed had increased perceptibly in my favour, so that the average speed should perhaps have been higher, but I am still not quite sure what I should have done to make it so.

GERMANY

Glider construction and glider flying instruction is starting in the Eastern Zone with Russia evidently disregarding the four power agreement prohibiting such activity.—Western Zone glider enthusiasts are confined to research on the drawing boards. They are tending toward 14-meter and 12-meter designs for future everyday use. One of the most interesting is a collapsible 12-meter sailplane called the " Kobold ". The wing is in four pieces and the fuselage is hinged in the middle permitting the tail to be folded up over the cockpit for compact storage. The disassembled ship can fit on a three meter trailer (i. e., it will fit in an ordinary garage). Also planned for future use is a construction method of moulding sailplane elements out of plywood and resin. On a 100-unit basis, it is estimated that a ship of the " Weihe " class could be built for one-sixth the prewar cost of an " Olympia ".

GOLD "C" HEIGHT OVER ST. AUBAN

By PETER G. MALLETT.

HAVING completed Gold " C " distance in Germany last year on a flight from Scharfoldendorf to Karlsruhre, it was not until I was posted to Northern Ireland that I realised the opportunities that had been missed while instructing in B.A.F.O.

Faced with eighteen days block leave in April, I was quick to realise the chances of obtaining Gold " C " height in the famous Standing Wave at St. Auban in the South of France.

On April 16th, I departed from Belfast by night ferry via London, Paris and Grenoble, arriving at St. Auban at midday on the 19th. After lunch I was introduced to the Commandant, M. Jolivoh and the five instructors, all of whom had Gold " C "s, with at least one diamond.

My first flight, an aero-tow in a two seater "C 800" with M. Lefarge, was used to point out the minimum safety heights to return from the Penitent Slope and L'escale range across the River Durance. (see p. 26 *Sailplane*, Feb. 1950). Strict adherance to these heights is necessary owing to the strong down draught and turbulence experienced in Mistral conditions. Thermals were good and no difficulty was found in staying airborne.

Although the Standing Wave at St. Auban has been flown for some years, and many flights over 7,000 metres have been made, a complete explanation of the Wave has yet to be found. A full time Met. Officer is stationed at St. Auban for the sole purpose of recording useful data and to assist in the forecasting of Mistral and Standing Wave. The most favourable meteorological situation appears to be a depression centred in the Gulf of Genoa. This activates the northerly Mistral wind which blows down the Durance Valley and creates this most interesting wave.

The following day I flew a " Grunau IIB " and then a " Nord 2,000 ". " Weihe," " Air 100 " and " Kranichs " are kept for French instructors only, the reason for this being that a pilot, after flying a " Weihe " in the Wave to over 6,000 metres without any oxygen, descended too rapidly and crash landed at the Railway Station while apparently still suffering from inoxia. Fortunately he wasn't hurt.

On the third day my French had evidently improved and I managed to convince my instructor of my ability to soar. I was then given a " Nord 2,000 " equipped with electric turn and bank indicator and oxygen. Now it only remained for the Mistral to blow.

On the 25th April, six days after my arrival, I was awakened at 2 a.m., by the low whistle of wind. The Mistral had arrived at last after being inactive for over a month. Although the wind strength was only 10 m.p.h., early in the morning, it gradually increased to 15 m.p.h., and 4-6/8 cumulus drifted across the blue sky with no sign of any lenticular clouds. At 12.00 hours I was towed across to the Penitent Slope and released at 300 metres where I rapidly climbed to cloud base at 1,500 metres. Almost immediately I was sucked down again to scrape along the slope at 350-400 metres for nearly an hour before I was able to cast away from the slope and soar on thermals over the Durance Valley, searching for the elusive Wave that was destroying lift on the Penitent Slope.

For five hours I explored the Durance Valley and Lure Mountains. I found good thermals up to cloud base everywhere except on the Penitent Slope; there was still no sign of lenticular clouds.

At 17.00 hours, after almost giving up hope, I climbed to cloud base at the south end of the Penitent, when I noticed a small wisp of vapourising cloud rising upwind of the cumulus. On exploring more closely I was rewarded with plus 4 metres per. sec., and soared on the edge of the cumulus as though it were a slope. Above cloud tops at 2,500 metres I realised I had bridged the gap between unstable and stable lift. The air was now quite smooth, and I settled down on a steady course into the wind of 310° (M), airspeed 65 k.p.h., with nothing but blue sky above and 4/8 cumulus below.

At 17,05 hours lift decreased, and at 3,000 metres the variometer was reading zero. Believing this to be the secondary wave from the Lure Mountains I increased airspeed and flew towards the Lure. At 17.07 hours I connected with the primary wave and climbed steadily again at plus 3-4 metres per sec. to 3,700 metres. At 17.09 hours I checked my oxygen and turned it on to emergency for a few seconds to celebrate passing Gold " C " height. The climb continued with decreasing lift until a maximum height of 4,800 metres above the airfield had been reached. By this time I was beginning to experience the extreme cold; the temperature had now dropped to -35° C. After 20 minutes searching for more lift and admiring the marvellous view of the Alps from Mont Blanc to the Mediterranean, I descended, passing several French students still climbing on thermal lift, and endeavouring to make contact with the Wave. I touched down at 18.30 hours after being airborne for six and a half hours.

On reporting my flight to the Met. Officer he quietly informed me that conditions were not very good on that particular day. Only a very weak depression in the Gulf of Genoa had caused the light Mistral and accompanying small Wave.

Though my climb to this altitude might appear outstanding, it is interesting to note that one of the instructors has attained Diamond altitude over fifty times in the Wave.

What holds in a really good Mistral at St. Auban between November, 1950, and March, 1951? The British or World Altitude Records?

CUMULUS, THERMALS AND WIND

By JOANNE STARR MALKUS, Ph. D.

CUMULUS clouds have often been compared by ground dwellers to cotton puffs floating through the sky, or to tumbleweed blown along by the wind. The sailplane pilot will recognize these descriptions as far too passive; he is aware that a cloud is not simply an aggregate of droplets drifting as a coherent body like a balloon, but rather a transient, dynamic balance between rapid growth and equally rapid destruction.

For example, it is a common observation that when an average midsummer cumulus moves out over the cooler ocean, thus leaving its energy source, the entire cloud disappears in 5-30 minutes' time. Figures 1-3 show this process occurring on a summer afternoon on Cape Cod, Massachusetts. The middle cloud in the first photograph was followed over a narrow strip of land and out over the shore. The second picture, taken from the dock 20 minutes after the first, shows the cloud in the final stages of dissipation.

An even more illuminating way to study clouds photographically is by means of a motion picture camera arranged to make exposures at the rate of about one every two or three seconds. When these so-called "timelapse" pictures are run off on an ordinary projector at 16 frames per second, the processes appear greatly accelerated; the clouds boil and bubble along almost like steam from a railroad engine, and many important aspects of their life cycles are revealed which ordinarily occur too slowly for naked eye recognition.

Many motion picture cameras can be easily equipped for this purpose. The camera used in these studies at the Woods Hole Oceanographic Institution was a Cine-Kodak 16mm, with an electrical shutter-triggering mechanism to expose the film once every two seconds. A red "A" filter was used with "Plus X" panchromatic film.

One of the most valuable revelations first suggested by such movies is that, in general, the speed of cumulus clouds does not correspond exactly to the speed of the wind. That often the clouds are moving through the air and not just drifting is evidenced on the film by cloud fragments seen streaming out in one direction only.

Since relative motions between cumulus clouds and the surrounding air can be shown to cause non-symmetrical patterns in the associated turbulence and vertical velocities, to modify the slopes of thermals and to affect even the growth processes of the clouds themselves, it is necessary to verify precisely that such relative motions really do occur, and to predict their magnitude. Such experimental verifications have been made by means of radar photographs of clouds taken by the Thunderstorm Project of the United States Weather Bureau. Why these relative motions must exist, can be deduced from Newton's

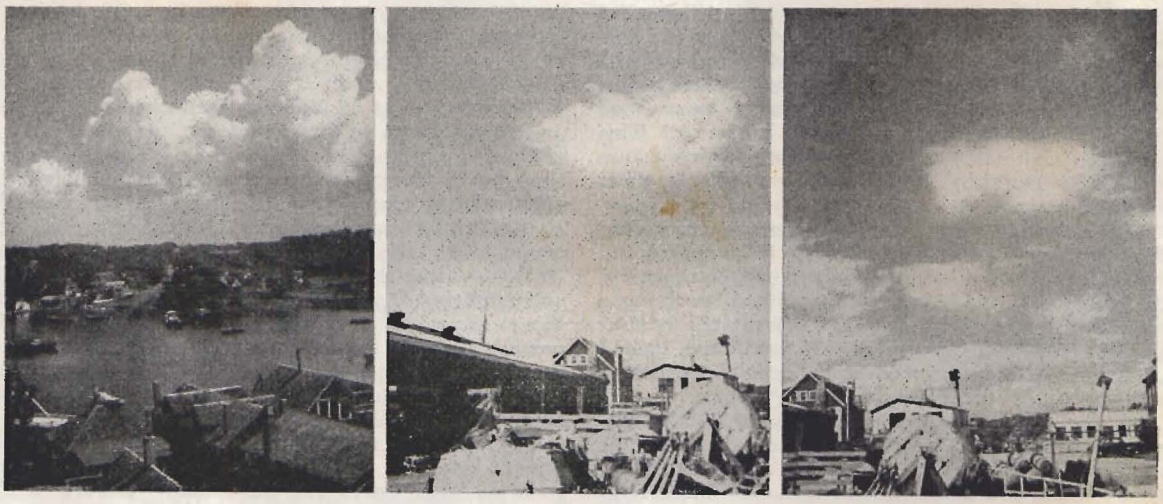
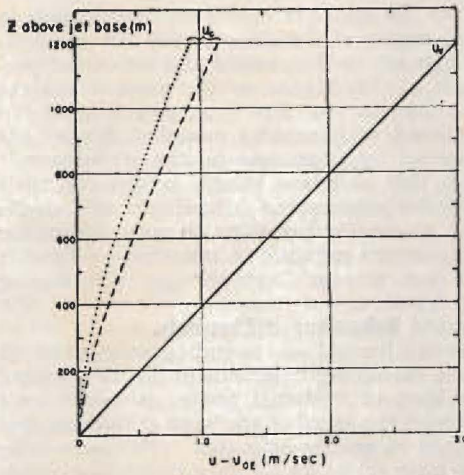
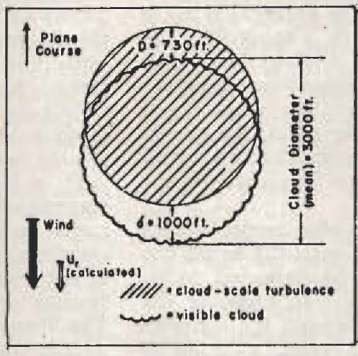


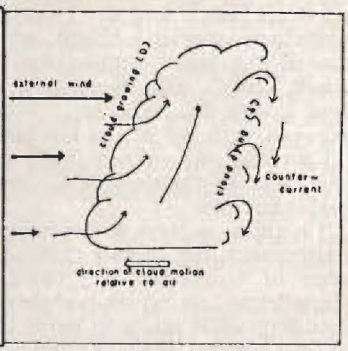
Fig. 1—Clouds forming at summer midday over sandy soil of Cape Cod. Cloud base at about 2,500 ft. top well below icy-crystal level. Presence of active updrafts and turbulence is indicated by cloud's hard rounded edges and tops. Prevailing wind was from rear left to front right of picture (northwesterly) so as to blow clouds directly out over harbour.

