

SAILPLANE & GLIDING

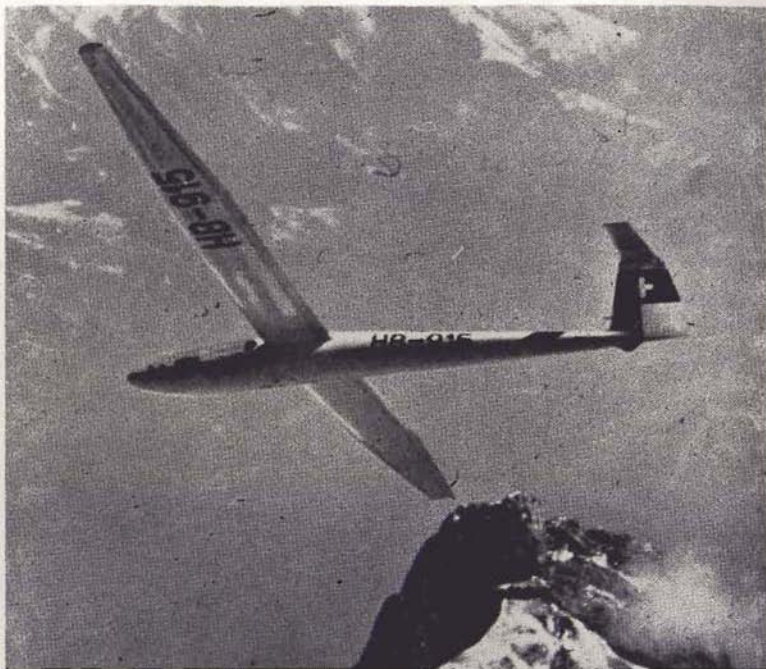
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SAILPLANE & GLIDING

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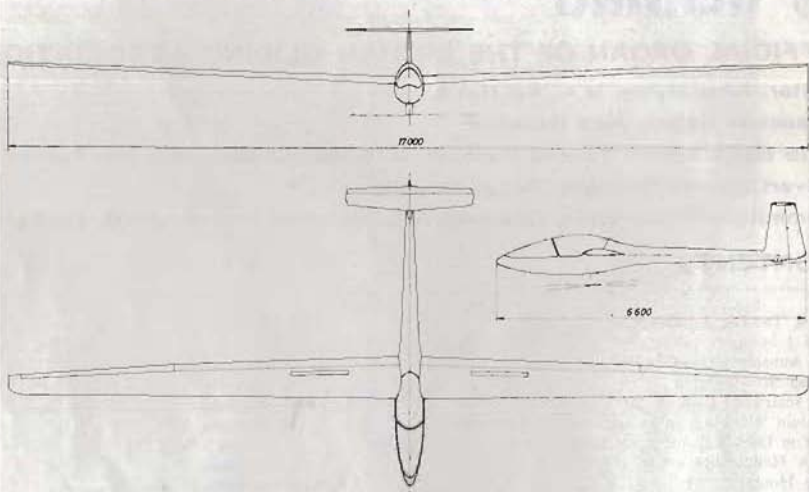
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LOOK TO THE FUTURE



A.E. Slater

OUR last issue, if not historic, was at least historical. Room was at last found for Chris Wills's account of the last Wasserkuppe Championships, written nearly a year earlier; also for Geoffrey Stephenson's pioneer Channel crossing, originally intended for the April-May issue to mark its 30th anniversary. Then there was another instalment of the beginnings of organised gliding in Britain, together with the Southdown "Vet-



erans' Rally", stimulated by an earlier instalment; and finally the usual "Thirty Years Ago" published every December.

This chance conglomeration did not go unnoticed. Comments from readers ranged from the one who finds every word of gliding history fascinating, through some who thought it rather a lot in one go, to a visionary who protested that we must not dwell on the past but "look to the future".

This last exhortation struck home. But how to put it into effect? To start with, there are all those accounts of soaring flights by pundits and others which habitually fill so many of our pages. Why, they were all made in the past! We must reorientate and publish, instead, descriptions of flights they intend to make in the future. And as to those BGA Annual Trophies for the best flights of the past year—the past is dead and gone. They should be offered, instead, for the best flights our readers intend to make during the coming year—the Londonderry Cup, for instance, should go for the longest forecast distance. But please don't send

in your entries yet: the little matter of the trophies must first be sorted out by the BGA Executive Council.

Better still, why not award those trophies to the pilot in each category who places the date of his flight farthest in the future? But here it would be difficult to beat the present record—an article by L. Howard-Flanders, aviation pioneer and first BGA Secretary, published in *THE SAILPLANE & GLIDER* for 13th March, 1931, entitled "Will it be like this in 1960?" That's 29 years ahead, and an underestimate at that, because the author envisages a flight from the Crystal Palace to Torquay made with the help of a rocket motor for take-off and for connecting with clouds from slope lift (dry thermals at low altitudes were unknown in England in early 1931).

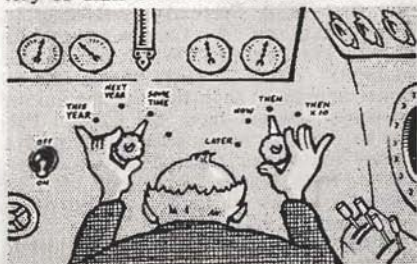
Meanwhile, to bridge the gap while those trophies are being sorted out, something had to be done for the present issue to mark the new orientation of *SAILPLANE & GLIDER*. So I borrowed H. G. Wells's time machine in order to spy out the future and give readers a foretaste of what lies in store for British Gliding in the years ahead. (You may object that this machine, at the end of Wells's story, took off for the past and was never seen again; but the fact is, it overshot so badly on the return journey as to by-pass the author's whole life span, so poor Wells never lived to see the last landing of his brain-child.)

Upon placing the machine at the launching point at my old gliding club (pardon—that word "old" betrays the past-worshipper!), I had a spot of bother with the man in charge of the time-sheet: he had only ruled columns for minutes and hours, and there was no space for months or years, let alone aeons and suchlike. However, I promised to make a return spot-landing (in the temporal sense) on the same day, and collect witnesses' signatures for any intermediate landings; the timekeeper accepted my assurance that only the times and dates would need recording, as it did not occur to him to raise the awk-

ward question of Continental Drift.

So I took off for the future. Just afterwards, a red-and-white Swallow was quickly dragged alongside, winched up at a high rate (it must have exceeded Placard Speed at the top), and club members then rushed about at a pace reminiscent of Lawrence Wright's "time compression" film of many years ago. Soon everything went so fast that all was blurred, and the bushes on the slope of the Downs grew visibly and spread over every vacant space.

How far into the future did I go? Alas, I could not interpret the great battery of dials on the dashboard. To make



things worse, some had to be read forwards and some backwards, like the dials on a gas meter. Presumably they were calibrated in various time units, but the ink used by the inventor in the Victorian era had faded except on the last dial, where the word BILLIONS was faintly visible. One might work backwards from that, but were they English or American billions?

By this time the quick succession of night and day was approaching the dangerous "flicker rate" which is liable to induce epilepsy—a phenomenon of which Wells's time-traveller was blissfully ignorant. So I slowed down and eventually came to rest (again in the temporal sense) on what was presumably the same club field—but all the hollows had been filled in and there was not a hedge in sight, while away to the south an excavator was dismantling the Downs and a line of lorries dumped the rubble to extend the airfield plateau to the west, where the Tring Road was being enclosed in a tunnel.

The sun appeared to be in the SSE, which (assuming the Eurasian Continent had not meanwhile twisted perceptibly on its axis in its anxiety to put still

more ocean between it and North America) meant that it was 10.30 GMT, or 11.30 BST, or 12.30 NBST (N for New), or 13.30 RNBST (R for Revised)—or perhaps they had gone right round the clock by now and got back to where they started. Wisps of Cu were sprouting in the sky, the wind was blowing up the hill (or what the excavator had left of it). But where were the gliders? Soon I heard a buzzing noise from the huge cluster of buildings where the clubhouse used to be. "A tug", I thought. Then more buzzings joined in and combined into a roar. "They must have an awful lot of tugs", I thought, and then spied a man coming towards me.

He introduced himself as the CFI and remarked: "That's a queer contraption you've got there; has a description of it been published yet?" "Yes," I replied, "by H. G. Wells in 1895."

"Eighteen-ninety-five?" he repeated slowly in a tone of subdued horror. Then he turned quickly on his heels, took my arm, and we marched rapidly away towards the clubhouse.

"What's this in aid of?" I protested.

"Haven't you heard of the NBGAP?" he asked.

"No," I said "what does the AP stand for?"

"The lot means New BGA Policy. Nobody is allowed to Dwell on the Past—we must Fix our Gaze on the Future. Let's change direction a bit so they won't see where we've come from."

"Big Brother is watching you," I murmured.

"What's that?" he snapped nervously.

"Oh, nothing," I replied, mentally noting that at last I had a clue to the probable date of my landing.

It took some time to convince him that I had only just arrived from the unspeakable past. Then his voice sank to a whisper: "Tell me, what was it like in the old days? We aren't allowed to read anything about it now." (Apparently Big Brother was not only watching us but bugging us too.) So I told him about all the frustrations, and so on, involved in handling "pure" sailplanes. "Ah!" he commented, "self-launching sailplanes have put an end to all that. It was the only rational solution. Surely you can't object to using a little engine for launching? Poor thing, you need bringing up-to-date. Come for a ride in our latest



... Using a little engine for launching.

advanced two-seater trainer—marvellous performance."

"What's its max L/D?" I asked.

"I don't mean that—I mean performance. Gets you to 2,000 feet in just under a minute."

So I got in, and we did just that. At the top of the climb I expected my pilot to turn off the motor and soar, as we had passed through several patches of good lift on the way up. But he exclaimed: "Just look at that growing cumulus over there—it's a beauty!"

"Yes," I said, "we can soon gain enough height to be able to glide to it."

"Why bother," he asked, "when we can go straight to it and get there before it disintegrates? What's the use of a motor if you don't use it? Really, you are old-fashioned. Why can't you be rational?"

"But," I protested, "you said the motor was only for launching."

"Don't be so pig-headed—it'll get you nowhere in this day and age." (So that pretentious cliché was still going strong.)

On reaching the cumulus, I expected him to search for best lift and then switch off the motor. But he had spied another good cumulus ahead, so we went through the same procedure again. And again. Then came a big dead patch, through which we purred along, the pilot looking happy and relaxed.

Next, a glorious cloud street appeared ahead, right along our track. I had started to draw the pilot's attention to it when he suddenly shut off the motor and glided down towards an airfield which had come in sight. It was evidently a gliding club, as several aircraft were scattered about its surface and people were tinkering with their motors.

"Lunchtime," said my pilot. "That's another advantage of a motor—don't have to miss your regular meals. You can always re-light afterwards. Be rational,

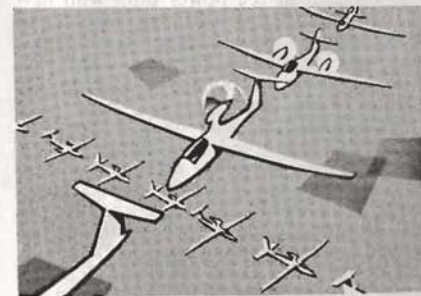
that's what I say." (The prophetic Howard-Flanders had made his pilot go down to lunch at Corfe Castle and then rocket back to the nearest cumulus.)

It was a good lunch, and a number of his acquaintances came to join us. The talk was entirely about the comparative merits of different glider-motors. I won't bore you with the details—rpm, mpg, bhp, tappets, intakes and the rest. They kept it up till 3 p.m., and then our pilot said: "Better be getting back—wind has picked up against us."

It had been a filling meal, and we were well over a minute getting back to 2,000 feet. Then, before long, a good-looking cloud street loomed up straight ahead. "Can't be bothered to use it," said the pilot, but he graciously consented to let me have a go. However, the lift was weaker than it looked, and I had to slow down to speed-for-minimum-sink. What with the wind being against us too, I could see our pilot getting impatient, till he burst out: "Enough of this, or we shall be late for tea," and switched on the motor again.

"Will the caterers have packed up?" I asked.

"No, the slot machines will be empty," he replied. "By the way," he added, "I ought to tell you that circling in thermals is no longer allowed. The Airways people have pinched so much that what's left for private flying is getting just too congested for words. So everyone's expected to fly



in more or less straight lines, because circling gliders create a collision hazard. Cloud streets, waves, cold fronts are allowed, and even sea-breeze fronts if they don't sport any awkward corners. As for isolated thermals, they recommend just slowing down in the lift and speeding up in the sink."

"Don't you mean slowing up in the lift and speeding down in the sink?" I asked.

"I couldn't care less," he replied with some irritation. "Anyway, all I ever do is throttle down in each bit of lift—if I've nothing better to think about."

Finally, we landed and rushed in for tea. But we were too late. "Trouble about these motor-gliders," he panted, "is that they're underpowered." (*Flight* had said just the same of the Carden-Baynes auxiliary-engined sailplane in 1935—but psst!—that is harping on the past.)

Before we parted, I asked the CFI why the Downs were being removed, when our one advantage over the flat-site clubs was that we could go on soaring through the winter.

"That's no advantage now that all the clubs have other means of staying up in winter. Would you believe it," he enthused, "we do more winter flying than any power-flying club".

"I'd believe it if you said 'any other' power-flying club." I retorted.

"There you go again," he burst out, "with your antediluvian prejudice against fitting a harmless little power unit. Why can't you adjust yourself to the modern scene? Anyway," he added, "the hill creates a hazard in east winds. You see, most of our new members have power-flying experience, so they couldn't care less about air currents around hills".

(I thought of the power pilot who flew a motorized Carden-Baynes into Dunstable Downs in an easterly gale. But that was in the mid-thirties, and the NBGAP left no room for learning the lessons of the past).

