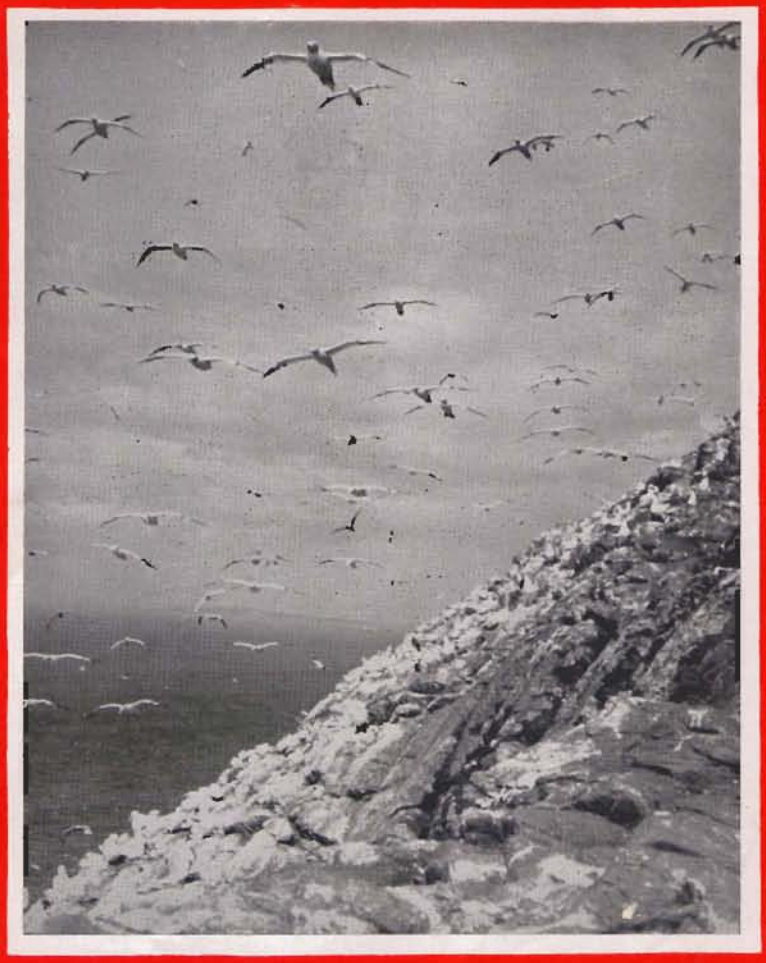
Sailplane and Glider

The First Journal devoted to Soaring and Gliding



MAY 1953

2/-

Sailplane and Glider

Founded in 1930

and ULTRA LIGHT AIRCRAFT

THE FIRST JOURNAL DEVOTED TO SOARING AND GLIDING

MAY 1953 ★ Vol XXI No 5

Editor :
VERNON BLUNT
MA, LLB (Cantab), FRMetS

Asst. Editor :
VERONICA PLATT

Editorial
and
Advertisement Offices :
8, Lower Belgrave Street
London, SW1
PHONE: SLO 7287

The *Sailplane and Glider* is published on the 5th of every month. Price Two Shillings per copy : 25s. 6d. per year posted. Advertising Rates on application.

Published for the licencees, Glider Press Ltd., by the Rolls House Publishing Co., Ltd., and printed by The Mendip Press, Ltd., London and Bath.

CONTENTS

Cover Photo :
Bird Sanctuary, Bass Rock, Firth of Forth. By John Barlee.

Editorial

LET us revert to the old topic of the rising cost of soaring, it simply cannot be disregarded. But this time let us widen the scope of our brief survey to include civil airlines, football pools, horse racing and commercial advertising.

In civil aviation ever more expensive aircraft provide lower and lower operating costs in terms of cost per ton mile or passenger mile. It is probable that the same applies to sailplanes, that the highly expensive self-launching, self-retrieving, powered high-performance two-seater sailplane would provide the cheapest soaring per hour per pilot because the annual utilization figure might reach six to seven hundred hours and that in turn represents twelve to fourteen hundred pilot hours. It must be emphasised that the initial capital cost of the sailplane is not in itself the determining factor of the amount and cost of soaring hours which can be extracted from it.

If we could reduce the inital cost of sailplanes by building lighter and smaller planes, so much the better as it would encourage more private and group ownership but the real aim of miniaturisation should be easier handling, more soaring. Such a step should not be taken if we cannot at the same time retain gliding ratios of 1:25 or better. The soundest way to reduce the cost of high-performance sailplanes is to build 5,000 of one type and to pay for them in advance and thereby smother all design progress for several years. Excepted from these general considerations is the extreme case which would be exemplified by future developments of the 'Tondokuro' mentioned last month.

To sum up, soaring is expensive and to obtain more and better soaring for all pilots will cost more and not less money.

State subsidies, even on the scale of those in France, Russia and the Third Reich, are or were not unqualified blessings and always bring with them degrees of public control and interference which metamorphose the movement not entirely to its advantage.

After all why should the tax-payer be forced to pay for your and my pleasure ? I believe that soaring flight has inspired the designers of aerodynamic improvements, jet and rocket aircraft since the thirties to an astounding extent and that, as a means of creating real Air-Mindedness among our people, which I again consider essential for the survival of these islands during the next thirty years, soaring flight has no rival. But the people of these islands do not believe this and regard electric toasters, football pools, paid holidays and the health service as far more important than the health of the gliding and flying clubs and of civil and military aviation. In fact more important than physical survival.

Millions of pounds are spent quite voluntary on commercial advertising and football pools and other quite unproductive activities. More than a million people who do not even know the rules of football and have never played a single game, eagerly spend a few pennies each week in the pools.

While retaining full freedom from any form of restrictive control on our sport can we not attract voluntary contributions to our expenses by offering the sides of our trailers and sailplanes to commercial advertisers ? After all, if this will enable you to put in more soaring why worry about the slogans painted on your sailplane ? So long as you are inside the sailplane you cannot see the advertisement. Let the advertising rates vary with the annual utilisation of the sailplane at a rate of one £ per hour. This would be the best means of satisfying and guarding the interests of both pilots and advertisers.

Surely if we really got down to it we could make sailplane cross-country goal, out-and-return and triangular flights of even greater interest to the football pool and horse and greyhound betting addicts than their present fields. Boy's train and aircraft spotters' clubs or better still the Royal Observer Corps might be enlisted to provide the necessary observing for such schemes. Let us see holiday resort municipalities competing with each other and paying hard cash for the privilege of having their resort selected as a goal during the National Competitions (and at any other time for that matter).

Having now so ably indicated the solution to the financial worries of the gliding movement, I must really give up unpaid and anonymous journalism and find some means of acquiring the privilege of paying income-tax.

O. W. NEUMARK

SOARING IN FRANCE

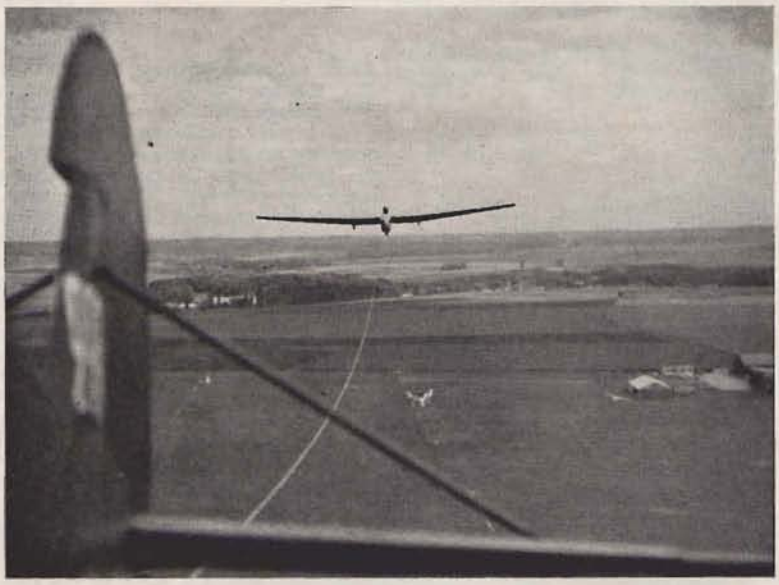
More about the 'Fauvel AV 36' Tailless Sailplane

By GUY BORGÉ

THE *Sailplane and Glider* has received many enquiries about the new tailless sailplane 'Fauvel AV 36.' Several enthusiasts enquire about construction drawings and wish to know their cost and conditions. Mr. Fauvel is preparing their edition and we learn that they would be sold at about 20,000 francs (or about twenty pounds) with the right to build one machine without financial profit. For full particulars they may write to the designer: Charles Fauvel, 72 Boulevard Carnot, Cannes (Alpes Maritimes).

During the official tests of the 'A.V. 36' several interesting points about the performances have been cleared, especially its better polar than the 'Meise' at any speed. At 100 km./hour (62 miles/hour) the 'Meise' loses 1.80 metre/second (59 feet/second) and the 'Fauvel' 1.65 metre/second (54 ft./second). In plotting on the same diagram the official polars of the well known sailplanes used in Spain like the 'Sky,' the 'Weihe,' the 'R.J.5,' the 'Fouga CM 8.15,' the 'Schweizer,' the prototype 'Air 100 II' (which I flew last year at Pont St. Vincent) and a serial 'Air 100,' the 'Fauvel AV 36' takes a good place and a remarkable classing in spite of its aspect ratio of 10. At 100 km./hour (62 miles/hour) the 'Fauvel' sinks at the same rate as the serial 'Air 100.' At 110 km./hour (68 miles/hour) as the 'Weihe.' At 115 km./hour (71 miles/hour) as the prototype 'Air 100.' At 140 km./hour (87 miles/hour) as the Slingsby 'Sky.' At greater speeds the 'AV 36' is outclassed only by the 'RJ.5,' the 'Schweizer' and the 'CM 8.15' but the 'Fauvel' is better between 45 km./hour (28 miles/hour) and 75 km./hour (47 miles/hour) in which zone the very fast sailplanes are nearly stalled. But the AV '36' proves its

(*continued at foot of next page*)



'Fauvel AV 36' in aero-tow

'Fauvel AV 36' in tow

The special trailer of the 'AV 36'

492 KILOMETRES IN A 'CONDOR 1'

An Argentine Distance Record

By JUAN B. CHOURROUT.

THE 30th November, 1952, dawned drizzly after passing of a storm front. Coming from the Atlantic, and entering the South of the Province of Buenos Aires, it had swept up the mass of tropical air which had for days past covered the whole of the province as well as the districts of Entre Rios and Corrientes. The rain stopped very early and at once the sky cleared, becoming a pure blue swept by a strong fast South wind—everything pointed to fine dry weather under conditions well known and well studied by me over many years.

It was a Sunday, one of those days when one feels grand, anxious to be up and doing, so I hurried out to the Club arriving there about 8 a.m. There was great activity already; the sailplanes were out of the hangar and the primaries were flying in the field. Alone in the centre of the empty hangar stood the old 'Condor,' a veteran built in 1937. She looked abandoned, tired, one wing resting on the ground as if she had been shoved here and there and finally deserted by her younger companions.

I made my number and exchanged impressions with various members, then asked if the old 'Condor' were free, since the other sailplanes were all needed for a contest. They said 'Yes, take her;'; but her certificate of airworthiness had expired two days earlier and she was missing various documents, instruments and so forth. There was none to tow her to the field, not even anyone to launch her, but these things cleared themselves up as they have a way of doing and with the help of several volunteers we got out on to the field at the moment when a welcome line of white cumulus was just appearing on the horizon.

From the first moment I had visualised the possibility of making a real distance flight towards the North in these conditions, but since the sailplane was very slow it was a question of time. I had to set out as early as possible, since I had to cross the wide Delta with its great belts of trees and its maze of rivers and streams; it is a cold region, full of dangers and difficulties in the event of a forced landing, only possible to fly across after midday and then not with a mediocre machine. This district lies only 80 kilometres from the aerodrome of Merlo.

When all was ready to start I gave in a goal, a thing I always do 'just in case.' I chose the city of Santa Fé, 400 km. away as the crow flies, and at the moment when the first cumulus passed low and swift over the field, exactly at 10.33 hrs., I took off, releasing after 7 minutes at 500 metres right below a small cumulus beginning to form over Mariane Acosta. (*continued on page* 11)

Juan B. Chourrout of the Club Albatros of Buenos Aires

SOARING IN FRANCE—*continued from previous page*

astonishing superiority in thermals by its very good climbing qualities. In a thermal of 100 metres (109 yards) radius, ascending at its centre at 5 metres/second (16 feet/second) decreasing towards its edges according to parabolic law, the 'Fauvel AV 36' outclimbs the 'Sky' by 0.45 metre/second (or 1.5 feet/second) and the 'RJ.5' by 1.65 metre/second (5.4 feet/second), while flying at a speed of 50 km./hour (31 miles/hour). This fact explains why Eric Nessler, the great French champion, recorded such a good average speed during his flight from Chavenay to Landes de Bussac in this simple training sailplane. The 'AV 36' can turn in a radius of only 30 metres (33 yards) with a sinking speed of 1 metre/second (3.3 ft./sec.), at 50 km./hour (31 m./hour), and hence use the smallest thermals.

Several machines of the 'AV 36' type are under construction to-day and will fly during summer. This construction takes about 800 hours of work after having built the jigs and is much simpler than for a 'Grunau Baby' by the absence of a fuselage, and wash-out at the wingtips. The 'Fauvel AV 36' will see more and more success in the future.