Fig. 2—Small, thin cloud at upper right is what remains of middle cloud in previous picture after 20 minutes of over-ocean travel. Soft, hazy appearance of cloud edges indicates that the turbulence and updrafts have disappeared and that the cloud is dying.

Fig. 3—Same cloud five minutes later.







←— **Fig. 4—Graph of horizontal cloud velocity vs. height. The external wind is given by the solid line, UE, and is shown to increase by 3 meters/sec in 1200 meters (6.7 miles per hour in about 4000 feet). The horizontal cloud-velocity for normal rates of mass entrainment is given by the dotted curve for Uc, and for double this rate of entrainment, by the dashed curve for Uc. Altering the rate of entrainment is seen to affect the relative motion (given by the difference between UE and Uc) only slightly. The velocities plotted are in excess of the velocity at the jet base (UoE). Fig. 5—Asymmetry between visible cloud and turbulence. Cloud-scale turbulence denotes the large values of turbulence usually associated with cumulus. Fig. 6—Predicted cross-section of moving cumulus with external wind shear.**

laws of motion, if we remember that ordinarily the wind does not remain constant with height above the ground, but increases or decreases in speed, and often changes its direction.

If a thermal chimney (the presence or absence of liquid water in the form of a cloud is unimportant insofar as the relative motion is concerned; it is merely the upward velocity which is vital) should ascend, without any frictional forces, through an environment in which the wind velocity is different from that at the thermal base, it will retain its original horizontal velocity (that of the wind at its level of origin) and hence at upper levels will have a different horizontal speed and direction from the air around it.

This is merely a statement of Newton's law of the conservation of momentum. While a cumulus or thermal cannot by any means be said to conserve vertical momentum, the horizontal component of its momentum can be dealt with more simply, and was utilized in the mathematical work underlying this discussion.

The hydrodynamical study of jets (to which a thermal or cumulus can conveniently be likened) shows us that frictional forces, which act to reduce the relative motion, must be considered. When the subject of friction is mentioned, the glider or airplane enthusiast will probably think of that part of friction called "form drag," i.e., the resistance to motion offered by solid bodies because they must push aside the surrounding air. Actually, in the case of ordinary cumulus clouds and thermals, form drag is found to be negligible. (For clouds the size of thunderstorm cells, on the other hand, the effect of form drag would probably be greater).

The frictional term of importance for ordinary cumulus is that due to the "entrainment" of environment air into the ascending chimney. Measurements show that after a cloud or thermal has risen about 4,000 ft., the amount of air moving upward has commonly doubled or tripled, the excess flowing in from the surroundings, mixing with the rising air, and being dragged along. The effect of this entrainment on the relative horizontal motion is understood qualitatively as follows: The "entrained" air comes from outside the cloud and hence possesses the horizontal velocity of the environment. When it mixes with the cloud air, it imparts some of the outside horizontal velocity (strictly, momentum is the quantity to be considered) to the cloud air, thus bringing the horizontal motion of the cloud closer to that of the environment. Therefore, a term expressing the entrainment rate must be put into the equations for the relative motion.

When this is done, calculations show that for normal wind conditions in our latitudes, the relative speeds are still of the order of 5-6 miles per hour and more at heights of about 5,000 feet (being proportionately less at lower elevations). A typical example is graphed

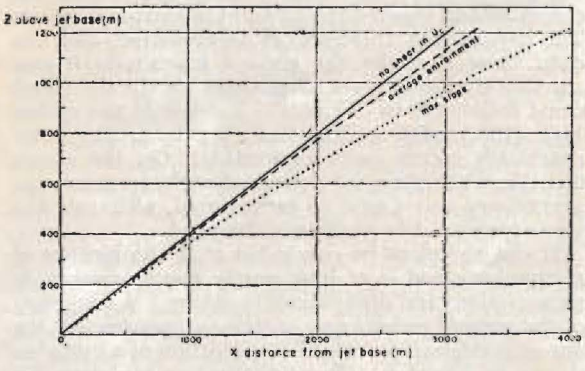


Fig. 7—Graph showing slopes of thermals when the external wind again increases 3 meters/sec in 1200 meters. The solid line represents a thermal with no entrainment; the dashed line shows a thermal with entrainment so large that rising thermal mass is negligible compared to the air entrained. Note the large horizontal displacements with height for all three curves.

and described in Fig. 4. Here the external wind is shown increasing with height, which is most often the case in the lower atmosphere. Under these conditions, clouds will move in a downwind direction more slowly than the air. When the wind speed decreases with height, on the other hand, the clouds will actually move downstream faster than the wind itself, due to their origin at lower levels where the wind is stronger.

If a cumulus were not moving with respect to its environment, but merely drifting with the wind, the inflow of "entrained" air could be expected to be symmetrical around its periphery. If, however the ascending jet is made to move through the air with a speed greater than the inflow speed, addition of velocities shows that on one side the inflow will be increased, while on the opposite side actual outflow of air from the jet must take place. On the outflow side, then, liquid cloud particles are pushed away from their source of energy just as surely as if those cloud particles moved out over the cool ocean. That part of the cloud, therefore, can be expected to die.

Re-examination of photographs 1-3 will show that dying clouds are not turbulent, while young and growing clouds (associated with updrafts) are highly so. Therefore, difference of location between the turbulent region and the region of visible cloud is to be expected, as predicted schematically in Figure 5. The shaded area represents the ascending jet, or turbulent region, while the scalloped area stands for visible cloud. The arrow Ur is the relative wind as felt by an observer riding on the cloud. The region D, of turbulence and no visible cloud, is the side of maximum entrainment, where new cloud can be expected to form. The region d, of visible cloud and little or no turbulence, represents "detrained" and therefore dying cloud.

Verification of these predicted asymmetries of cloud and turbulence was found in airplane traverses of tropical cumuli made by a group of meteorologists from Woods Hole Oceanographic Institution. An average of eight such cloud observations is presented in Figure 5. In all of these cases, the wind increased but did not shift with height. This means that the clouds moved upwind relative to the surrounding air. The asymmetry, therefore, is as predicted, and the data show it to be the correct magnitude if one assumes that it requires 25 minutes for the detrained cloud fragments to dissipate. In view of the rather high (70%) relative humidities in the tropics, this conclusion seems quite reasonable. On the single occasion when the wind decreased with elevation, the asymmetry was found to be reversed, although the plane continued to head into the wind.

It can therefore be concluded that the motion of a cumulus cloud is at least partly due to growth in some sections and dissipations in others. A summary of the present results and several further predictions are set forth in the vertical cross-section of a cumulus shown in Figure 6. This cross-section is drawn for an active, moving cumulus in a fairly strong wind which increases with elevation. It should be noted that an asymmetry in vertical motions is predicted, as well as the asymmetry in turbulence. The downward current, or countercurrent, which must occur with updrafts (so that there is no net upward motion of air way from the earth) is shown confined mainly to the leeward region of the cloud, while the most intense updrafts are in the central and windward portions. Such a distribution would account for the rolling-over motion, or slow "somersaulting", so often associated with moving cumulus clouds, and clearly revealed by time-lapse motion pictures.

It is felt that sailplane pilots, because of their concern with the behaviour and distribution of updrafts might be in an excellent position to make the rather simple observations required to investigate fully this hypothesis and process them through the Soaring Society of America.

The Slopes and Behaviour of Thermals.

If a thermal formed an ascending column which rose without entraining environment air, or suffering any other kind of frictional forces, it would drift downwind with the speed of the wind at its base, and its slope could be readily estimated. This is done by taking the ratio of its ascent rate to its base wind-speed. For example, let us suppose that a thermal ascends with a constant speed of 6ft./sec.[1] (according to an article by K. O. Lange in SOARING magazine for September-October, 1945, 85% of the thermals observed at 1,000 feet altitude ascend more slowly than 6 ft./sec.) and the horizontal wind at its base is observed to be 15 ft./sec. (about 10 miles per hour). This means that for every 6 feet the thermal column ascends, it would travel horizontally 15 feet downwind, or that it would have a slope of 6/15 or 2/5.

Taking into account the entrainment of environment air into the thermal, however, must result in a modification of its slope. If the wind increases with height, and the thermal entrains some of this faster-moving air on its way up, it will travel farther downstream for a given height than it did before, thus increasing its slope. Calculations show, however, that this increase is quite small, even for abnormally high entrainment rates.

An example is computed and plotted in Figure 7. In this graph, the wind at the base of the thermal is taken as 5/2 times the ascent rate (a thermal ascending at 6 ft./sec. would have a base wind of 15ft./sec. or about 10 miles per hour, etc.) The external wind is taken to increase 3 meters/sec. per 1,200 meters as in Figure 6. The solid line indicates the position of the thermal if no entrainment occurred. The normal rate of entrainment observed in the atmosphere would give the thermal the position shown by the dashed line, while the dotted line represents the absurd extreme of mass entrainment so rapid that the air already inside the thermal would be negligible in comparision to that entrained. In the case of normal entrainment, the slope of the thermal is reduced to about 1.85/5 (compared to 2/5 for no entrainment) which means that at 1,200 meters (or about 4,000 feet) above the thermal base, the ascending column is found about 75 meters (or roughly 250 feet) downwind of its position predicted by use of the base wind. It can therefore be concluded that for many thermals, a slope calculated from the surface wind alone is probably quite satisfactory for soaring purposes. Exceptions would be most likely to occur on days when the observed wind increased or decreased extremely rapidly with elevation.

The most striking feature of Figure 7, however,

still remains to be discussed. That is the large horizontal displacements shown, compared to the height attained by the column. The graph predicts, for example, that if a pilot encounters a thermal at 2,000 feet (600 meters), the patch of sand or heated soil which provides the energy source for the ascending chimney is nearly one mile upwind of the terrain he sees directly below him. So long as thermals are continuous columns of warmed, ascending air from a fixed source on the ground, such as the road, airport apron, ploughed field, etc., this cannot help but be the case. There appears to be observational evidence that some thermals do, indeed have fixed energy sources. On the other hand, it is well known that cumulus clouds are by no means so highly slanting as Figure 7 would predict. They are usually seen to move along with a much more nearly vertical orientation. It must therefore be concluded that these ascending columns do not, always, have a fixed source at the ground, but must often carry their energy supply with them as they move. Full details on how this is accomplished are not yet known by meteorologists.

The answers to these problems are of vital importance, both to the meteorologists' understanding of basic atmospheric processes, and to the soaring pilot's increased ability and enjoyment of his sport. And the sailplane itself can contribute greatly to their solution. With one or preferably several sailplanes it would be relatively easy to determine whether a given column ascends from a fixed source, or whether its base is actually moving downwind and the associated meteorological conditions. Perhaps it would even be possible, without expensive instruments, to determine what factors, such as windspeed, wind shear, lapse rate, presence of liquid water, etc. cause the transition from fixed base thermals to progressive thermals or cumulus.

It is in realms such as these that the glider appears to be a potentially invaluable tool in meteorological research, because a glider can obtain information about thermals and other convection processes not easily accessible to any other type of meteorological probe (except perhaps a very slow-flying airplane). It is also in these realms that the meteorologist in turn can hope to be of maximum service to the sailplane pilot by contributing knowledge leading to more effective location and use of updrafts.