Well, I walked sadly back to the time machine. Then I had an idea. In Wells's story the time-traveller, after an exciting stay among our remote descendants, thought he would like to peep into the still farther future before returning, so carried on to the point at which the sun had cooled to a faint red glow. I didn't fancy that, as there would have been no thermals, let alone gliders to soar in them. But I did go ahead until rather suddenly, in the course of a year or two, the sky seemed repeatedly to be darkened as if by a sort of locust swarm. So I "stopped" to investigate, and was immediately assailed by masses of insects of all shapes and sizes. I raced for the

clubhouse, and somebody wearing a kind of space helmet came out to meet me. He passed me through a decontamination chamber and led me into the hermetically-sealed clubhouse (based on the latest design for a residence on Mars—there's "space fall-out" for you!). Food was rationed because so much had been destroyed by the insect plague, but some members spared a bite or two for me.

Then the story came out. It was those commercial pilots again. Having eventually bagged the whole of the country's airspace for themselves, they no longer needed public support for their campaign to suppress everybody else, so at last they felt free to have a go at the birds, who really did cause accidents by colliding with aeroplanes in vast numbers. (I was afraid someone might remember a letter I wrote to *Flight* way back in 1969 which could have put this idea into their heads, but luckily the ban on bringing up the past still stood.)

Numerous scientists had tried to protest that the elimination of the birds would drastically upset the balance of Nature—you know, planetary ecology and all that. But the pilots managed to get the one remaining Air Correspondent on their side (a single newspaper having by now absorbed all its bankrupt rivals) so none of the protests appeared in the press (it is usual to consult the Air Correspondent before publishing any controversial letters on aviation matters). Now they found, too late, that they had bitten off more than they could chew. Unchecked by birds, the insects flourished exceedingly and began clogging up every form of aircraft engine that could be devised—until at last one ingenious inventor thought up something on the lines of a Ramjet. This apparatus ingested the insects, baked them dry in a sort of oven, then pushed their dessicated bodies into a combustion chamber to serve as fuel. But the engine had to be above a certain minimum size in order to work.

Then how did the gliding club cope? After all, they were still there.

"We just had to be rational," explained the chairman. "We equipped the club with eight-seaters, using the smallest size of 'Ramsect' (short name for the new engine). 'It's pushed up our membership to a new high—we have

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seven times as many associate members as flying members. Of course, now that private flying is out, we have had to get the machines classified as 'commercial aircraft, carrying passengers for gain', to get them licensed."

"What do you call them?" I asked.

"Gliderettes," he replied. Knowing my history, I was not surprised. When the Wrights put a 30 h.p. engine in a glider, the result was eventually called an "aeroplane". Then the 1922 Iford gliders led, through motorized gliders, to the first "light aeroplane", the 60 h.p. Moth. In the late 'forties, Slingsby put an engine in a Tutor glider and this led to the "ultra-light aircraft" movement, whose members, when last heard of, were trying to get 120 h.p. machines accepted in the ultra-light category. In the 'sixties people started putting engines in high-performance sailplanes—the last I heard of before taking off had 180 h.p.: they were called "motor gliders". I asked the chairman about his new machines: he replied "Oh, about 800 h.p., I think". So that was it: 30 h.p.=Aeroplane; 60 h.p.=Light Aeroplane; 120 h.p.=Ultra-Light Aircraft; 180 h.p.=Motor Glider; 800 h.p.

= Gliderette. (Forward-looking readers will, I feel sure, be delighted at this revelation that glider design will continue to advance, instead of stagnating at zero horsepower.)

"But," I protested, "when I first joined this club as a founder-member, the definition of a glider was: 'a heavier-than-air fixed-wing aircraft without mechanical power'."

"D'you mean to say there wasn't a motor in the entire club fleet?" the chairman asked incredulously. "But how on earth did you keep the things up?"

I had had enough. To hell with the future! I rushed out, leaving both doors of the airlock open, and raced for my time machine, pursued by a cloud of insects which, I saw on looking back, would soon be followed by a crowd of club members, now adjusting their space helmets. They seemed to be in an ugly mood: presumably the insects had got in through the open airlock and were eating their lunch.

The time machine itself was covered with insects and I took off wondering what problems would arise later in the way of import restrictions, quarantine and the like, on arrival back in 1970. But I need not have worried—the time factor took care of that. On being displaced into the past, all the insects detached themselves and flew off backwards in the manner of the legendary Oola-oola bird.

A spot-landing back at 1970 was not difficult. One simply had to watch all the dials unwind themselves back to zero. Just before arrival I noticed a red-and-white Swallow backing towards a point above the winch. Then a cable performed the Indian Rope Trick and hitched itself to the nose of the glider, which then executed a glorious tail-slide back to a perfect landing on earth. I "landed" beside it, and the timekeeper came up. His first words were: "What went wrong?"

"Nothing went wrong," I said, "— at least, not with the time machine."

"Why, you've been away less than a minute."

"But look here, don't you understand . . ." I protested.

He cut me short: "Got to see this Swallow launched—see if the release works properly."

"It does," I assured him. He gave me a queer look.

"Back in a minute," he said. Exasperated, I jumped into the time machine, drove it a minute forward, and got out to hear him exclaim: "Oh there you are—I thought I'd lost you. Anyway, you've got your A—35 seconds flat." He passed the time-sheet to a friend, took my arm and said "come along and fill in the form." He looked up: "Swallow got away all right on its first launch."

"What, again?" I commented. (Another queer look).

On the way to the clubhouse we deviated round a parked glider, whose owner was answering questions from a

member of the public. As we passed by, I caught the words: "Why don't you put a little engine in it?"



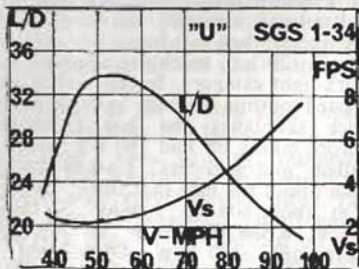
Fulfer



SGS 1-34

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AN AUTUMN CROSS-COUNTRY

By T. W. E. CORBETT

THERE are some flights which are remarkable, not for the great heights achieved nor the long distances flown, but for the simple beauty of powerless flight as only an occasional trip in a glider can give. One such trip I had the good fortune to make one Sunday in late October from Shobdon to the Long Mynd using wave all the way.

Louis Rotter and I arrived at the Mynd fairly early in the morning with high hopes of some good flying. There was some sunshine in the valley to the west, and there was a very promising "foehn" gap to the lee of the hill over Church Stretton. When we arrived, however, cloud-base was too low to allow more than two gliders to soar the ridge at once, and while this might rise a little, we were too impatient to wait. We rang Tony Gaze who very kindly agreed to give us an aerotow from Shobdon.

Our luck was in, and we both had a very good flight over about 6/8 strato-cu, with the sunlit patches showing where lift could be found. Louis landed at about 4.30 and we decided to call it a day. Just as we were towing the Dart off the runway, however, the sky seemed to clear to the west to give what appeared to be some very nice lenticulars. We both thought this was too much for any red-blooded glider pilot to miss, so I decided to have a final try, and see if I could fly back to the Mynd, I was towed off, and released just below cloud in a hole at 3,000 ft. above Shobdon.

Lift built up to about 3 knots and took me to 5,000 ft., which gave enough time for a little exploration. Where, from below, the clouds seemed even with fairly extensive cover, from above they presented a very different picture. The whole sky had the appearance of a moderate sea, but static instead of in motion. From time to time the trough of the wave disappeared into clear air, and, in the brilliant sunshine reflected from the tops of the cloud the ground through these holes seemed very dark. It soon became clear that the best lift was to be found on the downwind side of the gaps, and I then climbed to my best height of 6,000 ft.

By this time the waves could be seen in a north/south direction, and by flying along the side of them, height could easily be maintained. I therefore set off on a northerly track for the Mynd. For the next 20 minutes I had one of the pleasantest flights I have ever enjoyed. It was rather like ski-ing effortlessly on level ground along the side of a chain of brilliantly white hills with the sun starting to dip towards the horizon, which could be seen in the distance without any suspicion of haze to spoil the view. The glider was trimmed to fly at 45 knots, which could be maintained without touching the stick; the only decision to be made was which line of wave to follow to stay on track.

All good things come to an end, however, and I calculated that it would take me about 20 minutes to arrive at my destination. From time to time I could see the ground, and while I never knew my exact position, I could get an idea that I was to the west of track rather than to the east by the type of terrain I was passing over. I found the reason when I landed later—the wind had almost died to nothing. This was no doubt responsible for my having to lose height finally, and on breaking cloud I saw the Long Mynd 6 miles away to the north-east lit as if by floodlight through the remains of one of the wave gaps.

A lovely flight; and the moral? Why don't some of you folk who spend your time circuit-bashing on flat sites all the winter come up and find out for yourselves?

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CLOUD STREET FLYING

Brennig
James

WHEN the Olympia first came out in this country, people said that—with a machine having such a terrific performance—it would no longer be necessary to circle but one could fly straight all of the time, slowing down a little while passing through the lift. They have said the same thing every time that a new machine has appeared, but the fact remains that—even when conditions are good enough to fly straight in the lift—you can do better by flying faster and

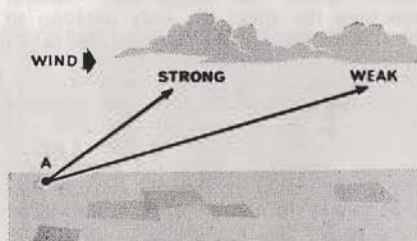


Fig. 1.

circling judiciously in the strong bits.

Under certain conditions the lift is distributed at random over the map, so that you have to make for the nearest good-looking cloud in the general direction of advance—preferring, naturally, the one which is upwind of track. Under these conditions, usually only one cloud in three works well, so always keep enough height in hand to try several. Mike Garrod has shown that the height of thermals usually is about one-fifth of their distance apart, so—with a glide of 1 in 30—you have the chance of trying six between leaving the top of one and having to land.

In "blue" conditions the best that you can do is to fly along track, diverting towards any very obvious thermal source, such as a large town. In contest conditions, although the flights achieved may vary greatly between pilots, their technique differs very little in the basic essentials of thermal soaring, cloud flying,

navigation, etc. What marks out the better pilot is his greater ability at finding lift, which includes his judgment of the relative chances of finding a better thermal than the one which he is in. These factors of judgment are very difficult to pass on to other pilots and, really, can be obtained only by task flying under these conditions. As few pilots fly more than ten tasks per year under these conditions, building up the necessary experience takes many years. There is an exception in the case of cloud streets, where a good deal of lore can be handed on, and this is the purpose of this article.

The more satellite photographs you see, the more you realise that clouds tend to form up in streets. Streets, therefore, seem more the rule than the exception and there is considerable need to understand how best to make use of them. If you consider a source A producing a thermal (Fig. 1) it is obvious that the stronger portions of lift will be upwind, so pilot Y, (Fig. 2) who flies upwind to the strong end, gets to point P before pilot X who climbs immediately. Grinding up a long cloud street at low altitude in weak lift until finally strong lift is found at the upwind edge when hope had been almost abandoned is one of the most exciting experiences in cross-country flying.

If, as you advance upwind, you find a

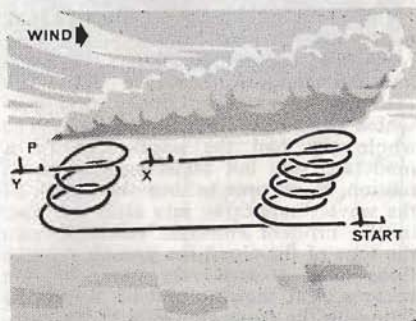


Fig. 2.

belt of rain in the way, it is usually wisest to climb where you are and get as high as you can; often there is strong sink under the rain and little chance of thermals from the rain-sodden ground upwind. Under these conditions, an upwind or downwind task is of little interest and crosswind tasks or triangles in fresh wind conditions are a much better test of a pilot. Here the technique is to work upwind to the strong lift, then continue up the street near cloudbase until the next street on track looks healthy. The gap should be crossed direct; check your position, fly at a slightly higher speed than the calculator suggests and always try to guess what your height will be at cloudbase, as finding lift at low altitude while fields are whizzing past underneath is very difficult. While working upwind keep about 500 ft. below cloudbase until you decide to cross the gap when the extra height should be obtained before crossing.

Two apparently contradicting pieces of sound advice are, first, when in doubt bore upwind and, second, when in doubt, get as high as you can; then you can come out of cloud high and see what the

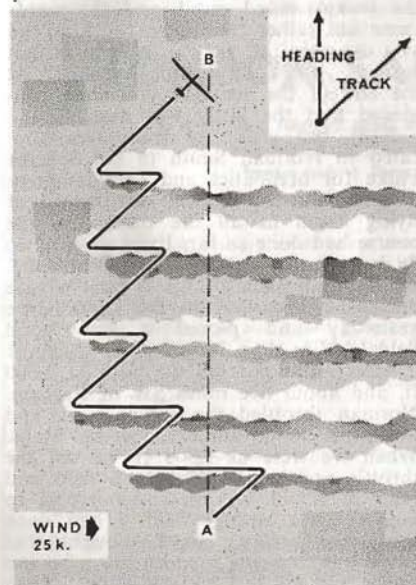


Fig. 3.

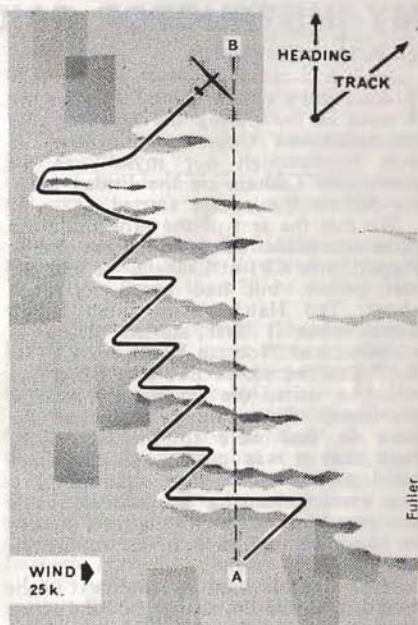


Fig. 4.

weather is doing.

In Fig. 3 the pilot has adopted a fairly good procedure; in Fig. 4 the clouds have over-developed so that he has had to work around the upwind edge, finally getting a high climb and long final glide.

