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QUARTERLY

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GLIDING

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CONTENTS

TITLE	AUTHOR	PAGE
World Championship Prospects		146
A New Condor	*F. Costin*	147
Over-to-Youmanship	*K. E. Machin*	148
Correspondence	*L. Wright*	149
The Schweizer 1-23D.	*H. C. N. Goodhart*	150
France Leads the Way	*F. Hoinville*	153
Doppelraab in Parts		154
A New Approach Suggested	*P. A. Wills*	155
Gliding Certificates		156
Another Cloud Street	*U. Radok*	158
B.G.A. News		159
World Championship Programme		160
Airspeeds and Fumble Factors	*J. C. Neilan*	162
Soaring Instruments	*A. D. Piggott*	166
On Finding a Thermal	*P. Temple*	167
Long Mynd Waves Summarized	*J. H. Hickling*	169
North Wind Wave	*J. H. Hickling*	170
South Wind Wave	*R. H. Prestwich*	171
The Airspeed Indicator	*T. R. Beasley*	172
Five Hours Over Lasham	*C. G. Dorman*	177
Reviews	*L. Welch, A. E. Slater*	178
An Early Test Flight	*L. Wright*	180
Air Training Corps		180
Clubs and Associations		181

Cover Photograph.—An Eagle soaring in the Pyrenees, photographed from a sailplane, Reproduced from "On Being a Bird", by Philip Wills, by courtesy of the publishers. Messrs. Max Parrish.

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Fifty Years of Mechanical Assistance

FIFTY years ago Wilbur and Orville Wright added a motor to their glider. The device was tried out successfully for the first time on 17th December, 1903 : hence the aeroplane. Since then, a great many people have suggested adding a motor to a glider, under the impression that it is an ingenious and original idea which would have been carried out years ago if only it had occurred to somebody. They are invariably surprised at being told that the Wright brothers had already thought of it by 1903 ; still more so if you point to an airliner or fighter passing overhead, remarking, "There, what did I tell you ?"

Twenty years after the Wrights' first flight, the nature of their achievement was so far forgotten that a competition for "motor gliders" was organized. Naturally enough, history merely repeated itself ; the motive power soon grew to the 60 h.p. of the early "Moth", and has continued to grow thereafter. In fact, a flying machine with the power of the Wrights', which was originally called an aeroplane, had by then become classified as a "light" aeroplane. Now it is called an "ultra-light", so that aviation history is all set for another repetition, and it will not be long before one more qualifying adjective will be needed.

The fact must be faced that sailplanes and aeroplanes serve wholly different purposes. Some 70 years ago S. P. Langley, having proved to his satisfaction that there is enough turbulence in the wind to sustain a flying machine by means of dynamic soaring alone, prophesied that when aeroplanes came they would fly almost entirely by this means, and only resort to motive power "in exceptional moments of calm". He proved a false prophet, and it was psychology that let him down : who is going to refrain from using a motor, once it is installed ?

Of course, there is that compromise, the "auxiliary-engined sailplane". It is as easy to make a list of the things it could do, if only somebody else would build and fly one, as it is to compile a list of articles suitable for publication in GLIDING, if only somebody else would write them. But what happens in practice ?

There was the Carden-Baynes auxiliary sailplane of 1935. It was bought by a power pilot, who took off from the London Gliding Club towards the hill against an east wind, got into trouble in the "unexpected" downcurrent, and a few moments later stepped out of a mass of wreckage. Such machines have practically never been used for their intended purpose, and the reason seems to be that soaring loses its savour when there is a motor waiting to be turned on in "exceptional moments of calm"—in this case vertical calm rather than horizontal.

In the last year or two, the Nelson Humming-bird has actually been used by a few pilots in America as an auxiliary sailplane. When such machines are produced in quantity, and their log-books show that they do as much soaring as the average sailplane, we shall believe they have a place to fill in the aviation world which not even the Wright brothers pioneered.

World Championship Prospects

THE British Gliding Association has received encouraging replies from countries wishing to come to the World Championships to be held in Derbyshire in 1954. Twenty-one nations have already written to say that they hope to attend, so with the addition of Great Britain there should be 22 represented.

The following will be bringing two-seaters (some of them interesting new types) as well as single-seaters: Austria, Egypt, France, Germany, Netherlands, Spain, Switzerland, U.S.A. and Yugoslavia. Single-seaters only will be brought by Belgium, Denmark, Finland, Iceland and Sweden. Then Israel, New Zealand and South Africa will come if they can hire sailplanes, and Egypt, Finland and Sweden want to hire sailplanes as well as those they are bringing; these countries want to rieh cars and trailers as well, and so do Austria, Belgium and Yugoslavia, while the U.S.A. team wants to hire six cars. Canada and Italy hope to come, Argentina and Brazil are believed to be coming, but Monaco, Norway, Portugal, the Saar and Colombia have written that they will be unable to take part.

As some countries, owing to distance or peculiar transport difficulties, will be unable to bring their own aircraft, the Organisers are asking Clubs and private owners to put themselves as drivers, and their equipment, at the disposal of the competitors. Such cars, trailers and gliders will be covered by contest insurance. Please lend your glider if you possibly can; we are the host nation and we want to show that we can do a first-class job. Your generosity may enable high-performance gliding to get really going in some new part of the world, by giving representative pilots the chance to fly in a World Championship.

It is now general knowledge that all launching will be by winches as was done at Samedan. Sufficient winches will be available, including some of over 100 h.p. to deal with the big two-seaters.

As the Camphill site is on the top of a hill with two soaring faces, west and south, it is possible to get gliders up into the soaring wind quickly with short launches. In other wind directions (N. and N.E.), which give unstable soaring weather but no slope, it is possible to obtain high enough launches to reach thermal lift. Winch launching, apart from enabling the contests to cost less, is more practical than aero-towing at Camphill owing to the slight undulations of the ground.

Also of interest to our visitors: as the visibility in the middle of England is sometimes not as good as we have become used to in previous World Championships, it is advisable that gliders should have clear-vision panels in the windscreen.

The organisers will endeavour to arrange tasks so that on at least some days it will be possible for competitors to get together after flying with time to talk and get to know each other, or in many cases to renew previous friendships. In this respect, if competitors like to bring with them short films of their national gliding, these may add to the opportunity of exchanging news and views.

NATIONAL CHAMPIONSHIPS

THE Kemsley Cup has been awarded to the London Gliding Club for its entry No. 16 in the 1953 Championships, an Olympia flown by C. P. Ellis and G. H. Lee, which earned the highest number of marks in the Team Class.

The Council of the British Gliding Association has decided that, in view of the World Championships, there will be no British National Championships in 1954. However, it wishes to encourage and support any rallies which Clubs may wish to hold which do not conflict with the international meeting.

EASTER RALLY

The Midland Gliding Club announces its intention of holding a Rally at Long Mynd, Shropshire, during Easter, 1954, Friday, 16th April being a practice day, with 17th, 18th, 19th and 20th as competition days.

The competition, as last year, will take the form of a Task Flying contest: handicapping rules and marking as for International contests. Early applications to the secretary are desirable.

A New Condor

by Frank Costin

THE idea behind this aircraft is to provide a performance approximately the same as the Prefect, with a sinking speed slightly higher.

It is ply-covered, apart from the area inboard of the aileron and aft of the rear spar. The wing, as usual, is the interesting part; at the roof it is Göttingen 426 (modified), changing linearly to a special section at the strut pickups, changing once again linearly to N.A.C.A. 64-110 at the tip. This special section has a 4.28 per cent camber at 44.5 per cent chord (rather like one of the Joukowski aerofoils).

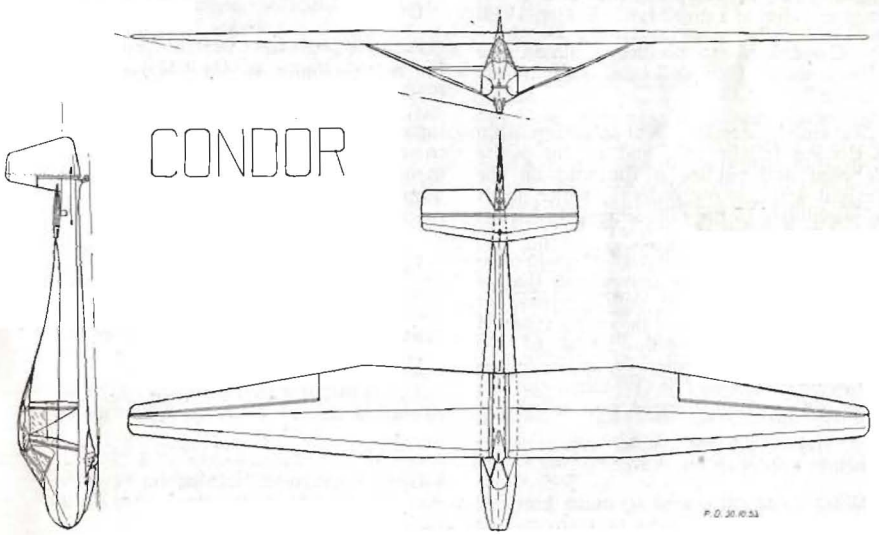
An attempt has been made to provide effective ailerons as, generally on a two-seater, these are inclined to be soggy—hence the differential can be varied by ground adjustment quite quickly and has a range of 1.85 : 1 to 1 : 1. At present these work very well indeed and the circuit has been designed to obtain high stiffness from the pilot's hands to the tip of the aileron.

No dive brakes are fitted, but the spin 'chute for A.R.B. trials will be retained to serve as an emergency brake. The struts have been made of laminated selected hemlock instead of spruce, in order to obtain a high t/c ratio.

Span, 44 ft. 6 ins.; area, 150 sq. ft.; aspect ratio, 10.4; length, 23 ft. 9 ins.; empty weight (at present) 418 lbs.



Frank Costin (front) and Peter Davis in their "Condor". Photo by G. T. Crouch.—*Courtesy "The Aeroplane".*



Over-to-Youmanship

by Ken Machin

THE enthusiastic reception which was accorded to the introductory article (Ref. 1) by the Chairman has encouraged —nay more, compelled—the British Glidermanship Association to widen its scope to fresh woods and cornfields new. One of the latest moves, announced in the B. Glp. Ass. circular from Londonderry House, Yeovil, has been the setting up of a Technical Committee, whose primary function is the issue of Certificates of Glidermanship. Attached to this committee in a loose way are certain technical advisers on specialist subjects; as one of these loose advisors, I have the honour to present my first effort.

This report (Ref. 2) covers the progress which has been made so far in applying that marvel of technological skill, the radio-telephone, to Glidermanship. This branch of the subject I have named Over-to-you-manship (Ueberzudirmannschiff) (Ref. 3). Needless to say, there is considerable opposition by conventional Glidermen to these new-fangled inventions, with the result that a whole host of counter-ploys has been developed. Typical of these is T. Goodbeard's counterploy; the scene is the briefing room at Long Mynd, Easter, 1953.

> Goodbeard (to his crew): "You just press on to Camphill, and wait for me there."

But slowly, steadily, Over-to-youmanship is driving in the thin end of the white elephant and gaining a foothold on the straight and narrow staircase which leads to popularity in the Glidermanship Movement.

In the first application of Over-to-you-manship which will be considered, that of cross-country flying, it would appear at first sight that radio must inevitably increase the fundamental One-down-ness of the Retrievedman. Consider, for example, the following situation. The Gliderman has just burst out of cloud inverted, and hears:

> "Hello, Gliding Able, report your height and position. Over."

What more calculated to make him feel One Down? But see how he recovers, see how he applies the knowledge at his week's course*:

> Gliderman (hoarsely): "Hello, Gliding Control, I hear you strength one, very distorted. Over."

This brilliant counter is known as the Welch gambit, as it was first developed by our Merionethshire group.

The advent of radio has been hailed by the ever-increasing band of Retrieverwomen, for it gives them at last the upper hand, the perfect answer. No longer can the Glider-man use the You-knew-I-wouldn't-get-back-you-ought-to-have-brought-the-trailer-manship ploys; the birds, bees and flowers (Ref. 4) have now to look elsewhere for inspirees, as the new direction-and-intention-finding equipment is brought into use. But Glidermen need not despair: they hold the trump card, still. What feminine mind can cope adequately with this sort of reply?

> Retrieverwoman: "Hello, darling, where are you?"
>
> Retrievedman: "Am now at map ref-erence three two seven, six one eight. Over."

All such ploys have been distinguished by the generic name of Over-to-you-darling-manship.

As a final example of how radio is redress-ing the balance and enabling the Gliderman to stay One Up, let us illustrate one of the gambits (regrettably becoming rarer these days) of the sub-section I-was-in-the-war-manship.

> Retrieverman: "Can you tell me how high you are?"
>
> Gliderman: "Gliding Control from Gliding Able, Rrrroger, wilco. Am now at angels one fife, I say again, one fife. Able to Control, over."

Let us turn our thoughts now to the other proposed use of radio in Glidermanship

---

* Open to anyone, training up to B. Glp. Ass. "B" certificate standard, only 73 gns., inclusive of accommodation.

Clubs—as an aid to training. Hitherto, when a pupil went solo, he inevitably got a tremendous feeling of being One Up; this has had to be corrected by returning him occasionally to the state of Two Up. With radio, however, the pupil can be kept for ever in the state of One-down-ness which his early training engenders. For instance, let us take this example of Infallibility Ploy, on which all good Instructormanship is founded:

Instructorman: "You are flying with three degrees of slip. Over."
Pupilman: "But the ball is in the middle!"
Instructorman: "You should know that the ball always sticks. Out."

The pupil is rattled; in all probability he will now undershoot and prang into the boundary fence. This will enormously increase the Instructorman's feeling of One Up.

It is proposed in certain quarters to use tape recordings of a newly-appointed instructor's patter in evidence against him. This procedure is unanimously condemned by the Technical Committee, who feel that it must inevitably introduce certain undesirablemanships into the Movement. For instance:

Instructorman: " . . . and as you join me here in Bluebell, the pupil is about to stall. His nose comes up—his left wing drops—oh, well saved, sir! A masterly recovery. And now as I speak, he comes up to another stall—he stalls, and it's a fast one this time—and *he's out*! His parachute opens, and as he floats peacefully earthwards, we return you to the studio, with the reminder that Fumbleworthy's Safety Harness is the strongest, comfiest harness that money can buy."

A new department of Glidermanship Accessories Ltd. (Ref. 1) has been opened to supply the needs of this lusty new branch of the Movement. The stock list so far includes the following:

(1) Dummy radio aerials to fit on your car roof.

(2) Empty walkie-talkie cases to be worn by gliding wives when they are photographed by the Press.

(3) Records saying: "I am now at forty-five thousand feet. Over." for playing in the trailer park at the Championships.

These are all available at 13 gns. each, or any two may be had in exchange for a complete set of gliding stamps.

I feel that there is no better way to conclude this report than to quote what is undoubtedly the finest Over-to-youmanship gambit which has yet come to my notice. It embodies all the soundest principles of Glidermanship, togather with that touch of genius which distinguishes a true artist. It is due to Bloggs, J., Corporal, A.T.C., and runs:

"Come over to my thermal, Philip, I've finished with it."

References

(1) Wills, P. A. *Gliding*, Vol. 4, No. 2, p. 52.
(2) Machin, K. E. *Gliding*, Vol. 4, No. 4, p. 148
(3) Cassell's School German Dictionary, pp. 153, 227, 254, 133, 196.
(4) Lasham Book of Folk Song, p. 270.

Correspondence

"GLIDING—TILL NOW"

Sir,

May I report progress with this film, which will be printed a few months hence and made available to clubs through the B.G.A.

I have been able to include some good material from the Derby and Lancs., London, Midland and Oxford clubs. But as the story now stands, the Army, Bristol, Cambridge, Southdown, Surrey and Yorkshire clubs might never have existed. I can not believe that nobody has any films showing typical activities at these clubs. Will somebody please make the necessary effort? (My letter in GLIDING for Autumn, 1953, gives details).

I have put out an appeal to overseas gliding-photographers who may bring material with them to the International meeting. Can anybody with contacts abroad help further here?

It is a good film as it stands, but could be much better.

LAWRENCE WRIGHT.

The Schweizer 1-23D

by Nicholas Goodhart

THE latest high-performance sailplane produced by the Schweizer Aircraft Corporation, the 1-23D, achieved outstanding success in the 20th United States National Soaring Contest, the three entered being placed first, third and fourth. It was, therefore, with considerable alacrity that I accepted Paul Schweizer's offer of a flight in the one in which he achieved third place in the championship.

The machine is an improved version of the standard all-metal sailplane, the most significant difference being an addition to each wing-tip which raises the span from 43 ft. 10 ins. to 50 ft. It is interesting that the aileron has not been extended and consequently ends about 3 ft. 6 ins from the wing-tip. In order to maintain the factors, the main spar has been beefed-up. Other than that, there is a close resemblance to the standard 1-23. The whole aircraft is flush-rivetted and, assisted by an excellent filling and painting job, presents a beautifully smooth exterior, though I am told that laminar flow is not ever expected to any appreciable extent.

The cockpit is huge by European standards (even Wally Kahn fully panacea'd would be comfortable) and has an adjustable back-rest. There are even arm-rests. One is, of course, horrified at the frontal area, but let's leave that until we get to performance. The most outstanding feature of this cockpit is the broad expanse of Perspex with no sharp curvature, which gives one an undisturbed view like standing on top of a lighthouse.

The instrument panel is adequately sloped to permit a square view of the instruments, and since the canopy extends down to the panel there is plenty of illumination. The instruments fitted were A.S.I., sensitive altimeter, turn indicator with ball-type slip indicator, compass, a Cosim variometer connected to a Cosim total-energy venturi, a plain Cosim, and a "Memphis" rate-of-climb. This latter instrument is a standard aircraft rate-of-climb modified so that a needle movement of about ¼ in. represents 100 ft./min. The A.S.I. is connected to a forward-facing pitot which is situated in a nose orfice which leads to the cockpit ventilator. This arrangement appears to nullify the advantages of the non-icing nose pitot, though Paul MacCready states that his did not ice up during several climbs above freezing level. Icing was not, however, severe.