WOMEN'S WORLD RECORD HEIGHT
IN SAN GABRIEL WAVE

By BETSY WOODWARD.

WE were awakened on the morning of Good Friday, April 7th, by shouts from Gus Briegleb that lenticular and culmulus clouds were all over the sky. This was not unusual—both the awakening and the waves. After several attempts at getting up, I poked my head outside and sure enough, there was a beautiful wave about 15 miles away over the San Gabriel Mts. to the south.

I didn't get my hopes up for I didn't know how long the wave would last, and also there were quite a few students who wanted to fly. By 10.00 a.m., however, the cloud was still there and with things now generally organized, Marty Blackman was towed off in the " Schweizer TG 3 " behind the " BT ". When Gus came down from towing he asked if Vera Gere (a member of A.G.C.S.C. who was here at El Mirage for several days) and I wanted to go up for a try at the international feminine two-placed altitude record.

We then got down to the business of preparing for a high altitude flight—checking oxygen equipment filling bottles, fixing barographs and digging up all the warm clothing we could find.

Marty landed after a fifty minute flight, having soared to 15,000 ft., when the canopy cracked (due to his head, not the cold). We loaded ourselves and the equipment into the ship—wiring in four bottles of oxygen as best we could. Gus instructed us not to go above 35,000 ft., and I assured him that I had no intention to. First of all—the ship was not properly insulated ; secondly, I wasn't too sure of the temporary oxygen installation and didn't care to have it go out at 30,000 ft. or more ; and thirdly, we weren't properly clothed. Vera had on Gus' flying boots and suit which were about ten sizes too big for her 100 lbs. I haven't a pair of woollen socks to my name and with merely nylon socks and ordinary shoes on, I was a little leary about how warm my feet would be.

We sealed up the majority of the air leaks and towed off shortly before twelve o'clock. The air was quite turbulent and within a few minutes we were under the roll cloud—about six miles south of El Mirage Field. At 6,700 feet ASL (or approximately 2,500 ft. above the ground) we released, as the rate of climb indicated about 1,500 feet a minute up. I didn't pull the nose up enough before releasing and also due to the fact that the air was quite rough, Gus didn't know I had released, so climbed 300 ft. more before diving (in order to get the release point on the tow plane barograph trace).

We flew under the roll cloud for 20 min. generally heading south into the wind. While under the roll, I got a big kick at seeing the variometer hit 18 meters a second up (or approximately 60 ft. a second). It lasted only a moment, and shortly we were getting 10 m/s down. However, I believe that it would have been very possible to spiral in the up, for as far as my meagre knowledge can judge, the roll cloud seemed to be generated by thermals formed on the lee side of the mountain. The thermals could be seen in the form of dust devils and this fact seems to indicate that a 1,000 or 1,500 foot release above the ground would be entirely possible.

We entered the smooth lift of the wave cloud at approximately 11,000 ft. and the variometer showed

7 m/s up. I felt greatly relaxed and I'm sure Vera did. This was really soaring. Vera thought she had better start using her oxygen so put on her mask at about 12,000 ft. Before I got my mask on we were at 15,000 ft. This was the first time either of us had used oxygen equipment, and I, for one, was surprised at the difference it made.

At 17,000 feet we had the international record well in the bag; the previous record being 9,459 feet gained. I was flying directly into the wind at 60 m.p.h. indicated airspeed, but instead of the lift getting stronger, as I expected, it gradually let off until we were getting but 2 m/s up. I then realised that I had been making a very foolish mistake. Instead of going towards the leading edge of the wave where we were headed, we were actually drifting backwards. The winds aloft were stronger than 60 m.p.h., our airspeed. This was only my second wave flight—the first being in February, when Jim Carr and I soared to 17,200 ft. without oxygen. During that flight we flew into the wind at 50 to 55 m.p.h., indicated, and had made quite a bit of headway, 360° turns being necessary periodically. When I finally realised that this flight could not be flown the same as the last, I drove the ship about 90 m.p.h. in order to penetrate the wind, but by this time we were well under the trailing edge of the wave, and lost about 6,000 ft. altitude before getting back into the lift. At 13,000 ft. we picked up the wave lift again, but just at this point, I found that I was not breathing very well. I turned and looked at the oxygen dial and saw that it was empty. I had checked it a number of times before and noticed that I had a sufficient supply. The bottle was good for an hour and a half at 20,000 feet and I could not understand why it was empty, since I had been using it for only 15 minutes. We learned after we landed that the valve had rubbed against the side of the cockpit and caused a leak. I had a small jump bottle (good for 20 min.) as a reserve, but we decided not to go up again so headed back to the field.

Had I realised that we did not have sufficient airspeed to penetrate the wind, and if the oxygen hadn't run out, I believe that we could have easily gone as high as it is safe to go without a pressurized cabin. Gus soared the " BT " to 18,000 ft. (without oxygen) and went out under the leading edge of the wave where he saw a second cloud well above it. The wave remained in approximately the same position for at least eight hours. Incidentally at 3.0 p.m., with Jack LaMare as student, we towed up again. By this time there were no longer wave clouds in this area, but we noticed a beautiful lenticular about 30 miles to the east over Lucerne Dry Lake, which indicated that the storm area had moved to the east. The wind direction shifted to the west in the El Mirage area. We were, however, able to spiral in thermals which gave us 10 m/s up, which is nothing to sneeze at.

It might be interesting to note that at 18,000 feet Gus noticed that the outside air temperature was —5°C. (or +5°F.) and it was at this altitude that both Vera and I put on our gloves. We had no thermometer in the sailplane, but the temperature inside the ship was quite pleasant due to the sun's radiation. My feet never even got chilly. We had taped an extra piece of plexiglass over the windshield, but had no trouble with it frosting over, perhaps due to the fact that there were still quite a number of air leaks.

I didn't note our highest altitude because I thought we would be going higher, but Vera said that she saw 19,000 feet on her altimeter. As yet, we have not received the official barograph report so the story might be slightly different. We carried an extra barograph in the ship which Gus calibrated and according to this trace we attained an altitude of 19,500 ft ASL. This does not come anywhere near the altitudes that have been obtained recently at Bishop, but at least we were able to bring possibly two new international records to the United States —2-place feminine altitude gained, and absolute altitude, subject, of course to homologation by SSA., NAA., and FaI. We also learned that high altitude flights are entirely possible in this area; but the important thing to me is the enjoyment of seeing the cloud formations and the ground from several miles above the earth—record or no record.

ON SAILPLANES WITH AUXILIARY PROPULSION

by A. R. WEYL, A.F.R.Ae.S.

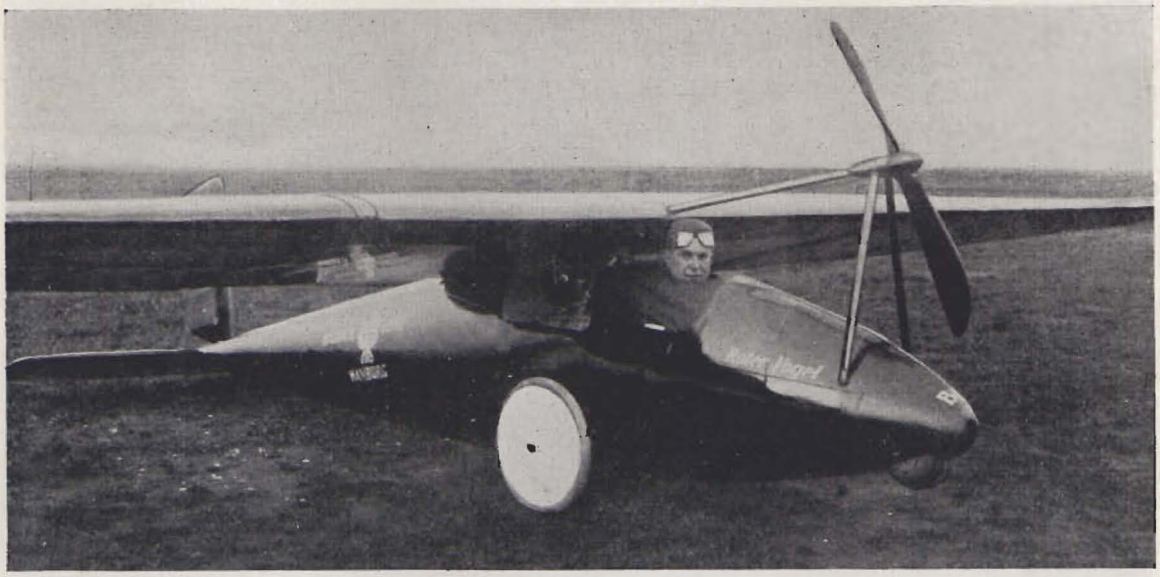
(Continued from Page 130)

Thermal-jet propulsion by means of *ramjets* (Lorin Ducts, or " athodyds ") looks ideal as far as simplicity and initial costs are concerned. However, to judge from our present experience, there is little hope for auxiliary propulsion of sailplanes.

The simplest form of prime mover and propulsive organ, the plain Lorin Duct, not only would be useless for take off, but also at the speeds which normal sailplanes are likely to attain. No possibility can be foreseen to improve upon this. It is the ram compression which matters, and this depends on the square of the speed of flight.

More prospective in regard to the generation of useful thrust at the speeds concerned is the *pulse-jet*, i.e. the propulsive duct with automatically operating inlet valves. But in this case, the operation is intermittent, and the duct becomes a producer of severe vibrations. Trials made in Germany with such pulse-jets fitted to normal aeroplanes, have indicated that they are quite unsuitable for sailplane propulsion too. Here again, the deficiency is fundamental, and no large improvements can be expected, unless a number of such propulsive ducts can be so coordinated as to give a reasonably balanced operation without undue vibrations. Such development can be visualized, but again it is doubtful if means will be available to do it.

Last but not least in our short survey is *rocket*



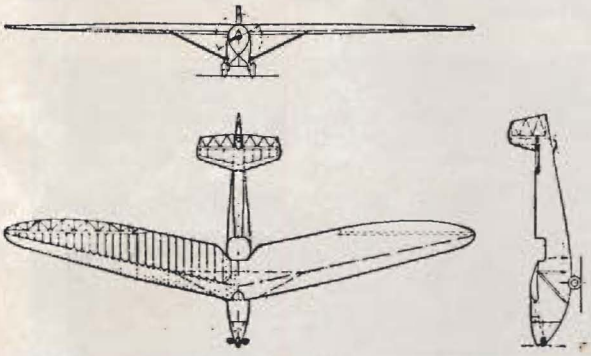
Balumur-Guenther "ROTER VOGEL" 1924.

14 h.p. (350 c.c.) Douglas engine partly submerged at c.g. Tractor airscrew geared by chain drive to long transmission shaft. Many power flights. No soaring attempts. Developed from Hanover H.G. Sailplane. (N.B. The two struts holding the 49" dia. airscrew and the propeller shaft is a steel tube of 14 S.W.G. Streamlined fine struts of approx. 1.4 × 0.5" dimensions.

propulsion. In spite of the horror felt by most soaring enthusiasts against the intrusion of rude fire-works into a noble and silent sport, this seems indeed the way which offers the greatest prospects.

The rocket provides any thrust which is needed, and at any speed. A submerged installation would practically give no additional parasite drag, when the propulsion is not acting. The rocket engine itself can be very light, and may be exceptionally simple. Moreover, it might be jettisoned after exhaustion of the propellant. The rocket can work without producing harmful vibrations; the thrust reaction is not harsh. Experimentation with sailplanes and gliders has proved all this.