In general, avoid trying to impose your will on the weather—the weather has a will of its own. Sometimes, the clouds look good but don't have much lift under them; sometimes the thermals feel rough but are not strong; and, sometimes, the lift under cloud is weak but the lift in cloud is strong. All that you can do is to vary your technique slightly all the time, in order to find what the existing conditions really are like. The world champion cannot convey the secret of his gliding ability to you in a thousand—or even a million—words, since his ability lies in balancing decisions between imponderables and in skilful exploitation of his luck.

The best that you can do is to practice crosswind tasks while varying your technique, in order to hunt for the optimum procedure in the existing weather.

MY INSTRUCTOR SAID TO ME

By P. M. STEVENSON

I don't think any of us realised what we were in for during the nine days of the Instructors' Course, and neither did Bob Scarborough nor myself, as we drove into Lasham on the Friday evening before the course started.

We met the rest of the group and the three course instructors in the bar. Derek Piggott, now CFI at Lasham, we had not met before, but had heard so much about; Ted Hatch, with whom I had flown when I first started flying at Lasham; and Norman Smith, ex CFI at RAF Cosford whom Bob and I had met when he visited the Mynd some months previously. These three instructors we were to find were to simulate every fault that it was possible to find in a pupil, and yet there they were that Friday evening looking as innocent as it was possible to look, with a glass of beer in hand, signing each of us up as we arrived.

Next day dawned as the next eight would, with the DI of the gliders that we were to use for that day. This was done at 8 a.m., followed by breakfast, and then at 9.15 a.m. we would have a lecture until 10.30 a.m. when we would start the day's flying if the weather was suitable. We had a short break for lunch and then flew until 6.30 p.m. when we would stop for supper. At 8.00 p.m., the evening lecture started, which sometimes went on until 9.30 p.m. A full day, but with Derek's enthusiasm one did not have time to be tired.

The evening lectures we all found to be most interesting and informative. We had Lorne Welch on field landings and flight limitations; Roy Procter on servicing of gliders; John Simpson on Sea Breeze fronts; Tom Robinson on Meteorology; and a Doctor from Boscombe Down spoke on hypoxia. I would like to thank these people for giving up their time to come and speak to us, and even if we did look rather tired, some of the things that were discussed did sink in!

On the first day Derek Piggott showed the effects of controls in a demonstration circuit. Getting the effect of elevator, ailerons and rudder into one circuit looked easy, but in fact we all found

this to be quite difficult. One found that one was running out of height before starting the effect of rudder. Derek did some sloppy flying and asked us to diagnose faults. Some faults! The speed in a turn never wavered from 42 knots in the Capstan. Could it be that he wasn't looking out? No, that was alright. Was he using any rudder? Yes, he was doing that. Ah, that's it, he hasn't used any aileron in that turn. Next he demonstrated gentle turns using ailerons only. Once tuned into the fact that you were criticising rather than being criticised, it was easier to pick up faults. We all found that after years of flying two-seaters and being told what to do and what was wrong with our flying, it was rather difficult to transfer and tell the other person what was wrong with his flying. Especially having Derek breathing down your neck it was difficult to find any faults—they were so well hidden, and anyway if you did say anything you found it impossible to treat him as the inexperienced pupil, and the words came out rather foolishly . . . "Um, did you use only . . . um . . . aileron in that turn . . . um . . . or am I wrong?" At the end of the sentence you were convinced that the latter was true.

Next, our group of four were allocated to Norman Smith in the Scheibe Falke for aerobatics and field landings. As Norman and I took off, instead of flying north as all the others on the course had done so far, I was directed to fly west into totally unfamiliar ground. As Norman said: "This is just in case you have been out to the north since yesterday and picked a few good fields!" Nice chap, Norman: so trusting!

After eight minutes we were at 2,000 ft. and about five miles SW of Lasham. Norman throttled the engine back and asked me to do some loops and stalls. When we were at 1,500 ft. he cut the throttle and said: "Choose a field and land in it". I was now committed to landing in a strange field. I had done this once before, but I thought that twice was chancing my arm just a bit too much, and not just my arm either! Then at 1,000 ft. there was a beauty. Every-

thing was right about it. It had a low hedge at the approach end and it was into wind—almost. The crop had been cut, there weren't any animals, there weren't any signs of electric fences, no power or telephone wires and it sloped up. So at 900 ft. I set my eye on that one, being careful not to turn my back onto it at any time in case I lost my field.

Norman, in the meantime, had selected other fields.

"Look at that", he said, "That's a good big field—in fact, better than yours".

"Yes," I said, at 800ft.

"What about that one over there, that's got an undershoot and an overshoot field, has your's?"

"No," I said at 700 ft.

"What about trying that field?" he said.

"It's no good" I said, "I'm not going to change my mind."

"Alright," he said, "Where is your field now?"

Now if you have ever seen a conjuror make cards and rabbits disappear, you will no doubt say they had gone up his sleeve or into a pocket; but here I was at

600 ft. and I'd lost a field which must have measured all of 100,000 sq. yds. Lost. Instead of it being just visible in front of the right wing tip, it had vanished. I could see Norman's fields, or at least most of them. 500 ft.

"You've lost your field, haven't you?" said Norman.

"Lost my field?" I said, "Of course not, it's . . . it's . . . it's down there."

"Where?" he said.

"Oh, down there", I said casually, nodding in the vague direction of down.

"Where, down there?" he said pointedly.

And then it happened. There was my lovely field all set up in front at 400 ft.

"There", I said, "just ahead" and tried to stifle my sigh of relief.

I was too close to get in from this height, so I did the cardinal sin and executed a 360° turn, but it worked, and in we went. Norman opened up the throttle just before we touched down and we climbed out of that field and went on to three others before heading back to Lasham. Navigation wasn't too bad after all our tight turns, but I was a little wet around the palms as we finally climbed

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away from that last field.

Ted Hatch was the next instructor that we were allocated to. We were to practise different stages of pupil tuition, using Ted as the pupil. We had the usual errors that one can get into a normal auto launch circuit. He would try to drag a wing on the runway and then go along with so much rudder that the tyre would start howling; this would be followed by a lift off that would have made a jet pilot green. My launch was awful; the attitude was first too high, then too low, then the right wing dropped slightly and we started drifting across to the right. "Let the pupil find things out for

himself," they said, "let him get himself out of trouble". This one was obviously in a great deal of trouble the way he rolled about dropping from one side to the other. In the end he seemed to settle down to a steady climb and at 900 ft., on pulling off the wire, he continued in this climbing attitude. On recovering control for him I asked him to try a gentle turn to the right. I was going on to explain what to do in such a case, and had actually formed the words ready to speak when the horizon suddenly went vertical. I don't think he quite understood what I said next because it was somewhat jumbled and spoken in a higher than normal voice. We were now in a very steep slip, rather than a turn, to the right. My pupil was happily looking to the left at the clouds. We came straight and level at 600 ft. and I handed the controls back to Ted.

Now I had thought it all out, and I was not going to let him catch me out on the landing. I gave the instructions as we completed the circuit: "Downwind leg onto the base leg, lower the nose to the approach attitude and trim to maintain speed, turn onto the into-wind leg,

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line up with the side of the runway to land on the grass beside the runway."

We started the approach with the speed constant at 55 knots; I was operating the airbrakes, and at this point I opened them and our rate of descent increased. As we were about 15 ft. from the ground I said: "Ease back slightly on the stick", which resulted in the approach attitude becoming less steep; all well so far. Again I said this at 2 ft., but we started to go up and not level off as was hoped.

It was at this point that I went wrong because I said: "Ease forward slightly on the stick". Ted took full advantage of the situation and we started towards terra firma again. At about 2 ft. he began to correct, but because of our speed and angle he was too late and we touched the ground. Having more than our stalling speed, we started to balloon up and Ted put the stick forward again. On the way down I remembered the brakes were open, so I snapped these shut. It helped, but not much, for we again touched down, a little harder than the last time, and took off again.

I decided it was time I took over. Grasping hold of the stick as we started our next descent, I pulled back; nothing happened. My pupil was stronger than I was. We pushed and pulled and as we were coming down for the fourth, or was it the fifth, time I remembered the magic words "I have control". With that he let go, leaving me at 5 ft. with about as much speed as is required by a moth!

We arrived, albeit with a hefty thump. Ted explained what had gone wrong and I hope that I have learned something from it. On pushing the Capstan back, we came across the rest of the group who were beside themselves with laughter, rolling around helpless in the grass. I hadn't thought it was that funny!

On the final Saturday we organised a farewell supper and brought drinks for our instructors in the hope that we might be able to sway them a little in their judgment!

It was a little difficult to get up the following morning for the final lecture. Most of us just sat and stared ahead in the hope that we might look inspired by what we were being taught. It wasn't until Derek mentioned something about interviews that we suddenly came to

life and realised we had better do something about that. The interviews consisted of going in front of Derek, Ted and Norman for a short chat.

I don't know how many of the course satisfied the instructors because I left Lasham soon after my interview, but I hope that those who passed are now instructing at their own clubs.

Never had so much gliding tuition been crammed into nine days, but whilst it was strenuous, it was also extremely interesting.

Instructing is a very rewarding part of gliding: you ought to try it sometime.

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STRAIGHT THINKING ON CHAMPIONSHIP STRUCTURES

By DAVID INCE

THE structure of our National Championships seems to be well on its way to join pilot rating as a subject for rumbling dissatisfaction and endless debate—to be enlivened from time to time no doubt by sudden and almost inevitable unsatisfactory change.

Rating has been a problem enough, in all conscience, and yet it has relatively few significant objectives which are reasonably simple and well understood. The difficulties with rating have arisen almost entirely as a result of trying to find a fair and generally acceptable solution which is seen to work in practice.

With competition structure the mind simply boggles over the mess we are likely to get into because, not only is there a multiplicity of solutions, but there is also a multiplicity of objectives and considerations. Furthermore, it seems that we have not yet even attempted to define those in any logical fashion, let alone discover how they rank in importance to the pilots taking part.

Unfortunately what seems to be likely to continue happening might well be described thus: A new structure will be proposed, written up and canvassed, and as a result of reaction to its exposure it will be modified, if necessary, and then put into operation. Soon afterwards we shall be hearing all the arguments—not only about its defects in relation to the obvious objectives which it was designed to satisfy, but also about other and hitherto unnoticed considerations which

have suddenly come to light. In short, we shall still be in trouble and the whole tedious process will have to be repeated once again.

Gradually with experience gained in this way we may get a structure which is more appropriate to our still largely undefined and only partially understood competition objectives—provided that the objectives themselves do not change with the passage of time.

It would surely be more efficient if the BGA Flying Committee were to start by finding out the wishes and needs of the majority of competition pilots *before* attempting to establish a competition structure to satisfy them.

The first step is by no means as difficult as one might imagine and there are well established techniques for determining and recording the information in a reasonably accurate and meaningful way.

If the BGA were to implement one of these and send out a questionnaire the process might go as shown in the following example. However, I am quite prepared to aggregate any results on this sample questionnaire. Please send details and suggestions to me at 45 Eastwick Drive, Great Bookham, Surrey.

Example Only

To pilots No. 1 to 'N' on the rating list—The BGA is seeking to establish a Nationals Competition structure which, so far as it is possible to do so, meets the wishes and needs of the majority of competition pilots.

The attached questionnaire is being circulated with this aim in view. When you have completed it you will have put the following factors in your own order of importance with your own numerical weighting in each case.

- 1 Improve British Team selection.
- 2 Bring on future world championship pilots.
- 3 Raise standard of competition flying.
- 4 Maximise fun for competitors.
- 5 Admit maximum number of pilots to Nationals.



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	1	2	3	4	5		16	17
IMPROVE BRITISH TEAM SELECTION	1	A	B	C	D			X
BRING ON FUTURE W.C. PILOTS		2	E	F	G			Y
RAISE STANDARDS OF COMP FLYING			3					Z
MAX FUN FOR COMPETITORS				4				
MAX NOS PILOTS TO NATIONALS					5			
							16	
								17

- 6 Keep all top pilots in one contest.
- 7 Maintain single rating list.
- 8 Obtain more accurate rating order.
- 9 Keep down cost of contest flying.
- 10 Maintain handicapping.
- 11 Contests to have wide aircraft performance spread.
- 12 Contests to have narrow aircraft performance spread.
- 13 Hold one-design contests.
- 14 Reduce size of individual contests.
- 15 Maximise publicity for gliding.
- 16 Strengthen fight against controlled airspace.

If you wish to add one or two additional factors of your own, space is available on the questionnaire. You are invited to define, insert and weigh these in the same manner as those already included.

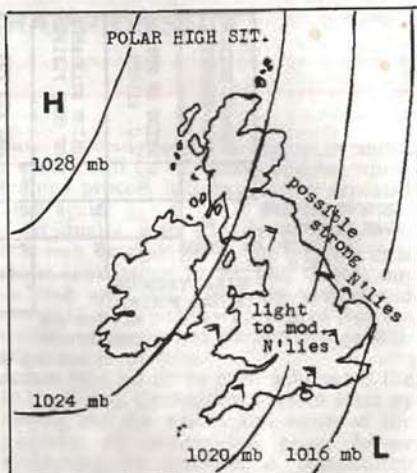
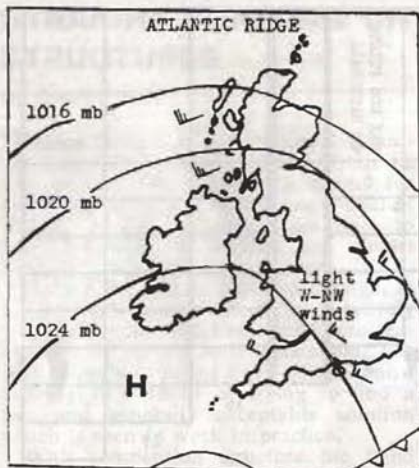
If redundant, overlapping or unimportant factors have been included on the questionnaire, they will disappear or become insignificant through the answers. Completion of the questionnaire itself involves comparing the importance of every one of the above factors with every other one as shown by the following extract and example.