AN ARTIFICIAL HORIZON AND DIRECTIONAL GYRO FOR SAILPLANE*

A Description of a Pair of Instruments Suitable for Sailplanes Developed from German Equipment

By A. H. Yates, B.Sc.(Eng.), A.F.R.Ae.S.

REFERENCES TO LITERATURE
(1) Yates. A new battery for gliders. *Gliding* (Spring 1951).
(2) Coates. Note on German combined artificial horizon and turn and bank indicators. *RAE Tech. Notes*, Inst. 916 and 919 (1945).

SUMMARY

The British Gliding Association has rightly called attention to the need for an artificial horizon suitable for use in a sailplane. This note argues that the artificial horizon, together with the directional gyro, form the ideal pair of instruments for the accurate and safe flying of sailplanes in clouds.

A description is given of a pair developed from German instruments together with full details of their weight, size and current consumption. It is shown that for a total weight of 20 lb. a sailplane can be fitted with an electrically driven horizon and directional gyro which will run continuously for over six hours before the batteries need recharging.

We are indebted to "AIRCRAFT ENGINEERING" for their kindness in allowing us to reprint this article from the issue of December, 1952.

1. The Argument for a Horizon.

FEW sailplanes are yet fitted with artificial horizons but many enter clouds. Their pilots rely on the airspeed indicator and turn and bank indicator to maintain circles at constant airspeed. With perseverance many pilots become sufficiently skilled in the use of these indirect indications of the glider's motions to fly safely and competently. Many others, however, are discouraged from cloud flying by the difficulties they encountered on their early attempts.

The task inside the cloud is to maintain the airspeed indicator reading as nearly as possible at a figure chosen from knowledge of the sinking speed, the stall, the roughness of the air and the tightness of the turn. At the same time, the rate of turn must be kept constant except when a slight variation in the path is required to move into a better lift area. The cloud flying novice finds an irresistible tendency to 'chase the A.S.I.,' and his attempts to keep a constant airspeed usually end in a series of dives and climbs while he circles. If the amplitude of this speed oscillation is not more than ±10 miles per hour no serious harm results, but the up and down path gives readings to the variometer which have no relation to the strength of the thermal. The novice has then no indication of the direction of the best lift and soon loses it.

A similar tendency to 'chase the A.S.I.,' is often to be found among learners in powered aircraft (and some in gliders) when flying in visual conditions. In these cases the instructor merely advises them to concentrate on maintaining a constant attitude to the horizon and the difficulty is at once overcome. In a cloud, too, the difficulty vanishes as soon as a horizon (artificial) is visible. The pilot maintains a constant attitude, whether he is circling or flying straight and makes adjustments to it only occasionally when the airspeed appears fast or slow. The rate of turn is set by maintaining a constant angle of bank (depending on the size of the lift area—say, 30 deg.) and keeping the 'slip' needle or ball central. The turn needle is not now needed in the turn since a correctly banked 30 deg. turn at a known airspeed corresponds to one rate of turn only—i.e. the turn indicator is redundant.† With an almost constant airspeed the variometer reading now means

Fig. 1.—The Venner Battery

* A paper based on this report was read by Mr. Yates at the Fourth Congress of O.S.T.I.V. (Organisation Scientifique et Technique du Vol à Voile) in Madrid in July, 1952.

† The turn needle is still useful for keeping a straight course in cloud—unless a directional gyro is available.

Fig. 2.—The original and modified artificial horizon

something and the process of centring in the lift can be begun.

2. The Argument for a Directional Gyro

The directional gyro gives a continuous indication of the heading of an aircraft. The presentation is usually similar to that of a compass (a card marked 0-360 deg. passing behind a window), but the gyro is unaffected by turns. While the glider is circling, the card of the magnetic compass may give a completely erroneous reading so that the pilot has no idea when to stop his turn to fly out of the cloud on, say, a northerly course. He stops the turn, waits for the card to settle down and then finds, perhaps, that he is flying south. He turns again—by counting seconds since the compass will be no guide—and again stops the turn. This process for coming out of a cloud with the aid of a magnetic compass is wasteful of time, height and distance. The inconvenience is minimized if the compass is well damped, but the turning error cannot be eliminated.

The directional gyro suffers from no turning error or damping deficiency. It must be set to read the same as the compass and then uncaged before the glider enters the cloud or, at least, while the glider is flying straight. The pilot can then see at any moment what his heading is and can leave the cloud on any course he wishes without waste of time. Unavoidable friction in the bearings of the gyro causes a ' precession,' i.e. a slow departure of the gyro bearing from the compass bearing. The directional gyro should therefore be caged and re-set every 15 minutes or so. A slight inaccuracy in the directional gyro reading is of no serious consequence since, if the pilot straightens up to fly out of the cloud in a northerly direction by the directional gyro but finds his magnetic compass reading 010 after it has settled down, the small correction to his flight path causes no inconvenience. The keeping of a straight course with a directional gyro is as easy as keeping a straight course in visual conditions. With a turn indicator the pilot must maintain the average rate of turn at zero and this must be checked frequently by glances at the compass.

The other great use for the directional gyro is in centring in the lift in the cloud. In clear air many sailplane pilots note the direction in which they are flying when the lift strength falls and then, when they have turned through 180 deg., straighten up for a few seconds before resuming the steady turn (to allow for the lag in the variometer the angle should be reduced to, say, 120 deg.). The direction in which the greater lift lies is then fixed in the pilot's mind and he has some indication of the general direction of the best lift. He may fix his direction by the sun or by landmarks on the ground, but he will not have the use of a magnetic compass which will be reading inaccurately in the turn. This technique can be used in cloud if the directional gyro is available. Other pilots measure the 120 deg. or 180 deg. by knowing the time for a 360 deg. turn (say, 20 or 25 seconds) and counting one-third or one-half of this before straightening up. A third technique consists of continuing the steady rate of turn after the lift strength falls and of straightening up for a few seconds when the lift improves again.

My impression is that most pilots use the first technique, using the sun or a neighbouring town as a direction fix, and for those pilots the directional gyro should be a help in a cloud.

3. Power Supplies for Gyro Instruments

The power supply to the horizon and directional gyro should be independent of the outside air conditions. Windmill driven generators and venturis for sucking air are not permissible because they may be useless under icing conditions. Electrical storage batteries or compressed air in bottles are the best power sources. The capacity must be enough to run the instruments for about five hours continuously before recharging is necessary, and the important factors are then the weight and bulk of the power supply with this capacity.

Fig. 4.—The inverter

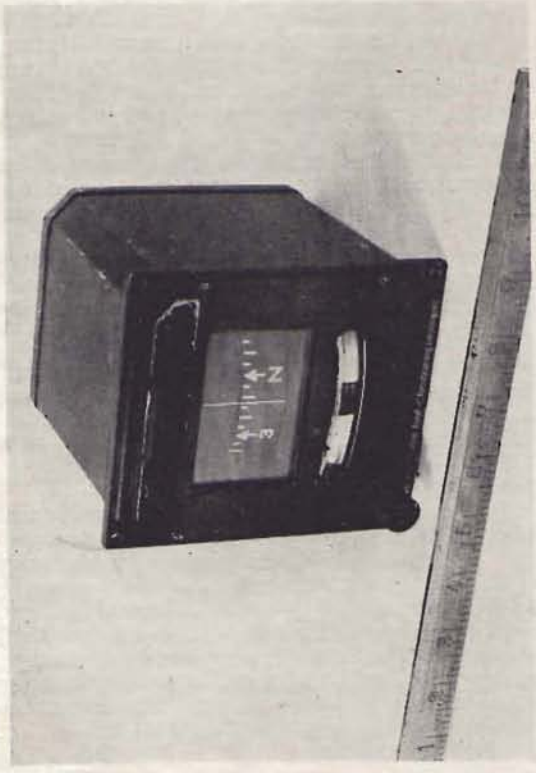


Fig. 3.—The directional gyro

The equipment about to be described is powered by twelve Venner[1] accumulator cells, type BB. Each cell gives 1.5 volts and has a nominal capacity of 15 ampere-hours at the 20-hour rate. The cells were removed from their bakelite cases and fitted into a specially built wooden box (Fig. 1). Details of the power supply are—

Weight :	Wooden box	0.8 lb.
	Cells	7.8 lb.
	Total	8.6 lb.

Size of box : 10.2 in. × 4 in. × 4.2 in. high.
Capacity : 18 V. 15 A-H nominal (at 20-hour rate)
16 A-H on test at 5-hour rate.

4. The Artificial Horizon

The horizon described below has been developed from the German (Horn) combined horizon and turn and bank indicator[2] by the removal of the turn gyro and fittings and the shortening of the case. The modified instrument is shown in Fig. 2 with one of the original instruments. Details of the two instruments are :

	Horn combined H. and T. and B.	*Modified Horizon*
Weight	4.5 lb.	2.8 lb. (i.e. a saving of 38 per cent)
Length	7.2 in.	6.0 in.
Diameter	4.1 in.	4.1 in.

The modified horizon has a single gyro driven by 36-V. 500-cycle 3-phase alternating current. The gyro can be caged with its axis vertical by rotating the milled ring surrounding the dial. When uncaged the movement of the horizontal relative to the glider is shown by the movement of the horizon bar relative to the model aeroplane which is fixed on the dial. The presentation is quite natural and no difficulty is found in entering and leaving turns or in flying straight.

The limits within which the indication is correct are—

pitch ± 80 deg.
roll ±100 deg.

If these limits are exceeded, for example by aerobatics, the gyro topples.

An erecting mechanism will bring the horizon bar slowly to the horizontal, if the gyro is toppled or uncaged when the glider is not on an even keel. The time taken is, however, of the order of 20 minutes, so that the process of re-setting to zero is best performed by caging the gyro and uncaging when the glider has been brought back to an even keel by means of the other instruments.

The erecting mechanism consists of a small mercury switch and an erecting coil which is energized via the switch when the gyro axis does not coincide with the apparent direction of gravity. In a properly banked turn the apparent direction of gravity is not vertical but in the plane of symmetry of the glider. This will cause the horizon to erect in a sense which reduces the angle of bank shown by the instrument

until it eventually indicates zero bank. If this took place the pilot would be steadily increasing his angle of bank while the artificial horizon indicated a constant bank angle. This is not, apparently, a real problem since many hours of flying with the horizon, including continuous circling in one direction for periods of over 15 minutes, have not led to any difficulty. If the erecting system did cause trouble it could, of course, be disconnected.

A slip indicator is fitted at the bottom of the dial. A ball moves in a curved tube filled with liquid. The turn needle of the original instrument has been removed on the modified horizon.

5. The Directional Gyro

The directional gyro described has been constructed from a German (Siemens) ' Kurskreisel.' This instrument (Fig. 3) consists of a free gyro with axis horizontal which can be caged by a knob on the left and rotated about a vertical axis until the scale indicates the desired reading—e.g. the same reading as that of the compass. The gyro can then be uncaged and remains with its axis fixed in space. The scale reading in the window then indicates the course being steered by the glider. This gyro, too, is driven by 36-V. 500-cycle 3-phase alternating current.

The original instrument had a second scale above the first, which was adjustable by a second knob on the right, and a large number of slip-rings from which signals were sent to the automatic pilot. All unnecessary parts were removed and data for the modified directional gyro are :

Weight	..	3.5 lb.
Length	..	5.1 in. (behind instrument panel)
Width	..	4.4 in. (,, ,, ,,)
Height	..	5.0 in. (,, ,, ,,)

There appears to be no manoeuvre which will topple the gyro. The friction in the gimbal bearings causes a slow precession of the gyro, i.e. the scale very slowly rotates in space at a rate of perhaps one degree in two minutes. It is necessary to adjust the directional gyro to read the same as the compass every 15 minutes or so. This is no great hardship, particularly since glider navigation is seldom conducted to accuracies of more than 10 deg. ; the whole advantage of the directional gyro over the magnetic compass is that, while turning, the pilot knows the direction, at least approximately, at each instant.

6. Alternating Current Supply

A standard German inverter* (shown in Fig. 4) has been used to convert the direct current at 18 V. to alternating current. The inverter is designed to operate from 27 V. d.c. and to deliver 3-phase a.c. at 500 cycles and 36 V., but operates successfully from 18 V. d.c. The a.c. frequency is reduced with the voltage and it is the frequency which decides the gyro r.p.m. However, no ill effects from precession of the gyros have been observed and it is concluded that 18 V. is an adequate d.c. voltage. Details are :

		Small size	*Alternative Larger size* (Maker : Oemig)
Weight	..	4.6 lb.	7.2 lb.
Length	..	6.1 in.	7.1 in.
Diameter	..	3.4 in.	4.0 in.

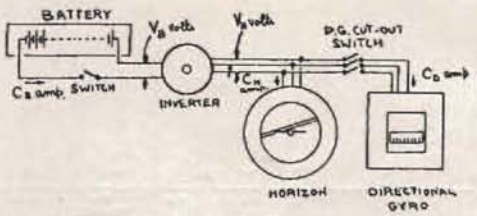


Fig. 5.—Circuit of test rig and of gyro instruments in the sailplane

7. Laboratory Test Rig Experiments

Tests on the Venner battery and the instruments described above have been conducted in the laboratory and in an ' Olympia ' glider. The circuit was as shown in Fig. 5 and the quantities measured during the run were :

The battery voltage	V_B
The current from the battery	C_B
The a.c. voltage from the inverter	V_H
The a.c. current to the horizon	C_H
The a.c. current to the directional gyro	C_D
The a.c. frequency	

The variations in these quantities with time have been determined during runs with both inverters with the horizon only and with both horizon and directional gyro. A typical result with the small inverter is plotted in Fig. 6. Both the horizon and directional gyro were being driven in this test and both ran satisfactorily for nearly 7 hours. It is seen that—

(i) V_B, the battery voltage, falls quite quickly to 17.8 volts (1.48 volts per cell) and then remains remarkably constant for nearly 5 hours. The fall in battery voltage is then fairly rapid and at about 8 volts the gyros topple. A warning blinker on the glider dashboard is set to close at 13 volts and this gives 15 minutes warning of gyro failure.