Behind the cockpit is a large amount of stowage space for the inevitable impedimenta—radio, barograph, oxygen equipment, etc.—and what is perhaps even more important, the maximum gross weight permits practically unlimited expanse in this field without any qualms.

Like all American sailplanes the 1-23D has a wheel with a nice fat tyre on it which gives a very smooth ride (even if one does hit the fence in short fields). There is also a small hard-tyred and unsprung tail wheel. The main wheel is fitted with a rather elementary brake operated by the air-brake control, of which more later.

The tow hook is external and contrasts with the general aerodynamic cleanliness.

Flying Qualities

I was still recovering from my surprise at the curious collection of noises which emanated from all over the machine whilst rolling on the ground, when we became airborne and suddenly all was peace and quiet—that is, if you ignore that noisy powered aircraft grumbling away out in front.

Even on tow it was apparent that the 1-23D is a thoroughbred; the controls were light with very little friction and smooth force-gradients, and the response was a joy to feel. In addition, elevator and aileron were beautifully harmonised. Rudder, like the other controls, was pleasantly responsive but a good deal heavier, a condition which I consider ideal, particularly since rudder angles were seldom required.

At about 1,800 ft. we released in a weakish thermal, and it was an enormous pleasure to snap into a tight right-hand circle with no difficulty in picking up the required speed of a touch over 40 m.p.h. It was immediately obvious that, in addition to the excellent response of the ailerons, the rate of roll was high and the adverse yaw very slight, only small amounts of rudder



Nick Goodhart getting into the 1-23D.

being required to enter the turn and little or none being required in the turn.

On entering the thermal the total-energy vario did not behave as it should, and I devoted a short time to feeling behind the instrument panel for the venturi pipe which had apparently become disconnected. The machine was so comfortably installed in the turn that there was no difficulty in maintaining it while I got the pipe reconnected.

By this time we were up to 4,000 ft. and it was time to try some of the high speed performance, so we straightened up and pushed up to 90 m.p.h. There was a very considerable whistle from behind the cockpit, which I am told disappears if the access door to the roof fittings is taped up; even so, at this high speed there was a delicious sensation of being, as it were, sliding along on ice, so shallow was the angle of descent.

Soon we hit a thermal and the total-energy vario really showed its worth as we whipped into a very tight left-hand spiral climb which got the speed down in about one turn. It was incredible how much real pleasure could be obtained from just the feel of such superb handling qualities. While working this thermal I was very impressed with the Memphis rate-of-climb which was very sensitive and apparently indicated appreciably before the Cosim.

At 5,000 ft.—cloud base—the thermal petered out, and besides there were several things such as stalls and aerobatics to do before my allotted hour was up, so we headed out into the clear to try the stalls. Stalling speed was about 33 m.p.h. (indicated) and the stall was straight, there being just the right amount of stall warning in the form of pre-stall buffet. Perhaps the most significant point was that all controls remained fully effective right up to and even past the stall. Unfortunately, the machine would not spin with the C.G. near the forward position, where my weight had put it, but merely flick-rolled into a spiral dive, when stalled with full crossed controls.

At this stage I noticed a new and very good-looking cloud starting which there was just time to explore. Under it the lift was steady and strong and in no time at all we reached cloud-base, but there was only five minutes left. What sailplane pilot could, however, resist a steady 800 f.p.m.?—and as the gyro appeared to start when I operated the only visible switch, we slid smoothly up at an increasing rate until the rate of climb read 1,000 f.p.m. It was all so smooth and easy that I began to wonder if maybe the "Old Tyrne and Banke" pundits were right after all.

At 10,700 ft. the usual turbulence indicated the top of the cloud had been reached, and sure enough as I looked back at it there were only a few hundred feet left. By now I knew the next pilot to fly the machine would be champing at the bit, so I put the speed up to 80 m.p.h. and pulled the air-brake toggle, which is situated below the instrument panel and is similar to a tow release. Here I came upon something which in my opinion was far from ideal : the air brakes are spring and air loaded to close, and it is a considerable strain to hold them open. There is also a very appreciable buffet and I was loath to put the speed up to the limit speed though I am told that this does not increase the buffet. A good deal of wrinkling occurs in the wing skin surrounding the air-brake area, which looks discouraging but apparently never does any harm.

After losing about 5,000 ft. in five minutes I got tired of holding the air brakes open and tried out the aerobatic qualities. As one would expect with such a clean machine, loops were very easy with plenty of speed left at the top. I only tried one roll which was not very neat, but this was my fault.

And so back to the field where the air brakes gave ample control over glide angle for a very easy touchdown and the end of 75 minutes of pure pleasure. I wish that I had recently flown some other high-performance sailplanes and that I could therefore make this analysis comparative: unfortunately the only sailplane I have flown during the last ten months is the Laister Kaufman training sailplane, the controls of which can only be described (with some restraint) as dreadful.

It was not, of course, possible in so short a time to make more than the briefest assessment of the handling qualities, nor was it possible to obtain any performance figures, but the following figures were given to me by Ernest Schweizer, who is the president and technical expert of the company. I gather that these figures are a combination of test and calculated performance.

PERFORMANCE (AT NORMAL GROSS):—

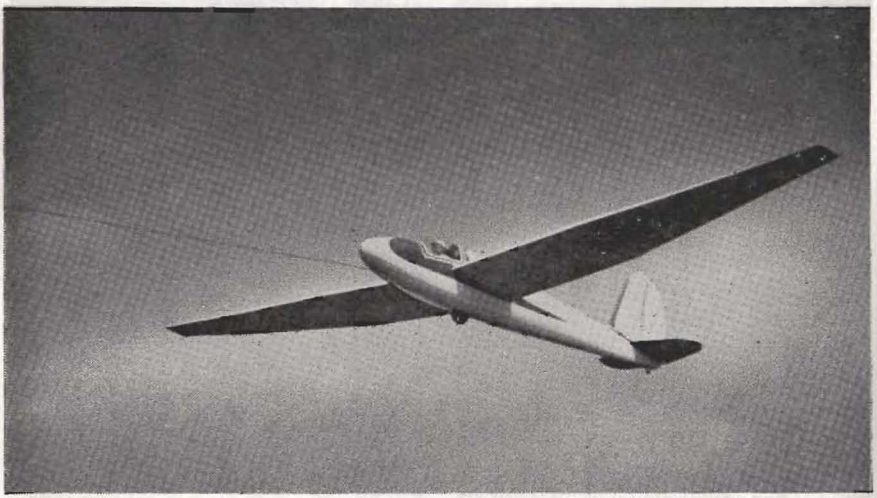
Min. sink	2 f.p.s. at 34 m.p.h.
Max. glide ratio	30 : 1
Speed for 6 ft./sec. sink	82 m.p.h.
Stall..	34 m.p.h.

The real worth of these figures is not apparent until one calculates a few theoretical cross-country achieved airspeeds and compares them with other sailplanes.

Absolute Thermal Strength	*Achieved Cross-country Air Speed (m.p.h.)*		
	Weihe	Skylark	1-23D
5 ft./sec.	20	17	23
7 ft./sec.	29	29	34
9 ft./sec.	35	36	41

The above figures depend of course for their accuracy on the accuracy of the polars. I had to make up the polar of the Skylark from very scanty data, and that of the 1-23D is derived from a relatively small amount of flight testing done by the company.

Whether or not the results are accurate, it is clear that the 1-23D has a very outstanding performance which, when considered in relation to its span (50 ft.) and



The Schweizer 1-23D.

its aspect ratio (15.6), is little short of miraculous (Handicap Committee of the British Nationals to note).

My theoretical cross-country air speed takes no account of the ability of a machine to make small circles and thus derive maximum rate-of-climb from small thermals. This ability depends on small span and low circling speed, both factors being present in the I-23D.

Leading Particulars

Span, 50 ft.; length, 20 ft. 9 ins.; wing area, 160 sq. ft.

Weight empty, 444 lbs.; normal gross weight, 634 lbs.; max. gross weight, 750 lbs.; wing loading (normal) 3.97 lbs./sq. ft.

Positive design load factor, 8.6; negative design load factor, 5.6.

Design speed, 132 m.p.h.; placard speed, 119 m.p.h.

France Leads the Way

by Fred Hoinville

SOME months ago I wrote for GLIDING an anguished plea for smaller, lighter, cheaper sailplanes (Spring, 1953, p. 22). Before this article reached print, the French Fauvel AV-36 was making headline news in the hands of Nessler and other top-line pilots, and doing extremely well in less experienced hands.

Now the AV-36 is not small enough to satisfy me, *but* it has everything else that I ask, and it can be scaled down or up to give any size at all with good performance. Therefore, it is almost the prototype that I want, and here and now I want to express to M. Fauvel my deep gratitude for what is in my opinion the finest offering presented to World Gliding for many, many years.

Flying-wing types have excited wide interest for years with their obvious advantages of low drag and simplicity, but most designers concentrated on the heavily swept-back design, which may not be a blind alley and has in fact produced some outstanding examples like the Horten series, but on the whole great amounts of sweep-back have led us into as many problems as they solved, with large washout and poor landing qualities. High aspect-ratio kept costs high and great span meant high weight and cost, and tapered wings meant complex construction.

The AV-36 design has changed all that. Once more, a practical man has confounded the back-room boys, the experts who have a long list of things that can't be done. Fauvel has solved the problem of stability in tailless gliders by demonstrating that the problem did not really exist.

The AV-36 combines all that is best and most practical in conventional and tailless designs, with modest size and ease of construction. Although the present model has semi-tapered wing, that does not appear to be an essential feature of the development, and the design lends itself to further simplification by using a rectangular wing. Thus, by following Fauvel's lead, we can scale down and modify the AV-36 into a "Minimidget" of 25 feet span, 4 feet chord, straight wing without taper, weight about 100 lbs. Dr. Raspet, whose calculations are based on much practical full-scale experiment, has calculated that a convent tional design of these dimensions can be made to give a glide angle of 20 to 1, with a minimum sink of 1.8 f.p.s. at 26 m.p.h., provided that the smoothed-surface lessons of the RJ-5 are applied to wing and nose of the cabin.

At first sight it may be seen that this proviso involves too much difficulty and expense, but the untapered wing alone removes most of the difficulty by using only one rib jig throughout, thus making it simple and cheap to use many more ribs of lighter weight than usual. Also, the mass production which must result from use of this design would permit the use of moulded noses and blown canopies at minimum cost.

Also, it seems logical that the change from conventional to AV-36 design must result in lower drag and so give slightly better results than those quoted. It should not be overlooked that Fauvel is a qualified theorist as well as a practical builder, and that the "36" gave results greatly exceeding his expectations.

In my earlier article I suggested 30 feet

as a maximum span. Now that there is good reason to expect that 25 feet is enough, I have further modified my ideas, and I now suggest that we make an international drive for a recognised "Minimidget" class of 25 feet span and 100 lbs. weight limits, with National and International record categories of its own.

A medium class of 45 feet and 400 lbs. could also be recognised. The present unlimited class would be retained for Open Records.

In addition to the 25 feet "Minimidget", there should be a 33 feet span "Minitwin" two-seater for training and contest and record work, with a weight of 200 lbs. This machine could use most of the parts of the solo midget.

A third high performance type could be made by using the solo pod with the two-seater wing, with very little extra cost.

In addition, it would speed up and cheapen training if these midgets could be provided with extras in the form of a light motor "power egg" and wheel for use as club trainers. This would permit very high utilisation and would permit training on days without wind or thermals, and would avoid the crowding dangers and over-simplification of slope soaring.

In strong thermal conditions, the "Minimidget" would be capable of distance flights of 300 miles. On a weak day, in a machine of less performance, and a ceiling never more than 2,000 feet above ground level, I have covered 90 miles. On a moderate day I have done 220 miles in a Gull I, which would be no better than the midget, if as good. The suggested midgets could be sold very cheaply in kit form, and even in complete form would be way below the price of anything now on the market. Kits could be finished by the buyers quite quickly because of their great simplicity.

We need a sailplane so cheap any youth can buy the kit without subsidy.

So simple anybody can build it quickly.

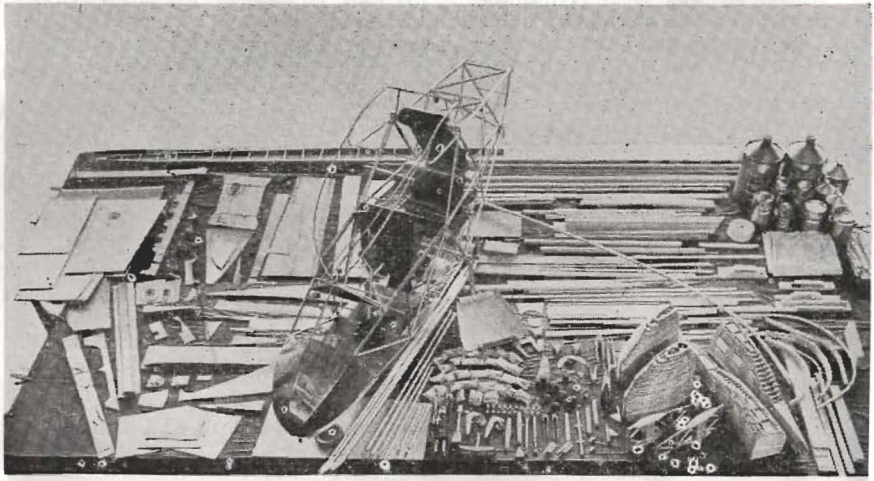
So small it can be built in a garage, housed without a hangar, landed on any road or track.

So light any car can carry it and launch it, any pilot can ground-handle it without help.

So clean it will glide better than 20 to 1.

So popular and numerous it can be allotted "class records" of its own.

We need the "Minimidget" and its brothers.



DOPPELRAAB IN PARTS.—Here is all the material you rneed, ready prepaed, foı building a "Doppelraab", the two-seater training machine marketed by Wolf Hirth's firn at Nabern-Teck, near Stuttgart. A photo of the machine in flight was given in our Spring issue on page 41. By early September, Doppelraabs were being built at two a week.

A New Approach Suggested

by Philip Wills

Acknowledgements to "The Aeroplane"

IN *The Aeroplane* recently, Air Marshal Sir Robert Saundby wrote an article headed "A New Approach Wanted", in which he outlined one of the most fundamental long-range problems of the Royal Air Force: how to attract an adequate flow of human material.

He gave incontrovertible reasons to show that it is in the highest degree unlikely that this can be achieved by offering financial incentives, sufficient to attract competent men from industrial and other occupations. He recorded, what seems apparent to most, that recruits of the right calibre and in sufficient numbers cannot be obtained by publishing large numbers of advertisements incorporating forms which have to be signed on the dotted line. It is hard to imagine a really competent and promising youngster (or his parents) being persuaded to plan his life by seeing and signing such advertisements in the ordinary Press.

He suggested that the correct approach therefore lay in the field of human relations, in building up a popular pride in the R.A.F. and a popular respect and affection for the air. His actual words were: admiration and reverence; and his thesis was that this relationship existed in respect of the Royal Navy. He admitted that this must take a long time, and had no specific plan to put forward as to how it was to be done, but the sooner a start was made, the better.

It was with feelings bordering on incredulity and relief that I at last saw so high-ranking and distinguished a service officer put the case, which those of us in this field have attempted to get over for many years, for a great increase in the encouragement of, and assistance for, motorless flight.

Why are we never, in war or peace, short of first-class human material for either Service or civil naval requirements? Because sufficient people of all ages and both sexes, including parents and grandparents, have "the sea in their blood". That is, even if they are not actually professional seafarers themselves, either they spend their spare time actually on the sea or thinking about it, or they hold it in such respect that they feel delighted if their children decide to make it their career.

Let me now indulge in a flight of fancy. The art of navigating the seas has only been discovered in the last 50 years. Whenever a ship, large or small, has a major or minor accident it is blazoned in the Press in headlines. The Royal Navy and Merchant Marines combine together to say that the sea is not large enough to contain them and any mere non-professionals, flopping about in it merely for fun. The Admiralty and Ministry of Shipping build up a complex tangle of licences and examinations which any ordinary citizen and his boat must get before he is allowed to own or even hire a racing dinghy. The mere attainment of these licences requires more time and money than is available to the ordinary man. No assistance is forthcoming to make it practicable or even permissible to equip any possible small harbours where small sporting craft can be kept, and enormous fees are charged for the use of such limited facilities as are already there.

The navies experience an unaccountable shortage of volunteers. They launch a campaign to increase sea-mindedness. They hold displays at enormous expense, which the public are invited to attend, and at these displays the most complex and dangerous evolutions are carried out, frequently involving the sticky end of one or more sailors.

Films of life at sea are sent round the circuits, all showing what a dare-devil you have to be to be a sailor. Sometimes even a tight-lipped girl is to be seen on a ship, usually because she worships one or more of the heroes in the crew, and will follow him to the inevitable end, watching his gallant movements with starry eyes.

The public realise to the full what an important thing it is to have a navy. They go away feeling extremely glad that there are certain folk brave enough and clever enough to man it, and to tackle this extraordinary and mysterious element, the sea, which so many official bodies combine to tell them is so difficult and dangerous.

But there continues to be an inexplicable shortage of volunteers, and of application forms cut out of the advertisement columns of "The Daily Blurb" and signed by eager young men.

For goodness' sake! Let me repeat what we in the gliding movement believe. We believe the air is a perfectly natural and intensely interesting medium that can be tackled, with ordinary discipline and intelligence, by the ordinary man or woman. Our children accordingly take it for granted, and if they choose it as a career, we and they regard it as a perfectly ordinary and laudable decision. We believe that "air-mindedness" by definition can only be achieved by personal experience of the air.