Fill in each horizontal line in turn—starting with line one (Improve British Team selection). If you consider that it is more important to “Improve British Team selection” than to “Bring on future

world championship pilots” you should insert the figure 1 in block A. If you believe the converse insert figure 2 in block A. Similarly, if you consider that “Raising the standard of competition flying” is more important than “Improving British Team selection” insert figure 3 in block B. If the converse, figure 1 in block B—and so on. When you have finished the questionnaire, add the number of 1s which you have inserted and put this number in block X. Similarly with the number of 2s in block Y and 3s in block Z.

The BGA will aggregate your results with those of all other pilots and will subsequently publish a summary and analysis. If you do not return the completed questionnaire by . . . it will be assumed that you do not wish to express any views. Even this will provide valuable information. Thank you for your help. (End of example).

And just supposing we were to get our information in this or some similar way—what then? Well, apart from the danger that I might bore you with another article on the subject, the next stage is surely a matter for the expertise of the Flying Committee, and no easy problem for its members either. But now at least they would have the advantage of being able to start with a set of clearly defined and *undisputed objectives*.



IF YOU DO 500 KMS AFTER READING THIS — TELL ME HOW!

By CHRIS LOVELL

IN common with a few others at Lasham I spent most of splendid 1969 chasing 500 kms. Several declarations have been made, all to no avail but of great education.

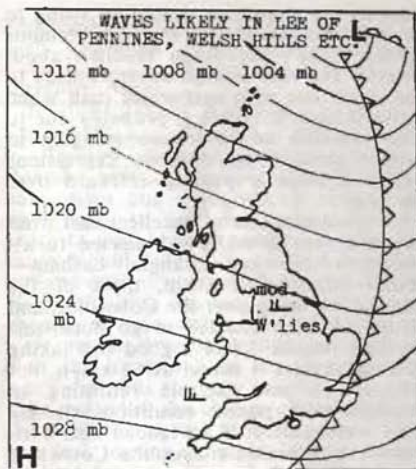
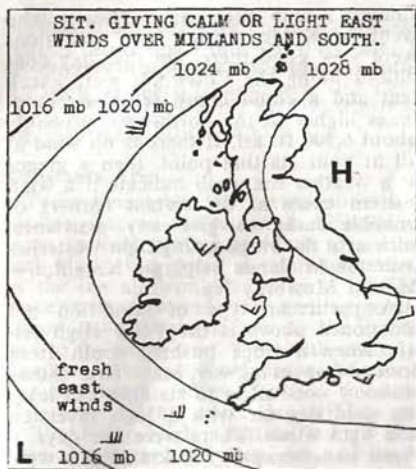
One flight was not so much a near miss (106 km. short!) as just a splendid day's tour by air. On Friday, 27th June, I had a club Dart 17 for a day which dawned with a definite 500 km. look about it. A weak cold front had passed south-east during the night and by 0930 cumulus was sprouting evenly all over an arctic blue sky. The wind was a few knots north-west on the ground so all seemed to be set for a 500 km. out-and-return to Llandrillo—find it on your quarter million.

Airborne at 1020, half-an-hour later than I had intended, I found cloudbase at 4,000 ft. asl. but a rather stronger north-west wind than I would have preferred. Rapid progress was possible due to an abundant supply of 6-8 knot thermals and excellent visibility making navigation very easy. The air was clearer than I've ever seen it in Southern England. In 80 minutes I had passed Cirencester, then I made the mistake. (Never

ignore a 4 knot thermal at 3,000 ft. even if it looks good ahead.) Down I came to 1,200 ft. and not until 45 minutes later was I up to operating altitudes again after a brave sortie over a village produced 6 knots. Don't ignore 4 knots anywhere, in spite of what the pundits say.

Things fizzed after this and downwind of Cheltenham I picked up 1,000 fpm to 5,800 ft. asl. cloudbase. This sort of lift persisted to Ludlow but there was some severe sink around. Something was odd about the necessity to re-centre upwind a lot, which is unusual on a good day, and near the Mynd the sky went queer with cloud becoming stratiform and spreading out in lines crosswind. Weak wave activity spoiling thermal production was obviously around but not strong enough to make progress across.

A glide out from Ludlow in smooth air brought me to 600 ft. above the Mynd—hill soaring—the ignominy of it! At least it confirmed my suspicions about the wind strength. It was now 1530 hours and not worth trying to push on even if it were possible. Cups of tea and buns were visualised through the clubhouse



roof but I wasn't to be tempted. A 6 knot thermal appeared near the windsock and a beautiful white and blue K-13 accompanied me to about 3,000 ft.; but then I lost the lift and cruised back to the ridge. Tea and buns were just coming into view again when another 6 knot core took me to cloudbase, and from 5,000 ft. asl. I could see the whole of Wales including the Dee and Severn Estuaries. My colour slide of Wenlock edge looks far too good to be true!

Time was now 1600 hours and with 5,000 ft. in hand a start home was made. Ever done a downwind dash? This was one in grand style, a few circles here and there in the best bits of lift saw me to Chedworth airfield at cloudbase 6,100 ft. asl. From just south-east of here to Lasham not a single circle was made. 75 km. in a straight glide at 60 knots! The lift was so good under some clouds that 500 ft. could be gained by just diverting a little to go under the blackest bits, there weren't any actual cloud streets. The trip was 4 hours 30 minutes including that more than half-an-hour's nasty scrape; some 25 minutes were spent in the vicinity of the Mynd, and it took 2 hours to get home, total distance 394 km.

This failure was the result of a wrong declaration. Toward the north-east from the Mynd conditions looked very good so a triangle with one turning-point in the Mynd area would have been more

sensible, especially as the weak waves had set up cu. streets in lines along a second leg in a north-easterly direction. A better study of the prevailing situation would have given an indication of possible trouble north-west of the Mynd.

The decision on the task to attempt is very difficult with the limited meteorological information available but when considering flights from Lasham, a general pattern has evolved for various situations. The genuine meteorologists among us will probably cringe at the theories put forward, but the decisions discussed are based on actual flights, thirty-five of which from Lasham in 1969 exceeded 300 kms., not including contest flying (where the decisions are out of the pilots' hands anyway!).

In light north-west winds a triangle is preferable because of overdevelopment north of the West Midlands, with moist sea air spreading over Wales and generally greater instability to the north of a ridge of high pressure which probably generated the promising looking day to start with. A good triangle under these conditions is Lasham—Knighton (20 km. SSW Mynd)—Melton Mowbray—Lasham, and for good measure this course removes the need for a diversion round the Birmingham SRZ.

In light east to south-east winds a North Wales out-and-return is definitely on, as a downwind leg in weaker morning conditions gets you to the distant end

just as the cloudbase should be rising to a safe height above the mountainous areas. (Don't ask Hugh Hilditch about that!). The risk of high cover appears to be much less with east winds than when a north-west is blowing; probably due to the presence of jetstreams bringing in upper cloud from Atlantic depressions when a ridge is passing eastward over Britain.

A good example of excellent east wind weather was 25th July. I elected to attempt a 318 km. triangle, Lasham—Bath—Stratford—Lasham, most of the second leg being over the Cotswolds, and Hugh Hilditch decided to go north-east to East Anglia. I had a good trip taking a club Skylark 4 round at 62 km/h, but Hugh ran into trouble returning to Lasham with poorer conditions chasing him westwards until he landed near Lut-terworth. Cloudbase over the Cotswolds was 6,000 ft. asl. and over and beyond the Severn Valley it was near 7,000 ft. asl. with $\frac{1}{2}$ cumulus . . . ! An out-and-return to North Wales was on, even in a Skylark.

The 300 km. triangle day, 22nd May, of the Open Class Nationals was very

similar; a club pilot, Harry Howitt, who went to Kidderminster, said conditions were very good there. On that day conditions along the Cotswolds were excellent and a cloud climb revealed cloudbases higher to the north-west, probably about 6,500 ft. asl. If there is no wind at all at your starting point, then a glance at a weather map will indicate if a wind pattern exists at the distant corners of possible tasks to give any assistance, such as a flat ridge giving light westerlies over the Midlands helping a Knighton—Melton Mowbray leg.

A particular type of condition not mentioned above is the Polar High set-up, when a ridge pushing south from Iceland moves slowly east. This causes showery northerlies to stabilise out leaving cold dry air with a high inversion and light winds. There were five days in April like this, and 300 km. flights were done on all of them, while the 400 km. triangle record was broken on one of these days. Cloudbase were 5,000 ft. asl. or more by midday and visibility was excellent. Under these conditions (which have a strong preference for spring and early summer) triangles to the north-west,

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north-east and back are on, also out-and-returns direct north into the ridge. Don't go directly north-east with this synoptic situation as there is usually a stiff northerly blowing down the east coast bringing showers a little inland.

Dunstable Area

From Dunstable 500 km decisions are similar, an out-and-return to Ffestiniog is on in light north-east winds to south-east winds, but never in north-westerlies as the sea air would soon spoil lift for some miles around the turning-point. Other out-and-returns are to the north and to the south-west. The south-westerly direction is very difficult due to the peculiar sea breeze effects in the Taunton Vale area. Flights north are certainly on in the Polar High situation but in the normal summer anticyclone weather soaring conditions are often not good enough in the Vale of York to maintain the high average speed required.

In westerlies there is the likelihood of waves lying north-south which would be a tremendous boost to one's average speed if a long enough system developed, as small areas of wave are difficult to use and are very good at eliminating thermals! Several competitors including myself in the 1967 Northern Regionals used a wave system forecast at briefing to assist them in a flight north along the Vale of Thirsk.

Triangles from Dunstable are a better proposition in some ways than from Lasham, due to the variety available avoiding clamp areas and controlled airspace. A very good one would appear to be Dunstable—Gainsborough—Long Mynd—Dunstable, providing there wasn't more than a few knots easterly wind which might cause stable air over the Fens to damp down lift on the first leg. If the wind is moderate easterly the course would be altered a bit to take in Camphill and Madley airfield (near Hereford) as turning-points. Industrial haze might make life difficult downwind of large towns, but my experience is that a good day is good wherever you are! Another good course in light easterlies is Dunstable—Wincanton Racecourse—Long Mynd—Dunstable. In my experience of Somerset and Gloucestershire the second leg of this triangle usually has good conditions on it in

east winds—at least when flying over it in early afternoon on trips from Lasham.

Coventry Area

From Husbands Bosworth and Rearsby triangles are rather more difficult to fit in. Rearsby—Winchester—Hayon Way—Rearsby, with a diversion round Birmingham, gives one a reasonable chance in light north to north-east winds, but in south to west breezes sea air is bound to cause trouble along the second leg. An out-and-return northward in the Polar High situation would give the best chance, as one would be going into a high pressure area containing cold air but with an inversion on it stopping too much vigorous showery activity.

In westerlies the chance of waves over much of the course is quite good. The practical turning point is Bishop Auckland, taking one downwind of the whole Pennine Range in both directions. Sutton Bank is out for 500 km. triangles; it's not geographically possible to fit any in that come inside the 28% rule. There is quite a wealth of out-and-returns in one area from Letchworth to about Malvern. All these trips would be all right in west through north-west to north-east conditions but one would have to be careful of sea breezes on the return to Sutton Bank. An out-and-return would theoretically be possible to about Portmoak. I believe someone tried to do an out-and-return to Portmoak from Leeming and very nearly succeeded, so he can give all the information on no-landing areas under 8/8th stratus when in wave . . .

Other Areas

Nympsfield has a 'can I get home?' problem, with the probability of thermals dying round the site before one can reasonably expect to get back. In light winds from east round to north, however, triangles to north-east, north-west and back should work, provided sea air hasn't spread too far inland from the Wash or up the Severn Estuary. There is only one reasonable out-and-return course taking one over good soaring country all the way and that is to the north. Marston Moor would be a good turning-point.

East Anglia can be very good away from the Fens, and when it is the sea breezes move in rapidly and can cut off one's retreat so to speak; but for 500

km. flights starting in East Anglia appear to be distinctly possible, Alf Warminger has had two near misses, out-and-returns, I believe.

Long Mynd aspirants have good triangle prospects with legs to the north-east and south-east but out-and-returns are most restricted and take one into doubtful areas too late in the day. Long Mynd—Wath on Dearne (near Rotherham)—Culham airfield—Long Mynd steers one clear of sea breezes. It is surprising how stretching the triangle shape (still keeping it within 28% of course) can take one over very much more favourable soaring country.

Far north of England and Scottish long distance cross-country flying is more difficult, due to both greater variability of terrain and weather than in the south. Undoubtedly 300 km. closed circuit flights are possible from northern areas; indeed, autumn and spring wave conditions should make out-and-returns relatively easy provided one is brave and there isn't too much cloud. 500 kms is really rather remote, but 300 km. closed circuits are very much on in crosswind waves. With lots of money and a willing

crew there must be many days where 15,000—20,000 ft. in an early spring wave at Portmoak one can set off on a 500 km. down-wind flight in 25 knots north-west wind.

Some of the lesser known sites offer reasonable prospects. Compton Abbas has seen a 500 km. triangle nearly done—Ray Foot was only a thermal or two short. Booker, of course, was the base of the only 500 km. closed circuit flight actually completed in this country, executed by the irrepressible Brenning James. His course was to the Mynd then Cranwell and back. I flew on this day and conditions were good and consistent from Lasham to Leicester and back with high winds and cloudbase 4,500 ft. asl.—wrong task declared!

Unless conditions are "South African", one must be flying a sailplane at least as good as a Dart 17. One can rarely maintain 63 km/h for long periods in a Skylark 4. With the advent of high-performance ships it would seem that the more adventurous tasks are coming within the capabilities of moderate pilots as well as the pundits. Out-and-returns along the Pennine Wave seem especially

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attractive, perhaps doing a "New Zealand" in a minor sort of way! I've often seen waves—always from a car—lying along the A1 from Newark to Newcastle—some out-and-return that would make!

These notes have been compiled after studying details of many individual flights done by pilots from Lasham and other sites, and after checking the weather maps of the days in question in "Weather" magazine. This journal supplies an "actual" for every day in the year, albeit two months in arrears! Although the weather was good it was also determination that produced more than 35 non-contest 300 km. flights from Lasham in 1969.