When rocket propulsion is considered, one factor of operation becomes dominant, and this is the time during which the propulsion will have to be supplied.



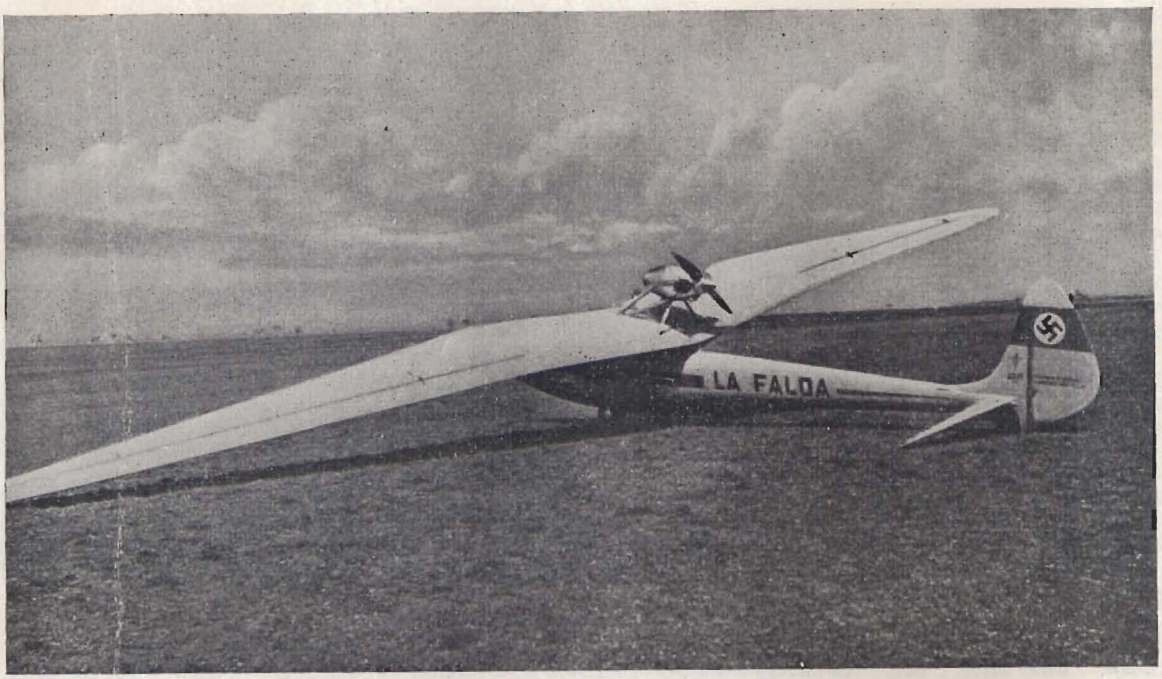
D.F.S. "Maikefer."

The second factor is the kind of thrust which is required. Both factors decide not only upon the nature of the rocket engine, but also if rocket propulsion is practical at all.

As soon as propulsion over a longer period of time is wanted, rocket propulsion is not applicable. In respect to propellant consumption, the rocket is wasteful. Even when the efficiency of the jet as propulsive means were good (which is *not* the case with an ordinary sailplane, but might be so with a jet-propelled airscrew), it must be realised that the rocket propellants constitute the *entire* mass of the jet (and not, as in a jet engine, the fuel added to a huge mass of the atmospheric air). Hence the weight and bulk of rocket propellant must be large, and the price high.

Rocket propulsion is, thus, only sensible when *short-time* operation is needed. It can be shown, therefore, that, for instance, it is far better to climb steep and fast whilst using a rocket engine, and that during flight, short bursts of high thrust are more economical than longer periods of operation. It is obvious that the use of rockets as auxiliary propulsion for sailplanes is basically different from all the other methods of power assistance we have previously mentioned.

As to the kind of thrust, we must distinguish between the "*one-shot*" rocket assistance, and the "*multiple-shot*" propulsion. The former means the facility of a sailplane to take off and climb under own power to a given altitude, after which the said aircraft turns into a sailplane pure and simple. In many instances, this is what is wanted first and foremost, in order to dispense with ground crews, winches and all the other impediments with which soaring is still



" *Motor-Condor* " (*Koeller* 18,5 *h.p.*) 1935.

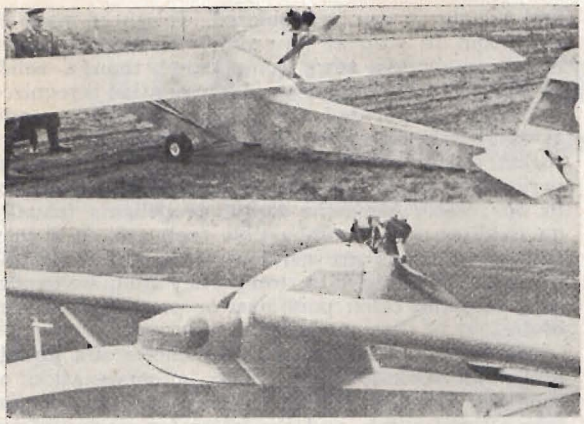
inflicted, and which renders the sport expensive and laborious.

The " *one-shot* " rocket engine could be very simple and cheap. No regulation of the thrust output would be necessary. Such a rocket propulsion device might be safely installed into any sailplane which is designed for aero-towing and winch-launching, because the strains imposed by the propulsion are not necessarily higher. Components aft of the jet (which contains flaming gases, and eventually, small burning particles) would need protection ; but in most cases, the thrust-giving device could be so installed that damage is unlikely. It is easily seen that the rocket has distinct design advantages over

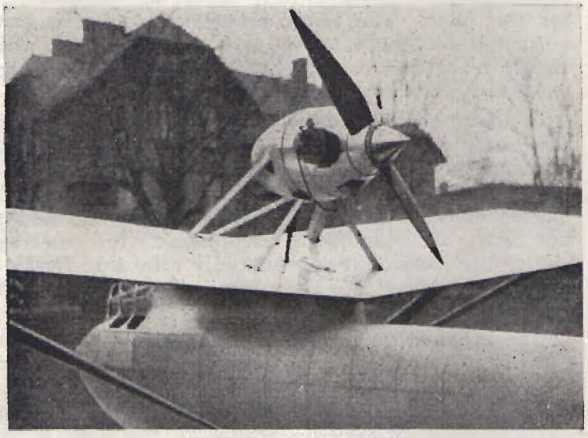


" *Motor Baby II* " 1936.





"*Kormoran 2a*" (1935).



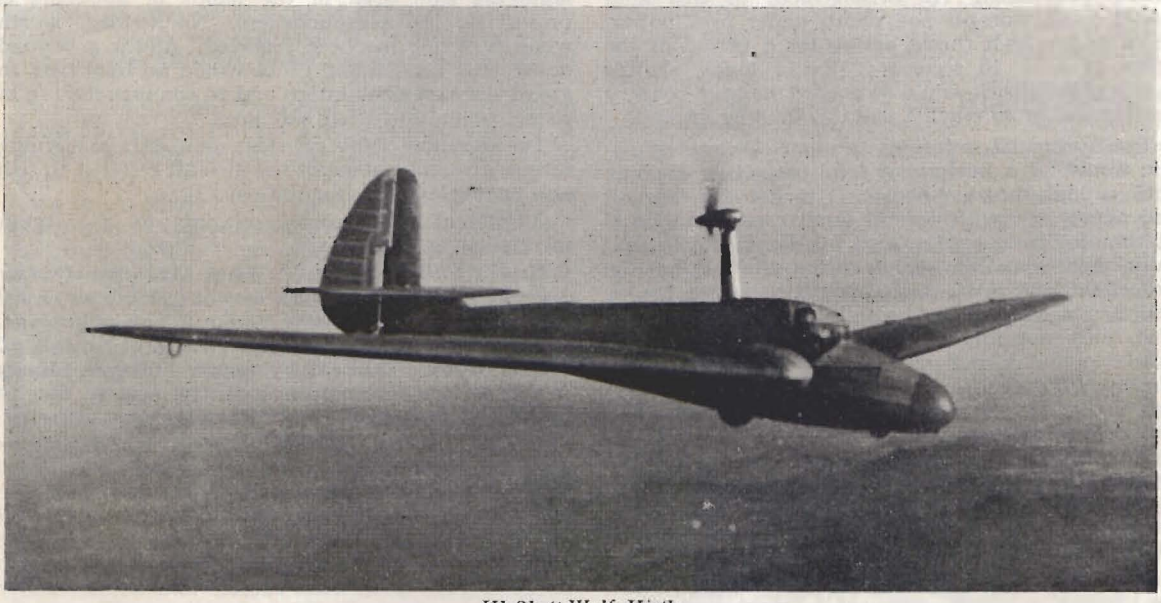
The "Motor-Condor."

the old expedient of piston-engine cum airscrew.

There is little doubt that, for single-shot propulsion only the *solid* (or plastic) propellant rocket or the steam rocket can come into consideration. The former relies on slow burning powders (*not* on the dangerous "black" gun-powder which has given rockets such a bad reputation !). The technique of such propellants is highly developed to-day, thanks to military experimentation, and there is little need any longer to be sceptical in respect to the reliability of such modern "fire-works." Even the precautions required for storage and handling are so simple, that informed amateurs might well deal with this kind of rockets. The major necessity is to take the outer temperature (of storage and of installation) into account. At elevated temperatures (in summer and in tropical regions), the gas pressures developed during burning are higher, and wider nozzles may have to be fitted for the same thrust ; in winter, the reverse is the case, and when the propellant is too cold, the rocket may become rather erratic and unpleasant. A detonation is little to fear, as modern thrust rockets are equipped with special devices to relieve excess pressures before a moment of danger occurs. More likely is damage to grass surfaces during take off, and eventually, to cause grass fires in dry periods. Proper installations should avoid such damage as far as possible.

Britain possesses a very good *safety* rocket propellant which is made by I.C.I., and which is already in wide use for model aeroplanes. At present, the disadvantage is still the price of this propellant. Few enthusiasts will be prepared to pay a couple of pounds for a rocket-assisted take-off and climb, when a winch-launch is charged at about 3/- a piece. It can, however, be foreseen that the propellant prices will come down too, when larger use is made of rocket propulsion.

A second possibility for powerful take-off and climb



*H*1-21 "*Wolf Hirth.*

offers the steam or "*hot-water*" *rocket* which the Germans have had under development with a fair success.

This is an application of the principle of the Ruths steam accumulator (employed as buffer supply with most electricity works, and also used for fire-less railway engines) : superheated water under pressure converts immediately into steam of high velocity as soon as the pressure is released. The steam jet thus formed gives a powerful jet reaction after emerging from a De Laval nozzle.

In Germany "hot-water" rockets were experimented with for the assisted take-off of bombers. Soaring enthusiasts also suggested them for sailplane take-off and climb (H. H. Koelle) : they shall be used with an oil burner to heat the water prior to the take-off ; the burner may be part of the installation, or better, belong to a detachable ground-servicing device. It has been proposed to utilize part of the torsion-taking nose of the wing as container for the super-heated water, and to discharge the steam jet from the wing.