(ii) C_B, the current taken from the battery, is large immediately after the switch is closed but falls as the inverter gathers speed and remains at about 2.5 amps. until the last 15 minutes of the run when it increases slightly. The battery thus delivers about 17 ampere-hours at the 7-hour rate, although its nominal rating is only 15 ampere-hours at a gentler rating.

(iii) V_H, the a.c. voltage from the inverter, is 30 V.

(iv) C_H, the a.c. current to the horizon is 0.21 amps.

(v) C_D, the a.c. current to the directional gyro is 0.36 amps.

(vi) The a.c. frequency is 360 cycles per second (380, if the directional gyro is disconnected).

* Inverter = ' Umformer ' in German.

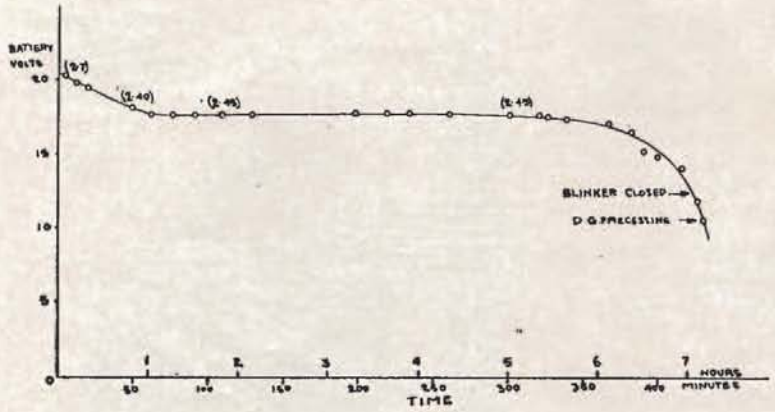


Fig. 6.—Venner battery discharge curve, with modified horizon and directional gyro and small inverter

Battery endurance

The quantity which decides the endurance of the battery is C_B, the current taken from the battery. The values measured with the small inverter are summarized below :

	C_B	*Battery Endurance*
(*a*) Horizon, in original state with turn gyro	2.3	7 hours approx.
(*b*) Horizon, modified by removal of turn gyro ..	2.1	—
(*c*) Directional gyro	1.7	—
(*d*) Modified horizon + directional gyro [(*b*) + (*c*)] ..	2.5	nearly 7 hours

8. Flight Tests

When fitted to an 'Olympia' for flight testing the batteries were mounted between the wings, on the top decking of the fuselage; the inverter was mounted under the nose cap replacing the ballast weight stowage normally there. The instrument panel was re-designed to give the horizon the pride of place at the top centre while the directional gyro was mounted at the very bottom of the panel on a floor pedestal.

Endurance tests confirmed that the Venner 18 V. battery will run the original horizon (or the modified horizon plus the directional gyro) for more than 6 hours continuously.

9. Conclusions

The three instruments described (inverter, horizon and directional gyro) driven by a Venner 18 V. 15 A-H battery form a valuable set of blind flying instruments for a sailplane. The weights are :

Battery	8.6 lb.
Inverter	4.6 lb.
Horizon	2.8 lb.
Directional gyro	3.5 lb.
Total	19.5 lb.

Laboratory and flight tests show that the instruments will run continuously for at least 6 hours before the battery needs recharging.

The disadvantages of the instruments described are (i) the lack, at present, of easily available substitutes for the German instruments used, and (ii) the very high cost of gyro instruments and of the Venner batteries. The tests have shown, however, the type of instrument and battery needed so that sailplane pilots must rely on the aircraft instrument industry to produce the instruments at a reasonable price or on their own ingenuity to modify existing instruments.

A comparison between the Venner batteries described above and the cheaper Varley batteries is given in the Appendix.

10. Appendix

Comparison of the Venner batteries described above with the alternative, cheaper Varley batteries.

The Varley (motor-cycle type) lead-acid accumulator is rated at 12 A-H at the 10-hour rate, but the capacity is reduced to about 8 A-H when the accumulator is discharged at the 5-hour rate. The Venner battery thus stands up to the heavy discharge rate much better than the Varley.

Comparative figures are :

	Venner	*Varley*
Volts	18	18 (three 6 V. accs.)
Capacity (A-H nominal at 10-hour rate)	15	12
Weight	9 lb.	25 lb.
Size, overall :		
Height	4.2 in.	6.4 in.
Length	10.2 in.	10.8 in.
Breadth	4.0 in.	5.0 in.
Volume	170 cu. in.	345 cu. in.
Retail price, approx.	£45	£8

Endurance

A series of tests with the various gyro instruments mentioned above was made using Venner accumulators with either the small or the large inverter. Additional tests were made with the Venner voltage reduced to 12 V. and with Varley accumulators giving 12 V. (18 V. was not available in Varley cells). A typical discharge curve for the Varley battery is given in Fig. 7.

The results obtained are given in Table 1.

UNPLANNED SILVER 'C'

By LOUIS LEITH

COMPARING recent copies of *Sailplane* and all issues of *Gliding*, this article will probably be considerably out of place. For example, pressurised sailplanes—casual starts from a mere 10,000 ft.—flights of three, four and five hundred kilometres—bitterly disappointed pilots who reach a paltry 200 kilometres.

Can there be any humble 'C' pilots who, like myself, have been struggling for years to achieve a modest thirty-five or so miles, or perhaps 3,500 ft. above launch, or that gruelling five hours?

I believe there are such people left in the gliding world, although at the moment it doesn't seem apparent from our magazines. So if you are searching for graphs or performance curves, standing waves or adiabatic lapse rates, then pass on pundit with my very best wishes and admiration: this story is not for you! And gather round, the clueless, the ham handed, the non map readers, the fearful cloud approachers and all the candidates whose only technical abilities are that of calculating sink rates with dependable regularity. If you feel, as I do, that lack of finance, time and brain power will always prevent you from reaching the stratosphere or from penetrating the 40-mile barrier then draw up your chair, this is our story! Unplanned Silver 'C' or 'Anything I can do, you can't help doing.' Strictly non-technical and enough to curl the hair of all glider pilots who believe in doing the job properly.

Thursday, 21 August, 1952, dawned and developed much as did Wednesday, the 20. No cloud until mid-day and then only patches of dull grey cloud around 5,000 ft. A thoroughly duff day—I know—because everyone told me.

However, it was perfect for training, so we religiously hauled out the two-seater at crack of dawn (or was it my back) according to Station Standing Orders. At this point, the system broke down and a runner puffed up to say that some silly ass had ordered an aerotow (probably last week) and not only that, but a 'Tiger' was waddling happily towards us. Startled observers confirmed this horror and again to quote S.S.O.'s 'An aerotow must never be refused or kept waiting.' So we accordingly fell upon the 'Olympia' and rushed her to the launching point.

Only two of us present were qualified to fly this machine and neither was keen, in view of weather and financial conditions, but whilst I was running at the wingtip I evidently lost the toss. This was to be

(continued on next page)

The following conclusions can be drawn from these results:

(i) That a reduction in the voltage of the Venner batteries from 18 to 12 does not appreciably change the current from the battery or the endurance (the inverter and gyro r.p.m. are, however, reduced).

(ii) That the current taken from the 12 V. battery is the same for Venner or Varley.

Thus, we may reasonably conclude that the battery current from the Venner 18 V. battery (tested) and a Varley 18 V. battery (not tested) would be the same and that both would run the instruments adequately, but that owing to greater capacity at the current demanded, the Venner batteries have about twice the endurance of the Varley batteries.

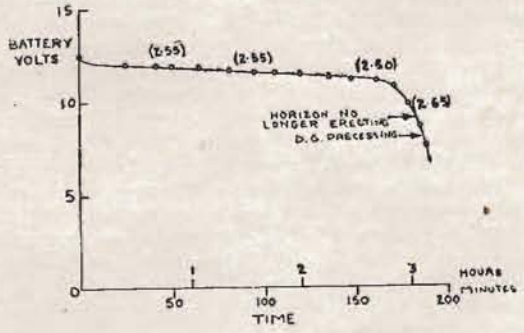


Fig. 7.—Varley battery discharge curve, with modified horizon and directional gyro and small inverter

TABLE 1

CURRENT FROM BATTERY, C_B, AMPS.

	Small Inverter			Large Inverter		
	(i) Venner 18 V.	(ii) Venner 12 V.	(iii) Varley 12 V.	(iv) Venner 18 V.	(v) Venner 12 V.	(vi) Varley 12 V.
(*a*) Horizon, with turn gyro ..	2.30	2.25	2.25	2.90	3.10	3.10
(*b*) Horizon, modified (turn gyro removed	2.10	1.90	1.95	2.70	—	2.80
(*c*) Directional gyro	1.70	1.75	1.75	2.40	2.55	2.60
(*d*) Horizon (modified)+directional gyro	2.60	2.60	2.55	3.10	—	3.40

UNPLANNED SILVER 'C' *continued from previous page*

my first aerotow in an ' Olympia ' and my second flight in the machine, so there was plenty to think about as I struggled to fasten the cockpit cover locking pins. Tommy gave me a mercenary leer as the ' Tiger ' pilot opened up and we moved away.

Little need be said of the aerotow itself, as I cannot remember offhand anything which I did correctly, or well.

One must, of course, release in a thermal : this is difficult if you do as I do on tow, balloon up and down all the time, although it does simplify things in that one is free to release almost anywhere. My personal technique (copyright reserved) is to gape anxiously round until I find the airfield, lost in the excitement of the tow, and then release. I performed this skilled manoeuvre at 2,000 ft.

The ' Olympia ' is a splendid sailplane and my usual sink rate was halved as we jogged carefully upwind in a perfectly clear sky and stable air. I couldn't exactly say when the variometer sprang into life as a stray ' Chipmunk ' attracted my attention, but on returning my gaze to the ' office ' I found the vario. recording plus one and it remained so, to my astonishment, during the inaccurate circling which followed. At 3,000 ft. the climb increased to 1½ f.p.s., and at 4,000 ft. ceased as mysteriously as it had commenced.

An important point when one has no maps is to observe downwind direction of drift in relation to the airfield and check compass reading when flying back to the field.

Upwind, the sky was filling with lifeless-looking grey cloud and downwind was clear, so I decided to test the upwind clouds and sure enough, they produced lift of the 2-3 f.p.s. variety merely by flying under their influence. Nothing complicated like choosing the up or down draught sides—I just paddled underneath and up we went although each time the lift petered out around the 4,000 ft. mark. On the fourth or fifth return from downwind drift I chose a rather larger cloud which was within reach and this time at 4,000 ft. the lift increased to 10 f.p.s.

My own cloud flying experience is extremely limited and I have been fortunate in yet having to spin out, so amidst groans of horror allow me to share my probably widely used but narrowly publicised technique.

At 4,500 ft. cold grey swirls were sweeping across the perspex cockpit cover and I immediately switched on the turn-and-bank indicator and had a last check on my position before putting my head in the office. By using needle, ball and airspeed frequently, in that order, I believe it is possible for even the most inexperienced to fly reasonably accurate circles in cloud. Looking out of the cockpit too often I find is extremely unsettling and may produce attacks of claustrophobia or instrument doubt, so keep your mind on that needle, ball and airspeed, and if anything, tend to take off bank rather than put it on.

Applying the above mentioned suggestions I found myself at 5,500 ft. and still going up quietly at 5 f.p.s., until I finally emerged from the cloud (observe the cunning encouragement to the reader when I don't say ' emerged from the top of the cloud ') at 6,000 ft. My next step was to apply the previously checked compass reading which must be the opposite of the upwind course (although pundits sometimes fly reciprocals) then look around for another suitable cloud as Cambridge by this time had disappeared. It doesn't matter if the new cloud is 20 degrees on either side of your downwind course as the drift will still be favourable. In this simple manner I dodged cheerfully downwind using cloud lift and without a clue or a care where I was going.

It's a glorious sensation—no maps to pore over—no goal to achieve—only the countryside to admire from the peace and solitude of the ' Olympia cockpit.

The blue sea fitted so softly and discreetly into the picture that it was some time before I realised how dangerously it was filling the picture and that a rapid change of course was necessary. My height was then 4,500 ft. and I saw an airfield which looked so barren and desolate that I pressed on and crossed (what I found to be later) the Crouch Estuary. A rather large seaside town hove into view and without the aid of maps I managed to recognise Southend Pier. Height now 3,000 ft., so I scurried back to Southend airport and joined the landing circuit, noting all visual landing instructions.

Bringing a glider into a strange airfield raises an interesting problem which had never confronted me before as all my other cross-countries, or should I say ' overshoots ' have finished up in fields, but, like yourself no doubt, I have listened to skilled performers describing how they skimmed along the edge of the airfield and stopped amidst squeals of delight and admiration outside Flying Control. Personally, as a married man who enjoys being nagged, I have my own theories governing the landing of valuable club aircraft on busy airfields. Choosing the edge of the field is certainly keeping out of the way, but a glider approaches silently, and obstacles, ranging from fitters to grass cutters can quickly prove troublesome. An obscure corner of the field is all right provided you have sandwiches and are prepared to remain there all day, which is probably what you will have to do.