Study the weather maps carefully and try to make your own decisions. The best radio forecast to listen to is the 0755 on Radio 4 every day. If you can find somebody with a VHF AM receiver band lend

an ear to the "Volmet" broadcasts (about 128 mc/s) which give a continuous stream of up-to-date reports from the airfields throughout the country—very useful for cloud cover and wind directions. Get airborne as early as possible—I've managed to get away in thermals four times before 1000 hours. Remember that you have to achieve an average of about 63 km/h for 8 hours or so! This means perhaps that for the first hour-and-a-half you might make only 65 km. in the weaker mid-morning thermals, but for much of the day something nearer 70 km/h is required. On the odd day this is possible in Skylark 4 performance gliders but, as mentioned earlier, I think one has to have a set of wings that will give an L/D of 1/30 at around 55 knots as a minimum to maintain the necessary speed.

If I haven't put you off, declare a 500 and see how far you get.

BGA HANDICAPPING LIST FOR 1970

By IAN STRACHAN

THE Skylark 3 is taken as "Datum Glider" at 100% (the Ka-6CR is also 100% and so is also effectively a "Datum Machine"). The basis of other figures is the relative theoretical cross-country speeds achieved after climbing in an "Average British Thermal" of about 2½ knots. Thus an ultra high-performance machine calculated to achieve twice the datum glider's cross-country speed would be handicapped at 50%; and a very low-performance glider, expected to travel at half the datum glider's speed, would be given 200%. Allowance is also made for thermalling performance by adjusting expected rates of climb according to the low speed end of the glider's polar curve—thus a Foka is given a lower rate of climb (about 2 knots) in the Average Thermal, than, say, a Ka-8 or a Skylark. (nearly 3 knots). These corrected climb rates are fed into the formula for cross-country speed that governs the handicap figures. Full information is given in S & G, December 1967, pages 459-461.

- 80% BS-1, Diamant 18
- 82% Phoebus 17
- 84% SHK, Cirrus, HP-14 (18 m)

- 86% ASW-15, Diamant 16.5, HP-14 (16.5 m)
- 88% Standard Libelle
- 90% Dart 17
- 92%
- 94%
- 96% Ka-6E, Olympia 419, Foka, Vasama
- 98% Dart 15, Olympia 465, Skylark 4, Pirat
- 100% Skylark 3 (Datum Glider), Ka-6CR, Olympia 403, M-100s
- 102% Fauvette, Olympia 463, Super Javelot

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Fit.Lt. J. S. WILLIAMSON

R.A.F. Thorney Island,
Emsworth, Hants.

104%	Standard Austria "S"
106%	Ka-8, Jaskolka, Regal, Olympia 460 Series 1
108%	Skylark 2, SF-26, T-53
110%	Ka-13, Blanik, Eagle, Bocian
112%	Sky, Weihe
114%	Mucha Standard, Capstan, Ka-7, Ka-2
116%	Skylark 1
118%	
120%	Kranich
125%	Meise, Olympia 2, Swallow, Gull 4

NOTES

1. Other gliders not included above will be given handicaps based on their maker's performance curves, unless subsequent information influences the handicap committee to the contrary. Maker's figures for the following gliders give these handicaps on the BGA Formula: Sigma, 64%; BS-1B, 72%; ASW-12, 74%; Kestrel, 78%; Open Class Libelle (with flaps), 83%; Phoebus 15, 87%.
2. Figures for two-seaters apply both one-up and two-up.
3. Pilots of gliders not mentioned above who wish to fly in British Contests, and any other pilots with questions on handicapping, should write as soon as possible to: Chairman of the BGA Handicapping Sub-Committee, c/o The British Gliding Association. Evidence of performance should be produced either from a polar curve, "Tested Points" (from timed or final glides), or from well conducted comparison flying with known types. Particular figures required are the performance at Min. Sink or in the thermal, and a high speed point at 70-75 knots (130-140 km/h). See also George Whitfield's article on performance testing on page 58.

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FIVE HOURS

By W. J. GALLOWAY

WITH my bronze badge still warm from the foundry and the ink on my Silver height claim hardly dry, I felt well on the way to achieving my personal target of two Silver legs in 1969. The second leg surely would be a piece of cake. All that I wanted was an east wind and medium convection, and that would be it—a quick dash down-wind and my target for the year would be achieved. So much for my ideas.

Grenville Hill, the CFI at Ulster and Shorts, took a different, if unspoken attitude. While he did not express his thoughts, I imagine that he was assessing me as a pilot with less than a year's solo experience, against the risk of an Olympia 2B buried in an Irish bog, or decorating a six-foot-thick stone wall at the up-wind side of one of our pocket-size fields.

The campaign Grenville conducted was akin to brainwashing and would have done justice to any of the great mind-benders of history. Conversations went as follows:—

CFI: "Have you flown today?"

Me: "Yes, I had 40 minutes."

CFI: "Why did you come back?"

Me: "There are other people who want to fly."

CFI: "You could get five hours today."

Me: "Around Long Kesh? You must be joking."

CFI: "Nonsense!"

After repeated doses of this, my subconscious must have accepted finally that it was possible and quietened an inner voice, which whispered "Five hours can be achieved only at a ridge or on a cross-country." I even started talking about it to my wife and children. The children were sympathetic and my wife had her own pre-solo problems, such as "Will they send me solo in the Capstan or will it be the EoN Baby?"

Saturday arrived bright and clear, the met. man had forecast very light winds with medium convection; Friday's inversion would go to 8,000 feet and cloudbase would be at 5,000-6,000 feet. Guess who was first on the list? Sure enough, the two-seaters started soaring at 11.00 hours;

by 11.35 I had the Olympia on the wire and launched to 1,300 feet straight into a thermal. I soared comfortably for an hour and, as convection increased, found—to my dismay—that cloudbase was at only 3,700 feet. Still, not to worry, the lift was plentiful and strong above 2,000 feet.

Two hours found me at 900 feet near the launch point, with indications of overdevelopment all around. I made for an isolated group of houses, illuminated through a break in the clouds, and picked up a classic thermal as it started. This took me back to cloudbase, where I celebrated with a cigarette. At about this time, Joe Taggart in the Wills-awarded Ka-6E came out to play and we swapped thermals for an hour or so, until Joe had to land for another stint of instructing. Although we operate an all-radio set-up, the company of other aircraft was most welcome and helped to pass the time quickly.

At the four-hour mark I was almost four miles west of Long Kesh at 2,500 feet, to hear the news that a sea-breeze front had reached the airfield. How far inland would it reach? My spirits sank—four hours at 30s. per hour for nothing, except an entry in my logbook to remind me forever of how uncomfortable sail-plane cockpits can get. Cumulus development was almost complete and I realized that I hadn't seen the sun for about 15 minutes. Where was the next thermal coming from? The devil looks after his own, for again the sun came through a hole in the overcast to set off another thermal—two knots' worth—which worked me back to 3,000 feet, raised my flagging hopes and, most important, consumed time.

Forty minutes to go and no lift. I was down to 1,400 feet, with a field chosen, when the sea-breeze front arrived—acres of it showing half a knot up. This was my first experience of this type of lift and I marvelled how smooth it was—wave must be something like this. I started exploring the line of the front, which seemed to be stationary. I was able to relax at 2,300 feet . . . I was going to make it. With five minutes to go, I turned for a final glide to Long Kesh and arrived over the boundary at 1,200 feet. Grenville counted down the seconds and a full-brake approach got me on the ground

again after five hours and three minutes. I had done it.

Of my adoring wife and family there was no sign. Monica was just being sent for her first solo flight in the Capstan and the children were hiding their eyes!

CIVV MEETING

THE main agenda items were the revision of the *Code Sportif* and the Rules for Marfa. These items were dealt with at the same time since the new *Code* will provide for general championship rules and the organisers draw up the Local Regulations within the framework of these rules. It is hoped to print the new *Code* in summer 1970.

Cat's Cradle was formally accepted as a championship task by a majority vote. Due, however, to unfamiliarity with this task by many countries who have not yet had the opportunity to try it for themselves, some misunderstanding existed as to the way in which it would work out in world championships. These countries proposed that Cat's Cradle, at Marfa, should start with a crossing of the Start Line, and not as is usual in distance tasks with the pilot free to go as soon as he wished.

Having decided this by a majority, it was further voted that all distance tasks at Marfa should start with a Start Line, which would not be opened until all gliders were airborne. This would include free distance on a day which could result in new World or National records. Unfortunately, the countries unfamiliar with Cat's Cradle could not appreciate the serious increase in collision hazard inherent in their proposals. This is that on crossing the start line gliders do not continue straight on, but immediately turn along the course line of their own choice and across the path of gliders just behind.

Motor Gliders. Seff Kunz would make proposals at the February meeting for special badges and records for motor gliders.

Paris, November 1969

ANN WELCH

STRUCTURAL TESTING OF GLASS-FIBRE SAILPLANE WINGS

By Dipl. Ing. F. K. Franzmeyer

Introduction

Glass-fibre primary structures were introduced in German sailplanes for the first time in 1955, and were considered by official Boards to be unconventional. To obtain data about the service behaviour of the new composite material, an extensive research programme was initiated with the assistance of the German Ministry of Defence. Among others, a test procedure consisting of full-scale static and dynamic tests on GF sailplane wings was worked out in the *Institut für Flugzeugbau und Leichtbau* of the Technical University of Braunschweig—Director: Prof. Dr. Ing. W. Thielemann—and in 1962 the first wing was tested in this new manner. This was a wing of the high-performance SB-6 sailplane, one of the first five GF sailplane types to be designed and built in Germany. This sailplane was the forerunner of the SB-7 to SB-9 series built by students of the Academic Flying Group in Braunschweig. Up to now, six wings of other GF sailplanes have been tested—two wings of the Libelle H-301, and one wing each of the BS-1 (old structure), BS-1 new structure), Phoebus and Cirrus.

The test procedure applied included the requirements of the Luftfahrt-Bundesamt (German Air Registration Board) (Ref. 1). Most important in this connection were two tests:

(1) A static loading test up to ultimate load at a test temperature of $t = 54^{\circ}\text{C}$. This test temperature was required because GF materials have the property of losing compression and shear strength at higher temperatures, which could occur on hot summer days.

(2) A fatigue test to indicate a fatigue life of the wing of 3,000 hours of flight.

The following examples show how this test procedure was performed. Described are the static and dynamic tests which were carried out on the wing of the Cirrus high-performance sailplane, the last wing tested up to now (Ref. 2). The Cirrus wing has a glass-fibre foam/

sandwich shell. The spars are normal glass-fibre uni-directional rovings and the wing-root connection is the usual "tongue-and-fork" system.

The Test Programme

Static loading tests were carried out to obtain data about the elastic properties and the strength of the structure. The results could then be compared with the assumption made at the design stage of the sailplane. These assumptions could then be corrected if found necessary. Later static tests will furnish data about the manner of failure, and information about the fatigue behaviour will be obtained by dynamic tests. Dynamic tests carried out on sailplane wings are believed to be new in the history of sailplanes.

Dynamic Tests

For technical and economic reasons, a test method was chosen which is known as "service" or "programme" testing. This method approximates the test conditions very closely to the actual flying conditions.

To set up a loading programme of a programme test, a flight time of a high-performance sailplane of 200 hours per year was taken, and a service life of 15 years was assumed. Consequently, the service life of a high-performance sailplane covers 3,000 hours of flight, and 3,000 launches during the life of a sailplane if one assumes an average flight time of one hour. It was assumed that an equal number of starts would be carried out by winch-launching and aerotowing.

To limit the expense of the fatigue test, only those loadings were applied which would have a substantial effect on fatigue of a sailplane wing. These are gust loads, loads due to launching, and landing loads.

The worst dynamic damage is caused by gust loads and they depend on the attitude of the sailplane. Therefore, the flight programme of the Cirrus was divi-

ded into five flight sections—(1) winch-launching, (2) aero-towing, (3) thermal flight, (4) cross-country flight and (5) high-speed flight.

The frequency of occurrence of the gust-load cycles in the test are calculated by the following equation:

$$HB = k1 \cdot k2 \cdot b \cdot T \cdot \frac{n=5}{+n-1} (pn \cdot Vmn)$$

The respective flight section is indicated by the index n : $k1$ is a correction factor which takes into consideration the fact that a programme test represents severer conditions than natural random loads in flight. A value of $k1=0.5$ appears justified: $k2$ takes into consideration the elasticity of the wing, which has an important influence on the frequency and magnitude of stress-cycles near the wing root caused by the gusts. Gust loads acting for a short time on an elastic wing produce a dynamic load increase through over-swinging and an increase in the frequency of occurrence of the loads due to rebound—the so-called "dynamic response". This correction factor was taken as $k2=2.0$: b is called the "mean frequency of gust cycles", and it represents the number of positive and negative gusts per flight-kilometre exceeding 0.6 m/sec. The calculation is based on a value of five gust-cycles per kilometre; a gust-cycle is the combination of one positive and one negative gust of equal magnitude; the flight time in the life of the sailplane is $TF=3,000$ hours as mentioned above: Pn implies the percentage of the flight time appertaining to the five flight sections ($p1=0.01$, $p2=0.06$, $p3=0.40$, $p4=0.43$, $p5=0.10$): Vmn is the mean airspeed assumed for the five flight sections $Vm1=100$ km/h.; $Vm2=110$ km/h.; $Vm3=80$ km/h.; $Vm4=130$ km/h.; $Vm5=150$ km/h. These factors produced the following gust-load totals:

HB1	=	15,000
HB2	=	99,000
HB3	=	480,000
HB4	=	838,500
HB5	=	225,000

$$HB=HBn = 1,657,000$$

The gust distribution in the fatigue test was based on the *Deutsche Versuchsan-*

stalt für Luftfahrt gust measurements at altitudes between 600 metres and 1,800 metres. During the test this continuous distribution was replaced by step-like functions made up of several load levels; magnitudes of gusts between ± 10 m/sec. and ± 0.6 m/sec. were taken into account. The maximum speed $Vmax$ of the five flight sections was used to find out the wing load factors
 $n(Vmax.1=110$ km/h.; $Vmax.2=150$ km/h.; $Vmax.3=100$ km/h.; $Vmax.4=155$ km/h.; $Vmax.5=205$ km/h.).