We believe that the ordinary man can be trusted to preserve his own neck, and that a little initiative and adventure for him is the crying need in this modern overcrowded world, without which we will before long become a race of morons watching the television in their spare time away from the repetitive work of the mass-production line. We even go so far as to think that to provide more opportunities for this, the very few fields in this country suitable for gliding should, with advantage to all, be devoted to this purpose rather than used for growing a few dozen sheep. We believe that our attitude, if it could become nation-wide, would bring about a very important change for the better in our future prospects as a first-class nation. And we believe, with considerable grounds from past experience, that if the Air Staff were to switch a small but, over the years, growing proportion of the money which they at present spend on advertisements, to the general encouragement of our movement, we could within, say, 10 years achieve the popular admiration of and reverence for the air which at present the people of our islands have for the sea.

Gliding Certificates

Diamond for Goal Flight

No.	*Name*	*Date of completion*
208	G. H. Stephenson	3.8.53

Gold C

14	G. H. Stephenson	3.8.53

Silver C

431	E. R. Stow	3.8.53
432	A. R. Adams	1.8.53
433	F. C. Worley	26.7.53
434	R. P. Brown	18.8.53
435	R. Sneath	2.9.53
436	L. Gilewicz	16.8.53
437	D. Riddell	20.9.53
438	V. McNabney	3.9.53
439	G. Hutt	14.7.53
440	C. Atkins	4.4.53
441	H. Turner	26.8.53

C Certificates

NOTE.—H.C.G.I.S.=Home Command Gliding Instructors' School (Detling).
E.T.P.S.=Empire Test Pilots' School (Farnborough).

July

2444	H. A. Boyce	Coventry G.C.
4991	R. O. Turner	Oxford G.C.
7071	A. G. Legg	No. 89 G.S.
7943	J. M. Maples	No. 24 G.S.
9366	P. W. Taylor	London G.C.
9878	R. A. Laing	No. 130 G.S.
11130	V. F. G. Bonnaud	London G.C.
12602	H. E. Mills	Bristol G.C.
12708	K. F. Bryant	No. 92 G.S.
13077	J. Ellis	No. 42 G.S.
13208	A. MacDonald	London G.C.
13697	A. R. C. Lennard	Southdown G.C.
13936	G. S. Fitzpatrick	Army G.C.
14273	R. Jamieson	Derby & Lancs.
14299	D. B. Hales	No. 84 G.S.
14533	D. G. T. Hyde	London G.C.
14552	R. L. Shadbolt	No. 105 G.S.
14743	A. J. R. Deacon	No. 126 G.S.
15060	A. G. P. Vaughan	Midland G.C.
15657	J. H. S. Howard	Southdown G.C.
15990	J. J. Joss	Coventry G.C.
16015	T. R. Inger	No. 45 G.S.
16019	P. J. B. Wilby	No. 104 G.S.
16063	L. S. Poulton	London G.S.
16071	M. J. Bindon	Midland G.C.

16072	E. N. Finch	No. 125 G.S.
16149	J. M. Alcock	Yorkshire G.C.
16260	T. R. K. Parkes	Bristol G.C.
16317	R. H. McArthur	No. 183 G.S.
16563	E. C. G. Morgan	Oxford G.C.
16524	A. Jerams	Gutersloh G.C.
16535	J. K. Latta	Bristol G.C.
16557	P. W. Mead	Scharfoldendorf
16590	G. Wilkinson	R.A.F. Fassberg
16598	A. R. Wirram	London G.C.
16611	E. A. Johnston	No. 104 G.S.
16617	A. D. Corbett	Scharfoldendorf
16627	A. Thorpe	No. 22 G.S.

August

6065	D. F. Poole	No. 180 G.S.
6132	H. J. Prowse	R.A.F. Gutersloh
8640	T. A. Hendry	Scottish G.U.
8882	E. J. Sjoberg	Midland G.C.
9165	T. A. F. Sheppard	Wessex G.C.
9438	D. F. Clarke	No. 5 G.S.
10938	R. W. Newstead	No. 122 G.S.
11475	K. G. R. Hallam	R.N.G.S.A.
13027	D. S. Hill	Scottish G.U.
13500	J. A. Douglas	Midland G.C.
13504	J. W. North	Midland G.C.
13561	R. W. Pembleton	Scottish G.U.
14461	H. C. F. Derrick	No. 80 G.S.
14562	D. L. Contostavlos	London G.C.
14819	B. Stubbs	No. 130 G.S.
15288	J. Ivelaw-Chapman	No. 80 G.S.
15476	J. M. Fleming	Scharfoldendorf
15521	R. B. Godwin-Austen	London G.C.
15543	L. A. Macpherson	No. 80 G.S.
15945	K. R. Coombs	No. 80 G.S.
16032	R. V. Snook	No. 80 G.S.
16067	C. E. Goulding	No. 80 G.S.
16086	D. C. Hodder	No. 89 G.S.
16129	D. M. Burrill	No. 31 G.S.
16360	G. C. Hudson	Hameln G.C.
16394	R. F. O. Kemp	Hameln G.C.
16398	B. Chart	Southdown G.C.
16553	A. F. Haye	Handley Page
16575	M. S. Hall	Scottish G.U.
16633	R. S. Guy	Midland G.C.
16671	E. Bruce	Midland G.C.
16675	E. C. Martin	Handley Page
16680	A. H. Parr	Deeside G.A.
16690	J. K. Cross	Scottish G.U.
16691	A. F. Heinzl	Scottish G.U.
16696	M. D. Brown	Derby & Lancs.
16701	P. J. Partridge	R.A.F. Lüneburg
16707	W. B. Harman	Surrey G.C.
16739	B. Perks	No. 125 G.S.
16745	R. S. Rickard	Scharfoldendorf
16783	C. W. Hill	No. 126 G.S.
16786	A. A. Keeler	London G.C.
16789	L. G. Cooper	Derby & Lancs.
16812	K. T. Owen	London G.C.
16828	G. C. Knowles	2nd T.A.F.

September

1645	R. G. Parker	Scottish G.U.
6119	A. C. Pond	No. 142 G.S.
10946	A. F. Flowers	No. 142 G.S.
12680	P. M. Berriman	No. 84 G.S.
13441	G. H. Truscott	Surrey & I.C.
14521	E. M. Grant	No. 80 G.S.
14976	J. P. Williams	No. 80 G.S.
15065	J. W. Stafford	Midland G.C.
15119	D. J. S. Burn	No. 161 G.S.
15129	J. I. Dodds	Scottish G.U.
15168	P. S. Bowis	No. 161 G.S.
15262	D. B. Foster	No. 105 G.S.
15266	E. R. Lane	No. 80 G.S.
15358	R. M. Oldershaw	Midland G.C.
15489	C. R. Faulkner	Derby & Lancs.
15497	A. J. F. Cronin	Surrey G.C.
15507	E. J. Lusted	Southdown G.C.
15634	D. S. Stewart	H.C.G.I.S.
15691	J. Smith	No. 130 G.S.
15750	Joan E. Cloke	Southdown G.C.
15863	W. A. Bosanko	No. 82 G.S.
16118	F. J. Staff	No. 80 G.S.
16144	M. C. Brown	No. 22 G.S.
16245	D. Hinde	H.C.G.I.S.
16319	A. F. Wright	London G.C.
16407	G. S. Larkins	Cranwell Coll.
16475	J. G. M. Reynolds	London G.C.
16588	M. Gopp	No. 80 G.S.
16596	P. M. Lucas	Hameln G.C.
16792	R. E. Vanson	Southdown G.C.
16867	R. C. Price	R.A.F. Middleton
16884	C. F. Moss	No. 168 G.S.
16945	B. W. Adams	Army G.C.
16973	S. B. Wills	Midland G.C.
17000	R. H. Wheatley	Midland G.C.
17014	E. N. Baig	Derby & Lancs.
17035	G. Hutt	R.A.F. Wahn
17063	W. J. Anderson	H.C.G.I.S.
17066	F. Mares	No. 84 G.S.

October

9057	D. R. Lowe	No. 89 G.S.
15721	G. A. Clayton	Wessex G.C.
15839	R. Kerr	Scottish G.U.
16077	L. E. Fletcher	Coventry G.C.
16559	P. R. Wellstead	Gutersloh G.C.
16566	M. S. Cooke	No. 104 G.S.
16577	A. D. Spicer	Midland G.C.
16967	W. J. Jallands	London G.C.
17069	R. W. Ford	Oxford G.C.
17094	W. V. Wood	Wessex G.C.
17147	J. N. W. Moss	Hq. 2nd T.A.F.
17167	D. J. Streeter	Surrey G.C.
17199	B. E. Lastowski	Surrey G.C.
17203	H. W. Turner	E.T.P.S.
17213	C. Wright	Army G.C.
17218	J. E. New	London G.C.
17257	E. E. Elliott	Celle G.C.

Another Cloud Street

by Uwe Radok

THIS cloud street emerged around 13.00 hours local time (K) on 22nd August 1952, at about 6,000 ft. in a gradually clearing sky. By 14.00 K, when the photo (fig. 1) was taken, no cloud remained within 10 miles on either side of the street. The latter extended for 11 miles upwind (N.N.W.) from the aerodrome at Cambridge, near Hobart, Tasmania, and retained not only its position but its structural details until it dissolved around 15.30 K.

The meteorological conditions are summarized in fig. 2, with the upper winds on the left and the upper temperatures on the right. All these data were obtained within 10 miles of the street's location at various times during that day and the preceding one. In the morning the wind showed an increase from almost nil at the surface to 70 knots at 5,000 ft., but these differences were smoothed out rapidly through convection and turbulence, so that, by the time the street appeared, little shear remained in evidence. The Hobart radio-sonde later in the afternoon showed a strong temperature inversion at 9,000 ft., somewhat higher than the day before. The balloon rate of ascent was sensibly constant except for a slight drop below the inversion.

Around 14.30 K a Tiger Moth aircraft flew along the street at 3,000 ft. in order to test the turbulence in the approaches to the aerodrome. Fairly strong turbulence (accelerations up to $\pm$ 0.8 g, corresponding to an "equivalent gust velocity" of 20 ft./sec. was found below the leading edge of the street, during the cross-wind leg past the Butler Hill range (cf. fig. 3). Elsewhere under the street there were downdraughts of up to 100 ft./minute.

These downdraughts probably represented the descending branch of a secondary circulation between the sunlit hills and the shaded valley below the cloud street. The initial thermal source of the street itself must have been the Butler Hill range, whilst its further growth suggests a train of short lee



Fig. 1—The cloud street at 14.00 hours, as seen from Cambridge, Tasmania.

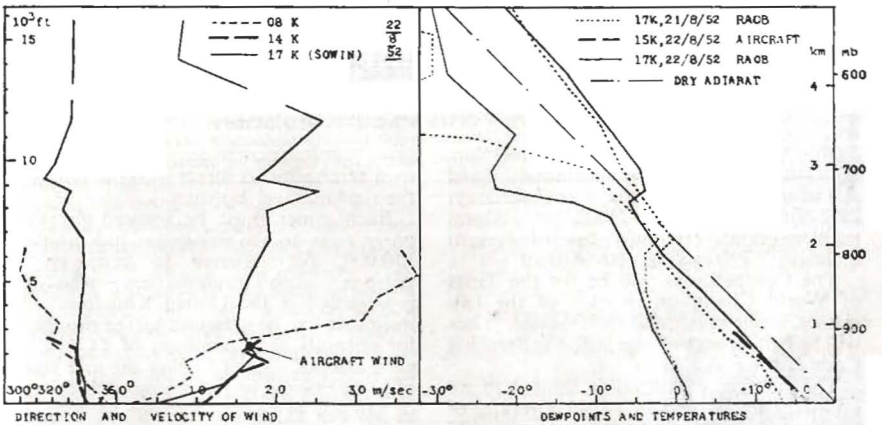


Fig. 2—Meteorological data for Hobart and Cambridge, 22.8.52.

waves. Although the clouds lacked a lenticular shape they remained perfectly still for over two hours in a 40-knot wind.

The surface configuration seems suitable, the 2,000-ft. Butler Hill range being followed by a descent to sea level and a renewed rise to 1,200 ft. However, the small wind shear and the temperature lapse rates would seem to rule out Scorer waves. Perhaps the inversion was responsible, for once.

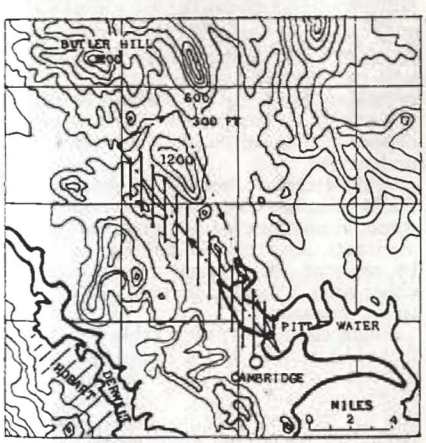


Fig 3—Surface contours of the Cambridge region. Cloud street shown by vertical shading; aircraft path by chain-dotted line with arrows.

B.G.A. News

New Records Homologated

FLIGHT Lieut. A. D. Piggott and Cadet Flight Sgt. B. Whatley, flying in a Sedbergh from Camphill to Grimsby on 27th July, 1953, set up a multi-seater British National and U.K. Local record for gain of height, 15,240 feet, and a multi-seater U.K. Local speed record to a 100-km. goal, 30 m.p.h.

P. A. Wills, flying a Sky from Camphill to Speeton on 26th July, 1953, set up a single-seater U.K. Local record for speed to a 100-km. goal, 47.7 m.p.h.

Control Zones and Airways

Complaints have been received by Air Traffic Control, M.C.A., that gliders have been flying in Control Zones and in Airways without observing the rules for V.F.R. conditions. These mean that aircraft are flying in conditions of visibility better than three miles and further from cloud than 2,000 feet horizontally and 500 feet vertically. If aircraft are flying in control Zones or Airways in visibility less than three miles or nearer to cloud than the above limits, they are breaking the regulations.

World Championships Programme

Extracts from Rules and Regulations

EXAMINATION of documentation and equipment, and Opening Ceremony; 20th July, 1954, 10.00-18.00 hrs. Competition days: 21st July to 3rd August inclusive. Prizegiving: 4th August.

The Competitions will be for the Titles of World Champion in each of the two classes, single-seater and multi-seater. They will be held in accordance with the Sporting Code of the F.A.I.

The number of entries is limited to an approximate maximum of 40 aircraft, of which not more than approximately 25 shall be in either the single-seater or multi-seater class. Each National Aero Club may submit up to five pilots, but if the number of entries exceed the maximum it will be necessary to reduce this number. Each entry may have a crew of four including pilot(s), and each national team must have a team manager, who may, if desired, be a member of one of the crews. No flying member of a team may be changed after 18.00 hours on 20th July, 1954.

Every pilot taking part in the Championships must be the holder of the F.A.I. Silver Badge, and a valid F.A.I. Sporting Licence.

Competitors shall be entered by their National Aero Club. Final entry forms must reach the British Gliding Association not later than the 1st February, 1954. They must be accompanied by the following fees: £20 per pilot; £10 per crew member and team manager. Fees cover launching and food and accommodation throughout the Championships.

Team members who wish to attend the practice period must advise the B.G.A. by 1st April, 1954, giving date of arrival. Notice must be accompanied by the fee: 35s. per day per head. This fee covers launching and board and lodging on the site.

Accommodation will be provided in one caravan and one tent per each entry. Accommodation in caravans and tents is not ordinarily available to visitors who are not members of a competing team. A list of hotels in the neighbourhood will be sent on request, and visitors must make their own arrangements direct with the hotels, or their own travel bureaux.

Each glider must be insured for third party risks to the minimum indemnity of £10,000, for damage to property, or persons, with underwriters who are represented in the United Kingdom. The insurance can be arranged by the organisers for entrants at a premium of £4 15s. for each aircraft. Each towing car and trailer must be insured to the minimum indemnity of £10,000 in case of damage to property, and to an unlimited amount in the case of injury to persons as required by the Road Traffic Act of the United Kingdom.

The following equipment is necessary: aircraft; oxygen (optional, but recommended); radio (optional).

The organisers will endeavour to loan competitors gliders, trailers and tow-cars, if they are unable to bring their own, providing they give notice to the B.G.A. of their requirements not later than December 15th, 1953. Trailers will not be loaned in cases where competitors supply their own gliders. Borrowers will meet the cost of insurance, which will be about £15-£25. This premium, together with £10 excess required by the insurers, must be deposited with the organisers within one month of the organisers notifying the competitor that a glider will be available. The £10 excess deposit will be refunded if the aircraft is undamaged.

A pilot cannot replace his aircraft once the Meeting has started, unless it is damaged through no fault of the pilot or of his assistants. Any parts thereof may, however, be replaced except complete fuselage or either wing. Doubtful cases will be referred to the stewards.

Flight equipment: serviceable parachute; first-aid kit; valid F.A.I. Sporting Licence; aircraft logbook; valid Certificate of Airworthiness; maps (maps, ½ inch to the mile, will be supplied free to those requiring them). A barograph need not be carried; however, for the establishment of a National or International Record, a calibrated and sealed barograph is a necessity (facilities

for calibration will be available after the flight).

Car and trailer: an information sheet covering United Kingdom road regulations will be sent.

Radio: negotiations with the licensing authorities are still proceeding, and the following information is subject to alteration.

Radio-telephone communication will be permitted between gliders and their retrieving cars and/or the Camphill site, in the frequency band 128-132 Mc/s. The power of the ground station shall not exceed 15 watts, and that of the airborne station 1 watt. The transmitters must be crystal-controlled; amplitude modulation shall be used. The ground-to-air and air-to-ground links must operate on the same frequency. No operators' licences or certificates will be necessary.

Any competitor wishing to use frequency modulation or to operate on a frequency other than in the above band must notify the B.G.A. by not later than 15th December, 1953; no guarantee is given that such operation will be permitted, though every effort will be made to obtain the approval of the licensing authority. Spot frequencies near 72, 85, 126 and 160 Mc/s may be available; operation between 30 and 70 Mc/s will *not* be possible. If many competitors intend to use radio, it may be necessary for the organisers to allocate one frequency to each team. If this is done, ample notice will be given to allow the necessary crystals to be obtained.

Launching will be by winch. Gliders must be fitted with suitable hooks and should provide their own cable attachment links.