Taken per weight of the propellant required for a given thrust and time, the hot-water rocket is about four times as heavy as a chemical rocket. Advantages are, however, cheapness in operation and simplicity (though solid-propellant rockets can be simpler still). In addition, the hot-water rocket is safer and more convenient in operation, as the jet constitutes neither a danger of fire nor forms poisonous or irritant fumes nor smoke etc. The propellant plain water is everywhere available and most convenient to handle. All these points might make such take-off assistance attractive for the soaring enthusiast. In addition, no development snags can be foreseen, nor could interference be expected on the part of powers-that-are.

A harder problem is that of the *multiple-shot* rocket propulsion. An arrangement of this kind would mean take-off and climb under own power, i.e. a rather high thrust acting for a period of the order of 5 to 15 seconds ; during flight, shorter bursts of less thrust would be needed for cross-country soaring and/or to reach a suitable landing ground.

Two principal solutions present themselves :— one would be a battery of solid-propellant rockets, with a high-thrust "booster" rocket for take-off and climb, and with several smaller rockets ignited at time intervals, as required by the pilot. Technically, there is no difficulty in such a solution, but the propellant load to be carried might be rather heavy, and may need a two-seater sailplane for installation. One must not forget that the best rocket engine available to-day consumes not less than appr. 17 lb. of propellant per pound thrust delivered, in one hour ; and that solid-propellant rockets are even inferior in that respect. Moreover, with a solid-propellant rocket, a regulation of the thrust is not a practical proposition, and that once such a rocket is ignited, it must burn to the end and supply all its thrust energy. Very often, that is not what is wanted by the soaring pilot.

The alternative solution is the rocket engine which works with *liquid* propellants. It is more efficient, and the thrust can be regulated. It can be made to work and to stop at any time. However, such a rocket engine is more complicated than a solid-propellant rocket, and the wider regulation is required the more complicated it becomes. In empty conditions, it is heavier too. The advantage that such a rocket engine could operate for longer continuous periods, for hours if necessary, is of little importance in our case. Also, the liquid propellants (usually an oxidizer and a combustible fuel) are, as a rule, substances which are neither convenient to handle by amateurs nor easy to store. They are quite expensive, too, and often poisonous or presenting danger of fire.

All this is not in favour of the choice of a liquid-propellant rocket engine. Also, a combination of solid and liquid-propellant rocket, the former for take-off and climb, and the latter for soaring glides and landing, would not seem practical from the point of simple and cheap design, whilst seemingly ideal for the pilot. The liquid-propellant engine is not very suitable for take-off and climb, because the thrust regulation cannot be extended over a large range, without introducing complications.

In the opinion of the writer, *solid-propellant rocket propulsion is immediately applicable to sailplanes and reasonably safe.* Excluding the piston engine and the airscrew, it should also be reasonably cheap. It would neither convert a sailplane into an inefficient glider nor into a second-rate areoplane : the soaring characteristics would be essentially retained. Best of all : such rocket propulsion might well be installed into existing sailplanes.

The attitude of the Authorities against this form of auxiliary propulsion will, of course, exert decisive influence. There is no longer a sound reason to apply all the provisions of the Explosives Act so as to exclude practical experimentation in this domain by soaring enthusiasts. That present-day rocket propellants are safe even in the hands of amateurs is proved by the aero-modellers. No accident worth while recording has been reported. And it is beyond doubt that the Gliding Clubs would do their best to guard the experimentation and to conduct the use of rocket propulsion along safe lines.

The adjoining Table provides some data concerning former attempts, some of the aircraft referred to will also be displayed in illustrations.

Additional information relating to the types mentioned, is as follows:—

Ksoll "Galgenvogel II" : 5 h.p. ILO (two-clyinder 2-stroke, 296 ccm. ; 33 lb. weight ; 5 h.p. at 3,000 r.p.m.). Tractor airscrew ; engine in nose of fuselage. Strut-braced, tapered wing. Two large wheels of narrow track. Take-off by bunjy. Flew in Rhoen and Rossitten Competitions. Little success due to insufficient power.

Martens "Max" :—Same engine, but cantilever wing, and undercarriage with three semi-submerged football wheels. Engine installed in front of the leading edge of the wing in front of the pilot ; tractor airscrew with shaft drive, above fuselage, can be swung directly by the pilot when sitting in the cockpit. Flew with little success and needed bunjy take-off.

ULTRA LIGHT AIRCRAFT ASSOCIATION

BULLETIN VOL. 4. No. 2.

A MONSTROUS IMPOSITION.

THE Budget proposal to increase the tax on petrol by a further ninepence a gallon must surely be the last straw to all those in the Private Flying movement who have struggled so hard to keep going during the past five years.

The Association, along with other bodies which represent all aspects of Civil Flying must make its protest against this imposition. Sir Stafford's proposals have already been openly referred to as a Railway Budget and we must hasten to agree most heartily with this description.

The Government have often proclaimed the principle of fair shares for all in the matter of rationing. But there, apparently, the principle ends. When it comes to contributing to the upkeep of the country the principle is not applied. If it is, then why should those who indulge in sporting flying be made to bear a double or even a triple burden ?

The flyer pays his income tax the same as the next man. In most cases, for he usually has to have a car or motor-cycle to reach his flying field, he pays his ninepence a gallon increase along with every other motorist, but to have to pay it again for the purpose of flying his aircraft is really too much to ask.

It is ironical when one pauses to reflect that the wheel has turned full circle. Subsidies to lower the cost of flying have been sought in vain during the past five years. The Clubs have become resigned to struggling along without it. But now ! To be asked to subsidise the Railways—for that is what it amounts to, and no amount of argument or Parliamentary denial will convince us to the contrary—is surely the ultimate insult to an already injured movement.

We would hesitate to suggest that the Government wishes to kill the Private Flying movement, but it certainly is going the right way about it if that should be its object.

We would predict that the financial strangulation of Private Flying will be the outcome of this imposition if the folly is persisted in. The loss will not only be ours—the whole nation—yes, even the whole world will be the poorer for it. The Association has never agreed with subsidies for flying—but still more vehemently do we oppose the idea of Civil Flying subsidising Rail Transport.

REPORT ON THE FOURTH ANNUAL GENERAL MEETING.

The Fourth Annual General Meeting of the Association was held at the Royal Aero Club Aviation Centre, Londonderry House, Park Lane, London, W.1., on the 29th April at 3.00 p.m. There were some fifty members present, including representatives of five affiliated Groups. The Executive Committee were especially pleased to see so many members from such long distances; in particular, four members of the Cardiff Ultra Light Aeroplane Club were present and Individual Members from as far afield as Leicester, Isle of Wight and Devon.

The Chairman of the Executive Committee, Group Captain E. L. Mole opened the meeting by welcoming the President of the Association, Mr. Peter Masefield. He referred to the Trophy generously offered by the President for the most efficient affiliated Group. This, he said, was to be awarded at each future A.G.M. to the winning Group, the decision being based on their performance during the preceding year ending on the 31st December.

The Chairman welcomed the affiliation of three new Groups since the last Meeting, but he regretted the winding up of the Aerotech Group at Filton which had been most enterprising in the design aspect. Although the Association's Group membership had increased, he had to report a fall in individual membership, details of which would be given in the Hon. Secretary's report. This fall was only to be expected until the Association had something concrete to offer members in the form of new aircraft designs, and kits of parts for home construction. The Chairman thanked all those individual members who had remained with the Association for so long despite disheartening slow progress. He felt confident that their loyal support would enable useful results to be shown before long.

Since last year there had been considerable progress in the design and construction fields, but the Ultra light movement was still held up by the lack of a suitable engine in production. However, the Chairman added, there was good reason to believe that this bottle-neck would soon be overcome.

Of special interest to the growing number of would-be home constructors is the " Britten-Norman " elementary single-seater aircraft specifically designed for this purpose. The Chairman confidently expected to see the prototype of this interesting venture flying this summer, and he congratulated Mr. Britten on his energy and drive in getting on with his project so rapidly. Great developments were anticipated in the ultra light movement when his aircraft had passed its tests, and kits of parts became available to home constructors.

The Chairman reported the failure of the Motor-Tutor scheme. Six of these aircraft had been offered to the Groups by the courtesy of the Kemsley Flying Trust on a very reasonable pay-as-you-fly plan, but only one Group had accepted the offer. The scheme had caused the Executive Committee a considerable amount of work, and he expressed his regret at the disappointing result.

During the past year, the Association had acquired two aircraft. One, a " Martlet ", had been generously presented by Mr. Billy Butlin. It had been

transferred to the South Hants. Ultra Light Air Club owing to their special interest in it—their Vice-President being Mr. George Miles, the original designer and builder of the machine. The other aircraft was the " Zaunkoenig," that interesting ultra light single-seater of German design and construction, which had been bought from the Ministry of Supply together with two spare 50 H.P. " Zundapp " engines for the token sum of £40—thanks largely to sponsoring from our good friends in the Ministry of Civil Aviation. This aircraft is being operated on behalf of the Association by the experimental Group at Redhill Aerodrome, and all members suitably experienced are welcome to fly it on payment of the standard fee. They should approach the Group for particulars.

The Chairman announced with pleasure that the Association's Gold Badge for the year 1949 had been awarded to Mr. Peter Gooch for his outstanding flight in his " 36 HP Aeronca " on the occasion of the Spanish Air Rally. Carrying a passenger, luggage and an over-load fuel tank, he completed the mountainous course without incident, and did much to arouse interest in the ultra light cause. The Chairman also congratulated Mr. Tony Cole on his splendid effort in gaining second place in last year's King's Cup on his amateur re-constructed "Comper Swift."

The Association's gratitude was expressed to the Royal Aero Club for permission to use the Library in Londonderry House for the A.G.M. and for making an office available at nominal rent in Londonderry House which enabled the Committee Members to get together two evenings a week.

The Executive Committee had suffered a serious loss in the retirement of Mr. R. W. Clegg from the duties of Chairman and Hon. Sec., but the Chairman was glad that his services had been retained on the Committee as Chairman of the Communications Sub-Committee. The duties of Hon. Sec., had been taken over temporarily by Mr. Maurice Imray, despite pressure of private business, and he had found that the volume of work necessitated the formation of a Secretariat consisting of several volunteers. The Chairman welcomed Mrs. Lindsay Neale, who had served as Deputy Hon. Sec., for the past eight months and now offered to stand for election as Hon. Sec. He also welcomed Mr. H. L. Pitt, who had proved a tower of strength on the Construction Sub-Committee, and to Mr. M. Macdonald who had enthusiastically taken on the Operations Sub-Committee on the resignation of its previous Chairman, Mr. I. G. Imray. Both Mr. Pitt and Mr. Macdonald were offering themselves for election as Chairman of their respective sub-committees. Finally the Chairman expressed regret that Mr. Geoffrey Dorman had had to resign from the General Purposes Sub-Committee owing to pressure of other work; Mr. Maurice Imray, he was glad to say, was standing for this post—which was an extremely important one, as it concerned the organisation of rallies and other functions, and liaison with Groups.

In conclusion, the Chairman thanked all members of the Executive Committee for their hard work during the past year. He felt confident that before very long their efforts for the ultra light cause would be rewarded by a rapid growth of the movement now that a suitable aircraft and engine were at last in sight.

The Chairman then called upon the Hon. Sec. to make his report.

Membership of the Association.

There were 160 Individual Members and 12 Affiliated Groups with approximately 400 members. 4 New Groups formed and affiliated during the year, but we regret that one, the Areotech Group at Bristol, has been disbanded.

Materials—J.A.P. Engines.