The second group of loadings which have a substantial influence on the life of a sailplane wing covers the loads of so-called "ground-air-ground cycles". They are caused by the change of the wing load between the negative load, if the sailplane rests on the ground ($nu=-0.62$), and the positive load, which is built up during winch-launching ($no=+2.3$). This cycle occurs at least once per flight or take-off. The frequency of the ground-air-ground cycles within the life of a sailplane is therefore: $HSL=3,000$.

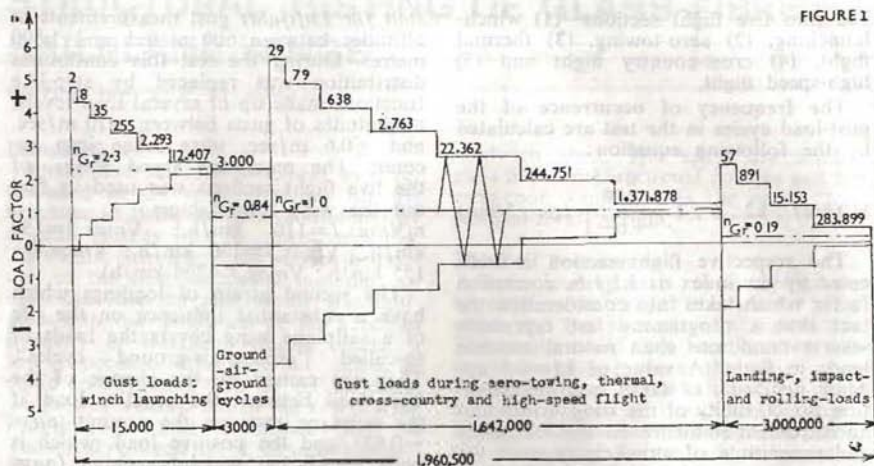
Dynamic loads appearing at take-off and landing, caused by landing impacts and rolling loads, represent the third group of important loadings. An exact landing-impact and rolling spectrum, which would be applicable to the Cirrus, was not at hand. Therefore, a spectrum was designed. The maximum incremental load was limited to 4g thus covering landing impacts as well as rolling loads. The frequency of shocks occurring when rolling on the ground is nearly proportional to the distance. The average rate is $r=0.5$ shocks per metre of ground run. If z is the number of take-offs and landings ($z=3,000$) and sR is the ground run covered by the sailplane at take-off and landing (take-off and landing distance together give 200 metres) the total no. of shocks will be $HR=300,000$.

The ground-run spectrum was reproduced in test by a four-step distribution. The elastic properties of the wing led to the assumption of a symmetrical distribution. The mean load corresponds to a load factor of $nGr R=+0.19$.

The fatigue test load spectrum was compiled from the above-mentioned five gust spectra and the launching-landing and ground-run spectrum. The arrange-

For ease of setting, all subscript letters and figures have been shown in italics.

FIGURE 1



ment of these distributions is shown in fig. 1.

Static Tests

Static loading tests were performed on the basis of the German Airworthiness Requirements for Sailplanes issued 1939 (BVS, *Bauvorschriften für Segelflugzeuge*). Maximum loads were obtained by the gust case (BVS-Fall 115), which gives a limit load of $n_{safe} = +5.0$ (airspeed: 205 km/h.; gust: +10 m/sec). The limit load is the calculated maximum load to be expected in use. The calculated design load of $nBr = +10.0$ is obtained by multiplication of the limit load with a safety factor of $j = 2.0$ (according to BVS for sailplanes only).

The ultimate strength of the structure had to be determined by a test at a temperature of 54°C. For sailplanes operating within moderate climate zones, an environmental temperature of the so-called "hottest summer day" was considered, which is $t = 38^\circ\text{C}$, according to FAR 23.1043 (b). Sun radiation causes an additional increase in the temperature of a sailplane's components. For white-painted surfaces—reference colour "Ducolux white"—an increase in temperature of $\Delta t = 12^\circ\text{C}$ was found. With an additional safety margin $\Delta t = 16^\circ\text{C}$ was accepted. These values led to the test temperature at $t = 54^\circ\text{C}$.

Carrying out the Tests

Four static and two dynamic tests were carried out:

1. A static loading test to limit load ($n = +5.0$) at normal room temperature (20°C).
PURPOSE: determination of stiffness.
2. A dynamic load test (Figure 2) according to the above loading programme, which was run three times to reach a life factor of 3.0.
PURPOSE: determination of a fatigue life of 3,000 hours of flight.
3. A static loading test to 75% of the calculated design load ($n0.75 Br = +7.5$) at normal room temperature (20°C).
PURPOSE: determination of stiffness.
4. Static load test up to the calculated design load ($nBr = +10.0$) at a test temperature of 54°C .
PURPOSE: determination of stiffness at higher temperatures and strength of the wing structure.
5. A dynamic load test according to the above loading programme but without the ground run loads. The test was run according to 10% of the whole life of the sailplane (=300 hours) with a full water-ballast tank in the wing. A safety life factor of 3.0 was taken into consideration.

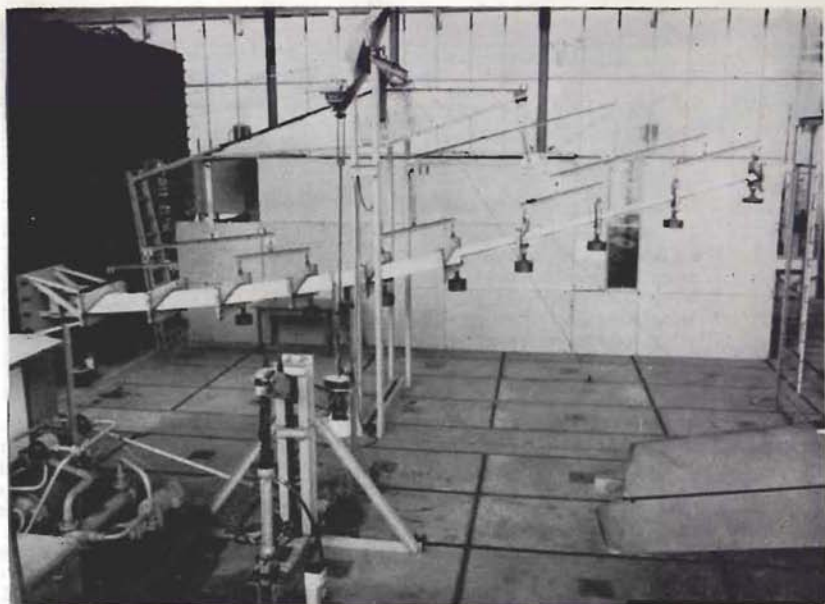


Figure 2: Fatigue test of the Cirrus wing. The picture shows the deflection of the wing at maximum positive load caused by a positive gust of 10 m/sec.

PURPOSE: to find out whether the contact between the water and the GF laminate would have an influence on fatigue strength of the wing.

6. A static load test up to ultimate load of the wing. The test temperature was 54°C and the water ballast tank was full.

PURPOSE: determination of ultimate load of the design and manner of failure.

Results of the Tests

A total of 5,911,150 loading cycles in the first fatigue test and 500,907 in the second were applied on the wing. This corresponded to more than 9,000 hours of flight in the test. No fatigue of the material could be found at the end of the dynamic tests. Taking a safety life factor of 3.0, it could be said on the basis of the present experience that a fatigue failure within a life of 3,000 hours of flight is unlikely. The maximum stresses were reached on load level

$n = +5.6$:

(a) Normal stress in the upper spar-booms (compression): -14.8 kp/mm^2 .

(b) Shear stress in the spar: 5.7 kp/mm^2 .

The determination of the stiffness in the static test shows that there are large deflections due to the inherent flexibility of the material (Figure 3).

The determined deflections of the wingtip of the Cirrus test wing at maximum load were 1,280 mm. at 20°C and 1,440 mm. at 54°C. This shows that the deflection of the wing increases about 12% on hot days compared with cool days; the deflection at ultimate load was 3,160 mm. at the wingtip. A clean break occurred in the upper (compression) spar-boom of the wing attachment "tongue" at a load corresponding to a load factor of $n = +11.0$ (Figure 4). That means that a reserve factor at maximum load of 2.2 was achieved. The maximum normal stress reached in the fracture section was 25.6 kp/mm^2 . This was only 60% of

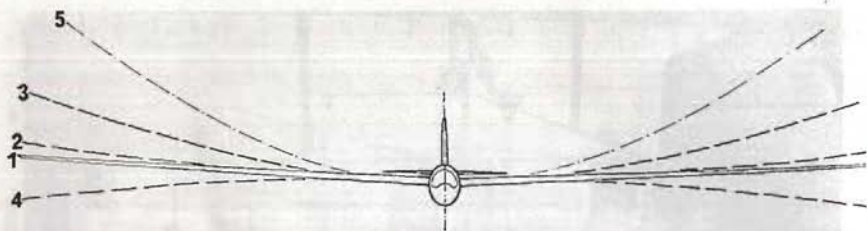


Figure 3: *Wing deflections at some characteristic loading cases:*

1. wing not under load
2. wing under normal flight load ($n=+1.0$)
3. wing load corresponding to a positive gust of 10 m/sec.
4. wing load corresponding to a negative gust of 10 m/sec.
5. ultimate load ($n=+11.0$ and $t=54^{\circ}\text{C}$)

the ultimate strength of the sparboom material (36 kp/mm^2 at 54°C). The fracture was therefore a buckling failure. On examination of the fracture it was found that the rovings in the tongue had not been straightened very well on manufacture of the test wing (Figure 5). This caused a reduction of the ultimate strength. In the production models of the Cirrus, this was improved, leading to a higher safety factor. The results of the static tests confirmed the calculations made for the wing structure. It should be mentioned that these results were obtained in spite of carrying out the other static and dynamic tests before the test to ultimate load.

Conclusion

An extensive research programme has been carried out on a wing of the Cirrus high-performance glass-fibre sailplane. The most important results of the tests would indicate a fatigue service life of 3,000 hours of flight—including a safety factor of 3.0—and a maximum load reached in a static test of 54°C of $n=+11.0$, in fact a reserve factor of 2.2 against limit load. This leads to the conclusion that the wing of the Cirrus incorporates—as far as possible at the present state of the art—sufficient static and dynamic strength. These results show again, like those tests on other glass-fibre sailplane wings mentioned in



Figure 4: *Fracture of the upper sparboom of the wing attachment tongue. The ultimate load factor reached was $n=+11.0$ corresponding to a safety factor of $j=2.2$. This result was obtained at a test-temperature of 54°C , the highest possible wing-surface temperature on a hot summer day.*

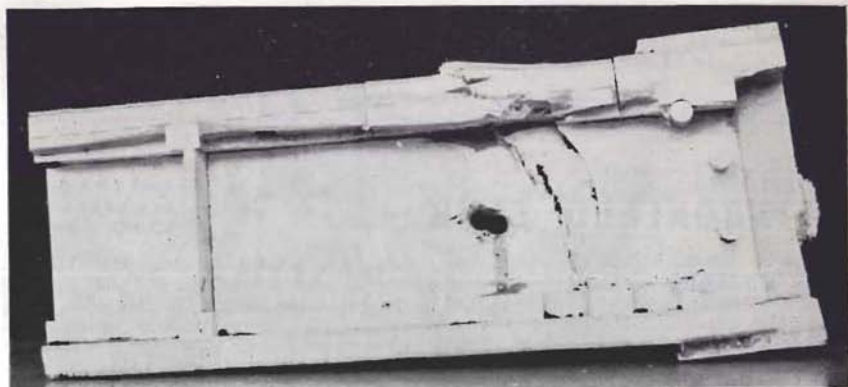


Figure 5: Longitudinal section through the wing attachment tongue. The picture shows the "down-hanging" rovings of the upper spar-boom which influenced the ultimate load. The required shape of the sparboom is indicated by the plotted line. In production models of the Cirrus the effect was removed.

the introduction, that German designers are able to build safe glass-fibre sailplanes.

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KAUL, H. W.: *Jahrbuch der Deutsche Versuchsanstalt für Luftfahrt (DVL) 1938, pp. 195—209.*

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Have you seen the New Look at the Club? We have a new carpet and new walls in the bar—why not come to see—and then join, if you're not already a member. Forgive the advertising but we feel that the existence of the Club is not known by enough people. The Club is here to promote interest in all kinds of aviation, mainly on the sporting side.

Wednesday evening is "Club Evening" when there is a talk on some subject, usually connected with aviation. The

Club also opens on Monday, Tuesday and Thursday evenings and will do until the evenings begin to lengthen. The Spring programme should be on your Club noticeboards now.

We hope the British Light Aviation Centre will be advertising our presence to all their members during the year so we look forward to an influx of power pilots.

Remember, the gate to the Club is to the left of the entrance to 74, Eccleston Square. Lucy Connolly at the BGA is our Membership Secretary. You can also telephone the Club in the evenings if you have any queries—01-828 8740.

AVIATION ART SOCIETY

1969 Annual Competition — JUDGE'S REPORT

THE 1969 show was remarkable for its marked distinction between the specialists and the amateurs. There appeared to be a far wider gap this year between these Entries. Nevertheless, the Judges found their task a difficult one. We were delighted to have Peter Scott, and Walter Woodington of the Royal Academy, co-operating in this year's judging.

Taking the professionals first, the Judges awarded the *Flight* Trophy to John Young's "224 Hurricane Peel Off". This was outstanding for several reasons—a good employment of the upright shape; careful planning of the composition and a great feeling of space and height with good restrained colour. We had one adverse comment—the tone values of the nearest and most distant aircraft were too similar, thus losing in depth what he had achieved in space and altitude. Notwithstanding, a good painting to be admired for its tranquillity.