Therefore, in view of these possibilities and considerations I took position behind a ' Chilton ' and several assorted aircraft on the approach run, but kept slightly to the left of their main landing area, where I set the ' Olympia ' down with care and concentration. A glider is never left very long in the middle of an airport and within three minutes a tractor came chugging across and the ' Olympia ' was towed to Flying Control and sandbagged down.

I thought the young lady Controller was charming until she informed me that I owed her 2/6d. landing fee. ' All landings ' she murmured, ' except emergency landings, are chargeable.'

In accordance with McTavish Clan Rules, I opened my mouth to launch the usual glider pilot's protest—thought of the tractor—closed it and paid up with a shocking disregard for the comfort of my ancestors in their graves.

N.B.—Whilst some incidents are obviously exaggerated to create a bit of fun, the basic facts are accurate and I sincerely hope they will prove encouraging, if not helpful, to all aspirants this coming season.

492 KILOMETRES IN A 'CONDOR I'—*continued from page 3*

I reckoned that it was the psychological moment for take-off, since my long experience of this area had taught me that there are days when one hour too early or too late may make just all the difference ; for instance, my first record flight (405 km), this one, and several others had all been made on days when no one else had been lucky, entirely due, I think, to having been begun at the critical moment.

When I reached the cloud base at about 800 metres I left it upwind towards another and better group. Circling under these I found 1½ metres per second, to their base at 1,000 metres. I began my first glides at once, slowly to begin with, letting myself drift unhurriedly, zigzagging inland so that I should arrive at the banks of the River Parana at about the level of Campana ; that took a little over an hour and cloud base remained at 1,100 metres. I reckoned it was still too early to try and cross the Delta, which looked sombre, cold and hostile. The cumulus were still not high enough and they were dissolving over the water, so I decided to fill in time circling along the banks waiting for the right moment. At the same time I worked my way towards the best place to cross, which I estimated at between Campana and Zarate, alongside the Irigoyen Canal where the ferryboat to Ibicuy and the raft to Puerto Constanza cross—which besides being the shortest distance (about 40 km.), is also the most populated zone and one of the few places where one could hope to find an emergency landing ground, communications, and so forth.

Thus well-placed and judging that the right moment had come I went about one kilometre inland and there circled in a strong thermal up to 800 metres, letting myself drift. As the thermal approached the coast it began to strengthen and at once began to form a cloud with myself and the sailplane inside it. With this I let myself drift across the dreaded Delta and when it dissolved I was half way over with 1,100 m. altitude ; I judged this sufficient to assure my arrival over the Entre Rios coast, but as there would surely be no other chance to climb I might perhaps be still too low and have to land. I decided not to try it and instead turned upwind to another batch of cumulus which like mine were in process of dissolution. So always upwind I made for a stronger group and arrived under them with only 500 metres, which I did not like at all. But I trusted in the Goddess of Luck and she found something for me ; circling with a lift of one to one-and-a-half metres at the base of these clouds I went into them and when I was again out in the blue I found the situation had improved, for I had 1,200 metres in hand and the coast was appreciably closer.

With great care I found my best angle of glide and with the wind well astern sailed slowly and tranquilly in an unhappy silence for long and anxious minutes to the other bank. I lost a lot of height in ferocious downcurrents and got the impression that the other bank and even the rivers were rising fast ! I found absolutely nothing to give me a lift or even to help maintain altitude until at last and with only 300 m. in hand there was a little shudder, the salvation of my flight. I began to circle most cautiously in a little zero and after two or three rounds found myself enveloped in a cloud of fifty or sixty storks who came along to help ; later other birds joined us, small eagles and hawks, and altogether we circled in zero, neither gaining nor losing altitude. I judged that letting myself be displaced by the wind I ought to be able to cover the three or four kilometres which still separated me from the other side of the Delta, a noticeable line of dry ground of quite a distinct vegetation, consisting of sandy banks and straggly scattered trees. All was well and over the other bank the thermal came up to two metres a second, birds and glider rising happily together. At first they went up more rapidly than I did, but soon I caught them and the ' Condor ' and I went higher. A few seconds later I reached cloud base at 1,500 metres and left that one for another which took me to 1,700 metres.

From this moment on I breathed happily and freely, for by my own thought and my own efforts I had got safely over. Now was the time for the real calculations. I had already been flying for three and a half hours and had only covered a little over 100 km.—that is to say an average speed of 30 km. an hour, poor enough but capable of great improvement under the prevailing conditions which looked magnificent for long distance flying. As I said I had given my goal as Santa Fe, capital of the province of the same name, which lay about 400 km. from Merlo, my starting point. I thought I could probably manage much more, reckoning seven o'clock as a reasonable landing time. Five more flying hours ! I began to laugh and talk aloud ; I had been after Joe Ortner's record but now it looked as if I might beat Cuadrado's as well. That meant another 400 km. to cover at an average speed of 80 km. per hour —a lot to ask of the old ' Condor.'

I was flying very comfortably, having in front of me a magnificent view, a complete map of the entire province, and I was situated between the railway line to Gualeguay and the international road to Gualeguaychu. I could see both cities and just in front of me a beautiful cloud street running with a strong wind right along my route. To make it better I knew my way very well and also the weather conditions, having much experience of them in earlier flights both by sailplane and aeroplane.

I would like to make a brief resumé of these conditions and the reasons for the meteorological situation which I had previously noticed and which on this occasion I was able to confirm.

The Province of Entre Rios offers a very special and curious topography, since although in the South with its wonderful Delta everything runs from East to West, in the rest of the province everything runs from North to South. Its many rivers with their exuberant vegetation alongside and the little ridges, marked out by rocky crests which hardly show, all follow this direction and give rise to great contrasts in temperature which in its turn strongly influences the air around and so provokes enormous atmos-

pheric changes, very suitable when the wind is in the South for distance flights. One might, too, be able to make use of those beautiful great clouds of fantastically high pillar-like shape and astonishing convective activity, clouds which we have seen many times, above all in the late hours of the evening.

(*Editor's note* : they are shaped like colossal elm trees, very high and narrow and bulging upwards—I have never seen them anywhere else in the world. V.P).

To continue with the tale of my flight . . . I had decided my goal should be Monte Caseros in the Province of Corrientes, a city which we had all thought of as at 500 km. from Buenos Aires. I would beat Pepe Cuadrado's 472 km. and get to Monte Caseros or bust the ' Condor,' which looked likely, considering her limitations. Fortunately the first alternative came up.

From this moment I put on the maximum speed available. I tried never to lose contact with the clouds, whose base was first at 1,500 metres and later at 2,000 metres, and I found thermals of between two and three-and-a-half metres a second which built up to six or seven inside the cloud. As I had no compass I never entered them circling since I would then not know which way to come out, so when I arrived at cloud base I entered with the turn and bank indicator centred and right on course and flew level. Even diving I rose at 2/3 metres a second so that I always came out with a gain of two or three hundred metres in the direction of the next cloud, at which I arrived about fifty or a hundred metres below cloud base. This I reached after five or six circles to repeat the manoeuvre again.

I continued in this fashion till I arrived over the railway junction of Parera, flying a little later over the aerodrome and gliding club of Urdinarrai, where nobody was flying and an absolute calm reigned. I hoped that the instructor Stabile, who in the moment of my take-off in Merlo was asking for weather conditions en route, might be flying ; but later I heard that he had not set out, since they could give him no weather report owing to ' storm conditions in Entre Rios.'

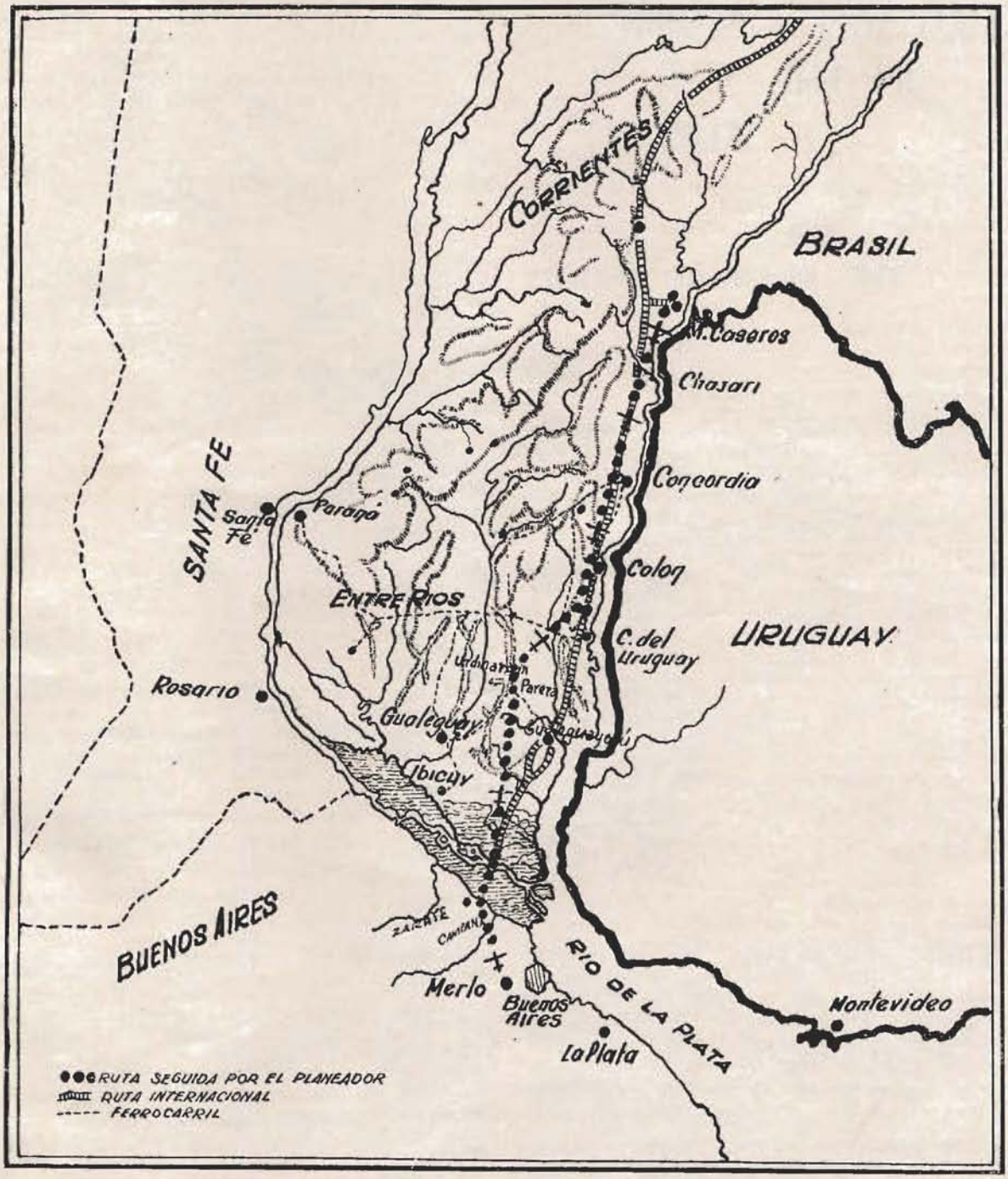
From that place, since the direction of the ridges and the clouds lined up along them was not the most convenient for me, I decided to go over to the other rocky chain, also outlined by a cloud street which began about the latitude of Gualeguaychu, and which I joined opposite Concepcion del Uruguay. Following this line and always with the same meteorological conditions I arrived at the border of the Province, noting that in this sector the thermals were much closer to each other. For this reason and in order to make longer glides I sometimes went through one or even two thermals without attempting to use them. I noticed also that all along the River Uruguay, across the water in the country of that name, the weather conditions were equally marvellous and the clouds were also in streets. In fact, I was flying over a region very well laid out for distance flights, since it is a rich well-populated zone in the neighbourhood of Corrientes, where the topography changes a little.

Finding myself with 2,000 metres altitude over the aerodrome and city of Chajari I could see in the direction of the coast and another 80 km. ahead the town of Monte Caseros, where I was quite sure I could now arrive. But if I flew in a straight line to reach my goal I must pass over Uruguayan territory and perhaps also over part of Brazil, and in my desire to avoid possible international complications I resolved to go left into Corrientes, flying just above Route No. 14 which leads to the frontier and which passes 30 km. to the West of Monte Caseros, thus keeping along a populated zone and well away from another which is deserted and inhospitable. Even at this height the sun was already low on the horizon and I noticed that over my destination the clouds were beginning to break up—warning that I could hope to get no further. So I squeezed the ultimate inch out of my last thermal and finding myself with 700 metres over the junction of Routes 14 and 122 (this last in process of construction) I could see ahead no house nor the remotest sign of life. On the other hand, 15 km. along Route 122 I could see the road constructor's camp and since I was sure of the record I made for this point rather than worry about the extra few kilometres I might gain. At this moment came a change in the weather ; the wind came from the East and just in front of me. It took me by surprise and instead of reaching the camp I had to land 2 km. short of it at the Estancia San Salvador.

With my sailplane pegged down I made for the camp and there found some most friendly people with all kinds of vehicles ; they drove me to Monte Caseros, from whence I could telephone my companions in Merlo.