All retrieving will be by road, and the pilot must accompany his team on retrieves. An exception will be made in the event of a cross-channel flight.

The Organisers reserve the right to cancel the Meeting if unforeseen circumstances arise or the number of entries is exceptionally low, and to discontinue the Meeting if unforeseen circumstances outside their control should necessitate such action.

Certain repair facilities and basic materials such as fabric, plywood, glue and paint, will be available on the site. Refilling of oxygen bottles will be possible, providing each crew brings an adaptor to fit a filling bottle with a ¼-inch British Gas right-hand thread. Motor fuel will be available on the aerodrome.

Time table: breakfast, 07.30-09.00 hours; briefing, 09.30; lunch, 12.00-14.30 (sandwich lunch will be provided if required); evening meal, 18.00-20.00.

Briefing will take place in English, French and German. English will be the official language of the Meeting. All rules and regulations will be published in French and English. Any crew desiring the attachment of an Interpreter should make application at the time of submitting the final entry form.

The following taska may be set:—

(a) Compulsory: I. Distance flights.
II. Race over a course fixed by the Organisers.

(b) Optional: I. Goal flights to goal fixed by pilot.
II. Triangular race.

Each class shall be set one task on any one day, but the two classes may each be required to carry out a separate task if the weather conditions make it desirable in the opinion of the Organisers.

The Meeting comprises a maximum of 8 competition days for each class, in a period of 14 days. It shall not be deemed a World Championship for either class unless competitions for that class shall have been held on at least 4 days. The Clerk of the Course shall decide whether a Competition Day shall be announced; he cannot do so if one-third or more of the pilots from either class, having flown more than 100 miles on the previous day in tasks (a)I (b)I, have not returned to the starting point.

A day shall not be counted as a Competition Day for a class unless each pilot in that class has, as far as the Clerk of the Course is concerned, been given at least one opportunity to take off; and unless at least 25% of the pilots in that class have scored points.

Launches will be available daily between 10.30 and 18.00 hours. No competition may be announced later than 13.00 hours. The Clerk of the Course may temporarily prohibit launching if conditions are such as to make flying unsafe, even if some pilots have already taken off. He may, at his discretion, rule that the day shall still be deemed a competition day for one or both classes.

Airspeeds and Fumble Factors

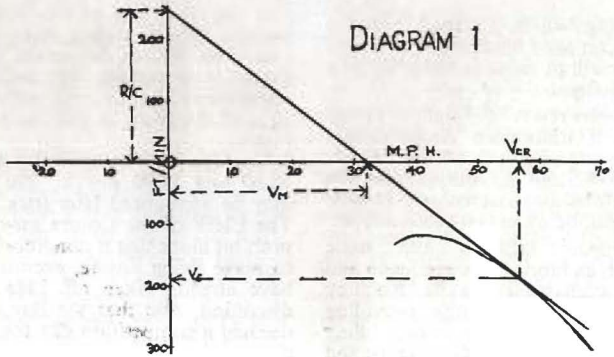
by J. C. Neilan

If we study Diagram 1, which most of you have seen before, it will become evident that regardless of how badly you circle, and of how much you have increased your sinking speed in circling flight due to bank and "g", the choice of the best cruising speed for use between thermals, and the mean airspeed resulting, depend only on your achieved Rate of Climb. The only difference that bad circling has is to reduce your achieved rate of climb, and you will be annoyed to be outclimbed in the same thermal by a better pilot, who will achieve a better climb rate, and therefore will use a higher cruising speed with impunity, and achieve a greater mean airspeed across country.

As no one goes about measuring up-current strengths, but only observing achieved rates of climb, this makes it quite unnecessary to complicate the calculations by asking what thermal strength will produce a mean cruising speed of so-and-so miles per hour, because the only answer to that is that it depends who is in the cockpit. For normal cross-country flying, including racing, out-and-return and triangular courses, the only information that the pilot can use is his own achieved rate of climb, and that is all that is necessary. Much has been said on how to estimate your rate of climb from casual glances at the variometer, but the truth is that all such estimates are highly unreliable, and there is only one way of finding out with any certainty, and that is to adopt Lorne Welch's technique of carrying a knee pad on which to record the actual time and height of entering and of leaving all thermals. The subsequent mental arithmetic required to find the rate of climb is quite easy, and there are no corrections to make for anything, provided the performance curve used for the computations of the optimum airspeeds is reasonably close to the performance of the glider itself.

The optimum cruising airspeed and the mean airspeed it will produce are got from diagram 1 by drawing a tangent to the performance curve from any selected value of Rate of Climb. I find it easier to use a perspex ruler with a straight line scribed down the middle, and where the lines at each inch (or whatever) cross this line, they form an easy guide to determining the actual point of tangency on a rather flat curve. The accuracy of the point can be further checked by calculations on the lines of those shown in Table 1, which were made in order to find out the effect on mean airspeed of variations of actual cruising speed. Before further discussion of this point it might be as well to mention briefly the theory of Optimum Cruising Speeds based on Rate of Climb.

The system is only applicable to purely thermal flying in which time is used in climbing in thermals, and the height so gained is lost in flying to the next one. The stronger the thermals, the quicker one can afford to cruise between them. The speed



for maximum gliding distance is only used when the rate of climb is nil. At any other time a higher speed should be used, and will be justified by the expected exploitation of further thermals. If no further thermals are expected then you revert to using the best gliding speed to cover the ground.

To return to the discussion of the required accuracy, it can be seen from Table 1 that use of a cruising speed within 5 m.p.h. of the optimum has only a very small effect on the achieved mean airspeed, the reason being that the time saved in achieving say a 50 ft/min. increase in rate of climb is large compared with that saved in pushing the speed up by 2 m.p.h. odd, which would be the corresponding new cruising speed. This only confirms what Lorne Welch has been saying for years—panaceas are all very well, but the real benefit only comes from achieving a better rate of climb, which means improving the thermalling technique by getting quicker into the best lift, staying in it better, and quicker decisions to get on with the flight and not hang on to the last shreds of lift unnecessarily. The use of the correct cruising airspeed affects the mean airspeed by only one or two tenths of a mile per hour at low rates of climb, whereas the achieving of another 25 ft/min. rate of climb will increase it by about 2 m.p.h.

In nearly all average British conditions, you could cruise the Olympia anywhere between 50 and 60 m.p.h. without making much difference to the mean airspeed. However, don't get the idea that I have suddenly become anti-panacea. I think it is most useful to have them, so that you can check up on how you are performing. Besides, I like playing about with them and thinking up better ones.

Diagram 2 is the result of working out a series of calculations on the lines of Table 1. Those who are not yet sold on the Optimum Airspeed Theory, but always cruise at the

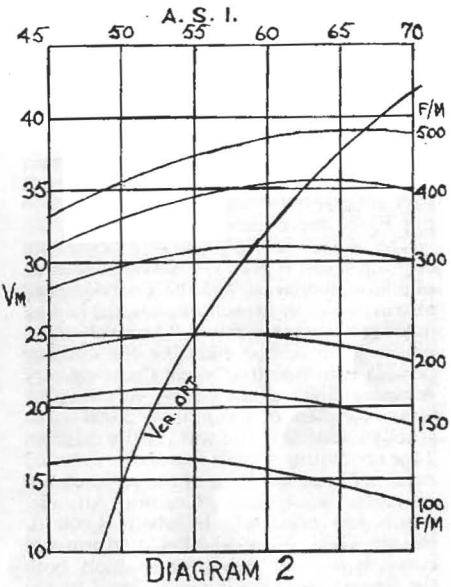


DIAGRAM 2

speed for best L/D, can see from this diagram how right they are at low rates of climb, up to about 150 ft/min.; but examination of the higher rates, e.g. 500 ft/min., shows that they are penalising themselves by about 6 m.p.h. by sticking to a cruising speed of 45 m.p.h. when conditions are really good.

You enter this diagram with the achieved rate of climb, choose from it the best A.S.I. for cruising, and finish up with the mean airspeed that you should achieve by using it or any variation from it you might use. What you are ultimately interested in, however, is groundspeed, and as it complicates the diagram a thousandfold to include on it the effects of wind, the best

Table 1

R/C	Time Climbing 1,000 ft.	V_{cr}	V_s	Time Descending 1,000 ft.	Distance covered at speed V_s	Total Time	V_m
100	10.0	45	178	5.62	4.21	15.62	16.16
		50	204	4.9	4.08	14.9	16.45
		55	238	4.2	3.85	14.2	16.3
		60	282	3.55	3.55	13.55	15.7

thing is to apply to the mean airspeed whatever is the head or tail wind component applicable to your flight, and this will be your groundspeed. No attempt has been made to allow for downcurrents, although these are frequently found. The reason for this is that in the majority of cases you are already cruising faster than the best "red ball" speed, but if you wish there is very little lost by adding on another 5-10 m.p.h. for the duration of the sink.

The effect of altitude on optimum cruising speed is nil. The sinking speed is, of course, increased, and the True Airspeed also increases by the same factor, the gliding angle remaining the same. The result of the higher True Airspeed during the cruising periods is to raise the Mean Cross-country Airspeed slightly, amounting very roughly to an increment of 1 m.p.h. per 5,000 ft., so strictly speaking if you want to use diagram 2 for computing fumble factors, you should make it out on the basis of the performance curve for your Mean Cruising Altitude, which you hope will be about 4,000 ft. Rather than draw another performance curve, it is easier merely to multiply both the Airspeed and the Sinking Speed by the relative Airspeed Factor, known to mathematical genii as one over the square root of sigma, or T.A.S. over I.A.S., the factor for 4,000 ft. being 1.061 in the International Standard Atmosphere, or about 1.078 for the equally hypothetical atmosphere known as English Summer Conditions, which allots a temperature of 16.4°C. to that height. This factor, incidentally, is what one sets one's computer to when converting Rectified Air Speed to a True Air Speed by setting Air Temperature against Pressure Altitude in the little subscale.

That more or less completes discussion of the best cruising speed to use. The thing to remember is that rate of climb is more important than cruising speed, but having found out what you have achieved, you might just as well use the best speed for that rate and get the benefit of the odd half mile-an-hour or so, but basically the thing is to improve your rate of climb.

If you are content with your estimations of Rate of Climb, go ahead and good luck to you. Your inaccuracy will only affect your own performance. But if you would really like to get things right, get yourself a knee pad, which can be quite simple, and rule it with four lines to form five columns. the last one being the widest for general observations. The first four should be headed Time, Height, Height, Time, respectively, the first two referring to the time and height of joining a thermal, and the other two to leaving it. Having been a test pilot for many years I find no difficulty in using a pad; it's only a matter of getting used to it, and having one that is comfortable and easy to use. Whenever you get some green ball and start to circle, take a quick glance at the clock and the altimeter and remember what they say by repeating it to yourself, e.g. thirty-five, twenty-seven hundred. Don't try to write it down until you have got comfortably settled in your thermal, and going round in nice steady circles. Then swop hands on the stick and get the pencil out and scribble 35 2700 in the first two columns. It's easier when leaving the thermal because you don't have to concentrate so much on your flying. At this stage you have not got time to work out your rate of climb so settle arbitrarily on a speed of 55 m.p.h. (for Olympias—work it out yourself for others), and then start your mental arithmetic on lines such as this;—2700 from 3650 equals 950 ft., 35 from 40 equals 5 minutes, 5 into 950 goes one-nine-0. Fifty-five m.p.h. is near enough the best airspeed for that rate.

The only other performance data you need for getting the most out of your aircraft is a gliding performance chart, to

Table 2

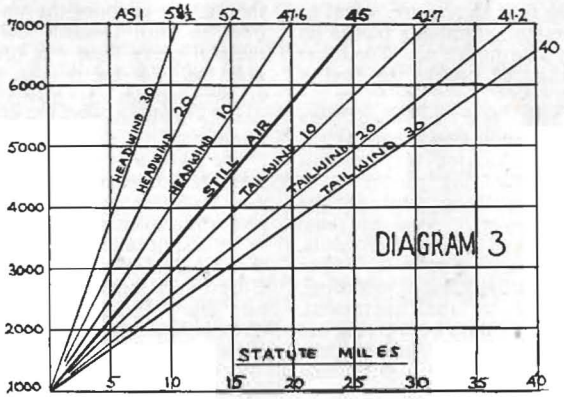
Wind	A.S.I.	G/S	Vs	Time to descend 6,000 ft.	Distance covered at G/S
Head 10	47.6	37.6	191	31.4	19.7
Calm	45	45	178	33.7	25.3
Tail 10	42.7	52.7	170	35.3	31.0

show you how far you can glide from what height in what wind and at what airspeed in a straight glide. Diagram 1 is used for this, the tangents being drawn from different points along the horizontal axis to find the speeds for different head or tail wind components. The results are tabulated as in Table 2 in order to get the information necessary from drawing Diagram 3. This is then used for deciding when you can abandon cruising technique for the final spurt to the finishing line in a race (strangely enough the "spurt" is lower than your cruising speed was but gets you there quicker because you don't have to waste any more time circling to gain height), or in non-competitive flying it will show you if you are within gliding range of the aerodrome. You can build into this chart a "safety height" to suit your own ideas on the subject. Allowance for downcurrents is again not made because it would mean making a selection of different charts for different wind conditions, and is not very practical. It is easier when downcurrents are anticipated to use the line calculated for the next more adverse wind condition and leave it at that. There is your built-in safety height available also for miscalculations or misfortunes unforeseen. The line representing the calm air performance should be marked a different colour from the others for easy identification.

With Diagram 2 stuck on one side of the cockpit, and Diagram 3 stuck on the other, and a knee pad strapped to your leg, and your map with distances marked along the track line, you are all set for reducing your fumble factor to the lowest possible. There will, of course, always be a fumble factor, some of it due to your ineptness in locating the best part of the thermal. This you will not know about unless someone shows you up by outclimbing you in the same thermal. But you will be able to check up on your achieved groundspeed as against the theoretical groundspeed for your achieved rate of climb, and you will then find, as I have found, that there is still far too much time being wasted going the wrong way to look for lift that isn't there anyway. You can define your fumble factor for cruising as the percentage difference between what you achieved as groundspeed, and what it should have been with the rate of climb achieved. It is quite a pleasant way of spending a winter evening analysing your last season's flights and seeing if you can find the reason why you didn't do better.

Symbols

R/C	=Rate of Climb, in feet per minute.
V_s	=Sinking speed of glider, in feet per minute.
V_{cr}	=Cruising speed between thermals in m.p.h.
V_m	=Mean cross-country airspeed in m.p.h.
V_{cr} Opt	=Best cruising airspeed to achieve highest V_m.
G/S	=Ground speed, equals airspeed plus or minus tail or head component of wind speed.
L/D	=Gliding angle or ratio of height lost to distance travelled.



Soaring Instruments

by Flight-Lieut. A. D. Piggott

PROGRESS in glider instruments has been very slow during the past few years and, apart from the total-energy variometer, there have been few real advances. Of course, there are some glider pilots who like to think of soaring as an art which should not be made too easy, and that the present aids are quite sufficient.

However, if the gliding movement is to expand, soaring must be made easier so that many more people will be encouraged to continue gliding after their first few solo flights.

The problem of thermal soaring efficiently involves more than the ability to fly the glider well, and to read and react to the readings of the variometer. The prime necessity seems to be a good sense of "feel", and this quality may take years of practice for some pilots to develop. Recent tests at the Home Command Gliding Instructors' School at Detling with experimental variometers and other aids have shown that this sense of "feel" for lift and sink is essential for efficient soaring, and that it is this quality which makes the good soaring pilot.

The sense of "feel" greatly influences the chances of finding a thermal because it makes the pilot aware of the presence of near-by lift and helps him to make the right decision to turn towards the thermal so that contact is made.

The need for this sense of "feel", which takes such a long time to acquire, seems to be one of the greatest stumbling blocks on the road to easy soaring for all. The other major problem is, of course, to find a thermal.

During the past year we have been attempting to solve these two problems.

The principle of looking for thermals with temperature-measuring instruments is an old one and has been tried out by numerous experimenters. Few of them appear to have persisted in their experiments, and their lack of success seems to have been because of poor sensitivity, lag in recording, or the complexity of the instrument. Recently, however, we have been trying out tests with an instrument devised by Mr. Peter Temple, and have had most encouraging results.

A "sense" unit is mounted in each wing-tip and is connected to a simple indicator in the cockpit. The wing-tip units contain a small thermopile with hundreds of junctions of two dissimilar metals. The current generated by the thermopile is fed to the instrument and a comparison is made of the temperature of the air at each wing-tip. The needle of the instrument points towards the warmer wing. The beauty of this instrument is that it requires no batteries and suffers no errors during turns or changes of speed.

A few weeks ago some flights were made in good soaring conditions and it was found possible to detect a thermal at considerable range. This result came as a pleasant surprise as we had only expected to obtain readings when almost in contact with the main body of the thermal. Using this Thermal Detector, Mr. Temple was able to predict the position of thermals and fly into them, also to direct a second pilot into them without any difficulty.

The significance of these results is very great: if a thermal can be detected at 50 feet, the chances of using it are immediately trebled! In favourable conditions with the greater range already obtained, it should be almost impossible to miss the thermals on a good day. Not only will this type of instrument help a pilot to find a thermal, but it will reduce the skill required to soar in thermals by enabling the most inexperienced pilot to turn towards the centre of the thermal every time. It promises to be a great help for the pundits flying at higher cruising speeds by giving indications of near-by thermals which would otherwise go unnoticed.

We have also been experimenting with instantaneous-reading variometers and have now sufficient experience with their use to give a fair assessment of their value.

At first, it takes some time to get used to the apparently contradictory readings of a Cosim Variometer and a variometer without any lag. Using the recently publicised Temple Variometer* it is usual to find that it shows a loss of height on one side of the

*GLIDING, Autumn, 1953, p. 118.

turn when the normal variometer is reading a steady two feet per second climb. The fact is that the glider is not accurately centred in the thermal and that after re-centring on the other variometer a definite increase in rate of climb is obtained. Clearly the difference in thermal soaring efficiency of two good pilots is in their ability to centre more accurately than is possible by variometer readings alone. The skill in thermal soaring is in interpreting the surges of lift by sense of "feel" and in centring on them accurately. Most of the types of variometers in use to-day can only give a very general picture of the lift in a thermal.