Mr. Bianchi has taken over from Mr. Rose-Dale, after Mr. Rose-Dale had to give up. Production is now going forward steadily and engines are coming off in numbers. The price has been revised upward to £60 for members.

General.

In a personal statement, Mr. Imray said :

" In placing my resignation before the meeting, I do so for two reasons. Firstly, lack of time to devote to secretarial duties during the week, and my wish to undertake organisational work (as General Purposes' Chairman) ".

Swansea Rally.

He is devoting most of his energies in the immediate future to organising the Association's side of the joint Rally with the Swansea Club, together with Mr. Macdonald.

Full support is asked of the members.

Ulair Limited.

Draft Memorandum Articles of Association are ready—but it was felt desirable to hold over to this meeting in view of the resolution in respect of non-ultra light Groups and our attitude towards them. Thus, any changes necessary in our articles and terms of reference can be made without difficulty.

Masefield Trophy.

The Chairman has dwelt on this point and Draft Regulations will be discussed by the General Council after the A.G.M., as the matter is peculiar to Groups.

Report by the Chairman, Design Sub-Committee.

The Chairman of the Design Sub-Committe, Group Captain E. L. Mole, stated that during the past year there had been a considerable amount of aircraft design going ahead : in all, he was in touch with fifteen aircraft design projects, of which three had already flown and three more were nearly ready to do so. The bottle-neck to progress was, as before, the lack of a suitable engine in production. Intensive efforts had been made to get engine firms to undertake the development of a 50 hp. engine, but nearly in every case they had been reluctant to risk their capital until an assured market was available. The market, of course, was unlikely to arise until the engine was available !

He had been fortunate, however, in persuading the Coventry Victor Motor Co. Ltd., to convert their existing Neptune engine for our purposes. This is a 1½ litre air-cooled flat four, which developes 40 h.p. at 3,100 r.p.m., and is already in quantity production.

Three prototypes of this engine are being prepared for flight trials, and they will cost about £100 each. Subsequent engines will be modified to make them lighter—they will probably weigh about 130 lb.—and they will be increased in power to 50 h.p. They may then cost nearly £150 each, but unlimited quantities will be available from the production line.

The position of the other engine projects which he had followed up was described by Group Captain Mole as follows :—

"*Zundapp.*" This was considered the ideal engine for ultra light aircraft purposes, and efforts had been made with two firms to get the engine produced over here. For reasons which Mr. Weyl will describe, no success has so far been achieved.

"*Marwyn.*" Messrs. Marwyn (Bournemouth) Ltd. are scheming out an engine design which will utilise as many motorcycle parts as possible. This will be of special value in replacing the 36 h.p. "Aeronca JAP" when our stock of these engines run out.

"*Vincent H.R.D.*" This 1 litre Vee twin motorcycle engine has been studied by Fairey's with a view to conversion for their "Junior". Though quite promising, no action has continued.

"*Ula*". This is a 45 h.p. flat twin project of extremely simple design, which the head of a well known motorcycle firm had promised to develop for the ultra light aircraft movement. Unfortunately owing to his continued absence abroad, it has been indefinitely delayed.

As regards the aircraft design in hand, Group Captain Mole gave the following details of the most promising projects :—

"*Motor-Tutor.*" The flight trials had been delayed for various reasons (not connected with the design of the aircraft), but the firm were confident that the C. of A. should be through by the end of May. Plans were in hand to make kits of parts available to amateur constructors.

"*Fairey Junior.*" The Mikron-engined prototype had been at Boscombe Down for test, where it had earned an excellent report. No plans for production of this attractive design are known to us, and the firm are probably still awaiting the availability of a suitable engine.

"*Dart Kitten*". The Dart Aircraft Company are well ahead in getting a prototype ready for C. of A. trials. This will be powered by a 36 h.p." Aeronca JAP" engine, with which the aircraft flew well before the war. When trials are over, the firm propose to make drawings and kits of parts available to home constructors.

Hants and Sussex "*Herald*". This is an interesting low wing tricycle monoplane, powered by a 36 h.p. "Aeronca JAP" engine. The prototype was nearly ready for flight test, when progress was delayed by the need for a minor design alteration which is in hand.

"*Britten-Norman Bn-1F.*" Progress on this prototype has gone ahead in almost record time, and it is expected to fly early this summer. The machine is an elementary single-seater parasol monoplane designed specially for ease of construction, and powered by one of our 36 h.p. "Aerona JAP" engines. When the C. of A. has been obtained, Mr. Britten plans to make kits of parts available for home construction.

"*Two-Seater Trainer.*" At the last A.G.M. the Association was requested to sponsor the design and development of a two-seater trainer. We drew up our specification requirements for this, which were published in the Bulletin last October, and a project is going ahead on this basis controlled by Mr. F. C. Kirkpatrick, Apprentice Supervisor at Messrs. Short Bros. and Harland Ltd. The firm's apprentices and their A.T.C. Squadron were designing the two-seater, and intended to build a prototype for flight trials. We had agreed to lend them one of our spare 50 h.p. "Zundapp" engines for the purpose.

"*Hoppicopter.*" This is an American design of single-seater helicopter with twin rotors, of extreme simplicity, and powered by a 50 h.p. engine. Messrs. Marwyn (Bournemouth) Ltd., are developing the design over here, and have installed a modified "Triumph Thunderbird" motorcycle engine very neatly into it. Flight trials have commenced.

"*Chilton*" This pre-war high performance type of ultra light aircraft, which was most successful, was being re-designed by the College of Aeronautical Engineering at Redhill aerodrome as an exercise for the students, and a prototype of an improved "Chilton" was to be built for flight tests. We have lent the College one of our "Aeronca JAP" engines for the purpose. The design and stress analysis is now well advanced, and we hope that the construction of the prototype will soon begin.

"*Ulap.*" This is the Dart Aircraft Company's scheme to provide the simplest and most robust elementary primary type suitable for amateur construction and to provide safe flying for less experienced pilots The firm are hoping to build two prototypes for flight trials, powered by 36 h.p. "JAP" engines. The design had a special function of interest to our movement in that it was suitable for solo-training trials which we were anxious to carry out to settle once and for all if this system was practicable. When the aircraft had obtained its C. of A. the firm propose to make kits of parts available for home construction at a very low cost.

In conclusion, Group Captain Mole mentioned Lord Ventry's "ultra light" airship project which had been described in the Bulletin last January. This, he had heard, was coming along extremely well. It had a capacity of 45,000 cubic feet, and would be capable of carrying 5 or 6 people for short flights. Its maximum endurance should be about 10 hours. The cabin, with 75 h.p. Salmson engine installation and control surfaces were completed, and the envelope was being prepared for the assembly.

(To be concluded)

THE BRITISH GLIDING ASSOCIATION

NATIONAL GLIDING CONTESTS, 1950

To be held at GREAT HUCKLOW, Derbyshire, JULY 22nd to 30th inclusive

Herewith a list of the entries for the National Gliding Contests, as passed by the Selection Committee of this Association on the 20th June, 1950. The Organizers are prepared to accept five more Late Entries.

The following points of interest will be noted :

1. For the first time in the National Contests there are five two-seater gliders entered.
2. The services are represented by two entries from the Royal Naval Gliding and Soaring Association, one entry from The Army Flying Club, two entries from the Royal Air Force (Bomber Command and Maintenance Command) and five entries from the Air Training Corps.
3. Of the four pilots flying in the British Team at the International Contests in Sweden in early July, only Philip Wills is able to take part in the National Competitions, as the others are not able to spare further time from their jobs.
4. There are 3 machines, and 72 pilots, one of whom is a woman.
5. There are twelve entries from civilian clubs.
6. A high percentage of the pilots have not flown previously in National Contests, and this should make a particularly interesting Competition.

A. KINLOCH. *Secretary*

LIST OF ENTRIES FOR THE NATIONAL GLIDING CONTESTS 1950.

	Entrant and Team	*Type of Glider*
1.	T. Rex Young Plus three other un-named pilots	EoN Olympia
2.	P. A. Wills	Weihe
3.	A.T.C. Entry 188 Gliding School L. Redshaw	EoN Olympia
4.	Frank Foster P. A. Lang	Rhon Bussard
5.	Imperial College G.C. F. G. Irving Miss M. Gilbert P. Murden	EoN Olympia Mk. II
6.	H. K. Cartwright G. Lee	EoN Olympia
7.	Newcastle G.C. A. Coulson S. C. O'Grady	EoN Olympia
8.	Surrey G.C. W. A. H. Kahn D. Brown	Weihe
9.	H.G.C. Buckingham Bomber Command R.A.F. Team F./Lt. Archbold F/O. Latham F./Lt. Robius F./O. Page	EoN Olympia
10.	Surrey G.C. P. Blanchard A. Deane Drummond W. Jordan G. Gregory	EoN Olympia
11.	A.T.C. Entry 146 Gliding School F./Lt. Anderson H. B. Sadler	Rhon Bussard
12.	Derby & Lancs. G.C. R. C. Roper	Gull I
13	Surrey G.C. T E. H. Beck L. J. W. Hall R. S. Hooper	EoN Olympia
14.	Bristol G.C. K. W. Turner C. Staffurth	EoN Olympia
15.	The Army Flying Club R. Swinn L./Col. Dickson	EoN Olympia
16.	W. T. Fisher S. Feeves D. Fletcher L. Zeyfort	EoN Olympia
17.	A. de Redder S. C O'Grady	Petrel
18.	A.T.C. Entry 89 Gliding School F. R. E. Hayter P. J. Squelch J. C. Allan G. F. Ball	Sedbergh Mk. I. T21 B
19.	A.T.C. Entry G. W. Charman Thomas	Sedbergh T21 B
20.	London G.C. C. A. P. Ellis John Hurry A. E. Rowley	Gull I
21.	London G.C. G. H. Stephenson	EoN Olympia
22.	A.T.C. Entry 65 Group R.A.F. E. Erdman H. R. Watson B. Gould W. Watson	Prefect
23.	H.C.B. Buckingham, Maintenance Command R.A.F. Team S./Ldr. A. A. J. Saunders F./Lt. Meidzybrodski	EoN Olympia
24.	Cambridge G.C. J. H. Edwards J. Grantham T. G. Phillips F. R. Ward	Kranich
25.	Cambridge G.C. B. E. Bell A. L. L. Alexander D. R. Clayton D. L. Martlew	EoN Olympia
26.	A.T.C. Entry 64 (N.R.) Group, R.A.F. H. Neubroch G. Furniss G A Hinchcliffe W. D. Campion	Grunau B
27.	Royal Naval Gliding & Soaring Association L./Cmdr. G. A. J. Goodhart L./Cmdr. H. C. N. Goodhart	Mu 13a
28.	Royal Naval Gliding & Soaring Association L./Cmdr. H. C. N. Goodhart	Kranich
29.	A.T.C. Entry 203 Gliding School R. J. Browne D. B. Hamilton	Gull I
30.	D.H.G. Ince	EoN Olympia

NEWS FROM THE CLUBS

VICTORIAN MOTORLESS FLIGHT GROUP

Flying Diary

Saturday, May 6th. Overcast, with low scud. Wind west 10 m.p.h. down to 5 m.p.h. 15 flights. The long period of fine, warm weather broke temporarily this week-end and, on both days, occasional showers sent people scurrying under wings. Flying commenced at 14.30 hrs. in " Coogee," with John, Mike and Grace popping merrily in and out of cloud; on Mike's second flight, " Coogee " entered cloud at 600 feet, the drogue came whistling out on the cable, but Mike and " Coogee " did not re-appear for four minutes. The clouds lifted considerably later and the " Rhon " was towed out. Ron, doing the check-flight, reported sheepishly that at the top of the launch, he put out an absentminded finger to tap the non-existent altimeter on the non-existent instrument-panel, being mildly alarmed to find himself tapping space. Stewart Moyes, after a couple of S turns, proceeded rather splendidly to his first circuits. On his last flight, he landed the " Rhon " to instructions some three hundred yards from the hangar and then exuberantly pulled it single-handed the rest of the way. Technical Committee (Ron Roberts, Geoff Richardson, Les Williams) had been on the job during the afternoon, going over club gliders with the proverbial fine tooth comb, amusing themselves by announcing various shocking and fictitious (we HOPE) discoveries, such as borers in " Coogee."