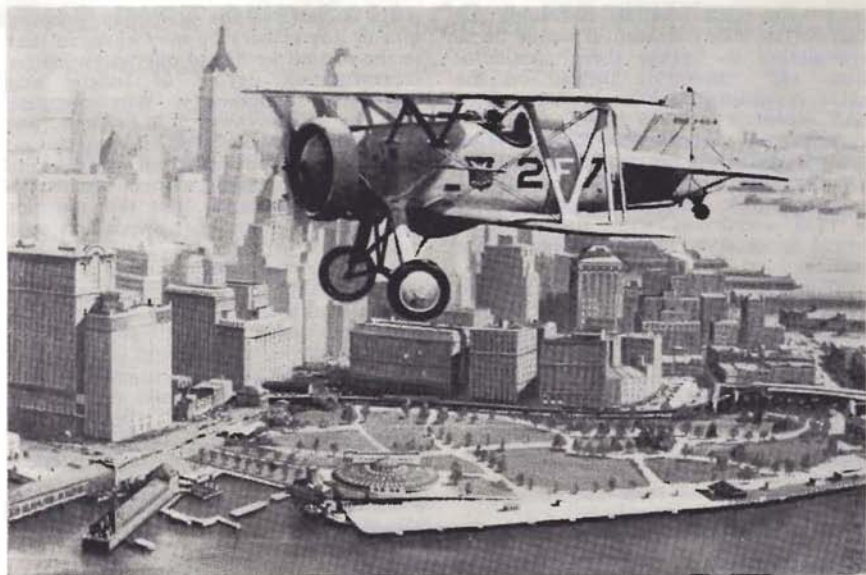
Gerald Coulson's "Evening Patrol"

was a penetrating study, very competent, but I would have liked to have seen a more aesthetic study of the Spitfire executed with as much feeling as he put into the distant clouds. This artist can paint weight without effort, as seen in his "Bombers' Moon", but this could well have been enhanced by more colour and atmosphere.

A. C. Harold produced an extremely good watercolour entitled "Lighter than Air" carried out with great spontaneity and clean colour. Also the "Handley Page Hampden" by Roy Nockolds was commended in this section especially by Peter Scott, who admired the effect of moonlight on water.

Now to the non-professional work. One could expect a more refreshing approach, for these artists are not so consciously concerned with professional considerations.

One painting met these expectations and was awarded the Kronfeld Trophy—"Harvest Scene 1940" by Edmund



Miller. The clever commentary of the painting had great appeal. Of these paintings that have a narrative element this was outstanding, expressing with great economy (one aircraft and one figure) far more than a sky full of battling aircraft and smoke trails!

A conventional portrait of the Valiant selected for its simplicity and satisfying quality was "Valiant Vigil" by Roy Wensley-Smith. "You've Got Her" by C. W. E. Waller succeeded for its less conventional approach as against the many paintings of aircraft flying across the picture plane in one direction or another. It gave one a great impression of being in the aircraft. I think anyone who has flown will agree that the artist put this over extremely well, although his choice of colour was unfortunate.

While on the subject of colour, I must mention "Catapult Crew" by Maureen Anne Gordon. This work is to be commended for its colours, warm, bold and arresting, after so many blue paintings.

Leaving the selected paintings, I would like to comment on the show generally. Inevitably I suppose one must expect a stultifying uniformity from those with a limited range striving for the characteristic competence of the Professional

Yankee Doodle Dandy (Boeing F4B-4 of USS Lexington over Manhattan) by Brian Withams, and below Conditions Good by Margaret Kahn.



Artist with his impeccable technique, and therein lies their downfall. It would be so stimulating to bypass these considerations and concentrate instead on the more rewarding qualities of atmosphere and colour. Sir Winston Churchill received an early lesson in this from Lady Lavery and, in his book entitled "Painting as a Pastime" advocates 'be audacious'. Sir John Lavery could tackle a 1918 aerodrome with aircraft in a broad loose style losing nothing in the process.

With the flat distemper-like treatment of the overworked blue sky so often employed by those carried away with their expertise with a brush, one misses the delicate stirring of atmospheric light, the vibrancy of atmospheric haze and space. Too often one cannot fail to see how the craftsman has been hypnotised by the photograph to a point where the photo-

graph dictates to the craftsman, robbing him of any artistry he may have, so that in the end all he has to offer is an artless representation devoid of feeling and lacking in spontaneity. Why compete with the lens anyway? It is not selective, cannot compose, and has no imagination. Employ it if you must, but don't be its slave. Vermeer used a camera obscura to assist his perspective, but this did not obscure his sense of composition and colour nor his feeling for light and space, which gave his paintings a monumental quality.

One final word of advice to those who choose to paint moonlit subjects. With a little perception, one could work on the theory of cold light and warm shadows, soft edges and forms, and make these studies so much more colourful and exciting.

FRANK WOOTTON
Chairman, Judging Panel

GLIDING CERTIFICATES

DIAMOND GOAL

No.	Name	Club	1969
2/304	I. N. Hobday	Thames Valley	7.6
2/305	M. G. Throssell	Essex	20.8
2/306	V. F. G. Tull	London	22.5
2/307	P. R. Horne	Surrey & Hants	30.7
2/308	Patricia Watson	Surrey & Hants	30.7
2/309	A. G. Burne	Kent	30.7

GOLD C COMPLETE

No.	Name	Club	1969
240	D. W. Lilburn	Yorkshire	5.7
241	Patricia Watson	Surrey & Hants	11.8
242	R. S. Waller	Bristol	16.8

GOLD C HEIGHT

Name	Club	1969
R. Beck	Cleavelands	5.7
D. W. Lilburn	Yorkshire	5.7
R. J. Kerr	Fulmar	27.7
L. S. Ash	Yorkshire	19.7
G. D. Butler-Madden	Surrey & Hants	11.8
Patricia Watson	Surrey & Hants	11.8
T. Steggle	E. Midlands	18.5
R. S. Waller	Bristol	16.8
L. E. Rotter	Midland	14.10
C. O. O'Leary	NAE	1.10
R. H. Brown	SGU	25.8
G. F. Brindle	Crusaders	15.10

GOLD C DISTANCE

Name	Club	1969
I. H. Hobday	Thames Valley	7.6
M. G. Throssell	Essex	20.8
V. F. G. Tull	London	22.5
P. R. Horne	Surrey & Hants	30.7
Patricia Watson	Surrey & Hants	30.7
A. G. Burne	Kent	30.7

SILVER C COMPLETE

No.	Name	Club	1969
2546	T. K. Simmons	Purismouth Naval	7.8
2547	J. B. Lord	Bristol	27.8
2548	A. Newton	East Midlands	22.9
2549	R. F. Tindall	Dorset F.C.	28.9
2550	K. L. Dehmer	Bicester	29.9
2551	J. P. Mellor	Midland	22.9
2552	R. A. Cashmore	Bicester	29.9
2553	E. Duffin	South Wales	28.9
2554	J. P. Rogers	Essex	27.9
2555	J. C. Shipley	Derby & Lanes	28.9
2556	F. H. Feneley	Perkins	27.7
2557	J. B. Bradley	Yorkshire	17.7
2558	W. Pattison	Mendips	15.6
2559	A. Lowens	Staffordshire	27.9
2560	D. E. Williams	Phoenix	1.11
2561	D. T. Crisp	Four Counties	24.10
2562	R. A. Snow	SGU	26.10
2563	M. Wood	Two Rivers	1.11
2564	D. West	Imp. College	5.7

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THE RISE AND FALL OF A NORTHERN CLUB

By FRED SLINGSBY

Under this title, in *The Sailplane & Glider* of October, 1933, Fred Slingsby, calling himself "Northern Nomad", alluded to the recent demise of a northern gliding club in terms which precluded the revealing of names. This article, reproduced immediately below, is followed by the full story now disclosed by Slingsby for the first time after nearly forty years.

Many years ago a Man stood on the top of an exceedingly high hill and, stretching out his arms as a bird does its wings, cried in a loud voice "Lo! I will ride the wind." And had he not lifted up his voice for all to hear, his fellows would never have known his thoughts.

His sorrowing Companions, pondering deeply on the Man's failure to fly like a bird, were much intrigued with the problem, and they gathered together divers pieces of wood and fine cloth to fashion for themselves a device like the wings of a bird, saying one to the other, "If it looks all right, lo! it is OK."

Having cast lots for the honour of making the first venture, they firmly fixed the Chosen One to the device with eagerness and haste, for the other Companions were strangely happy, even though they had not been favoured in the drawing of lots.

The strange device and its burden was hurled with force from the high hill, for the Companions had use of a rope with the power of increasing its length according to the strength of men.

As the Chosen One was still possessed of the strength to sit erect when found in the woods below the hill, the Companions rejoiced, saying, "Surely we are great! The power is ours we can fly as do the birds!" And there was much drinking of wine and voices were lifted up in song, and each man patted his own back in accordance with the custom. Scribes came from near and far to record these wonders, weaving their own dreams in the tidings so that all the people marvelled.

Season followed season, and strange were the devices made and eagerly were they hurled from the hill tops and counts up to an hundred could be made before the breaking.

Then it came to pass, when the Companions

were gathered together, that one of their number having a loud voice said, "Let us buy for ourselves a device so cunningly contrived that two may be hurled forth instead of one." And the others praised the man for his wisdom, for he was well respected, being the owner of an inn.

Great feasts were held to enthuse the multitude and lighten their purses, for much money was required for the making of this machine and had not the Merchants demanded gold for accounts yet unpaid—even the maker of balloons. Moreover, there were certain Powerful Ones who lived in a fine palace in the mighty city, and they had enlightened the Companions on many matters and, being full of wisdom, did not desire for themselves the joy of being hurled from hill-tops.

But it came to pass, that after many tribulations, the Companions possessed a machine in which two could be carried yet their numbers had melted like snow in sunshine, so great had been their labours.

Now the Powerful Ones in the great city became restless, and after many murmurings descended on the few remaining workers and, scattering them with threats of legal vengeance, carried off the machine for which so much gold had been paid. "For," they said, "we must have something." And they sold the machine in a strange market for a few coins.

From that day the Companions were so routed that not two came together again, and they remember, with bitterness in their hearts, never again to seek wisdom in a loud voice, even though the speaker be the owner of an inn.

But a man still roams the mountains, seeking to soar like a bird, even unto this day.

WHAT REALLY HAPPENED

BROWSING through some very old copies of *THE SAILPLANE AND GLIDER*, I came across the sad legend of the old Scarborough Gliding Club, couched in terms of exaggerated simplicity, which at first sight reads like a lot of tripe. Nevertheless, it must have been a *cri de coeur* from its author in those far-off days of 1933. What fun and heartaches the legend recalls for me!

The opening sentence about "a Man standing on an exceedingly high hill...", etc., merely illustrates the great urge in

all men keen on flying, to know more about the new sport of gliding which was making such strides in Europe, particularly in Germany.

Early in 1930, a young man who was a dance band leader, name of Sanders, came round to my small furniture factory in Scarborough and showed me an article in a London newspaper describing the sport of gliding, and the very large response arising from an appeal to all interested persons to attend a preliminary meeting in a London

restaurant and consider the formation of a British gliding movement.

Young Sanders knew, of course, of my eight years' service in the RFC and RAF and that he could play tunes on my enthusiasm to get flying again, even in gliders. So we put out a paragraph in our local newspaper, timed it for the usual "downbeat" of a Monday issue, and the local scribes got weaving on it. The timing was spot on, the response was remarkable, and soon we had a large gathering of all types of people with mixed ideas about gliding, but very eager to learn more, and to get started. A Committee was formed to link up with the newly formed British Gliding Association in London, referred to in the legend as the "Powerful Ones in the Big City".

At our next meeting a very energetic young man with ready speech and an active mind invited the Committee to hold all its future meetings at His Place; he happened to be the new manager of a luxury hotel in Scarborough, nicely located in the centre of the town. So our Committee members matched his acumen by promptly co-opting him and elected him Chairman of the Scarborough Gliding Club without more ado. We henceforth settled down to our ponderous deliberations in warmth and comfort, not to mention luxury. Incidentally, it soon became the custom to attend Committee meetings in correct dinner suits, so we were always well fed and the business of the day was carried out unhurriedly until the very late hours, and with very few absentees. It was generally agreed that there appeared to be more in Gliding than we imagined, and so eventually we got down to the purchase of a primary type trainer from Messrs R. F. Dagnall of Guildford. This firm had been persuaded by the BGA to make and market a few of these gliders. It was known in its original form as a Zögling, but after certain modifications to the tailbooms and other details by the American Gliding Association and a few more other items by Dagnall's, the type became known as the Dagling. The BGA sold sheets of blueprints to clubs for 25s. per set. To help the gliding movement, Dagnall marketed the completed job for about £50, delivery extra.

While awaiting the arrival of the Dagling, the Committee decided that the question of the appointment of an Instructor and an Honorary Ground Engineer was no problem. Slingsby, with his RFC and RAF training, could cope with both jobs. I felt honoured, but somewhat apprehensive. However, our meetings at the hotel were completely free from tension, and as the evenings wore on, an atmosphere of utter tranquillity pervaded that hotel lounge: our Chairman could do no wrong at making such decisions.

Came the day when the Dagling arrived from Guildford. That Saturday afternoon was just right for the occasion. The Press and all members had been alerted, all was set, and it was my day. The long motorcade, headed by Dagnall's lorry, dashed with appropriate recklessness to the chosen spot of the moorland outside the town. The pathetic-looking aircraft with its dangling wires and tubing was carefully assembled under my supervision, checked with trammels, squinted down for alignment, sighted from fore, aft and all that—this was my day. With touching and unexpected magnanimity I was asked to take the first flight. However, I felt they had been rather enthusiastic in the way the safety belt was fastened. I had my way about the size of the launching team on the elastic rope and got this reduced from ten a side to five, with three holding back. I successfully suppressed the astonishing acceleration and consequential decapitation of the nearest members of the launchers, and a height of 10 feet was recorded with a measured distance flown of 70 yards.