An instantaneous-reading variometer can truly be said to take away the need for a good sense of "feel". Each surge of lift shows on the variometer as it is felt, and the use of such an instrument greatly reduces the fatigue of soaring in difficult conditions.

It might be better to have such an instrument indicating the lift by a changing note so that the pilot's attention is attracted when lift is encountered. The main difficulty in doing this is the complicated electronic equipment necessary.

The Temple Variometer has virtually no lag and has a most useful clatter of the relay in lift, compared with a quiet clicking noise in sink. This attracts attention when lift is encountered and also allows the pilot to relax more and use his sense of hearing to some extent. This instrument was found to be of great value in weak wave lift due to its high sensitivity, when other variometers gave no indication.

There must be many more experiments on these lines of which little has been published. It would be most useful to hear of them and compare results. I consider this field is most promising from the point of view of raising the general standard of soaring in this country and it offers hopes of drastically reducing the flying experience required to reach cross-country soaring standard.

We have been most fortunate in obtaining official support for flying tests on the new instruments designed by Mr. Temple, and it is fitting that the A.T.C. Gliding Instructors' School should take an active interest in all new developments which might result in better gliding instruction.

Perhaps this article will inspire fresh attempts to provide the instruments we need to make soaring easier for all.

On Finding a Thermal

by Peter Temple

It appears likely that when a thermal is born, the air which first rises does so at a comparatively low speed, soon dispersing and being pushed to the sides by the following, faster-moving air forming the main body of the thermal; the dispersed air, and the remains of preceding thermal bubbles from the same source, therefore cause a temperature gradient over considerable lateral distances.

It is possible that a gradient is also caused by friction between rising warm air and relatively still cold air causing the outer surface of the thermal to be retarded and become mixed with the surface of the air through which it is travelling; moreover, some cold air will mix with, and be accelerated by, the outer surface of the rising air—a phenomenon, incidentally, which would help to account for the increase of diameter of a thermal with height.

It was this assumption, that the temperature gradient around a thermal covers a wide area, which led to the decision to make some sensitive thermopiles (a number of junctions of a pair of dissimilar metals) with the object of locating thermals.

The first thermopile was made as a single unit, one set of junctions being fed with air from a pitot head; this air was then passed to a small insulated chamber and then to the second set of junctions, thus giving an indication of the temperature of where one is, compared with where one was a predetermined distance ago. This distance lag could be varied by altering the volume of the insulated chamber.

The results with this unit in flight were

surprisingly good—when there were any thermals about. There were, however, two disadvantages:—

1—under ridge or wave soaring conditions it was as likely to guide one out of the lift as into it, and

2—it was a full-time occupation for the passenger to interpret the indications and navigate the pilot into a thermal.

These flights were so promising that it was decided to make two more thermopiles and mount them on the wing-tips, having them so interconnected that the indication given was of the difference of temperature between them. In flight this proved to be very satisfactory; after a suitable technique had been evolved it was possible for the pilot to read and interpret the instrument without the help of a passenger. On receiving an indication, a 45° turn would be made in the appropriate direction, after which the pointer would return to zero; after flying a further distance—usually 100 yards to half a mile—a second indication and a 45° turn would be made, almost invariably straight into the thermal. At one time during trials it was possible to locate and use a thermal, and after gaining height, dive out of and away from it, turn, locate it again and use it (it was believed to be the same one).

During a flight when being flown by an experienced pilot—who was not used to soaring—I was able, by using thermopiles for left-and-right and fore-and-aft, and also an electric variometer and a "Cosim" total-energy variometer, to talk the pilot into thermals, and after about an hour's experience predict fairly closely the rate of lift we would find when we got there.

If one uses a differential thermopile (left and right) and flies straight into a thermal, or the same distance between two thermals of equal strength, or at such a position between two unequal thermals that there is no difference of temperature (or the difference is less than 0.005°C), there will be no indication; but it is extremely unlikely for a glider to travel past thermals without obtaining some indication either when approaching or when leaving them.

When flying a high-performance sailplane at high speed from one thermal to what is believed to be the next, there is with existing instruments no indication that one is passing near a moderate or weak thermal, but if one uses a differential thermopile it alone will give an indication of the presence of such a thermal.

There has been a number of not very successful attempts to make instruments for locating thermals. A difficulty has been time lag, and to overcome this most of them have involved some form of electrical thermometry. Of those which used a thermopile the makers apparently found it difficult to make a compact instrument with sufficient junctions to give the required sensitivity; also, the bulk of material which had to be either warmed or cooled caused a considerable time lag. (The finest wire used was apparently 0.001 in. diameter.) Another electrical method tried was passing a heating current through a resistance wire which was assumed to be cooled in proportion to the temperature of the air passing over it; when this was put into practice it was found that during a turn the inside wing-tip which was lower (and slower) indicated a higher air temperature, and it was therefore assumed that the effect of temperature gradient with height would mask lateral temperature gradient due to a thermal. This was an incorrect assumption; the cause of the indication of higher temperature on the inner wing-tip was due to the lower air velocity there during a turn.

It was found that by using a thermopile with several hundred pairs of junctions in series, made of wire considerably finer than that used before, sufficient sensitivity was obtained to give a deflection of $\frac{3}{8}$ in. of the pointer of the indicator when approximately 400 yards from a thermal which, when entered, gave a lift of 10 ft. per second in a Sedbergh. Use of this fine wire for the junctions so reduced the time lag that, upon noting an indication and turning 45°, the indicator returned to zero before the glider was levelled out.

The total weight of the two wing-tip elements and cockpit indicator is 7¼ ounces. The elements are $1\frac{1}{8}$ in. diameter by 2¼ ins. long, and it is proposed to make some more with 1,500 pairs of junctions, $\frac{3}{8}$ in. diameter by 11 ins. long. These instruments are quite robust; one was fitted to a glider which landed on the remains of a wall, when the floor and seats collapsed but none of the instruments was affected.

When flying in ridge or wave lift with thermopiles it is usual to get a number of indications which, if followed up, do not usually, as with thermals, lead to lift. This could be the basis of interesting and useful research.

Long Mynd Waves Summarized

by John Hickling

APART from isolated instances before and immediately after the war, wave exploration did not become recognised as a fairly regular means of altitude, and to a lesser extent distance soaring until recent years.

A nine-day camp for club and visiting pilots held in September 1948 was the first occasion that full use was made of this condition by all comers.

Since then waves have been contacted in winds from all points of the compass. The most recent development has been the utilisation of lee waves produced by winds in the easterly sector blowing down the Long Mynd escarpment itself (see GLIDING, Autumn 1953, pp. 128-131).

The picture so formed from our experiences points conclusively to the fact that winds from the W.N.W.-N. sector produce the most consistent and best conditions, as in fact they do for all other forms of soaring. Table I illustrates this point (only flights above 10,000 ft. a.s.l. included).

The asterisk against the flights made by Prestwich and Pickup indicates that their climbs were deliberately cut short, even though the rate of climb was in each case undiminished at 10-15 ft/sec., because of sheer exposure in the first case and gathering darkness in the second.

Flights of note have also been accomplished in other wind directions, as is shown in Table II.

What of the future? It is the writer's opinion that to date we have only just begun to use what is perhaps a very frequent phenomenon, but progress will only come about if we can provide gliding facilities on every flyable day throughout the year, and make available a towing aeroplane.

Table I

Date	*Pilot(s)*	*Aircraft*	*Maximum Height (ft)*	*Wind in wave Direction and speed (kts)*	*Wind on site Direction and speed (kts)*
16.3.49	Neill	Olympia	13,500	N.N.W./30	N.N.W./20-25
,,	Carrow	Olympia	10,400	N.N.W./35	,,
3.7.51	Yates	Olympia	11,300	W.N.W./35	W.N.W./15
22.3.52	Prestwich and Risk	T-21b	13,000*	N.W./35	N.W./25
,,	McDougall ..	Prefect	11,000	N.W./35	N.W./25
1.11.52	Prestwich	Olympia	14,000	N.W./35	W.N.W./20
,,	Pickup	Olympia	14,500*	N.W./40	N.W./10
,,	Testar and Maxam	T-21b	10,600	N.W./40	N.W./10
,,	Hickling and Jones	Venture	11,000	N.W./40	N.W./10
31.5.53	Horrell	Olympia	11,300	N.N.W./40	N./30
,,	Hickling	Olympia	11,000	N.N.W./40	N./30

Table II

Date	*Pilot*	*Aircraft*	*Maximum Height (ft)*	*Wind in wave Direction and speed (kts)*	*Wind on site Direction and speed (kts)*
15.9.46	Thwaite	Petrel	9,600	W./25	W./15
24.8.48	Sanders	Olympia	9,000	W.S.W./35	S.W./25
14.8.49	Testar	Olympia	12,300	W./10	W./10
18.3.53	Neumann	Prefect	6,600	E./25	E./25
20.6.53	Prestwich	Olympia	8,800	S./20	S./10

North Wind Wave

by John Hickling

THE flight made by the writer on 30th May, 1953 is an example of the bigger wave system encountered in the northerly sector.

Quite a boisterous day had developed, following a morning's and early afternoon's pleasant and uneventful hill-soaring, and the wind that had been W.N.W., 20 knots, now veered almost due north. Hill-soaring instruction in T-21b had to be abandoned at 16.00 hrs. because of the gale-force wind of 40 knots and violent turbulence that accompanied it—in fact, all flying ceased for about half-an-hour and aircraft were securely picketed down.

There was very little cloud anywhere except, tantalisingly, not far away to the north, where a cloud street, that disappeared into the north-western horizon and ended a few miles down wind, seemed to offer prospects of good thermal soaring.

Blue Olympia and I were duly launched to 1,100 ft. at 16.25 hrs. and, amazing as it may seem, I was able to maintain this height all the way along the west-facing northern half of the Long Mynd in what appeared to be broken thermal. I failed to make contact with the cloud street as such, but succeeded in thermalling at between 2,500 ft. and 3,500 ft. a.s.l. under bits of cloud along its edge, all the time being able to maintain a ground position against the strong wind.

After two hours of this rough but pleasant flying, I returned southwards 3 miles and entered the circuit for a landing, but noticed that whereas earlier, flying T-21b, I had been glad of the Sutton harness, the air now appeared to be quite steady and to my delight the green ball showed a regular 2 ft/sec. up. I extended my downwind leg one mile to Myndtown without hesitation, as even with a north wind there is always reasonable hill lift there, should I lose some of my 1,200 ft. of spare height. By working hard for 20 minutes I improved my altitude to 5,000 ft. a.s.l. and was pleased to see that the club Olympia was on its way to join me (time now being 18.10) with John Hurrell aboard. The position of the wave was roughly Myndtown-Bishops Castle, and up to now it was not marked in any way by cloud.

Lift improved to 5 ft/sec. and stayed so, and it was now possible to see that the cloud street, that still survived to the north, had developed a 90-degree bend (across wind) north of Welshpool. The cumulus tops visible looked typically lifeless as is usual under these conditions.

At 7,500 ft. the Aer Lingus Bristol Freighter passed by, giving me quite a kick some minutes after its passing—a kick resembling a very heavy landing!

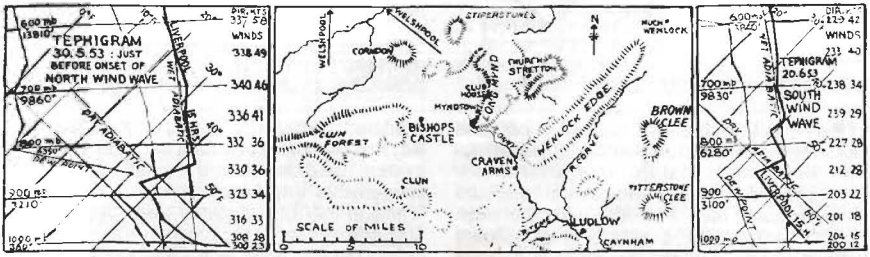
Cloud coverage increased rapidly as the climb continued, and the wave now became quite marked as the usual patch of orographic-type cumulus formed near the south tip of the Mynd. The cloud street seemed to have been engulfed in masses of flat strato-cu to the north and indicated further waves upwind by well-spaced holes. The wind direction had, if anything, backed with height and now appeared to be N.N.W.-N.W. and the velocity only slightly increased at 40 knots.

At 11,000 ft. the rate of climb dropped to zero and so did my hopes of Gold C heights. I searched east and west with no improvement but learned later that Hurrell had been able to reach 11,300 ft. in a position immediately to my rear (that's why I could not see him).

I burned off 5,000 ft. trying to reach the next hole up-wind, but this proved strangely unco-operative, and so I returned to the original wave where I joined David Dick in the Sky and climbed back to 8,000 ft. The landing was eventually made at 20.35 hrs.

This flight emphasises the need for pilots to be able to recognise the symptoms of wave system influence. I eventually recognised the set-up, but how long had it been working before I used it? The periodic surges of green ball found early in the first part of the flight were taken to be thermal, but on reflection could it have been?

The surging and, at times, violent lift mentioned above is very much a characteristic of the wave bottom; lift rarely smooths out and becomes consistent until heights of the order of 3,000-5,000 ft. a.s.l. are reached (see A. Pickup's article in GLIDING, Winter 1952-53, p. 164).



South Wind Wave

by R. H. Prestwich

On the evening of 20th June, a wave forming in a south wind was contacted for the first time. Acting on a hunch, and also thinking that a bottom retrieve would be quite fun, I had several high winch launches in Blue Olympia throughout the day, each time feeling around over the Church Stretton valley.

On the fifth launch I headed straight for the south end at 55-60 m.p.h., sinking like a brick the whole way and passing over the edge at about 200 ft., all boats being thoroughly burned. By then I had struck no sink, and then gradually started working up a bit of lift near Mr. Hardwick's private claptraps. Turning S.E. I found better lift out over the valley, about two miles S.E. of the end of the Mynd. This gradually increased up to 10 ft/sec. and I really began to feel that I wasn't going to the bottom after all. At 2,000 ft. (all heights are above the Mynd, 1,400 ft. a.s.l.) I was sitting in front of the first wave cloud, watching the T-21 then the Cream Olympia join me in the wave. Still climbing, I headed west again, and at 4,500 ft. passed another wave cloud, rather smaller than the first one below it, but still well-defined. Above me was total cover on which I eventually bumped my head at 7,000 ft.

Having visions of bursting through cover into clear air, with the sky the limit, I switched on the horizon and entered cloud. Twenty minutes later I was still only at 7,400 ft., in failing lift, so I opened the brakes and cleared cloud at 6,500 ft. By some amazing coincidence I was still approximately where I intended to be.

Deciding it was time to explore. I headed west in no sink at 60 m.p.h. The wave stretched for miles, slowly curling southwards like a half moon. Along this I flew until I was about 10 miles S.W. of Corndon, and about 10 miles W. of Bishops Castle. Lift was failing here, so I turned about and came home, on the way meeting Cream-O flown by Bruce Bowdler. Together we flew along the wave, passing south of the Mynd over Craven Arms, and then on to Brown Clee. I lost Bruce here, but eventually saw him again about 5 miles south of me over Ludlow. I followed him out, flying in one of the biggest areas of no-sink that I have ever found, and finally caught him up over Caynham. He seemed to be determined to carry on to Cornwall or somewhere, so I left him to it and came home. The wave cloud had by then moved back a couple of miles, so I was able to get in very easily, without descending through cloud.

In the various wave flights I have made, I have never seen such a long wave cloud. I must have flown along it for almost 40 miles, and am sure I could have gone further if I had not wasted time trying to climb through cloud. However, by the time I was at the west end of the wave, the lift had stopped, although the cloud still looked quite useful. This flight makes me realise what we have been missing, sitting on the ground waiting for west winds in stable conditions. However, now that we know that it's there, I am sure that bottom landings in south winds will increase by leaps and bounds, as they have in N.E., N., E., or S.E. winds. Long live the five-shilling fee, and beware of the bull!

The Airspeed Indicator

by T. R. Beasley

THIS article is intended to explain how the airspeed indicator works, its construction, installation, and its failings.

In principle it is a differential pressure gauge measuring the difference between "pitot" and "static" pressure. Fig. 1 shows a pitot-static head connected to a U-tube filled with liquid; obviously, as the pressure in the pitot pipeline, P, increases with respect to that in the static line, S, there will be a difference in the level of the liquid in the two limbs of the tube, as shown. This device, then, could be calibrated as an A.S.I. but would not be very sensitive and errors would be introduced by changes of attitude.

Fig. 2 illustrates a second type of differential pressure gauge: a flexible diaphragm divides a box into two; one side is connected to the pitot line, P, and the other to static, S, as shown. As the difference in these pressures varies, due to variations in airspeed, the diaphragm will bulge (shown dotted) and by means of a suitable linkage system it can be made to move a pointer over a dial graduated in units of airspeed. This is the basic principle of modern types of A.S.I.

Actual constructional detail will vary between manufacturers, but can be divided into two distinct types: diaphragm or capsule. It will be seen that both types do depend on the principle shown in fig. 2, but with added refinements.

The diaphragm type of instrument more closely resembles the diagrammatic sketch, as it actually utilises a diaphragm across an airtight box; this is sketched in fig. 3. In the earliest instruments this diaphragm was made of rubber or oiled silk, but these have given way to specially developed metals, the diaphragm form becoming a disc with concentric corrugations to give greater flexibility (seen in section in the sketch). As can be seen, the diaphragm divides a container, known as an "oyster," into two parts, the diaphragm being soldered to the lower half of the oyster containing the pitot connection; it is essential that there are no air leaks around this joint. The top half of the oyster is then soldered into position; this has a hole in it through which protrudes the top of an angle bracket, B, which is soldered to the diaphragm. It is the top edge of this bracket which actuates the lever system used to magnify small diaphragm movements into larger pointer movements. The top half of the oyster also supports the framework for the mechanism; thus by removing the bezel and glass together with the nut, X, the whole mechanism may be withdrawn from the case.