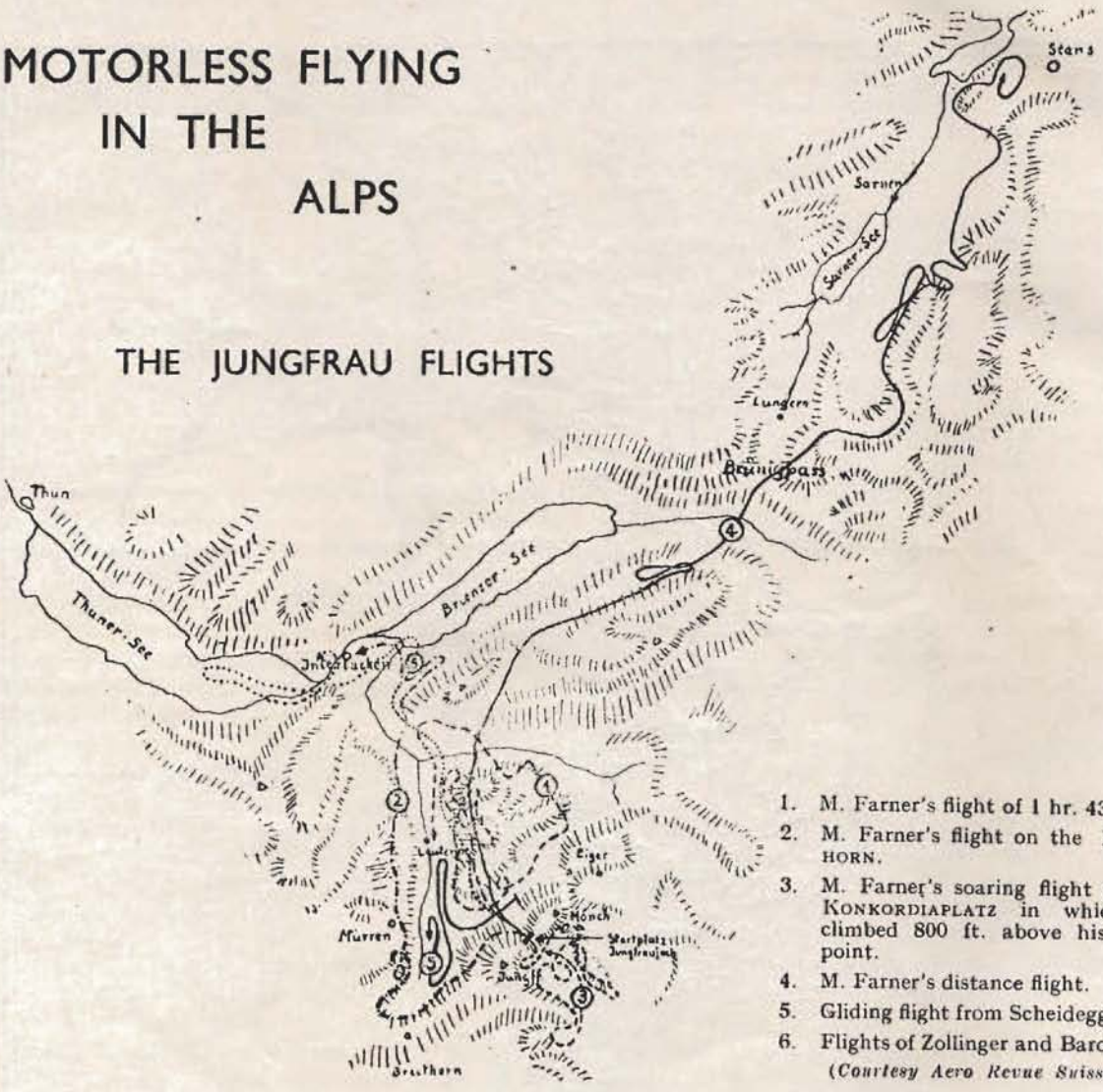
So ended for me an unforgettable flight, at 19.03 hrs., after 8 hrs. 23 mins., in the air, a flight during which the old ' Condor ' had reached the extraordinary average speed of 80 km. Unfortunately since I had started so unexpectedly there had been no barograph, which was a pity because it would have looked like an unusually jagged Mountain range and would have been interesting to reconstruct.

This flight only beat the previous record by 20 km., but it was in a new direction and so opened up new possibilities for other and longer flights with better and faster machines.


CORRIENTES
BRASIL
M. Caseros
Chasari
Concordia
Colon
C. del Uruguay
URUGUAY
SANTA FE
Santa Fe
Parana
ENTRE RIOS
Rosario
Gualeguay
Ibicuy
BUENOS AIRES
Merlo
Buenos Aires
La Plata
RIO DE LA PLATA
Montevideo
RUTA SEGUIDA POR EL PLANEADOR
RUTA INTERNACIONAL
FERROCARRIL

MOTORLESS FLYING IN THE ALPS

THE JUNGFRAU FLIGHTS



1. M. Farner's flight of 1 hr. 43 mins.
2. M. Farner's flight on the BREITHORN.
3. M. Farner's soaring flight to the KONKORDIAPLATZ in which he climbed 800 ft. above his start point.
4. M. Farner's distance flight.
5. Gliding flight from Scheidegg.
6. Flights of Zollinger and Baroni.

(Courtesy Aero Revue Suisse)

THE *Sailplane* has already reported the flights which Herr Groenhoff made in June of this year, from the Jungfrau in Switzerland, but the flights were so interesting that I believe a fuller description, which has been approved by Herr Groenhoff will prove of value.

The machine he used was the ' Fafnir,' the gull-like record-breaker frequently illustrated in this paper.

Some difficulty was experienced in finding a suitable terrain for the start. Owing to the depth of the snow it was impossible for the starting men to run, so it was decided to use ten men on each side of the double 40m. starting ropes. Even this large starting crew was unable to give the machine sufficient speed and when it was released it began by tobogganing over the ground.

The pilot endeavoured to pull it off but the tail of the ' Fafnir ' lies on the ground, which makes it extremely difficult to put a positive angle of incidence on the wings when the machine is being started down hill. It then ran through a stone wall and almost fell over a precipice. Herr Groenhoff tried again to pull the machine up, but found the elevators did not work.

The cockpit-covering of the ' Fafnir ' only provides the pilot with an 8 in. aperture on either side of the totally enclosed cockpit so that he was unable to look back to see what had happened to the tail. Again

the machine caught itself. Shortly afterwards it went on its nose again and the pilot decided to see if he could keep it there by pushing the stick forward. This he succeeded in doing and came to the conclusion that the elevator must be working to some extent and that therefore, the faster he flew, the more likely he would be able to control its flight, so he flew the machine at about twice its normal speed.

In spite of this the machine fell out of his hands at least a dozen times. On more than one occasion he thought he would have to jump with his parachute, and he prepared his camera to take a picture of the ' Fafnir ' as she spun down, but the prospect of losing the machine and landing amongst crevasses on the ice when he might be hurt and unable to move, deterred him.

He succeeded in bringing the machine to Interlaken, where he had to make a high-speed landing to prevent the machine falling out of his hands again. There he discovered that he had lost half of his elevator in the crash through the snow wall.

At the next start the machine left the ground, but the pilot felt his rudder pedals go forward together and immediately discovered he had no directional control over the machine. The aileron control of the ' Fafnir ' is effected by a bar on top of the stick and the pilot decided to attempt to turn the machine by making use of the flexible wings. When he wished to alter course to the left, he gave sharp right aileron by pulling the bar down and returning it as quickly as possible. This resulted in the right wing flexing and the thrust obtained by repeating this movement at frequent intervals was sufficient to permit the machine to be steered to some extent. The landing was made at Interlaken, where the machine was stalled down until the last moment, when a normal landing was affected. The pilot then discovered that the wooden block at the rear of the tail skid, which takes the hand ropes for the tail men at the start, had pulled out and taken with it the rudder.

The next start was normal and the flight ended at Interlaken.

The flight after this last one was particularly interesting in that the pilot had promised to attend the Berne Air Meeting and said that he might come by air. When the day came there was a South wind which under normal circumstances might have been expected to have prevented a start being made, as the flight was to be made in a Northerly direction. However, the appearance of the clouds indicated. that an eddy was being formed behind the mountain top. This proved to be the case and a North wind was found on the North side.

This enabled a start to be made, but the machine immediately encountered a terrific down-wind of 6 metres per sec. (19.6 ft. per sec.) through which, of course, the pilot flew as quickly as possible. On coming out of the down-wind he made a normal flight to Berne Aerodrome using the clouds he encountered after this. He arrived over the aerodrome at a height of 400 metres (1,300 ft.) and was lucky enough to find a cloud, which enabled him to give a demonstration of cloud-flying before a much-impressed crowd.

Several other starts were made, but the machine failed to leave the ground.

The pilot considers the ideal height to start is from 1,000 to 1,500 metres (3,280—4,920 feet). At such great altitudes as the Jungfrau, the air is too rare to lift the machine and the difficulty of finding a good starting-crew locally is almost insuperable. Furthermore, conditions appear to be unreliable. Sometimes it is only possible to soar near the mountains and at other times it is only possible to soar in the valleys.

On the whole the Jungfrau flights revealed the fact that high starts are not desirable.

Should anyone consider making further flights of this description, they are advised to use longer starting ropes, to see that the machine is so designed that the tail is well away from the ground and to make certain that the tail-rope cannot pull out and carry away any portion of the controlling surfaces. —ABEL ARD.

A SWISS EXPEDITION.

On June 10, of this year, some Swiss gliding enthusiasts of O.V.L., organised an expedition to the Jungfrau in the Bernese Alps. The object of the expedition was to investigate the possibilities of motorless flight at high altitudes. A similar expedition had already been made by the Austrian Aero Club in the Winter of 1929 to the Tyrolese Alps. It was on this latter expedition that Herr Kronfeld obtained some remarkable data.

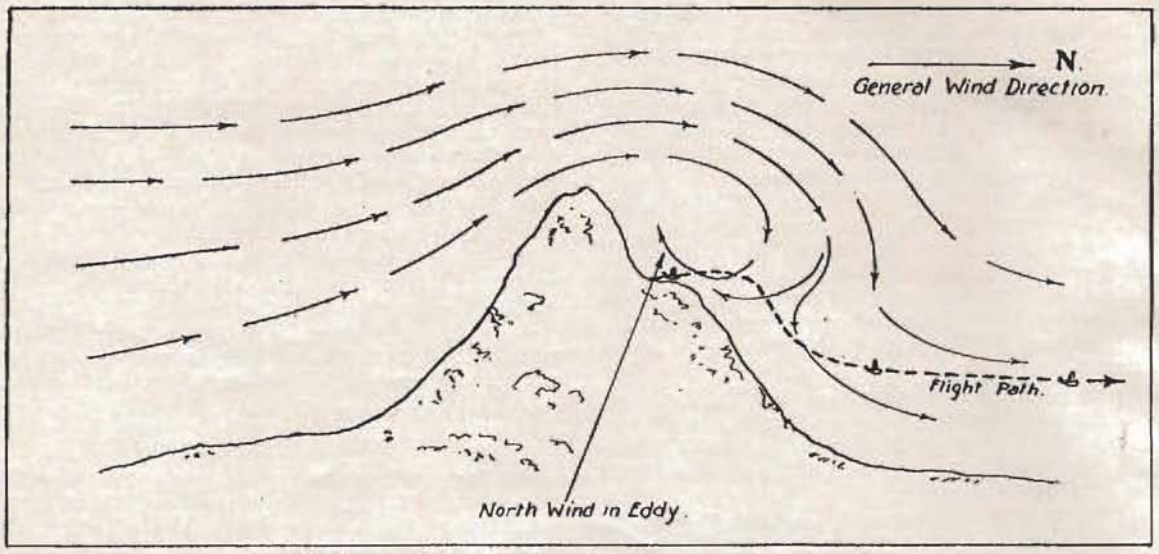
The Swiss enthusiasts chose the Jungfrau because there is a railway up the mountain to a height of 3,447 metres (11,300 ft.), which made possible the transport of machines right up the mountain. At the same time as the Swiss expedition, Herr Gunter Groenhoff, with his sailplane, the ' Fafnir,' had arrived at the same site with a view to making researches on behalf of the R.R.G.

The Swiss expedition explored the air-currents with the aid of small observation balloons and smoke-candles attached to parachutes.

On June 11, M. Farner started at 7.30 in the morning and soared for some minutes above the Guggi Glacier in a strong ascending current. He crossed the Tschedden and the Lauberhorn mountains in order to reach Grindlewald valley where favourable thermal currents enabled him to climb to about 500 metres (1,540 ft.). Continuing his flight towards the North, M. Farner found some new up-currents close to Interlaken which enabled him to climb towards the South and to land at Lauterbrunnen at the foot of the Jungfrau after a magnificent flight of 1 hour 42 minutes. This broke the Swiss record by three-quarters of an hour.

The following day the same pilot took off to investigate the thermal currents in the Lauterbrunnen valley. He was remarkably successful and maintained his height for more than a quarter of an hour after leaving the Jungfrau. He landed at Interlaken after a flight of 49 minutes.

As unfavourable winds made the take-offs very difficult, the Swiss expedition stationed two of their machines on the Schiedegg where MM. Baroni and Traxler made some instructive flights, notably those of M. Baroni in Truemmelen Gorge which is only some 300 ft. wide and bordered by rocky walls about 3,000 ft. high.



A diagram which shows how the pilot managed to take off.

The two outstanding flights of the expedition were that of M. Farner to Stans, a distance of 57 km. (35.4 miles), in which he flew across the Brunig col, and the flight of Herr Groenhoff to Berne, a glide of 58 km. (36 miles).

The last flight of the Swiss expedition was made by M. Zollinger who after leaving the Jungfrau, steered a course for Interlaken over which he obtained a height of 1,400 metres (4,600 ft.), by the aid of up-currents. From Interlaken the young pilot steered towards Lake Thuen which he flew over for a distance of 12 km. (7.45 miles) using the up-currents off the two banks. After this he returned to Interlaken having flown for 31 minutes.