Sunday, May 7th. Overcast, periodical, low, junior fronts sweeping by. Wind, south 5 m.p.h. In the morning, we did various wet-day jobs and also replaced one thousand feet of cable. A parachute was being fitted and some malicious amusement was afforded your correspondent who was able to inform Derek, Ron and Mike that they had half-way completed attaching the chute to the piece of cable which had just been discarded. A leisurely lunch in the hangar, for a change, then flying started at 15.00 hrs. 25 flights in " Coogee " " Kestrel " and " Rhon." The Victorian Rowing Association was entertaining inter-State oarsmen at the Showgrounds and large numbers of them visited us. Rather unnerving to look up after fastening the harness and discover " Coogee " surrounded by at least fifty tall, handsome young men. These boating types were refreshingly intelligent about soaring, having a quick understanding of construction and control and being particularly interested in the use of the rudder. Longest flights for the afternoon—Bill Iggulden in " Kestrel," 9½ mins.; Grace Roberts in " Coogee," 10 mins. On her second flight, Grace left her heavy boots on the ground, intending to fly in socks. Ron carefully tied a boot to the lower end of each strut, much to the pilot's wrath, whose flight was prolonged by one of the little fronts, enjoyment being somewhat marred by the knowledge that her boots were rapidly filling with rain. People on the ground seemed to be slightly convulsed by the sight of " Coogee " bumbling solemnly along, containing a pilot who had seemingly kicked her way out of the fuselage to prove that sailplanes don't really need rudder control. Charlie Berwick circuited the " Rhon " and Alex Hogan did beautiful straights. On the last flight of the day, Ron tried very hard to spin " Coogee " but she continued her attitude of cow-like placidity and flatly refused to co-operate.

Saturday, May 13th. It was drizzling everywhere but at Berwick and only two optimists turned up to fly. One, being an Honorary Member of the Beaufort Club, spent the afternoon with them painting iron; the other, not being such a member, spent the afternoon lying on a stretcher reading.

Sunday, May 14th. More drizzling rain and very low cloud kept us on the ground until 11.49 hrs., then we flew " Coogee " and " Kestrel," 25 flights, in rather turbulent conditions, unsuitable for training until too late an hour to get the primaries out.

Saturday, May 20th. From low cloud, flat calm, to clear sky and slight southerly. Flying started at 13.00 hrs. 17 flights in " Coogee " and " Rhon." We heard a lady spectator say, after peering into a cockpit, " But what have you GOT in there that pulls you up like that? "

Sunday, May 21st. Busy day, with " Coogee," " Kestrel," " Rhon " and " Heron " doing 40 flights. Sky overcast again, ceiling about 1,100 feet, flat calm. After the first few flights, a light westerly came up and we had to change everything round. Clouds broke up and rose higher. Ron Roberts, in " Coogee," 22 mins, 900 feet to 1,100 feet; Bill Iggulden in " Kestrel," 15½ mins., 850 feet to 1,400 feet; Viv Drough and Jack Iggulden had 9 and 10 mins. respectively. Ron Simpson had his first ground-slides and did very well; Graham Wycherly back in the training group again, doing slides on the " Heron " and visibly glowing with enthusiasm. Graham is the answer to an instructor's prayer for a good time-keeper. Alan Head and Alan Patching carrying out more radio tests. So far, tests with radio in " Kestrel " have proved successful; sets will be fitted later to " Coogee " and " Golden Eagle." Walking over to the hangar to get some food, your correspondent blanched to hear a sepulchral voice chanting, " One, Two, Three, Four," looked wildly around and saw no one, " Five, Six, Seven," decided it was the voice of doom counting her out, " Eight, Nine, Ten," heard the cat-cry of the " Kestrel " cornering and looked up to see Bill carrying out radio tests some hundreds of feet up.

Saturday, May 27th. With sth/west, 3 m.p.h., cloud 4/8 st. cu. 17 flights in " Coogee " and " Kestrel," with no one arriving to fly primaries.

Sunday, May 29th. One of the most exasperating days in Group, or pre-Group, history. A slight drift from the south, first, so John Day was launched in " Coogee " but could scramble to only 600 feet, where the " Coogee," being released from the cable, assumed the gliding angle of a brick and put down on the ground again within two minutes. John reported very rough

conditions. People arriving, reported a howling northerly to Dandenong and an uncanny calm behond it. Two windsocks, a thousand feet apart, began to blow gently towards each other. We waited for a while, then started our first move, as a northerly seemed indicated. By the time winch and glider met in the middle of the runway, the wind was blowing from the south. Your correspondent suggested, as three windsocks suddenly began blowing in different directions, that confusion would be less if all socks were pulled down. Derek Reid, Duty Instructor for V.M.F.G. and Ron Roberts for Beaufort, met frequently and fruitlessly. Next decision was to move to the main diagonal runway, taking off into the north-west. Grace Roberts about to be launched in " Coogee " when the wind came in from the south-east. After waiting a few minutes, we decided to try it anyway. " Coogee " mushed up to 400 feet, then seemed to strike a headwind and rose quickly to 900 feet. Pilot's main job was to try and locate wind direction. In oddly gusty conditions, slight intermittent lift was contacted and the flight prolonged for 9 mins. Wind seemed to be from north-west but at the same time, two columns of smoke over Berwick were observed bending chummily towards each other. Derek flew next, but could get only 700 feet, the winch almost popping herself apart with the strain. Six vehicles met in the middle of the field and people from both clubs tore their hair and finally decided to reverse positions once again, flying into the lower south-east wind. The " Whippet," tired of all the hoo-haa, blew her front nearside tyre again and four of us went into the hangar, seizing the opportunity, too, to brew a cup of tea. By about 15.00 hours, the wind had swung more to the north-west, so gibbering, we changed again. Result, 20 flights in " Coogee," " Kestrel," " Rhon " and " Heron." Yet we managed to get a lot of laughs out of the day, especially when a small boy said to his cobber, " Hey, what's that ? " as the primary took off, and the other small boy answered, in a bored voice, " Oh, I think it's just a glider that's fallen to bits."

Total flights for May—157.



A composite photo of The London Gliding Club

News from Inter-State and New Zealand

Not long ago we had the pleasure of meeting Herb Tyson of the Northern Tasmanian Gliding Association, who spent a day with us at Berwick. Now the Hon. Secretary of that club has written to say that someone must have given Herb an injection of glider-bug while he was there, as, since his return, he has already constructed the jig for building 'Dagling' wing ribs and, " in his mind's eye the final coat of varnish is already being applied to the machine." With about twenty keen members, things are moving in the club and they hope the 'Dagling' will be ready in the Spring, then they will start building a " Grunau." Some time in the future, the Tasmanians say, they will pay us a visit and perhaps offer some friendly competition. Let's hope that time is not too far away. It would certainly give us great pleasure.

The latest copy of the *Gliding Club* of Western Australia's newsletter reports that Ric New did his first cross-country with the " Kestrel " recently, landing on Mount Lawley Golf Course, eight miles from the airstrip, having reached 3,000 feet en route. Easter was a hectic time for the W.A. people, as their tow car broke down on the day before Good Friday. A terrific effort (in which we note the name of Harold Luckly) had it ready for action by late Friday. During the Easter Camp, the " Wren," " Grunau," Kestrel," " H-17 " and " Rhon " were flown.

We've received copy number one of the Adelaide Soaring Club's (late Gliding and Soaring Club of South Australia) official organ, *Towline*, which tells of thermal soaring at Gawler, of the club altitude record being broken three times in one day and of the club duration record eclipsed twice. Pilots—Brian Greer, Ray Duke, Alan DeLaine. Among other interesting things, there's an article on " Thermal Soaring by Dr. Fritz Loewe." Copies of *Towline*, at 6d. each, could be ordered from Brian Greer, of 9, Main St., Richmond, South Australia, or through *Gliding Angle*.

Jim Harkness, of Auckland, New Zealand, writes to tell that a local firm has taken an agency for " Slingsby " and the " Tandem Tutor " is available in kit form for £440. Two clubs have already placed orders while an individual pilot is importing a " Prefect." The Auckland Club is raising money and this is how they're doing it. (Heaven help them). It seems that each member must make himself responsible for the raising of £30 and members are doing house painting, drive laying, section levelling, lawn laying and gardening, proceeds going to the club. (These four lines will be carefully deleted from our Committee Members' copies of *Gliding Angle*, so you may relax again). The " Hookings-Court Olympia " is flying most week-ends and proving very popular with the crowds. Jim remarks that, as one of its guardians, he has been asked the horrible question which he thought emanated from the pen only, " Where is the Motor ? " (You ought to spend a few week-ends at Berwick, Jim !) He was also asked—" Say, Mister, why do people go so crook when you blow down that thing in the front ?" Says Jim—" From what I gathered in the subsequent heart-to-heart talk, I consider that Arthur Hardinge would have liked to have that youngster alone for a little while." On a recent flight in the " Olympia ", Gordon Hookings found himself under a 20 f.p.s. cloud street running across the Island—unfortunately, the Island at that point is only 12 miles across, so Gordon couldn't get away. Jim relays a message from Ralph Court, sending kind regards to our Derek Reid, who taught Ralph to drive a winch while in England.

From Ashburton, N.Z., news from Mr. J. Evans, who is building a " Kestrel " He hopes to be ready for test flights about August, providing " Kestrel " is O.K.'d by various authorities. Sounds rather formidable — Civil Authorities' N.Z.G.A. Technical Committee, Local Supervisor, C.A.B. Mr. Evans adds a compliment about Arthur Hardinge—" He certainly did a great job here ; to tour this country, a stranger in a strange land, and come out with flying colours as he did, was worth a V.C."

Farewell, Yellow Witch

With the selling of the " Yellow Witch " to the Waikerie Gliding Club, our association with Australia's most famous sailplane ends. Those of us who were close to Arthur Hardinge during the three years' construction and the test-flying of the " Olympia " and, later, during the time when he toured New Zealand, know well the great strain he was undergoing. He and the " Yellow Witch " have written a chapter in gliding history that will not be forgotten, nor will those of us who were at Berwick when she flew there forget her. To some of us, no other sailplane will ever be quite as beautiful as the " Witch," nor possess her grace and elegance.

The results of that tour are obvious in the news now coming from New Zealand and I don't think any New Zealander will dispute the part played by Arthur and the " Witch " in the changed attitude of their Civil Aviation Board and in the revitalising of soaring in New Zealand. We had all hoped that, with the tour safely concluded, Arthur could have settled down to some well-earned, happy and care-free flying with the " Witch " at Berwick. I have received many enquiries from Inter-State and overseas—" Why did Arthur sell the ' Witch ' ? " I don't think he will mind my saying that the carrying out of the New Zealand tour, in the face of terrific difficulties and setbacks, demanded a toll of him, a toll that was paid physically, mentally, and financially It is a sad, sober fact that to-day, enthusiasm, energy and skill are not enough if one wants to do really worthwhile soaring. Hard, cold cash is necessary, too, in greater quantities than the average working man or woman can hope to accumulate.