The second type of A.S.I. differs only in the design of the sensitive element; instead of using a simple diaphragm it uses a cylindrical metal box in the form of a "capsule" (fig. 4). As can be seen, the box is again corrugated concentrically to give greater flexibility; it is open to pitot pressure as shown. In this type of construction the rest of the mechanism is supported by means of extensions on the distance piece, Q, so the whole mechanism may be removed in the same manner as in the diaphragm type of instrument. In actuality this type of construction is, in effect, a double diaphragm. The top and bottom of the box may be considered as two separate diaphragms, and consequently this type of construction is more sensitive to pressure changes for the same diameter of detecting element as the simple diaphragm

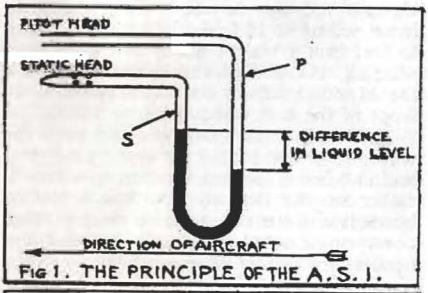


FIG 1. THE PRINCIPLE OF THE A.S.I.

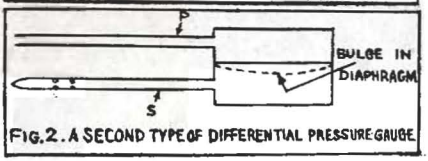


FIG. 2. A SECOND TYPE OF DIFFERENTIAL PRESSURE GAUGE

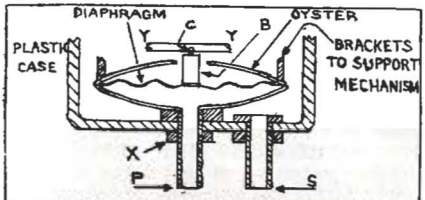
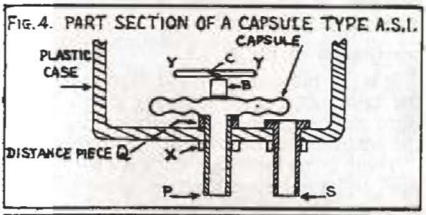


FIG.3. PART SECTION OF A DIAPHRAGM-TYPE A.S.I.



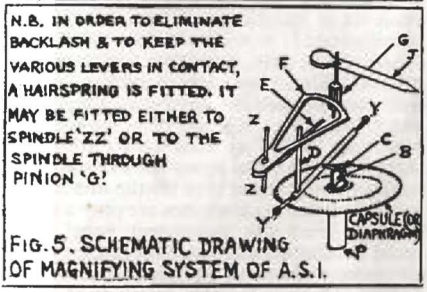


FIG.5. SCHEMATIC DRAWING OF MAGNIFYING SYSTEM OF A.S.I.

type. For this reason it is more usual to find capsule type construction in the instruments fitted to sailplanes.

The amplifying mechanism has been omitted in both sketches for clarity; it is identical for both types of instrument and will now be described (fig. 5).

Both types of instrument have the bracket, B, soldered to the upper surface of the corrugated element (see figs. 3, 4 and 5). This bracket is in contact with a short lever, C, carried on the rocking shaft, YY; thus the linear movement of the diaphragm is converted to rotational motion. The rocking shaft, YY, also carries a second lever, D, which is in contact with the sector lever, E, which, as its name implies, is carried on the toothed sector, F, whose spindle is ZZ. The sector, F, is geared to the small pinion, G, carrying the pointer, J; thus, the small movements of the diaphragm are amplified into readable indications on the scale over which the pointer moves. In order to keep the parts in contact there is a hairspring fitted, either to the spindle, ZZ, or to the spindle carrying the pinion, G.

The total magnification will depend on the ratio of the lengths of the various levers; this, therefore, provides a convenient means of adjustment to allow for slightly different diaphragm (or capsule) characteristics. To adjust the magnification the levers may be bent slightly, thus altering their effective lengths; for this reason lever D is known as the calibrating lever, as this is the one most used for adjustment. It is made of bi-metallic material to compensate for errors introduced by temperature variations.

Some instruments may be found with a direct connecting link between the capsule and the rocking shaft. Calibration is effected by altering the effective length of the calibrating lever and also by an axial movement of the capsule in the framework supporting the mechanism.

Many sailplanes are fitted with German A.S.I.s which do not use the pitot head described; instead of this they measure the difference between static pressure and the reduced pressure at the throat of a small venturi tube. In this case the static pressure is greater than the venturi pressure and will therefore be connected to the centre pipe, P, in the sketches. These instruments will invariably be of the capsule type. However, some German instruments used on powered aircraft may have a leaf spring across the capsule to reduce its movements; it is sometimes possible to remove this spring and re-calibrate the instrument as a low range type. When calibrating these venturi type A.S.I.s it must be realised that the pressure difference is four times that of a pitot instrument at the same speed, i.e. at 60 m.p.h. the pressure difference for a pitot-static instrument will be 4.508 cm. of water, while for a venturi-static type it will be 18.032 cm. This, of course, is only applicable when the instrument is to be used with the correct venturi tube. It might here be mentioned that it is possible to use a pitot-venturi arrangement with a high range A.S.I. re-calibrated to suit the venturi used.

Errors in the A.S.I.

Unfortunately the A.S.I., like most aircraft instruments, does not give a true reading. For this reason its reading is known as Indicated Air-Speed (I.A.S.), while the True Air-Speed is abbreviated to

T.A.S. The errors involved are instrument error, position error, density error and compressibility error. N.B. Contrary to a common belief there is no lag in the A.S.I.'s reading. This belief may be attributed to the fact that, owing to the glider's inertia, it takes a little time for the glider to change speed and this means that the attitude must be held steady for a short time before the A.S.I. can be regarded as an indication of the glider's attitude.

INSTRUMENT ERROR, I.E., is due to constructional defects causing the indicated reading to differ slightly from the calibrator reading on testing. Provided the reading lies between certain specified limits the instrument is acceptable, and as the error is known, the manufacturers or calibrators usually supply a correction card.

POSITION ERROR, P.E., is the name given to errors attributed to the pitot-static arrangement. These are due to the airflow being modified by the motion of the aircraft; the error therefore varies throughout its speed range. The magnitude of the error depends on three factors: the position of pitot and static, the airspeed, and the angle of attack.

The position of the heads is important as they detect the *local* pressure in their immediate vicinity, and this depends upon the aerodynamics of the aircraft whose movement causes variations in the local airflow, and hence in the local pressure. The airspeed and angle of attack are closely related, as they both affect the pressure distribution around the aircraft. The corrections necessary can only be obtained by flight tests on prototype aircraft; they are then applicable to all similar type aircraft and are applied by referring to a correction card. When both position and instrument error corrections have been applied to the I.A.S. the result is known as Rectified Airspeed, R.A.S.

DENSITY ERROR is the most important error of the A.S.I. The instrument is calibrated for air satisfying I.C.A.N. standard conditions, (15°C and 1013.2 mb. pressure); therefore any departure from these conditions will affect the reading of the instrument. Now, the density at height h will vary according to the air temperature at that height, and a correction can therefore be applied only if the free air temperature and the height are known. In practice, powered aircraft usually carry a computer, but this is really outside the scope of the sailplane pilot. An approximate true airspeed may be obtained by use of the simple formula:—

$$\text{T.A.S.} = \text{R.A.S.} + h \times \frac{\text{R.A.S.}}{100} \times 1.75$$

(h in thousands of ft.); e.g. T.A.S. for a sailplane flying at 100 m.p.h. at 10,000 ft.

$$= 100 + 10 \times \frac{100}{100} \times 1.75$$

$$= 117.5 \text{ m.p.h.}$$

COMPRESSIBILITY ERROR is not of importance at speeds below about 300 m.p.h. and can therefore safely be ignored.

Installation of the A.S.I.

It is the purpose of this section to discuss the best methods of ensuring that correct pitot and static pressures are available at the instrument connexions.

There is no necessity for the two "pick-ups" to be mounted together, although this is often the practice employed for convenience of installation. The usual method of mounting is as shown in the sketch, fig. 6. As can be seen, it consists simply of two parallel tubes, clipped or brazed together, bent forward into the airstream. One tube, usually the upper, is sealed off at the end and has holes drilled as shown to open it to static pressure. The lower tube is left open to the airstream and receives the impact, or pitot pressure. As the tubes are only a short distance from the instrument panel it is usual to extend them inside the fuselage and to connect them to the instruments with rubber tubing, a T-piece being inserted in the static line in order to make connexions to the altimeter and variometer.

Unfortunately the installation has its disadvantages, namely: liability to icing, drag, position error (see previous section), and the ease with which uninformed persons can blow down it and ruin the A.S.I. Under icing conditions the pitot tube will accumulate ice in the form of a straw; the A.S.I. will therefore continue to function until such time that the straw seals over. It has been found that this does not usually occur until the ice begins to melt, and the water enters the tube. In severe icing conditions (e.g. flight through freezing rain), not only is the pitot likely to ice up but the static holes also may become blocked and the A.S.I. will either read incorrectly or fall back to zero.

In order to avoid these disadvantages, other installations have been devised. Alternative pitot installations are: electric

de-icer, large nose type pitot tube, and nose pitot-pot. Alternative static arrangements are: static vents, and cockpit static. Of course, any one of the three pitot suggestions may be used with any form of static, or even more than one; e.g. the electric de-icer pitot may be used in conjunction with static vents, while a cock is included in the static tubing so that it may be opened to cockpit pressure in the unlikely event of the vents becoming blocked.

The various improvements will now be discussed in detail, the above-mentioned pitot modifications being considered first.

ELECTRIC DE-ICER.—This consists of a simple electric heating coil around the end of the pitot tube. It is used to melt off the ice straw, once formed. The device has the advantage of being merely an addition to the existing installation; its disadvantages are its requirement for electric power and a slight increase in drag. For a full description see GLIDING, Vol. 3, No. 2 (Summer, 1952).

LARGE TYPE NOSE PITOT TUBE (Fig. 7).—This is believed to be quite popular in the U.S.A. A fairly long large-bore tube is used (½ in. to 1 in. dia. and up to 12 ins. long), and the small-bore connexion taken from the top a little forward of the rear end (see sketch). Ice accretion, in the form of a larger straw, may still take place, but when it breaks up it is less likely to block the pipeline. This type of installation should not produce an appreciable increase in drag if it is installed at the correct point in the nose.

THE POT-PITOT (figs. 8 and 9) is gaining favour in this country. It is a well-known fact that the pressure at any point in a container is the same in any direction; therefore, provided the pressure in the pot, R, is at true pitot pressure, then the pressure in the pipe, P, will also be true pitot pressure, despite the fact that it is rear-facing. Under icing conditions the accretion will take place only on the front of the pipe P, and will not block the tube; even when it begins to melt and break up, it still cannot block the hole. The only likelihood of icing is when flight takes place through

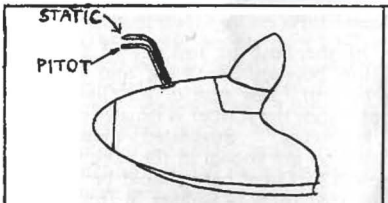


FIG. 6. A COMMON TYPE OF PITOT-STATIC

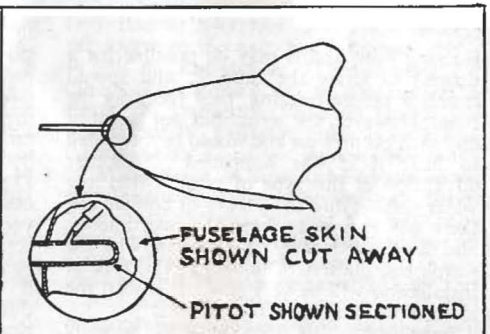


FIG. 7. LARGE NOSE PITOT TUBE

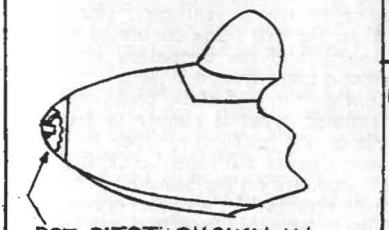


FIG. 8. POSITION OF POT-PITOT

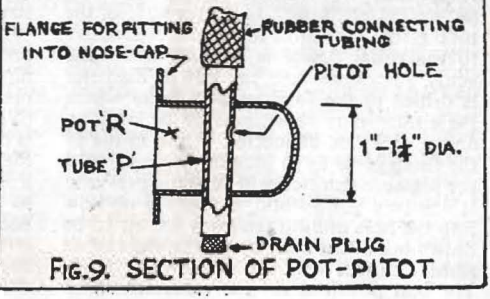


FIG. 9. SECTION OF POT-PITOT

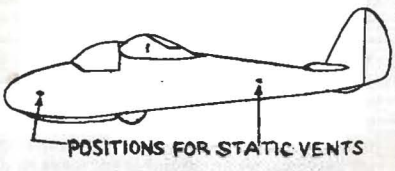
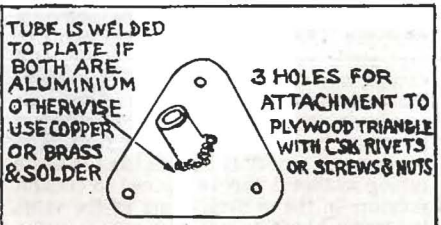
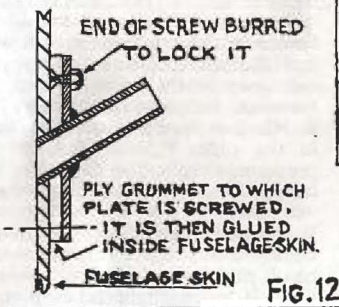


FIG. 10. STATIC VENTS



TRIANGULAR PLATE WITH TUBE ATTACHED. NOTE: TUBE SLOPES UP & TOWARD THE NOSE FOR WATER TO DRAIN OUT. FITTING SKETCHED IS THEREFORE FOR STARBOARD SIDE.

FIG. 11. ASSEMBLY OF STATIC VENT



NOTE: A SMALL HOLE IS FIRST DRILLED IN THE FUSELAGE SKIN. IT IS THEN FILED OPEN TO TAKE THE VENT TUBE WHICH IS CAREFULLY FILED FLUSH.

FIG. 12. ASSEMBLY TO FUSELAGE

freezing rain, and it may be possible for a droplet to strike the tube, P, and spread round it before freezing, thus blocking the hole. However, the writer has not heard of any such occurrence and would be interested to hear if it has happened. Another advantage of this type of pitot is that any water getting into the tubing or condensing there will run away from the instruments, and not towards them as is the case with the simple installation. The drag of this type of installation will be very low. It is also the most difficult type to blow down.

IMPROVING THE STATIC.—As already mentioned, the static head is chiefly responsible for Position Error, some authorities attributing to it over 90% of the total error. The most important alternative to the usual device is the use of "static vents." If a small hole, say 3/16 in. diameter is drilled in the fuselage at a point where the airflow may be assumed to be laminar, and a pipe line connected to the inside of the fuselage so as to include the hole, then the pressure detected will be static pressure. It will be a good static, as there is no flow into the hole and no tendency for air to be drawn out of the hole, as may be the case at some attitudes with the usual static head. The best positions for the vents are either side of the nose or just aft of the mid-position between the wing and tailplane (see fig. 10). For ease of installation and maintenance the former is usually preferred on sailplanes. Suggested methods of installation are shown in the sketches, figs. 11 and 12. Great care should be taken to ensure that there is *nothing* in front of the vent liable to cause turbulent flow; even screw-heads should be avoided, as they may have an appreciable effect on the flow. In an attempt to maintain correct readings during a sideslip, it is sometimes the practice to use a vent each side of the fuselage, the two being connected together by tubing and the connexion to the instruments taken from a T-piece.

Another form of static commonly used on training types is simply to leave the nipple on the instruments open to cockpit pressure: hence the term 'cockpit static." (N.B. standard on the Slingsby T-21b.). It is easily arranged for a rubber connexion in the line to be within the pilot's reach so that if he has reason to distrust the instruments, as in the event of the static vent or line becoming blocked, he can break the rubber connexion, thus opening the instruments to cockpit pressure.

It must be realised that faults in the line

will affect the instrument readings in different ways; these can be expected to be as follows:—

PITOT LINE.—If blocked, will not react to changes in speed. If leaking, will read low and possibly erratically.

STATIC LINE.—If blocked at altitude, A.S.I. over-reads on descent and vice versa. If leaking, may over-read, particularly in open cockpit types and when windows are opened in others.

From the above discussion it can be seen that the best all-round installation is probably the pot-pitot in conjunction with nose-type static vents. When making an installation it is advisable to fit a spare A.S.I. temporarily in order to check the new pitot-static against the existing installation. The two instruments should not differ by more than a few m.p.h.; if they do, then the indicators should be interchanged to ascertain whether it is the actual instruments at fault or whether there is a definite difference in the pitot-static pressures. If it is proved that the instruments themselves agree, then, by changing over the pitot connexions only, it is a simple matter to determine to which modification the difference in reading is due. However, if the Position Error correction card for the sailplane's original installation is available, it is an easier solution to draw up a new card for the modified installation; it should be found that the corrections necessary are lower than previously.

Five Hours Over Lasham

by C. G. Dorman

AT the start of this flight on Whit Tuesday, 26th May, the possibility of Silver C duration was not considered. I declared a triangular course of 25 miles, Lasham—Micheldever—Basingstoke—Lasham. The conditions were good, cloudbase about 4,000 feet and a 12-knot north wind. The wind direction decided me to try the leg to Micheldever first so as to avoid having any leg direct into wind.

I was towed off in my Olympia behind the Tiger and released at five past one at 1,300 feet in good lift. With a steady climb at 7 feet per second I was soon at cloudbase. I was unable to enter cloud since I had neither an A.S.I. nor horizon working; as it happened there was little height to be gained in the clouds. I soon found that the north wind was making it very difficult for me to get near my course. After three thermals and thirty minutes flying I was back over the aerodrome at 800 feet.