The Swiss expedition discovered that take-offs in the rarefied mountain atmosphere are extremely difficult and the most careful preparations are necessary to avoid catastrophe. Generally speaking, such expeditions must be equipped with extremely rugged aircraft and the pilots must be widely experienced. There is an absolute necessity for an extensive ground organisation as every forced landing on a glacier which is made out of sight of an observation post might easily have fatal results in such desolate expanses of snow and ice.

'BEAVER' DRIVING

The following, reprinted from *The Lasham News Letter* we think will be of interest to all.

These thoughts are prompted, first by the failure of the ground handling manual to materialise, and secondly, as most people can drive a car, sooner or later they are flung into the ' Beaver ' without having much of a clue as to cable retrieving or the general procedure of ' Beaver ' driving.

The object of ' Beaver ' driving is cable retrieving and it is also equally true, though maybe not quite so obvious, that the ' Beaver ' driver has a greater effect on the rate of launching than anyone else on the field.

When you take over the ' Beaver ', it is then your responsibility and this ranges from running into things to running out of petrol.

The ' Beaver ' must never carry children or non-members and must always carry a mate. The former is a rule, the latter a necessity. The mate's main function is to watch the winch for signals during towing out, but apart from that, he or she can save appreciable time by saving the driver having to leave his seat for hitching on and off and replacing the wires on the rollers.

To return to the ' Beaver ' driver. Whilst a launch is in progress and if you are at the winch end, don't park in front of the winch. You distract the winch driver and may have the cable fall on the ' Beaver.' If two winches are being used, the cables will be pulled right in after each launch. If only one winch is operating and the cable is falling in the general direction of the launching point, the winch driver should leave it out to save wear and tear, and if this is happening consistently don't return to the winch each time, but wait some way up the field opposite where you think the cable will drop to save petrol, and on this subject, if you are going to be parked for any length of time, switch off the engine.

(continued on page 18)

RATE OF CLIMB IN AERO-TOWING

By BARRIE JEFFERY

ANYTHING that can be done to improve the rate of climb of a 'Moth'–sailplane combination will not only improve the economy and safety of operation but will also make for pleasanter soaring and glider training. The most spectacular method is the 'lifting tow,' tested in Germany ten years ago, in which the glider flies almost directly above the tug on a very short cable, carrying part of the weight of the tug more efficiently. The method results in tripled or quadrupled rates of climb, but as it was not generally adopted in Germany it seems safe to assume that the reported safety and ease of operation were over-rated.

Many months ago a few calculations and flight measurements were made that gave hope of more modest but still worthwhile improvements in rate of climb. The method was simply to design a special towing propellor. This propellor has not been designed yet, but these words are written in the hope that someone will soon get around to it.

The rate of climb and glide tests on the 'Gatineau Moth' fitted with a Granby propellor (80 in. diameter, 52.4 in. pitch) indicated a propulsive efficiency of about 50% at 55 m.p.h. An approximate calculation of propulsive efficiency by the S.B.A.C. standard method rendered a value nearer 60%. At any rate, the value is low. This does not mean the propellor is poorly designed, but only that it was designed for different operating conditions. The propellor sections appear to be the best possible compromise for the normal range of operation of the 'Moth.'

The calculations indicated that the following improvement in rate of climb is to be expected for an increase in propulsive efficiency of only one per cent:

'Moth' 1,600 lb.—23 f.p.m.

'Moth' and 600 lb. sailplane—16.5 f.p.m.

'Moth' and 1,100 lb. sailplane—13.4 f.p.m.

It seems likely that the propulsive efficiency could be improved 5%. The improvement in rate of climb for the above cases would then be 115, 82, and 67 feet per minute respectively, or nearly 25%. The saving of two or three minutes per climb would add up to twenty or thirty hours flying time for most club 'Moths' in a year—a saving of a hundred dollars in direct costs.

What would our towing propellor look like? It would be large in diameter (even as much as 9 feet, allowing 6 inches ground clearance with fuselage horizontal) and would preferably be narrow bladed and of moderate pitch. A more costly development would be to gear down the propellor and use three blades.

The 'Moth' with a towing propellor would have a very low top speed (in the 60's perhaps) and pilots would have to be specially warned about trying to climb at a higher speed than necessary in order to avoid loss of thrust. The 'Moth's' spin would have to be checked carefully: the negative thrust and gyroscopic effect of the large propellor might materially alter the recovery characteristics.

The rate of climb can be improved somewhat by reducing the drag and weight of the tug, for

$$\text{Rate of climb} = \frac{(\text{Thrust}-\text{Drag}) \times \text{Climbing speed}}{\text{Weight}}$$

The greatest single reduction in weight is achieved by only filling the fuel tank half full—a saving of 75 lb., which means 3% in the rate of climb. Considerable further weight saving results from removing the front seat and controls, duplicate instruments, navigation lights, and other odds and ends not in general use. If the convenience of a second seat can be foregone completely, a further weight (and drag) reduction would result from removing the canopy covering the front cockpit, and using a small windscreen or canopy for the pilot.

The boundary layer should not be forgotten, even on the 'Moth'—those grasshoppers and mud-splashes on the propellor and wings can materially reduce the performance. Another major source of drag is the wheels—but who ever saw a 'Moth' with wheel pants?

A large manilla tow rope has considerable drag; replacement by a wire rope should add a few feet per minute to the rate of climb.

While all these small improvements might add up to a 10% gain in rate of climb ($30 per year) improving the propulsive efficiency only 2% would have the same result—and maybe someone can give us a 10% improvement.

Reproduced from *Free Flight*.

'BEAVER' DRIVING—*continued from page 16*

Do remember, when you have hitched on the cable, to drive very slowly until the winch has given you ' ALL OUT.' Anything more than about 3 m.p.h. produces an incredible tweak at the winch end when the last of the slack is taken up. When you get the ALL OUT, wave your hand above your head to show that you have seen; and if you have to retrieve by yourself, look back occasionally. When you reach the Launching Point, slow down gradually, sudden braking will overrun the winch drums, and, when stopped, reverse a bit to ease the cables on the booms.

Don't loiter at the Launching Point, but get back to a suitable spot for the next retrieve, and incidentally, you may be able to save time by removing the Army cable if it has drifted across ours, but if you do touch it, keep it taut and don't let it kink. When returning up the runway, keep an eye open for the Army car to avoid interfering with their auto-tows.

If, when cable retrieving, it appears that a glider is landing toward you, go straight off to the side. If it is not landing towards you, but may land near you, stop and stay still until it has completed its landing.

A flashing GREEN light from the Launching Point means ' Come back to the Launching Point.' A steady Green means ' Come back to the Launching Point but bring the cable with you.'

Know how to mend a broken cable (Fisherman's knot and locking wire) and make sure you have locking wire and a hammer on the ' Beaver.' If a cable does break, the winch driver will wind his end in and it is for you to find the other end and tow it up to the winch.

Odd points include, taking Daisy or Pansy pushers up the field if they are landing some way up. If you remember, ask the Duty Pilot what the launches have been like, it helps the winch driver to know.

Finally, treat the ' Beaver ' as if it were your own car.

SOUTHDOWN CLUB COURSES

Southdown Gliding Club are holding a Gliding Camp, open to non-members, at Friston from August 15 to 22. The course will be limited to pilots of ' B ' standard and above. Cost £12. Write—Course Sec.: A. R. C. Lennard, 48, Arthurdon Road, London, S.E.4.

BREVITIES

Telefunken G.m.b.H., Berlin, have loaned three V.H.F. Radio telephone sets, type Teleport II to a Berlin gliding club operating with a ' Mu-13 E ' Bergfalke two-seater. It is frequency modulated and can operate in 156-174 m.c.s. band.

The January 1953 issue of the Quarterly Journal of the Royal Meteorological Society contains several papers of interest to sailplane pilots. ' Theory of airflow over mountains. II—The flow over a ridge ' by R. S. Scorer. ' Bubble theory of penetrative convection ' by R. S. Scorer and F. H. Ludlam, and ' Reviews of Modern Electricity—Atmospheric Electricity; some recent trends and problems ' by T. W. Wormell. The latter is recommended to all sailplane pilots who are interested in thermal detection from afar by means of its electro magnetic field. Considerable airborne research on atmospheric electricity was performed in the days of airships and we will be grateful to any readers who might draw our attention to papers relevant to the problem of thermal detection.

CORRESPONDENCE

SIR,

I read the editorial of your April issue with great interest, in particular the last paragraphs refering to a modern conception of Icarus's wings (written I suspect with the tongue in the cheek).

Some years ago I hoped to build a contraption of this type. It even got as far as the detail design stage, before I realised how dangerous and uncomfortable it would be for the pilot, and sadly I left it.

I should like therefore to voice some objections to your editorial suggestion, before others are carried away on a flight of fancy.

1. I think a large wing is inevitable. A low Cl. max. is unavoidable (probably less than 13), firstly because a small Cm. is desired, and secondly because of the low R.N. If one concedes your point about landing at 15 m.p.h., a wing area exceeding 250 sq. ft. is required. You might claim that ground effect could ameliorate this, but that would not be present if one jumped from a cliff top.

I had visualised a much greater landing speed. I have not the details of my scheme to hand, but I recall the wing area was about 50 sq. ft., span about 20 ft., and structure weight approximately 40 lb.; thus A.U.W. (including parachute) was about 200 lb.

2. To handle such a structure the pilot would need powerful, conventional controls. The design of satisfactory controls for a prone position pilot is a problem probably not yet satisfactorily solved.

3. I did not even consider using the legs as an undercarriage. (Try trotting around the average gliding site, and see how soon you get a sprained ankle).

4. Forgetting landing hazards, the prone position pilot is unfavourably located in the event of a cable snap. In my design I had considered twin tow hooks picking up near the pilot's hands (about a third of the semi-span out), but this does not solve the problem.

5. It is necessary to protect the pilot's limbs in case a gust or involuntary manoeuvre pulls the wings off, i.e., the pilot cannot be treated as part of the structure.

6. Instruments would be required, even if only a clock, variometer and compass. Ideally they should be about 18 ins. from the eyes—not easily accomplished.

7. It should be possible for the pilot to move and to reach his face with his hands (otherwise grit in his eye or an itching nose could be catastrophic). This I think the biggest snag in the ' magical flying suit ' you suggest.

I shall be interested in your reactions to these comments.

For my part, I hope to build a machine which would in some measure approach your ideal, as soon as I can afford the time and money . . . . but not on the Clem Sohn principle!—**R. Prizeman, Lanchester Hall, College of Aeronautics, Cranfield, Bletchley, Bucks.**

Reply :

My Icarus ideal is put forward quite seriously for a specialised form of soaring. It is based on the Japanese ' Tondokuro ' as a starting point. The use of the pilot's legs for running down a slope for take-off is essential to the conception but landings may be performed on a skid. Hence a stalling speed of 15 m.p.h. is highly desirable but a stalling speed of 19-20 m.p.h. would still allow it to be used in the desired manner, provided that very effective decelleration air-brakes or a minimum-lag tail parachute were available.

The design of really satisfactory controls for the prone position, is, to my mind very easy. Much more difficult is the design of a retracting skid and the ' bomb ' doors for the pilot's legs.

I quite agree that the pilot's arms may not be used as part of the structure, and for aerodynamic reasons the pilot's head must be encased in a perspex bubble windscreen.

The instrument problem is very easy, they can be located facing forwards under the pilot's chest and are viewed through a driving mirror, thus an effective distance from the pilot's eyes of 18-24 ins. can easily be achieved.

I am quite aware that a magical flying suit à la Klem Sohn or Icarus is not immediately attainable although it might emerge in the fourth or fifth generation of developments of the ' Tondokuro.' How about a smaller and lighter ' Fauvel 36 ' with the pilot prone and totally enclosed on top of the wing?—**O. W. Neumark.**

CORRECTIONS TO LAST MONTH'S ISSUE

The ' LO-100 Zwergreiher.' Other sources state that the cost without instruments is DM. 5,800 and in kit form DM. 3,100 and not DM. 250 (£23) as given by our first informants.

' Spatz,' performance, max. gliding ratio has been established as 1:25 or better. The figures 1:26-28 were quoted by us from one report which has not yet been confirmed. The actual finish of the sailplane might make considerable difference to the performance.

ACKNOWLEDGMENT

We are indebted to Hubert Zuerl's publication *Aero* of Munich for kindly allowing us to re-publish particulars of the ' LO-100 Zwergreiher ' and ' Kaiser Ka-1 ' in last month's issue and regret that no due acknowledgment was made in that issue.

NEW BRITISH GOLD ' C ' AND DIAMOND

We congratulate Lt.-Cdr. G. A. J. (Tony) Goodhart on his Gold ' C ' and Diamond Goal Flight of just over 300 km., from the Long Mynd to Leiston on the East Coast in Suffolk on Tuesday, 7th April, in a ' MU-13.'

NEWS FROM THE CLUBS

LONDON GLIDING CLUB ANNUAL DINNER

ON Saturday, 21 March, the annual dinner took place in the London Gliding Club's own club house. An excellent feast was provided by Mrs. Turvey who has been looking after members' gastronomic needs for the past twenty-three years.

Derrick Abbott's friends from Geraldo's Orchestra provided music for the dance which followed.

The guest of honour, a life member of the club, Mr. Phillip Wills, paid tribute to the past leaders of the club whose enterprise and foresight enabled present members to enjoy unique benefits ; possession of their own land, a magnificent club house and a hangar full of sailplanes and sufficient funds to operate effectively. Among the guests were the Captain of the Dunstable Golf Club and his wife, neighbouring farmers, Mr. and Mrs. Kay, representatives of *Flight*, *Aeroplane* and *The Times*.