We know that the Waikerie boys will achieve great flights in the " Yellow Witch." We wish her long life, her pilots happy hunting. Look after her well, chaps, she's a great and honoured lady.

THE SCOTTISH GLIDING UNION.

Since our last report, and since the dark thunder clouds of directorial disapproval have temporarily at least rolled away from this column, there have been two major happenings at Balado as well as several minor events. Towards the back end of April we took delivery of a " T21B ", as an aid to training and an incentive to soaring. Having been duly admired, patted and otherwise caressed, it was put

to work and has scarcely been out of the sky since—necessarily so, as those who are acquainted with the very hard facts of glider finance will appreciate. So far its uses have been threefold ; to train pupils in the elementary stages of flying as a supplement to the sturdy S.G., to pass out the more experienced members as first pilots, and to take a few of our admiring audiences on propaganda cum pleasure trips.

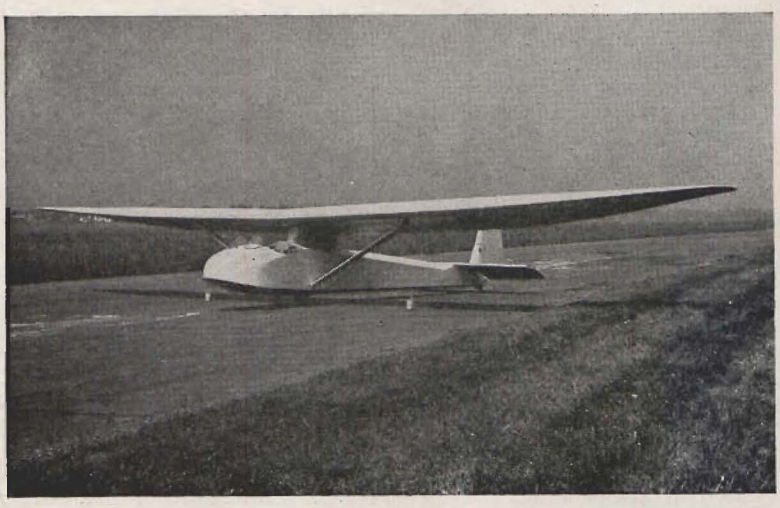
The audience has come along with the second major event, the abolition of petrol rationing. The cars stream out from the nearby Fifeshire towns, from Dundee and from Edinburgh on any flying afternoon. And particularly at the week-end, when they collect in and around the airfield in considerable numbers. The Secretary, as a result of their interest, can now only be found on Saturday and Sunday afternoons buried amidst a host of eager enquirers, and we can only gaze in wonder at his patience and magnificent aplomb.

In combination with the 'S.G.' and "Cadet" there have been as many as 130 launches during week-ends of favourable weather, and on these occasions many and desperate have been the attempts to catch elusive thermals. The " T-21 " and our other white hope, the " Olympia," have been particularly prominent in their efforts, but as yet their persistance has had no reward. But that the stuff is there is beyond question, as Duncan Aitcheson proved the other week. In a humble "Cadet." from a launch of a mere 600 feet, he reached a height of 1,700 feet and happily maintained this altitude until, unfortunately, he decided to give some one else a chance of glory. Our principal difficulty is to get the right people in the right aircraft at the right time. On this occasion, as a case in point, the " Olympia " was down at Edinburgh's Macmerry airfield, whilst the " T-21 " was not at that time ready to be flown.

But if Balado has been in its customary mood of tempt and tantilise, delight and denial, Bishophill has once again come into its own. It is with pleasure that we report the steady and successful exploitation of this magnificent site. Using a " Cadet," the old hands have spent many hours in recent weeks flying from the plateau that is its peak. And new hands have gained the " C " certificates for which so many have waited so long. Bertie Brown and George Whyte, two long established members of the club, were the first to achieve this honour in the recent re-birth of activity. Bertie Brown whose once proud moustache has drooped steadily with increasing age and the disillusionment of the post-war world, earned his certificate in conditions that were far from ideal. Likewise George, our indispensable, hard labouring, food providing George, who followed hard on Bertie's heels in qualifying.

After that the process became slightly monotonous and there have been no new failures to record and so no new members to enrol in our club within a club, that of the Gravity Boys'—those who are launched only to sink slowly, painfully, and expensively to the flats 1,300 feet below. Instead genial Bob Gairns, Arthur Lucas, Douglas Fleming and Bill Adamson made the process look easy, and with the minimum of fuss and the maximum of efficiency they gained their certificates. Bishophill, as a straightforward soaring site, or as a stepping stone to the Southern Uplands or the massive Cairngorms has an unlimited potential. Why

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BRISTOL GLIDING CLUB

Thanks to our intensive winter maintenance programme, we have now got almost the entire club fleet of aircraft and vehicles serviceable. However, at Lulsgate thermals have so far been conspicuous by their absence, and at Roundway there has not been a West Wind since the Easter camp when over 40 hours soaring was done. The Club "Olympia" and "Tutor," and our two privately owned "Olympias" were joined by Philip Will's "Weihe" and a Surrey Club "Olympia."

In spite of the strong wind, which on one occasion overturned a trailer, five hour duration flights were made by R. H. Perrott and N. D. Batstone.

Our Summer Training Courses start at Lulsgate on 18th June and are already well booked up, we hope they will be favoured with good weather.

THE SOUTHDOWN GLIDING CLUB

Since my last news in the May issue of the *Sailplane* a long-awaited event took place. The week ending May 13/14 found us with a strong N.N.E. wind. Our new trailer, which was already loaded with bunjy, was promptly and neatly packed with one of our "Tutors" and despatched with all available members to Firle.

Excitement was terrific for it was the first time that this method of launching had been used and many had not seen it before. Willing hands soon had the machine rigged and our C.F.I. Ray Brigden made the first flight. He attained a height of 1,200 feet above our hilltop which plus our 600 feet hill put him over the fields below at 1,800 feet. Being the afternoon thermals were about and undoubtedly contributed to what turned out to be the highest flight of the weekend.

Flying then continued with 30-minute trips for those of us qualified to soar until we cut for the day.

On Sunday the wind still continued to blow hard and a very early start was made from Friston with the first "Tutor." Dave Parsey, our Hon. Treas. was launched before 10 a.m. and did his 5 hours. Meanwhile the trailer went back to Friston and collected the second "Tutor" which was quickly rigged and test-flown by Ray for 30 minutes, followed by flights of the same period throughout the day. Don. Snodgrass ventured a little too far to the west and landed on Firle Beacon. A party was organised to carry the bungy and left looking like an Alpine expedition. Later on, from our hill, we saw the "Tutor" take off and it was soon soaring overhead again. Johnny Billeness meanwhile had been flying back and forth along the ridge. He came down to about 20 feet above our heads and called down that he was going to land, then climbed to 400 feet to await the positioning of the handling crew—necessary precaution in view of the rather rough ground we had to use as a landing strip with a long haul back to take-off point.

Nothing untoward happened to spoil the weekend and we finished up with I believe, over 18 hours flying.

Nothing much happened to report until Whitsun. The holiday presented us with one of our good S.W. winds and full use was made of it to the tune of three 5-hour durations. Don Snodgrass and Joe Hahn of our Club, and a visitor from the Surrey Club in their "Green-O." Joe was rather unfortunate as he came in to land; a cow decided to race him to his touchdown point, but Joe beat her and tore some fabric on his port wing in passing over her horns. Nevertheless we clocked over 28 hours' flying for the holiday which was not too bad. The "T 21" periodically joined the three machines over the cliffs with training and joy flights. If we can keep this up we shall have another good year to report at the next A.G.M.

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"C" .. 13
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Gold "C" 1

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2869	Ronald Derek Hunt	166 G.S.	21. 5.50
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6787	Ronald Wynne	192 G.S.	7. 5.50
9145	John Keith Manning	26 G.S.	17. 5.50
9468	John Rennie Green	192 G.S.	14. 4.50
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10513	Brian Patrick Hogan	168 G.S.	23. 4.50
10669	William Cecil Wood	R.A.F. Halton	7. 5.50
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11013	Gordon Richards	102 G.S.	6. 8.50
11096	William Eric Turner	192 G.S.	7. 5.50
11293	Nigel John Thomas	123 G.S.	23. 4.50
11344	William John Mouey	166 G.S.	7. 5.50
11471	John Ernest Eley	Channel G.C.	21. 5.50
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11668	Robert Thomas Marshall James	Midland G.C.	14.11.48
11670	Robert Charles Barron Marshall	192 G.S.	15. 4.50
11675	Brian Wilfred Coles	Gutersloh G.C.	24.11.48
11679	Manton Eustace Ticknell	R.E.F.C.	22. 4.50
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11690	Leonard Bracey	48 G.S.	15. 4.50
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11741	Rodney Karl Batstone	168 G.C.	23. 4.50
11743	John Mark Mitchell	168 G.C.	23. 4.50
11744	Cecily Elizabeth Roe	Southdown G.C.	7. 5.50
11745	Alleyn Robert Wayte	168 G.S.	23. 4.50
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11784	Leonard James Guyatt	Luneburg G.C.	12.10.49
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11828	Walter David Nash	41 G.S.	16. 4.50
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11831	James Lewtas	26 G.S.	24. 5.50
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10450	Arthur William Frederic Gotch	Bristol G.C.	1. 3.50
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11717	Richard Henry Prestwich	Cambridge U. G.C.	19. 3.50
11786	Frederick Harry Pearce	Gutersloh G.C.	23. 4.50

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259	L. R. Bulling	8644	23. 4.50
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261	L. J. O'Sullivan	10203	19. 4.50

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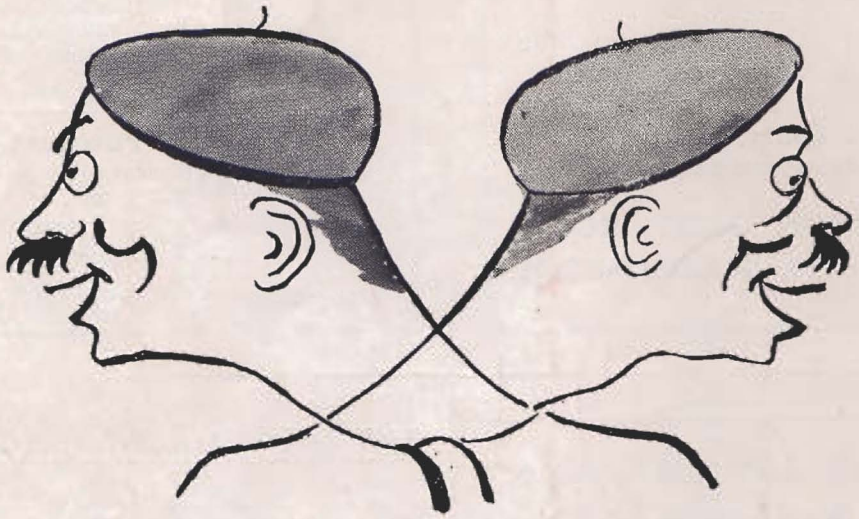
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