The resident Lasham thermal came to my rescue. I reached 3,600 ft. over Alton and worked back upwind to regain the airfield at 1,600 ft. At 2 o'clock I was again over the aerodrome, this time at 4,000, having had far less trouble in gaining ground to the north. The presence of good clouds to the north made me change my plan and make for Basingstoke, which I reached half an hour later at 2,400 feet. I was now drifting off course to the east, but the implications of this did not sink in. Using four lively clouds I climbed to 4,500, worked round the north of Basingstoke and set course for Micheldever. Forty minutes later I was circling under a cloud in weak lift due north of Micheldever waiting to be blown south over the turning point when the smoke from a chimney showed me that the wind was now westerly. I rounded Micheldever at 3.30 and set off down wind to Lasham, arriving after fifteen minutes with 2,200 feet

A wide easy thermal off the airfield tempted me to stay up a while longer. From 4,000 feet I watched the two Army Club trailers being brought out for the club Olympia and the Prefect which had both landed away. Then I realised that I had been up over three hours, and since conditions were easy I decided to try to last out till after 6 o'clock. Between 3.50 and 5.40 I used eighteen thermals without ever dropping below 3,500 feet. About 5.45 I was well downwind of the airfield at 3,000, wondering where to find the one thermal I needed to make the duration safe. Then I saw the T-21b circling tightly over a mile away. I joined it and was again at 3,000 at 6 o'clock. I floated gently down to land at 6.20 p.m.

Reviews

Return Ticket : by ANTHONY DEANE-DRUMMOND. Published by Collins, London, 1953. Price 12s. 6d.

THIS may not seem to be the appropriate place for a review of a book which is not connected with gliding, but two circumstances justify it. Firstly, it is written by one who is well known in gliding circles, and secondly, because success in escaping requires much the same qualities as those needed to become a first-class soaring pilot. That the author made three escapes from captivity, of which two were successful, shows that he possesses judgement, determination and courage in no small degree.

The book describes these escapes. In 1942 he escaped from Italy, where he had been captured when taking part in one of the first parachute raids of the war. Two years later he escaped from Arnhem, where he voluntarily stayed for thirteen days in a cupboard before he was able to get away. The accounts of these escapades would be well worth reading even if the writing were poor, and this it most certainly is not. The author writes clearly and does not mince words.

The binding is pleasing and the book contains suitable maps which, however, would be improved if they showed north.

Altogether a book worth buying.

L. WELCH.

Feathered Wings: A Study of the Flight of Birds; by ANTHONY JACK. Published by Methuen & Co. Ltd., London, 1953. Price 15s.

In his introduction the author makes the unusual point that books on bird flight can be divided into two kinds: those written before and after 17th December, 1903. The first kind "are written by men wholly seized of the passion for flight; there is an enthusiasm, a madness, a brotherhood about some of them that belongs to airmen and not to ornithologists." Gliding people, rather similarly, are apt to divide the authors of such books into (a) those who understand soaring flight, and (b) ornithologists. Mr. Anthony Jack, though admittedly an ornithologist, overlaps into the other class by virtue of having learned to fly during the war. But in spite of this his book is not altogether free from lapses into confusion.

He has the sense to deal with "flapless flight" before "flapping flight," unlike the typical ornithologist who imagines the latter to be more easily explained. The flapless chapter is pretty reliable, but he gives only three lines of print to slope-soaring. For the chapter on flapping flight, the author has obviously had recourse to a scientific book, probably that by Stolpe and Zimmer mentioned in his bibliography; consequently it is good.

In Chapter 5, "The Wind," there is the inevitable attempt to explain the difference between air-speed and ground-speed to the average ornithological reader, who is notoriously clueless on this point. Few authors come through this ordeal unscathed; but Mr. Jack gets through with flying colours, until he says that "we are probably wrong to think . . . that thermal currents always rise vertically," apparently not realizing that it makes a difference whether you relate the thermal's motion to the surrounding air or to the ground. He makes a good suggestion for teaching ornithologists the difference: you fix a map to a table-top, cover it with a movable sheet of glass (representing the wind), and run a clockwork toy engine (representing the bird) over the moving glass.

The interesting chapter on "manoeuvres" includes a statement that herons, egrets and similar birds often side-slip when coming down to a small pond surrounded by high trees—a manoeuvre once recommended to sailplane pilots by H. C. Bergel (substituting "field" for "pond"). The author says that birds fly in echelon to avoid each other's slipstream, but it has been shown that a bird gets some lift from the airflow in the wake of another's wing-tip.

It is in his chapter on the dynamic soaring of the albatross that the author really muddles his reader. He begins well by assuming three layers of air, one above the other, moving at 5, 10 and 15 m.p.h. respectively. Thus the bird can move from one air stream into another with a change of height so small as to be ignored; but, having given the bird 20 m.p.h. air-speed in one layer, he says it still retains this 20 m.p.h. air-speed on entering a faster one, and that the effect of this faster stream is "presented to it as 5 m.p.h. of wind blowing over its

wings free and undisturbed." What reader would guess this to mean an increase of air-speed from 20 to 25 m.p.h.? However, the author may be forgiven much for a particularly valuable diagram, showing his personal observation of the course flown by an albatross in relation to his ship while engaged in dynamic soaring.

The Anatomy chapter is distinguished by some important new findings about birds' eyes. When we look directly at an object, it is registered on a specialised part of our retina called the fovea, where vision is more acute than elsewhere. But the foveas of birds not only provide more acute vision than ours, but they can take on an extra-ordinary variety of shapes. For instance, the fovea of a shearwater runs right across the retina in a line, so that it can look directly at the whole visible horizon simultaneously; and each eye of a hawk has two foveas, one for looking ahead and the other for looking sideways.

Nature's most important physiological adaptation for flight, the fact that air blows right through a bird's lungs instead of in and out as in a mammal's, is not mentioned.

In the chapter on speed, the author puts that of the generality of birds as between 20 and 35 m.p.h., and the faster birds cruise at between 40 and 60—not very different from gliders. But a reported observation of frigate birds flying at 225 knots is regarded by him as not incredible. I should say it is incredible. A speed of 75 knots should be enough for such a bird's natural require-ments; but power increases as the cube of the speed, and to fly three times as fast it would need 27 times the muscle power. It is incredible that (a) Nature would give the bird 27 times as much muscle as it needs, or (b) its body could accommodate all that muscle without becoming fantastically misshapen.

Other chapters are on Meteorology, Navigation, and the Theory of the Aerofoil.

Most glider pilots will find much to learn from the book—except on their own subject—and various points to criticise. But to any criticisms the author has a rather effective reply; he points out that in studying the flight of birds there are at least four sciences concerned, "and if you treat them with the awed solemnity that the scientists expect, you will never get beyond writing things down in a note-book."

A. F. SLATER.

Maloja Wind: by FELIX PELTZER. Translated by Louis Hagen. Published by Hammond, Hammond & Co., London, 1953. Price 10s. 6d.

This novel was originally published in German at Cologne, but the story deals with a "European Youth Gliding Contest" at Samedan, Switzerland, where the Maloja wind provides the main source of lift for raising pilots from a winch launch to the upper thermal regions. Not only is it illustrated with photographs taken at the International Contest of 1948, but that meeting has obviously inspired the author. However, the competitors who then took part will be relieved to know that none of the author's characters is modelled on any of them—except that two Spaniards land their Kranich safely in an impossible clap-trap high up in the Bernina, which actually happened in 1948.

The characters of the eight competitors are modelled on the author's ideas of national types—the flamboyant Italian, the cocksure Frenchman, the stolid Englishman (of course), and the Dutchman who is appalled at the sight of so many mountains; but over the single feminine competitor, a black-haired Swedish girl, he has really let himself go. All are between 16 and 18 years of age, and they give the organizers such a harrowing time that it is just as well the contest days are limited to three—for altitude, duration and distance. Archibald Huxton, the red-haired son of a British General, gives Milan for a goal and has to take to his parachute in a thunderstorm.

Comparison with the original shows that the translator has frequently rearranged the sentences to give a better narrative. But in spite of his familiarity with military gliders (he was the author of *Arnhem Lift*), the main spar becomes a "crossbeam," and winds are given in feet per second, and wrongly at that. In fact, he has not taken the trouble to find out how many feet there are in a metre, so that, for instance, a pilot who climbs at 12 m/sec. to 5,600 m. is credited with only 30 ft/sec. and 16,200 ft. instead of 40 ft/sec. and 18,400 ft.

The book would make a suitable present for anyone below the age of the com-petitors, as an introduction to the potential-ities of soaring flight. And fans of the collecting type, who buy every gliding book regardless, will probably want to have it too.

A.E.S.

An Early Test Flight

by L. Wright

DOCTOR Johnson's "Rasselas" (1759) is not much read nowadays, and not many glider pilots will have come across these passages, which may amuse. A "workman", who seems rather to have been a sort of early Slingsby, is seeking backing from the Prince. His language, by the way, is hardly that of a workman nor even of a Slingsby, but is pure Johnson:—

"Instead of the tardy conveyance of ships and chariots, man might use the swifter migration of wings; that the fields of air are open to knowledge, and that only ignorance and idleness need crawl upon the ground . . .

"He that can swim need not despair to fly; to swim is to fly in a grosser fluid, and to fly is to swim in a subtler. We are only to proportion our power or resistance to the different density of matter through which we are to pass. You will be necessarily upborne by the air, if you can renew any impulse upon it faster than the air can recede from the pressure."

Is there in this last remark a hint of

$$V = \frac{W}{C_{L.p.A}} \quad ?$$

If so, the effect is spoiled by the next passage, which goes badly off the rails:—

"The labour of rising from the ground will be great, as we see it in the heavier domestic fowls, but as we mount higher, the earth's attraction, and the body's gravity, will be gradually diminished, till we shall arrive at a region where the man will float in the air without any tendency to fall: no care will then be necessary but to move forwards, which the gentlest impulse will effect."

To that happy region, alas, even Flt.-Lt. Piggott did not attain.

"You, sir, whose curiosity is so extensive, will easily conceive with what pleasure a philosopher, furnished with wings, and hovering in the sky, would see the earth, and all its inhabitants, rolling beneath him . . ." (and again a bad slip follows) ". . . and presenting to him successively, by its diurnal motion, all the countries within the same parallel." If that last bit were true, the Silver C requirement would not be five hours, but twenty-four, assuming one wanted to land back at base. "How it must amuse the pendant spectator to see the moving scene of land and ocean, cities and deserts!" When I am a pendant spectator, give me land every time.

To all this the Prince, knowing that oxygen has yet to be discovered and bottled, objects that "no man will be able to breathe in these regions of speculation and tranquillity." To which the other replies rather evasively: "If you will favour my project, I will try the first flight at my own hazard."

It took a year to build the machine. It had "the folding continuity of the bat's wings" together with "many ingenious contrivances to unite levity with strength." The first launch was from a promontory above a lake.

The pilot, uninsured as agreed, jumped. He fell into the lake. "His wings, which were of no use in the air, sustained him in the water, and the Prince drew him to land, half dead with terror and vexation."

L W.

Air Training Corps

BY the end of August the A.T.C. had a total of 980 Proficiency Gliding Standards and 70 Advanced Gliding Standards, and a total flying time of 5,922 hours 34 minutes. The Proficiency Gliding Standard is virtually the equivalent of a B.G.A. "B" Certificate plus two spot landings, and the Advanced Gliding Standard requires a soaring flight of a total duration of not less than 15 minutes, followed again by a spot landing. The figures for 1952 were 1,128 and 54 respectively, so that there is every prospect of exceeding those totals by a good margin this year All this is being done with an accident rate which is lower than any previously recorded in the Air Training Corps.

Clubs & Associations

London Gliding Club

AUGUST brought a good cross-country day on the 16th, when Philip Jeffery, who belongs to the College of Aeronautics as well as to our Club, flew 75 miles from Cranfield to Ipswich in the college Grunau. He got away at 12.30 from a winch launch to 1,200 ft., reached 7,500 ft. on the way, arrived over Ipswich at 14.40 and landed at 15.00. Meanwhile Dudley Hiscox was pushing along from Dunstable in the opposite direction, trying to get upwind to Kidlington and back; after 2½ hours he landed at Upper Heyford, somewhat to the flusterment of U.S. Security.

On 11th September a sky full of enormous wave clouds tempted Hennessy into the air for 3½ hours; but after thermalling up to 1,700 ft. he found the waves still out of reach. Observation showed that they were moving nearly as fast as the wind, so there could not have been much air flowing through them.

A low-altitude lee wave on 19th October produced weak lift between the Club and Totternhoe, just insufficient for maintaining height. The last strong thermal lift was encountered on 25th October when three pilots stayed up under a passing cumulo-nimbus, G. Scarborough for 25 minutes and D. Riddell for 10 minutes.

On 20th September we were visited by Prince Nicholas of Yugoslavia and on 24th October by Mr. Jussi Soini from Finland.

Winter Cross-Country Competition.—The Club has decided to offer prizes of £10 and £5 for the best cross-country flights between 1st November and 28th February. Minimum distance to qualify is 25 miles. Competitors will be marked according to mileage, with additional bonuses of 20% for reaching a declared goal, 30% if the pilot has not already done 100 miles of cross-country flying, and bonuses for machines of lower aspect ratio as during the Championships.

The award of the Kemsley Trophy, left undecided after the National Championships, has now been made to our Club.

In three months 68 new members have signed on at Dunstable, while an unknown number, believed to be almost as great, have joined through the London office.

Deeside Gliding Club

THE Kite has had several launches from the Clwyd Gate and also from the Dyserth site, at which latter one C was obtained in May and more are expected. Club facilities, in the shape of a club-room with bar (and view!) are now available at Clwyd Gate, so that non-flying members are also catered for.

Thermals at Sealand were elusive up to June, but as good winch launches are the rule there (1,500 ft. being frequent and 2,000 ft. several times exceeded), aerodrome circuits are not without interest. An excursion with the Kite to the Mynd at Easter, whilst enjoyable, merely gave the participants circuits at a fresh site, hill lift being absent.

V.B.

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Midland Gliding Club

FLYING from Long Mynd this year has been extensive — 2,000 hours have already been flown by early in November. Generally, flying had taken place on more days than last year, and the discovery of the south, and to a greater extent of the east wind wave has taken away the bogy of frustration we have suffered in the past in east winds.

As was hinted in our last notes, the club now possesses two Olympias, having taken over the syndicate-owned Blue Olympia on 1st November. This machine will be permanently equipped with oxygen.

The prototype Slingsby Skylark was made available to us in September, thanks to Mr. Slingsby, and numerous pilots expressed delight at its handling and penetration qualities. Theo Testar successfully rolled the machine several times, and John Cotton made more use of a 1,000-ft. winch launch than was hitherto thought possible. Unfortunately, Skylark was damaged during a bungy launch on 3rd September, but it is now back flying with us again.

We were a little optimistic last time about the progress of the clubhouse building; it is still incomplete, but interior work is proceeding apace. A workshop, combining separate sections for our ground engineer, Teddy Proll, and a motor transport workshop is also in course of erection.

Flying Activities

The club's remaining two camps for this year were very well attended and the weather man was fairly co-operative on both occasions.

The first one, organised by Bruce Bowdler in early August, resulted in 225 hours being flown. One member, Barnard, got his Silver C height and duration, and another his duration, and three C's were taken. Mrs. Joan Price, Dudley Hiscox and Lawrence Wright of the London Club visited us during the camp and contributed towards the flying total in no small way.

The camp arranged for late August was in the capable hands of David Martlew, and he had the additional responsibility of several members of the Army Club with their Prefect. Flying hours during the nine days were 170, with one Silver C duration, one height, four C's and one ab-initio B.

Saturday, 8th August, was quite interesting with a N.W. wind of about 30 knots blowing. Pickup and Hickling both contacted a wave up to 7,000 ft. a.s.l. during the afternoon in Blue Olympia. Contact on the first occasion was made through a layer of 7/8 cu, i.e., no hole.

On Sunday, 13th September, a small wave to 3,600 ft. a.s.l. was used by Prestwich, Hickling, Brooks and Dennett in Blue Olympia, T-21b and Prefect respectively in an east wind. Unfortunately, the cloud closed in beneath them all and a landing was made at the bottom in each case.

The spell of anticyclonic weather during the months of September and October enabled several of our newly trained members to solo: Wheatley and Spicer gained B and C, Brooks, Jones, Ricketts and Keyse gained B's.

Lockwood, from the Yorkshire Club, visited us in early October and he was promptly launched into a wave.

This season's last thermals likely to be contacted from winch launches were well used over the week-end 3rd-4th October, but the outstanding day of the period was, without doubt, 11th October, when the whole club fleet was launched into an east wind wave in a clear blue sky.

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Moonrakers Gliding and Soaring Club

THE past year has seen a great increase in enthusiasm and activity in the Club, the year's flying hours and launch totals being the highest since the formation of the club; over 1,800 launches and 115 hours flying time have been completed. During this time members have gained the following certificates : 18 A, 17 B and 1 C. This latter certificate was the first club-trained C to be gained by a Moonraker member.

At the moment the club owns two Kirby Cadet Mk. III, a T-31 and a Gull I; one of the Kirby Cadets unfortunately needs repairing after a stalled approach. By the next soaring season it is hoped to purchase an intermediate sailplane, thus giving the opportunity for our more experienced pupils to gain their C certificates.

The number of members in the club remains almost constant, but personalities frequently change because of postings. One recent posting involved the C.F.I., to whom we all give our thanks for his patience and work during the time he was here. The new C.F.I. will be selected at the next Committee Meeting.

We look forward to next year's flying and, if anything, hope to better the past year's achievements.

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Surrey and Imperial College Gliding Clubs

THE most notable feature of this summer has been the large number of new members, mostly ab-initio, who have joined the club; and in consequence we will not, as we have done on some previous occasions, close down for two months from the Christmas Party in order to concentrate on our C's of A. Flying will therefore take place every week-end this winter, except the Christmas week-end, and as we try to start flying as early as possible on Saturday mornings we hope more people will come down to Lasham on Friday night.