Mr D. Smith, the C.F.I., and present Chairman of the club declared that 1953 would become a record cross-country year now that 1,500 ft. launches were obtainable on non-slope soaring days.

The House Committee can be congratulated on their winter programme of entertainment and enlightenment which culminated with this successful dinner.

IRISH GLIDING

A brief history by S. M. O'BRIEN.

THE first attempt at gliding in Ireland was made in the late 1890's in the grounds of Trinity College, Dublin. Professor George Fitzgerald built a ' flying machine ' about which little is known beyond the fact that it must have been very much heavier-than-air for, during its trials in College Park, it could not be enticed off the ground. It was later brought to a more open space in Sandymount, where several methods of launching were tried—including towing downhill by a bicycle ! All proved unsuccessful, and, as a last resort, the ' glider ' was hoisted to the top of a large hay rick, a jockey named J. Fiely volunteering to act as pilot. Thus was made the first crash-landing in the history of Irish aviation—the new-fangled machine, not well enough equipped to resist gravity, just toppled clumsily to earth breaking a wing, and convincing onlookers that there was no future in flying.

It was not until 1930 that serious interest in the

new sport spread to this island. In that year the Ulster Gliding Club was formed, and two years later one of its members, in a ' Kassel 20 ' sailplane made the first soaring flight, staying aloft for almost half an hour over Magilligan Strand in County Derry.

On St. Patrick's Day, 1934, the Dublin Gliding Club came into being. Its first item of equipment was the ' Reynard ' elementary training glider which the Ulster Club had been using, then a tow-car and cable were acquired, and six weeks after its founding the new Club held a flying meeting in a large field at Clochran (near Dublin Airport) where Primary training was carried on during the Summer of 1934.

Meanwhile, a second club—the National Gliding Club—had been formed, but had not reached the flying stage when in October, 1934, at a meeting in the Mansion House, Dublin, the two groups were amalgamated, and the first name the Dublin Gliding Club was retained. The merger instilled new enthusiasm into the movement. The ' Reynard ' glider which had been badly damaged towards the end of the Summer of 1934 was soon repaired and, whenever weather permitted, its flying wires were set humming during the Winter of 1934/35. In those far-off days, the price of a training glider ran to about £70 (including transport) while an advanced machine cost over twice that sum. These are formidable figures in 1934, and the only solution to the problem of finance was for the Club to build its own machines. This it proceeded to do in earnest. A workshop was provided in Foley Street, Dublin, and members contributed their share each of the one-thousand man-hours needed for the construction of a simple glider. By March, 1935, three machines were completed, one of which (a ' Scud ') was used to investigate possible soaring sites in the Dublin and Wicklow Mountains. Several flights were made over a promising ridge at a place called Lacken, which was later rendered unsuitable through the flooding of the Electricity Supply Board's Reservoir at nearby Poulaphouca. Unfortunately, at this auspicious stage in its development the Club lapsed into inactivity, and we must look elsewhere for contemporary interest in the sport.

In July, 1934, gliding enthusiasts in the Irish Air Corps had built an up-to-date training machine—a ' Dickson Primary,' which was followed in 1935 by a ' Grunau Baby.' Both machines were flown regularly at Baldonnel Aerodrome up to 1939 when the war grounded gliders everywhere. The then Air Minister for Defence, Mr. Frank Aiken, was keenly interested in the Club and in the promotion of gliding generally. He acted as Chairman of a meeting held in September, 1934, to form an Irish Gliding Association.

While the Baldonnel Club continued its activities and the Dublin Gliding Club unhappily lay dormant, members of the Volunteer Force formed a gliding unit, and carried out some elementary training on the site formerly used by the Dublin Gliding Club. Its development, too, was cut short in 1939.

This, briefly, is the history of gliding in Ireland in pre-war years. An outline of developments since 1945 was given in the Notes published in this journal in September, 1952.

ULSTER GLIDING CLUB

Easter Monday, April 6th.

Derek Murphy opened the season with a short soaring flight as soon as the tide went out. F./Lt. Stonham, R.A.F., and Duggie Cooper arrived from an A.T.C. Course at Limavady and each flew 30 minutes. Then Beck in ' Tutor ' and Liddell in ' Gull ' each had a grand time for 2¼ hours, landing just before dark. The wind came round to the North West and made Binevenagh possible. Cloud base was 2,500 ft. Two Ravens were very aggressive. One attacked Beck over Eagle Hill. Liddell over Binevenagh was watching and enjoying the fun until he looked up and saw a winged monster a foot above his own head.

These must be the same Ravens which were so active a year ago and apparently nesting in their old haunts.

W.L.

NEW ZEALAND GLIDING ASSOCIATION (Inc.)

Review of the Gliding and Soaring Activity in N.Z. in recent months.

THE year 1952 will undoubtedly retain an honoured place in the history of the sport in New Zealand. This year Club flying has recommenced in both islands after an unduly long recess caused by World War II. In the middle of the year, the Auckland Gliding Club's ' T.31 ' was test flown successfully, and since then has logged over one thousand flights for a total flying time of more than 70 hours. She has carried 75 people, 34 being pilot members and the remainder Associate members. There is keen competition among the pilot members to hold the ' T.31 ' duration and altitude records of the Club. At the moment the figures are 40 minutes and 3,200 feet respectively, but both are expected to be increased before the season is over. The Auckland Gliding Club has purchased an ' Eon Baby ' sailplane from the Midland Gliding Club in England and members are eagerly awaiting its delivery, so that they can experience the thrill of solo soaring, and not merely soaring under instruction.

The Canterbury Gliding Club's ' T.31 ' was test flown more recently—a little over a month ago, but from reports received its flying hours are mounting even more rapidly than the Auckland Club's two-seater. The airfield from which it is being operated at present is within only a few minutes' drive from the centre of Christchurch, so that it is quite possible for keen members to have some dawn flying and then appear at work at the required hour. By virtue of this circumstance, and also because the present method of launching is by aerotow, the logbook of the Canterbury ' T.31 ' is rapidly being filled. Future plans of the Canterbury Club include the overhaul of a winch, and the transfer of operations to an airfield outside the control zone.

A group in the Manawatu district has a ' T.31 ' kitset being shipped out from the U.K., and at the present time, while there is a possibility that a Club may be formed in Dunedin and that one or more of the Aero Clubs that have been forced to cease flying operations owing to high costs, may take up gliding.

The Association takes the view that now that Club flying has recommenced, the sphere of activity is bound to broaden.

Among the private owners there is a keen sense of competition that matches the enthusiasm of the Club members. The ' Prefect,' which has been flown in the Christchurch area for the past two years by S. H. (' Dick ') Georgeson, has been sold to Dr. Peter Renshaw of Dunedin. Both these pilots received their initial training at Dunstable, gaining Silver ' C's ' there, so that in a few weeks' time when they get together at a Gliding camp in the McKenzie country, even better performances than last year should be achieved. Before he parted with the ' Prefect,' Dick Georgeson took it for a second trip into a standing wave, and rose to 13,000 ft. Now, however, he has taken delivery of the ' Weihe ' that was formerly owned by the World Champion, Phillip Wills, and New Zealand records are expected to be set at a level nearer overseas standards.

The Auckland ' Olympia ' owners have benefitted from the recommencement of Club flying, as more willing helpers are on the spot to assist in getting the sailplane into the air. The ridge at Clevedon discovered by Ralph Court has proved to be a first class slope. It is about six miles from the airfield at Ardmore where the Auckland Gliding Club operates. The technique is to catch a thermal after an auto-tow launch, and then if the wind strength is suitable head off downwind to the slope. Eventually (with luck) the thermal conditions will improve sufficiently to allow the return flight upwind back to the airfield, thus saving a retrieve and the necessity for derigging. This has been accomplished four times within the past six or seven week-ends, so that it has almost ceased to be a matter of luck. The ' Olympia ' made its first Gold ' C ' climb last week-end, when Gordon Hookings took it to 11,500 ft. from a launch to 800 ft. He reported that everything went according to the text-book descriptions including the formation of ice on the leading edges, canopy and pitot head. Gold ' C ' distance will be more difficult to achieve from Auckland, and Diamond distance virtually impossible, but perhaps before twenty years have elapsed, as many radical changes will have taken place as have occurred in the past twenty years as far as New Zealand gliding is concerned.

The Christmas and New Year holiday period did not provide very good soaring conditions anywhere in New Zealand, but all the available gliders and sailplanes were kept in the air as much as possible. The most notable results were achieved at a camp held by the South Island enthusiasts at Irishman's Creek station in the McKenzie Basin. The Canterbury Gliding Club's ' T.31 ' two-seater and Dick Georgeson's recently imported ' Weihe ' were taken from Christchurch, while Peter Renshaw's ' Prefect ' made the 200 mile trip from Dunedin. The three machines in ten days logged a total of 53 hours, the ' T.31 ' contributing 27½ of these. Thus some valuable training and slope soaring was done, while the occasional thermal added interest, such as a climb of 7,500 ft. to cloud base by Peter Renshaw, and a four hour trip by Dick Georgeson most of the time between 8,000 ft. and 10,000 ft.

Since then some of the Canterbury Club's trainees have been sent solo on the ' T.31 ' so-that a single seater sailplane is now required as a follow-on machine. The Auckland Club have received their ' Eon Baby ' from the U.K., and several soaring flights have been logged. In the test flight, thermal conditions permitted Gordon Hookings to regain height after the 100 m.p.h. dive for instance and then go through the spinning and aerobatic tests in a leisurely fashion during the 36 minute flight. The same day the ' T.31 ' on a test flight after repairs made a cross-country trip from Mangere to Ardmore along the edge of a minor front. The distance is certainly rather short, but nevertheless 10 miles in an elementary trainer is a reasonable achievement, and delivery by air is much preferable to trailer towing. Half a dozen of the Auckland Club members have been promoted to the ' Eon Baby ' and the following have gained the first official ' C ' badges to be awarded in New Zealand :

No. 1. N. B. Grant.
No. 2. L. J. Perry.
No. 3. P. T. Chinnery-Brown.
No. 4. J. C. Harkness.

A notable flight was made recently by Ralph Court in the ' Olympia ' when he took off in a strong wind which was blowing directly from Ardmore on to the bush-clad Hunau ranges. Although there was a high cloud cover to dampen the convection a little, he was able to climb to 7,000 ft., and then turned across wind towards the Hauraki Plains. The low-lying damp soil there gave very little lift but he was able to get as far as Kerepehi, just short of Paeroa, a total distance of 39 miles from Ardmore. As this is only the second Silver ' C ' distance that has been recorded in New Zealand, it was a very creditable performance, especially in view of the conditions and the terrain.

Further opportunities to demonstrate the sailplanes have been afforded by recent Aero Club pageants, and the interest that is growing in the sport is reflected by the fact that eight gliders are now registered in N.Z., the letters ZK-GAH having been

---

allotted to the Manawatu Club for their ' T.31 ' kitset.

On the 8th February, Dick Georgeson made in his ' Weihe ' sailplane a soaring flight in standing waves from the Southern Alps which, subject to official confirmation, will raise the N.Z. gain of altitude record to 12,000 ft., and distance record to 90 miles. His description of the flight is as follows :

I left Harewood about 9.50 in heavy rain from high cloud of an approaching warm front from the North. Visibility to the North was limited, the sky in the North-West was full of lenticulars at a great height with a few roll clouds lying across the wind about 8,000 ft. About 15,000 ft. were a few isolated lenticular clouds.

Ground wind was Northerly, but as we left Harewood we came into the N.W. wind. The tow lasted about 45 minutes, during which time we climbed to 8,000 ft. and then lost 2,000 ft. I was hoping to reach a roll cloud ahead, but realised that we would probably encounter a big downdraught before we got to it. However at about 6,000 ft. we again encountered lift so I released. I gained a few hundred feet and then lost 2,000 ft. rapidly. On the way down I noticed a roll cloud close to the lee of a range of hills behind Oxford. The wind was at least 35 m.p.h. at this point. I therefore flew at about 80 m.p.h. towards the roll cloud, arriving within two miles of the range at about 4,000 ft. It seemed the wrong place for lift except for the cloud's indication. At 4,000 ft. I had decided to quit the area and fly out into the plains to find a landing spot if I did not get lift. At this point the air became very turbulent and I got two bumps with negative G. I then began to get patches of lift in rough air, and gradually climbed to 6,000 ft. Conditions smoothed out and all went well to 8,000 ft., when suddenly I lost it and before I knew where I was I was down to 4,000 ft. again. In desperation I tried flying towards the hills, and once again got lift but lost it at 6,000 ft. I again positioned myself and decided that this time I would not move from the spot. I flew dead into wind and at 45 m.p.h. remained stationary. I realised then that if I could get to 14,500 ft. I would just beat the existing record. Well, I got beautiful lift to 14,000 ft. when it stopped. My agitation was considerable until I again got lift and eventually got something over 16,000 ft. on the altimeter. I stayed at this height for some time, and could have got much higher except for lack of oxygen. I didn't feel bad but decided it would be unwise to go on.

The warm front had completely hidden Christchurch which was behind me downwind, but to the South visibility was superb. I could see Timaru over 100 miles away from my position over Lees Valley. I decided for Timaru, but realised that without lift I would not reach it. I arrived over the Ashburton river after about 35 minutes. I was down to 11,000 ft. and it was obvious I would not make it without further lift, so I headed in towards the hills again. This is where the ' Weihe's ' penetration is superb. I flew at 80 m.p.h. against a 45 m.p.h. wind. Once more I caught a lee wave and went from 9,000 to 14,000 ft., which gave me an ample margin for Timaru. I glided the 50 miles and arrived at Timaru with 4,000 ft. in hand. Total time in the air 4 hours 55 minutes approximately. In a few minutes there were at least a hundred people on the airfield and the inevitable happened. A small girl trod on the wing, luckily causing only minor damage.