The club has purchased a one-year-old Standard Vanguard "Pick-up" and this has been fitted with a canvas cabin at the back so that it can take seven or eight passengers quite comfortably. Apart from reducing the cost of retrieves, the Pick-up is running a regular bus service from Imperial College to Lasham. It leaves I.C. at 9.00 on Saturdays and returns on Sunday evenings at a time to suit those travelling on it.

A most successful course was run by John Lathbury in September. All but one of the members went solo and John describes it as one of the most satisfying fortnight's holidays that he has ever spent; this despite the fact that on the instructing side he was virtually single-handed.

Peter Murden has a number of thoughts for expeditions to other clubs and sites during the winter. One idea is to keep an Olympia in London during the week, and then, depending on the weather forecast on Friday, those interested can be informed of the selected site and the expedition will leave London on Friday evening or early Saturday morning.

We are running a series of talks this winter on Saturday evenings. These are on various aspects of Gliding, including the reminiscences of members who visited gliding clubs abroad last summer. On 16th January we are having a showing of various films and stills taken by members.

Lasham Living, the organisation for social and domestic welfare, are planning a number of improvements this winter. Heating of the bunkhouses and sanitation (our biggest bugbear) are high on the list.

H.T.

Southdown Gliding Club

NEW ground has been trodden by the club this year, running a course and, in October, a dance. The course was held at Friston from the 15th to 22nd August, mainly to enable pilots of a little gliding experience to do some soaring. It turned out to be a great success, due mainly to the hard work put in by the instructors, Len Lennard, who looked after the secretarial side and a few others who took their holiday time to give a hand. The course members were all very enthusiastic and agreed they had had a very enjoyable time with plenty of soaring in pleasant surroundings. The increasing number of lady members in the club undoubtedly brought about the dance, which was organised very ably by Bob Burns and his wife at Haywards Heath; this also was a great success.

We took our winch and a Tutor to a field at the top of the hill near Firle Beacon; this was in a north wind but of insufficient strength to soar the hill. There was some very interesting flying and we think that winching from here will help our inexperienced members to get used to flying on hill sites.

The cliffs have been soared on several occasions. Dick Vanson got his C certificate on Sunday, 23rd August, before flying was stopped by rain. On Saturday, 24th October, the Olympia was brought out and in a S.S.E. wind Ray Brigden flew straight from the launch to Beachy Head, the Seven Sisters not being soarable, and found good lift. When Bill Jordan's turn came to fly he followed suit, and having climbed to the maximum obtainable height, he flew over Eastbourne seafront as far as the pier. The next day the wind was from S.S.W. but of less strength; the Seven Sisters were soarable all day, but at times only just. Peter Crabtree made an attempt on five hours but had to land after three. The Olympia and T-21b made several trips to Beachy Head and some Olympia pilots also soared Seaford Head. A total of over 20 hours were flown during the week-end.

Last year's totals of launches and hours have already been passed and we are now approaching the figures for 1949, which was our record year.

A.R.S.

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Scottish Gliding Union

It looks as if the ten Silver C legs flown this summer have acted as a fillip to the gliding palates at Balado. Each Sunday when weather permits—and permission has been granted beyond all hopes, with clear sunny days, complete with suitable winds—all available aircraft are in full use until the last possible moment.

The two-seater is hard put to it to satisfy the numerous customers in training. We have welcomed many new members, some brand-new and some second-hand, who, having enjoyed their week of holiday course, have joined the club. Hardly a week has passed but some happy pupil has abandoned his seat in the T-21b and gained solo freedom and his B in the Cadet.

In contrast to the Sunday weather, the various holiday Mondays have mostly been disappointing days with very little flying. The exception was Monday, 28th September. On that day conditions were very fine. Martin Hall, a hard-working member on leave from Kenya, flew the Tutor from Balado to Bishop Hill, a distance of eight miles. He manfully endured the rigours of the Scottish temperature in hill lift for 4¾ hours, when a sudden squall forced him down. As Martin is now on his way back to Kenya, it is to be hoped that he has better luck in weather which will remain constant for more than five hours.

We were glad to have a visit from a Surrey Gliding Club party who were on their way home from the National Contest. Unfortunately, their visit coincided with that of a dirty big high-pressure area, and all we could offer them was pleasant warm weather, no wind and generally hopeless conditions. Needless to say, there was a strong west wind the day after they left.

The Cadet kept on Bishop Hill was brought down to Balado for some weeks while minor repairs were done on the Balado Cadet. As soon as these were completed, a party set out to trail the Cadet back to the hill again. The tractor, used to tow where the road winds uphill all the way, was more than usually stubborn to start. At last it was found that some ill-advised yokel had filled all tanks with paraffin. When this small matter was righted the rest of the climb was uneventful.

Launches to 31st October are 2,984 and flying hours are 207—a clear indication of progress, since there were 2,229 launches during the same period last year and only 129 hours flown in the whole year.

D.S.L.

Army Gliding Club

At this time of the year we like to check up on what we did last season and see how we can improve ourselves for the next. In the period 1st March—1st November, 1953, we carried out a total of 4,565 launches with a flying time of 674 hours, of which non-club aircraft claimed 230 launches and 69 hours. During the same period the following certificates were gained by club members:—20 A, 22 B, 11 C, 3 distance, 3 duration and 7 height legs for Silver C—total 66.

One Silver C Duration and one Height were obtained by the party who visited the Mynd with the Club Prefect; otherwise all the other certificates were gained at Lasham. As the club only owns four gliders, and all the instruction has been done by John Free (C.F.I.), Tony Deane-Drummond, Stewart Morison and David Martlew, we think our utilisation can compare favourably with most clubs.

Club aircraft only flew a total of 360 miles cross-country as against 700 during the previous year. This is disappointing, especially as a hired Tiger Moth was available for launches all the summer. Most soaring flights, including the Silver C legs, were started off by normal car-tow launch to about 1,200 feet above Lasham; but there is no doubt that aero-towing enabled a lot of soaring to be done on otherwise very difficult days. The Moth did a total of 229 tows (of which the C.F.I. did 207) for a flying time of 58 hours.

Our chief worry this year has been a very high rate of turnover of members. Our low subscription rates may encourage this, but only a few really keen ones kept on coming. Those that did soon went solo and had a lot of flying last summer. Like most clubs we did not have to look far for a reason, which was the inordinate amount of time spent on the ground by the learners for a very few minutes in the air. This frustration has been partly due to insufficient launch lines, partly to lack of instructors, and occasionally because we only had one hard-worked T-21. Until this problem is solved—and we do not think we are alone here—it will be difficult

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As a solution for the lack of launch lines, the two-drum winch has at last emerged from workshops, only for us to discover that the non-gliding boffins who had built it had made one or two fundamental errors with the pay-on mechanisms. David Martlew hopes to rebuild this part of the winch and have it working by next spring. The club will then have two auto-tow cars and one two-drum winch, which should be enough for only four gliders. We hope to beat easily the club record of 1,057 launches carried out during the month of May, 1953.

Bristol Gliding Club

SINCE the National Contests, our flying activities at Lulsgate have been confined largely to training circuits, with just the odd flicker of lift to remind us of what might have been. At Roundway, however, on the few week-ends when we could operate, pre-war practice was revived when, with a 20-knot S.S.W. wind almost parallel to the main slope, the Grunau was bungied from the Cambridge Field spur, and flights of over one hour were made. Landing after these flights were normally uphill and down or cross wind, and these made us feel that the field promised at the bottom of the hill might prove a more safe proposition. The T-31 has also been circuited to give some members their first air-to-ground view of Roundway and their first experience of winch launching on a hill site.

Our summer courses for this year achieved a total of 132 course member weeks, thus bringing our total of course weeks to nearly 600 since the series began in 1948. As usual, we had more applications than there were vacancies, and we only wish that it was possible to extend the courses into the autumn.

Maintenance of the club fleet of auto-towing and retrieving vehicles has been our biggest problem this year, and we have now formed a sub-committee to advise the Chief Ground Engineer and, most important, to implement his decisions. During the winter it is hoped to produce a completely overhauled set of vehicles for use next year, so that there will be a minimum loss of flying time.

M.G.

Oxford Gliding Club

PILOTS at flat sites always dream of getting their silver badges from winch launches without help from a hill; now this club can claim that one of its members has done it—almost! Eric Stow had had his height for some time when, on 6th June, good conditions arrived; he was winched in the red Grunau Baby almost straight into a thermal which took him to cloud base at 4,600 ft., and he set off across country. At Inkpen he had to blot his copy book by hill-scraping for some time before another thermal came to the rescue, and he eventually reached the coast, landing 77 miles away at Hurn. The five-hour duration was achieved on 3rd August in another outstanding flight, during which a partial clamp brought Toby Fisher down after three hours and forced Graham down at Finmere, but Stow just managed to hang on over the cement works until conditions improved again.

On 5th July 86 launches were given—a club record—and a number of visiting pilots did well. Tobin got his 1,000-metre climb in the Gull III, and Buckley and Anson from the London Club had half an hour each in their Olympia, while Chris Wills stayed up for 16 minutes in the club G.B. Morgan, who took his B on the 4th, took his C on 19th July by reaching 1,700 ft. in the Tutor.

The best flying of the year was on Bank Holiday week-end. On the Saturday, McLeod kept the G.B. up for 18 minutes and gained his C, Graham had an hour in the Scud III, and Stow did a 36-mile triangular course in over two hours' soaring. On 2nd August, Ford got his C with an hour in the G.B. and Stephen Wills qualified also with a two-hour flight which included more than a thousand metres climb, but no barograph! Ayres and Graham each got Silver height in the Scud III, and Gibbons narrowly missed it in the Club G.B.

On 3rd August some 15 hours of soaring were logged, including Stow's five hours which has already been mentioned. After Stow's flight, Chris Wright took the same machine up to 5,200 ft., and Stephen Wills (now with a barograph) had 1¾ hours soaring and almost reached 3,000 ft. above his launch.

On the following week-end we had a pleasant visit by the Southdown Club and their Olympia, and Parsey soared on each



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day in company with Ayres and Stafford-Allen of the Oxford Club.

These satisfactory results have been accompanied by less fortunate happenings, and various club members—including the C.F.I.—have preferred standing to sitting recently, owing to a series of accidents. First the T-31b got caught by a low winch failure, then the Gull III's wing tip met some very resistant corn, and lastly, the Tutor's skid was bent in a heavy landing. The Gull III has not come back. Instead, Chris Wright has bought a Sky, which was put through its paces on 22nd August, and much admired by all who flew it.

September was not a good soaring month. On the 6th Varley managed to catch a thermal off the winch and stayed up for 1½ hours. On the 26th Chris Wright had a flight of the same duration from an aero-tow in the Sky. It was not easy to catch the lift at low heights, but Goodall, Morgan and Stow each had flights of about a quarter of an hour. Early in the month Barratt went solo and quickly took A and B. Mann completed his B on the 26th.

Lastly, we must congratulate Anita Schmidt on being the first of the girls to get both A and B. The event was celebrated with quantities of hamburgers and cider and general rejoicing. G.C.V.

Derbyshire & Lancashire Gliding Club

CLUB activities in 1953 have been overshadowed by the National Championships; and similarly, of course, club activities for 1954 are already even more overshadowed by the International Championships. Nevertheless, club and private-owner flying have kept on steadily. The outstanding flights of the year were by Bernard Thomas—173 miles to Sittingbourne and two other flights of over 100 miles the same week—and by Stan Armstrong and Fred Breeze, who both flew to Hastings (195 miles) on the same day; not forgetting the 98 miles of Rodney Sneath for his Silver C on the Competition "rest-day."

Training has plodded along as usual, or as nearly as usual as circumstances would allow; at the time of writing we have gained 15 C certificates this year in the club, not counting the 20 odd C's gained by the Air Training Corps in their courses at Camphill.

We have so many trainees on the books now that we are having to give the T-21 training priority over joy-riding, the T-31 of course still being used exclusively for training, as before.

The winches and motor transport seem to remain in their perpetual state of precarious serviceability, as always; and, in fact, work on the new Diesel winch has been slowed down, due to other work of less interest but more immediate necessity. The new winch still manages to progress, however, and is definitely scheduled to be in operation for the Internationals.

We are of course looking forward with great pride and pleasure to the opportunity of greeting our guests from all over the world next summer; but we shall always have room for familiar faces as well, and we look forward with equal pleasure to seeing all our old friends again.

G.O.S.

Crown Agents' Gliding Club

THE Club has recently been honoured by receiving an application for Associate Membership from Sir George Beresford-Stooke, K.C.M.G., Second Crown Agent, who was, until his present appointment, Governor and Commander-in-Chief of Sierra Leone. Sir George, though not (as yet) a Glider Pilot, is no stranger to flying, as in the course of his duties in Africa he has covered much of the country by air and has experienced the violent strength of some of the thermals to be found there.

Good progress has been made during this, the Club's first season, the greatest obstacle being the distance between London and the Surrey Club's airfield at Lasham. We have tried to surmount this by arranging, once a month, a "Crown Agents' Monday", when an Instructor from the Surrey Club has graciously devoted a day's leave to training some half-dozen members at a time, giving them intensive practice in ground handling and possibly six or seven circuits each.

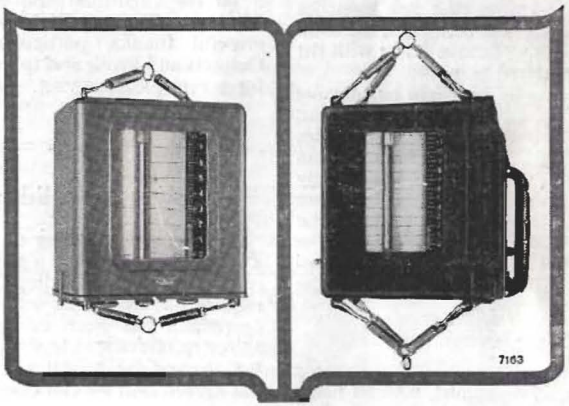
On the social side a very successful "Tea Party" was held on 1st October, when some 20 members and friends assembled in the Refreshment Club at No. 4 Millbank. Wally Kahn, our honoured guest of the evening, answered many questions, and the evening was concluded by his showing a colour film of gliding incidents in England and on the Continent. J.E.H.G.

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Handley Page Gliding Club

THE club has had a most encouraging season. Membership has steadily increased from a faithful few to a reasonable number; launches and hours have accumulated at a satisfactory rate, and a successful ten-day camp was organised at the Long Mynd in August.

Flying commenced for the year on 7th February with the emergence of the towing car from hibernation. With the acquisition of a twin vehicle, one source of flying interruptions has been removed, although both cars are subject to the temperament common to all gliding equipment. We still suffer from interruptions by test flights of the firm's products, though not so frequently as was once feared.

During the first part of the year our Cadet was converted to a Tutor; by flying it alternately with the club's T-31b, a launching rate of six an hour has been maintained, using one cable and towing car.

Flying has been mainly confined to week-ends; on a few days in Summer it was found possible to obtain a worth-while number of flights on week-day evenings after members had finished work.

The number of launches to the end of October total 682, equivalent to 48 hours. It is interesting to note that 388 launches were obtained by eleven members, the total number of persons who have flown with the club during the period being 48.

While Radlett is an excellent aerodrome for short training circuits, it is hardly an ideal gliding site since there are no facilities for slope-soaring. Circuits longer than about five to ten minutes are comparatively rare on training aircraft, and it was therefore decided to organise a Summer camp at the Midland Club's site in Shropshire. The following account is based on the descriptions, by some of the participants, of the hazards involved.

Summer Camp

On Saturday, 25th August, a small party set out with the Club's T-31b from Radlett at 3.45 p.m., some six hours behind schedule, to spend ten days at the Long Mynd as guests of the Midland G.C. The journey was interrupted for two hours to install a new fuel system in the towing car, one hour to overhaul the engine, and minor stops every ten miles to attend to the needs of both.

At 6.0 a.m. on Sunday, after driving through the night, the party arrived at the Mynd, had breakfast, and with unprecedented zeal rigged the aircraft. The first day was spent in getting acclimatized to the local conditions, vastly different from those prevailing at the home site. At Radlett all launches are by auto-tow, but as a result of the visit, we now have a qualified bungy team and a winch driver.

After three unsuccessful attempts had been made to keep the T-31b airborne, we realized just how inferior its performance was to that of the T-21 and the Tutor, which were soaring superciliously above. Once the peculiarities of the site had been mastered, it was possible to keep the T-31, a comparatively rare bird in those parts, airborne in almost average conditions.

Five good soaring days were enjoyed; of the remainder, four were devoted to flying circuits of longer duration than are possible at home, and one to a sightseeing tour of Shrewsbury. Total flying time for the nine days was 18 hours, during which one member of the party of seven gained his A, B and C, and another a C. Only one of the party had had any previous soaring experience, so that the expedition was extremely useful.

To the Chairman and members of the Midland Gliding Club we extend our grateful thanks, particularly to Messrs. Dennett and Proll, and to the catering staff, for a very pleasant visit.

L.J.F.

Newcastle Gliding Club

AT a general meeting of the club it was agreed to develop a soaring site of our own, as Yorkshire Gliding Club do not now require our assistance and our joint flying agreement has been cancelled. The Air Ministry, through the kind offices of the B.G.A. and the Ministry of Civil Aviation, has agreed that we can operate on Usworth aerodrome, but we are still, at the time of writing, awaiting confirmation of the date on which this can take place. Meanwhile, our aircraft has been overhauled for C. of A. and the winch and Beaverette have been thoroughly reconditioned.

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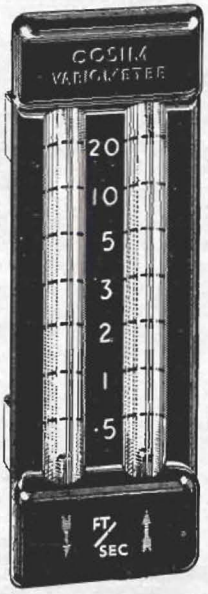
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