I learnt a great deal from the trip, and found that other clouds than lenticular give lift providing they are stationary. But on a trip like that it is important to be comfortable, which I was not. With oxygen I might have got to a considerable height, although it would have been cold. Freezing point was 14,000 ft., at which height the inside of the canopy iced up.

This flight is an important one, apart from the raising of the N.Z. records. It is Dick Georgeson's second sortie into standing waves, the first also providing steady lift but of smaller proportions. On this occasion he has gained more experience and of course the ' Weihe ' is a more suitable aircraft than the ' Prefect ' he used on the first attempt. When the difficulty of obtaining oxygen free of water vapour is overcome he should be able to explore the waves from the Southern Alps to much greater altitudes. Measurements taken from the ground have shown that these waves extend to the 50,000 ft. level on occasions. Interest in the N.Z. waves has been shown overseas following the publication in the *Illustrated London News* and other journals of a photograph by Mr. L. L. White of a freak roll cloud over Middlemarch. Dr. Joachim Kuettner, a world authority on this aspect of meteorology, has written from the United States Air Force Cambridge Research Centre inquiring about conditions causing these wave clouds and it is likely that flights into the Southern lee waves will become more frequent in order to provide scientific data as well as to raise the local altitude records.

Review of Activities during February, 1953

The Auckland Gliding Club reports :

Two-seater :

Feb.	1	' T.31,'	42	circuits,	3	hrs.	21	mins.
,,	7	,,	50	,,	4	,,		
,,	14	,,	25	,,	2	,,	25	,,
,,	15	,,	45	,,	4	,,	40	,,
,,	21	,,	25	,,	2	,,	33	,,
,,	22	,,	43	,,	3	,,	9	,,
,,	28	,,	34	,,	1	,,	31	,,

Single-seater :

Feb.	1	' Eon Baby,'	16	launches,	1	hr.	53	mins.
,,	7	,,	24	,,	2	,,	17	,,
,,	14	,,	13	,,	1	,,	57	,,
,,	15	,,	21	,,	2	,,	51	,,
,,	21	,,	12	,,	1	,,	22	,,
,,	22	,,	18	,,	1	,,	49	,,
,,	28	,,	4	,,			16	,,

' Totals for the month : ' T.31,' two-seater 264 flights for 21 hours 39 minutes ; ' Eon Baby ' single-seater : 108 flights for 12 hours 25 minutes.

Longest flights of the month : ' T.31,' G. A. Hookings and A. Bright, 45 minutes on 14.2.53 ; ' Eon Baby,' J. C. Harkness, 37 minutes on 14.2.53.

F.A.I. ' C ' Certificates awarded during the month : NZ 5, A. Macdonald, 34 minutes on Feb. 15th.

NZ 6, A. E. Vause, 13½ minutes on Feb. 15th.

NZ 7, L. Wallis, 15½ minutes on Feb. 22nd.

The Canterbury Gliding Club reports :

Feb. 1. 'T.31,' 24 flights, 3 hrs. 15 mins., from aerotows.

Feb. 7-8. 'T.31,' 24 flights, 1 hr. 35 mins., from aerotows.

Feb. 22. 'T.31,' 19 flights, 3 hrs. 32 mins., from aerotows.

Total for the month : 'T.31,' 77 aerotow launches for 11 hours 59 minutes.

Total since 1 Nov., 1952 : 305 launches for 57 hrs. 12 mins.

Three club members have been trained to solo, one, F. M. Dunn, making a flight of 22 mins., on Feb. 22.

Royal Aero Club Certificates

(Issued under delegation by the B.G.A.) MARCH, 1953

CERTIFICATES 'A' .. 91 (15991-16081)
'B' .. 102
'C' .. 5
Silver 'C' 1
Gold 'C' —

'B' CERTIFICATES

No.	Name.	A.T.C. School or Gliding Club.	Date taken.
9057	D. R. Lowe	No. 89 G.S.	21. 3.53
9878	R. A. Laing	No. 130 G.S.	2.12.50
9998	E. J. Chandler	Wessex G.C.	16. 9.52
11651	M. F. Balchin	R.A.F., Halton	25. 2.53
13103	B. S. Jones	No. 68 G.S.	8. 3.53
13703	P. France	H.C.G.I.S.	27. 2.53
13908	G. G. White	H.C.G.I.S.	27. 2.53
13994	P. M. Rainbird	No. 104 G.S.	9.11.52
14895	G. C. Gatfield	No. 42 G.S.	8. 3.53
15407	T. Warren	No .26 G.S.	22. 3.53
15674	B. Kettlewell	No. 26 G.S.	8. 3.53
15814	J. T. Burrows	F.A.F., G.S.A., Western A.	18. 1.53
15822	B. F. Saunders	No. 142 G.S.	15. 3.53
15959	E. Elliott	Deeside G.C.	8. 3.53
15991	C. B. Kiddell	H.C.G.I.S.	14. 8.52
15992	D. J. R. Nicholls	No. 166 G.S.	9.11.52
15993	J. D. Burgess	No. 22 G.S.	18. 1.53
15994	P. A. Green	No. 89 G.S.	23.11.52

The privately owned sailplanes continue to operate in Auckland, Christchurch and Dunedin. J. R. Court's Silver 'C' distance flight in the 'Olympia,' and S. H. Georgeson's record height (12,200 ft. gain) and distance (90 miles) flight in the 'Weihe' have already been reported.

'B' CERTIFICATES *continued*

No.	*Name.*	*A.T.C. School or Gliding Club.*	*Date taken*
15995	B. K. Jennings	No. 141 G.S.	28. 9.52
15996	D. K. Payne	No. 123 G.S.	22. 2.53
15999	B. P. Pamplin	H.C.G.I.S.	27. 2.53
16000	L. A. E. Glover	No. 89 G.S.	25. 1.53
16001	B. Hedgecock	R.A.F., Sylt	28. 2.52
16002	J. L. Smith	No. 146 G.S.	1. 3.53
16003	G. Brunton	No. 31 G.S.	1. 3.53
16004	D. H. Dale	No. 166 G.S.	8. 2.53
16005	A. J. Ridley	No. 146 G.S.	1. 3.53
16006	M. A. Leonard	No. 68 G.S.	1. 3.53
16007	R. L. Mitchell	Salisbury G.C.	22. 2.53
16008	M. W. Meadows	No. 106 G.S.	22. 2.53
16009	J. A. Breckell	No. 186 G.S.	25. 1.53
16010	J. E. Covill	No. 105 G.S.	28. 3.53
16011	R. Emeny	No. 2. G.S.	1. 6.52
16012	B. Goldstraw	No. 45 G.S.	9. 3.52
16013	M. G. Harwood	No. 48 G.S.	1. 3.53
16014	D. G. Holton	R.A.F., Halton	28. 2.53
16015	T. R. Inger	No. 45 G.S.	22. 2.53
16015	R. G. A. Mundy	R.A.F., Halton	25. 2.53
16017	P. R. Jenkins	No. 89 G.S.	11. 1.53
16018	K. S. Staines	No. 104 G.S.	22. 2.53
16019	P. J. B. Wilby	No. 104 G.S.	22. 2.53
16020	E. A. Allan	Scharfoldendorf	5. 5.51
16021	T. G. Shipton	H.C.G.I.S.	27. 2.53
16023	C. W. Oliver	No. 104 G.S.	12. 4.52
16024	J. P. S. Thompson	No. 43 G.S.	8. 3.53
16025	M. J. Crosby	No. 168 G.S.	11. 1.53
16026	R. J. D. Jones	No. 2. G.S.	8. 3.53
16027	R. C. V. Skinner	No. 43. G.S.	8. 3.53
16028	B. S. Grieve	No. 186 G.S.	8. 3.53
16029	D. Holcroft	No. 186 G.S.	8. 3.53
16030	K. J. Fuller	No. 104 G.S.	8. 3.53
16031	D. A. Eaton	Moourakers G.C.	4. 3.53
16032	R. V. Snook	No. 123 G.S.	8. 3.53
16033	W. B. Hill	Deeside G.C.	8. 3.53
16034	A. M. Phin	No. 1 G.S.	22. 2.53
16035	M. A. Weavers	No. 104 G.S.	8. 3.53
16036	B. E. Purser	No. 146 G.S.	7. 3.53
16037	T. A. Harrison	No. 45 G.S.	22. 2.53
16038	A. J. B. Jackson	No. 105 G.S.	9. 3.53
16039	R. K. Postlethwaite	No. 122 G.S.	15. 3.53
16040	B. G. Crossin	No. 130 G.S.	19. 4.52
16041	J. Dennard	No. 130 G.S.	17. 8.52
16042	R. D. G. Lee	Ni. 130 G.S.	23. 2.53
16043	J. R. Guest	No. 203 G.S.	14. 3.53
16044	D. E. Ison	No. 125 G.S.	15. 3.53
16045	J. Morris	No. 106 G.S.	15. 3.53
16046	D. A. Harper	No. 141 G.S.	15. 3.53
16047	R. C. Smith	No. 143 G.S.	15. 3.53
16048	P. S. Summers	No. 125 G.S.	15. 3.53
16049	F. H. Tongue	No. 49 G.S.	8. 3.53
16050	I. Blair	No. 1 G.S.	27. 7.52
16051	T. J. Briley	No. 168 G.S.	15, 3.55
16052	T. Canham	No. 106 G.S.	15. 3.53
16053	S. T. Heath	No. 87 G.S.	8. 3.53
16054	A. Price	No. 166 G.S.	23. 7.52
16055	R. H. V. Dudley	Surrey G.C.	15. 3.53
16056	D. E. Locke	No. 68 G.S.	28.12.52
16057	B. P. Cooper	No. 161 G.S.	15. 3.53
16058	J. Hollas	No. 1 G.S.	21. 9.52
16059	P. J. Forde	No. 183 G.S.	26.10.52
16060	G. D. Taylor	Bristol G.C.	11. 5.52
16061	B. Ludlam	No. 122 G.S.	1. 3.53
16062	N. J. Follett	No. 168 G.S.	15. 3.53
16063	L. S. Poulton	London G.C.	14. 3.53
16064	M. Young	No. 105 G.S.	8. 3.53
16065	J. R. Tudgey	Bristol G.C.	22. 3.53
16066	J. L. Whitehead	No. 168 G.S.	18. 1.53
16067	C. E. Goulding	No. 83 G.S.	8. 3.53
16068	K. C. Lush	No. 104 G.S.	1. 2.53
16069	W. S. Bennett	Deeside G.C.	18.10.52
16070	J. M. Aitken	No. 106 G.S.	22. 3.53
16071	M. J. Bindon	Bristol G.C.	22. 3.53
16072	E. N. Finch	No. 125 G.S.	15. 3.53
16073	J. B. Molloy	Perak F.C.	20. 5.51
16074	G. C. Simpson	No. 2 G.S.	24. 8.52
16075	D. H. Vyse	No. 31 G.S.	15. 3.53
16076	G. Carmichael	No. 188 G.S.	15. 3.53
16077	L. E. Fletcher	Coventry G.C.	7. 2.53
16079	M. J. Green	No. 49 G.S.	15. 3.53
16078	V. B. Godrich	No. 49 G.S.	22. 3.53
16080	J. C. G. Kerr	R.A.F. College, Cranwell	2. 7.50
16081	D. S. G. Jackson	No. 141 G.S.	15. 3.53

'C' CERTIFICATES

No.	*Name.*	*A.T.C. School or Gliding Club.*	*Date taken.*
12030	B. W. Townsend	No. 146 G.S.	15. 3.53
13829	E. R. Bastin	No. 125 G.S.	8. 3.53
16020	E. A. Allan	Scharfoldendorf	26. 8.52
16060	G. D. Taylor	Bristol G.C.	25. 5.52
16073	J. B. Molloy	Perak F.C.	15.12.52

SILVER 'C'

No.	*Name.*	*A.T.C. School or Gliding Club.*	*Date taken.*
409	M. R. Bishop	R.A.F.G.S.A.	18.1225.

The aeroplane

The Vickers Viscount 701. Soon in use with B.E.A. on busy Continental routes. This great airliner was not only the first turbo-prop aircraft in the world but also the first prop-jet aircraft ever to carry passengers on scheduled services. Wing Span: 94'. Length: 81'. The Viscount is powered by four Rolls-Royce Dart engines.

the pilot

Though his flying career began as recently as 1939, G. R. Bryce has already handled over 45 different types of aircraft and logged more than 5,000 flying hours. Served during the War in the R.A.F. with Fighter, Coastal and Transport Commands, subsequently became a member of the King's Flight, finally joined Vickers-Armstrongs in 1946. At the controls of the Tay Viscount on her maiden flight. Responsible for all development flying on the Valiant. G.R.B. has been Chief Test Pilot at Weybridge since 1951. Of Shell and BP Aviation Service he remarks, "The crews know their jobs inside out — there's never a moment wasted."

Shell and BP Aviation Service

When a Shell and BP crew is on the job, a pilot knows he can leave all his refuelling worries entirely to them. After a tough session testing aircraft, that can mean a lot. Test pilots appreciate this unfailingly first-class service. So do aircraft manufacturers. So do operators in almost every field of flying. Whatever their refuelling needs, they know they can trust Shell and BP Aviation Service to meet them — every time.

SHELL-MEX AND B.P. LTD., Shell-Mex House, Strand, London, W.C.2. Distributors in the United Kingdom for the Shell and Anglo-Iranian Oil Groups.