After showers of congratulations and Press photos, we continued our fun, until a steeper slope was found which gave us more height and much longer trips which, viewed from ground level, were most spectacular; the Dagling did not appear to be quite strong enough for the landings. We took it to my furniture works later that evening and there it stayed for a week or so getting sorted out. It was just as well as it turned out, because, taking a short cut from the hill we were using to the main road, I was compelled to take evasive action from a very heavy

old bull which compelled me to jump a wall, and I landed in a deep dry ditch. Next day I had a bruise down my leg about a yard long. That week we appointed an Honorary Doctor: nice chap—he also had served in the RFC, I remember.

In the meantime, we had news that Amy Johnson had completed her remarkable solo flight from England to Australia. Our worthy young Chairman rose to the occasion and sent a cable to Amy inviting her to be the President of the Scarborough Gliding Club; she accepted immediately. The Scarborough Town Council were delighted, and we of the Gliding Club became people of some importance in the district. When Amy Johnson was able to visit us at Scarborough many months later, she was given a royal reception which, of course, was put on by the Chairman at our own Club Headquarters, that lovely hotel! Gliding was such fun in those bygone days. Meanwhile, the wires and metal parts were slowly rusting on the Dagling in the farm shed on the Yorkshire Wolds where we had found a new site.

The *Daily Mail* invited Robert Kronfeld, the famous Austrian sailplane pilot, to give a demonstration of his skill on the South Downs. The *Daily Express* chipped in and invited a German pilot, Carl Magersuppe, to bring his sailplane, the Professor, also to give a show. The demonstrations were to be controlled by the BGA. Again our Chairman rose to the occasion and invited both of the foreign pilots to come along to Scarborough as soon as they had finished the South Downs demonstration. Robert Kronfeld came and selected a site, the Castle Hill, overlooking the sea, and the Club got busy with gate control, food tents, and all the trimmings.

The weather was fine but a little breezy; it was the height of the season, and a huge crowd turned up. It so happened that the German airship Graf Zeppelin was cruising down the Yorkshire Coast a few miles out to sea, and passed over the Castle Hill as we were about to start the launchings. We had the greatest difficulty in restraining our lively Chairman from getting hold of the public address system and announcing the

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arrival of the Zeppelin as a well-timed bit of organisation by the Gliding Club to add to the display.

We launched Carli Magersuppe in his Professor to start the display. That launch went sadly wrong, perhaps because somebody holding the port wingtip held on too long and Carli had to check this until too late to avoid striking the fence along the edge of the cliff, or because a gust caught one wing as it swung over the steep cliff; but the sailplane gusted up at a steep angle, came back over the crowd and went down the cliff on the opposite side of the field and flopped into the sea below. The crowd were thrilled to bits and swarmed like bees against the frail fence along the edge of the hill, and we just avoided a major tragedy by the skilful use of the public address system. The German pilot sat on top of his sailplane, which was filling with sea water and drifting away from the shore. A party of fishermen in a motor cobble did some quick work over to the frail aircraft, and snatched Carli aboard their craft, and then crunched the nose of the fuselage to get a line round it, and towed

it ashore. One of us picked up the German from the harbour; the rescuers found a small yard nearby where they heaped up the remains of the sailplane on show and collected a well-earned painful of sundry coins for their labours.

Up on the hill we made an attempt to launch Robert Kronfeld in his Wien, but he also had trouble with his crew and, in fact, collected a little damage to his skid. So he packed up and went off to Dunstable to get repairs done, as he was scheduled to give a show to the Prince of Wales near Dunstable the next week. That left a weary, wet and gliderless, but otherwise perfectly good, highly skilled German pilot in our midst.

Once more our Chairman settled the matter forthwith. Here we had an excellent German instructor, wet but willing to be taken into our service, and thus we would be the only Club in the country with a "pro". That evening in our hotel lounge we discussed all aspects of the proposal and dried out, fed, jollied up and bedded the young German pilot. Once again I thought of the pathetic Dagling rusting in the farm shed. Even-

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PETER JEFFERS

BERT PAGE

PETER ROSS



tually we organised a course of instruction given by our most expert instructor on the care and maintenance of primary gliders, greasing up the wires and things, and so on. We were introduced into the making and use of tack-strips, unknown in this country before 1930—and I say that with some authority. We also received regular weekly gliding training under strict discipline, starting with slides down gentle slopes and encouraged by a mixture of German and English.

Progress must have seemed rather dreary for the young German instructor, and he began to press for the purchase of a dual control two-seater, a "Doppelsitzer" I think he called it. He said he knew of a firm in Kassel, Germany, who made a really excellent job for about £250. This seemed a lot of money at the time, and of course we still owed the BGA £75 for the ghastly gliding show on the Castle Hill. However, we felt rather justified in delaying immediate payment as the show was such a flop. So a team of expert persuaders was selected to work on the likelier guests at the hotel, about "training the Youth of Britain to fly," the high cost of this "laudable work carried out by the Scarborough Gliding Club," etc. This finally resulted in an adequate sum to buy the Kassel two-seater. This most impressive machine was delivered to us in a very short time, and was rigged in the hotel ballroom, christened with a bottle of something or other, and suitable speeches were made by leading members of the British Gliding Association, specially invited from London and suitably entertained in our hotel. They were so impressed as to carefully overlook on that occasion the ridiculous debt of £75 still drifting around the chilly patches of the mind. But it finally caught up with us; they, "the Powerful Ones in the Great City," issued a writ and then swiped our lovely Kassel, which was eagerly snapped up by a London Gliding Club group for a very small sum.

This blow finished the Scarborough Club, and so disgusted the young German instructor that he left us. The remnants of the club were welded into the newly formed Yorkshire Gliding Club.

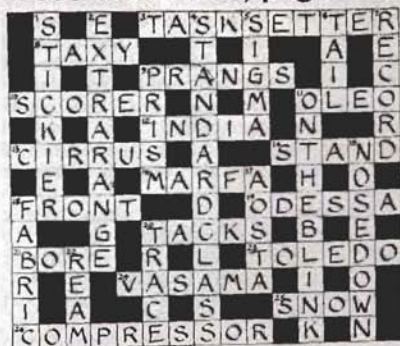
Me? Oh, I built a glider of my own,

the Falcon, and wandered about the country with kindred spirits to enjoy it. Later, I was reduced to making the things for a living. This went on for years until some clever blokes from the "Great City" swooped down on me . . . clever blokes, these Cockneys! Watch'em, that's all!

FUTURE EVENTS

- Feb. 21-22.** 2nd Symposium on Competitive Soaring, Pittsburgh, Pa. (revised date).
- Mar. 14-15.** Symposium on Cross-country Soaring, Pittsburgh, Pa.
- May 30-June 7.** Standard-Sport Class Nationals at Dunstable.
- June 13-21.** Western Regionals at Nympsfield.
- June 15-July 4.** World Championships at Marfa, Texas.
- June 27-July 5.** Scottish Regionals at Portmoak.
- July 11-19.** Dorset Regionals at Compton Abbas.
- July 11-12.** Air League Rally at Sywell (revised date).
- July 25-August 2.** Northern Regionals at Sutton Bank.
- August 8-16.** Wycombe Regionals at Booker.
- August 22-28.** Inter-Club Soaring Meet at Lasham.
- August 22-31.** Open Class Nationals at Doncaster.
- August 29-Sept. 6.** Lasham Regionals at Lasham.

CROSSWORD SOLUTION December issue, page 519



CONTESTS FOR ALL

By ANN WELCH

AS the performance of new gliders becomes increasingly magnificent, there is a growing need for competitions in which there is a chance of winning without having to buy several thousand pounds' worth of exotica. What is needed is a good "dinghy", or Formula IV class, for the pilot who can fly only at weekends, even though he may think about it all the week.

Such a class should *not* have anything to do with world championships. The Open and Standard Classes work satisfactorily, not least by diverting design attention alternately between orchids and daisies, the result being apparent in the wide range of top-class gliders available. But not all gliders are, or should be, designed for world championships, and world championship gliders become out-classed, although they remain excellent for general competitive soaring.

So a separate Class is needed which should limit the top end of the performance range, and be internationally available for countries or clubs to use at their convenience. For example, there could be championships in the Class between the Scandinavian countries, or between gliding clubs in Britain, or between Regions in the United States, each working to the Class rules (which should be minimal) but otherwise organising the event to suit their own conditions.

On looking into ways of limiting the range of performance to an extent which would allow reasonable comparison to be made between pilots, the first thing to forget about is handicapping, with its tedium of getting agreement, and detailing permitted modifications. But whatever criteria are applied, it is essential that they shall be easy to measure, and not acquire special tests or involve opinion.

Fortunately there is one characteristic of conventional gliders which is easy to check, and which can be used effectively; that is, aspect ratio. Improved performance generally demands higher aspect ratio, so a halt can be called at any aspect ratio that gives the desired top

limit. From time to time there has been the odd prototype which would not fit in with this rule, but they are rare enough to be discounted, and for all practical purposes there are none now or in prospect. It is not even expected that anyone would build gliders specially for the Class.

Aspect ratio 20 allows such gliders as the Dart 15, Foka, Ka-6 and Phoebus 15; 21 allows in addition the ASW-15 and Diamant 16.5, for example; and 22 the HP-14. A more comprehensive list is given in Table 1. Organisers of competitions could declare the aspect ratio limit to suit their own circumstances, calling their event, say, the British 20 Class championships, or the European 25 Class Championships. After some experience it is likely that competitions would settle into just one or two popular groups. In the event of too many entries the organisers could cut out the lowest performance gliders by declaring a low aspect ratio limit.

A merit of working to this system is that it is very flexible. If after a few years it is felt that an aspect ratio has become too low, the number can be raised without any other complication. At present several countries are introducing competitions for the more ordinary gliders — the British Sport Class is an example — but it would be a pity if everyone arrived at a totally different set of rules which would preclude easily arranged competitions between groups of countries. Limiting by aspect ratio is obviously not as precise as having tight Class rules, or one-design contests, but it is simple, practical, and does not require anyone to get fussed over minor details.

Moving further along the line of an international "everyman's" contest, is there any reason why the scoring system should not be simple as well? There is a great deal of interest, and a large amount of work has been done by C. E. Wallington, and others, in a "placing order". A non-world, but international, championship Class might provide a good opportunity to introduce it, but if placing is to be used, it must be accepted that the results will differentiate between pilots' performances only fairly coarsely, and attempts to make it refined or complicated should be avoided. Its merit is its

simplicity, and its purpose is to find the winners, and not to sort out fine degrees of losing.

Introduction of a new group of championship Classes could also be an opportunity to introduce another task. It should be remembered that tasks are to enable organisers to use the weather as fully as possible, and the inclusion of any one task is not mandatory. A task which encourages pilots to get the best from more lightly loaded ships, and certainly requires from them more in the way of flight decision, is out-and-return with pilot selected (photographically recognisable) turning point: each return kilometre being, say, twice the value of an out-going kilometre. Pilots would have to register their turning points with the organisers and then get going. The organisers would accept any turning point which was practical, and/or could issue a list of photographically acceptable ones.

Obviously neither a placing system nor the new task are a necessary part of the proposed Class, but there might be no harm in combining them so that competition in the Class started with a fresh and enterprising approach. To give owners of the many excellent Ka-6s, Darts, Fokas and Boomerangs and similar that are around, more to go on than they have at present, here is an outline of how the Aspect Ratio Class Rules might look.

Proposals for International Aspect Ratio Class Rules

1. Championships shall be run in general accordance with the *Code Sportif*.
2. Any NAcC or Club may organise a Class Championships open to whomsoever it wishes. The event shall be entitled by the name of the Organiser, e.g.: The UK Inter-club 20 (or 22, etc.) Class Championships.
3. There shall be daily tasks generally as in world championships. The minimum total period is 7 days, preferably consecutive or as a series of 4 consecutive weekends.
4. Any glider with a valid C of A or Permit to Fly may enter, as follows:
Span. Between 14 metres and 18.1 metres, except that this limitation need not apply to individual gliders first

flown more than, say, 7 years previously.

Aspect Ratio. Not in excess of the figure declared by the organisers. The maker's figure for aspect ratio flaps-in shall be used except that in the case of a prototype or modified aircraft the aspect ratio shall be determined as described in "The World's Sailplanes".

Tail Parachutes. Prohibited except on gliders fitted with airbrakes.

5. **Tasks.** World championship tasks and those accepted in National Championships of the country, plus Out-and-Return distance in which the pilot selects his own turning point. The value of any return distance is doubled.
6. **Scoring.** A simple placing system or other straightforward method.

TABLE ONE —

Aspect Ratio of gliders in general use.

Up to 20.00

Austria	M-100S
BG-12	Mucha
Blanik	Olympia 419
Boomerang	Olympia 463
Breguet 901	Pik 3c
Dart 15	Phoebus 15
Edelweiss	Pirat
Elfe S3	Sagitta
Foka 4	SGS 1-34
Ka-6	SF-27
Ka-13	Vasama
L-Spatz	Zugvogel 4

Up to 23.00

ASW-15
Dart 17
Diamant 16.5
Diamant 18
HP-14
Phoebus 17
SHK
Skylark 3
Skylark 4
Standard Cirrus
Zefir

Up to 25.00

AN-66
Cirrus
Eolo
HP-14C
LS-1
Meteor
Sisu 1A
Standard Libelle

Over 25.00

AN-66C
BJ-4
HP-15
Nimbus
Sigma

If AR 22 was accepted as the top limit, the Diamant 18 and Standard Cirrus would go out of list 2



Close-up of the Observer's Panel with the tape-recorder above it.

THE RED QUEEN — A Glider for Meteorological Research

By G. R. WHITFIELD and J. R. MILFORD



George Whitfield attaching Thermometers.

RREADING University has just taken delivery of a T-53B for meteorological research. The aircraft will be based at Lasham and will be flown by a small group of pilots and observers working from the University Department of Geophysics and Applied Physical Sciences.

The aircraft is being fitted with a 4 ft. nose boom and instruments, to measure up to a dozen parameters and record them on magnetic tape for computer analysis. The parameters include height (measured to within a few feet), airspeed, vertical acceleration, pitch, roll, and compass heading. Meteorological parameters include temperature, humidity, and the angles of yaw and incidence measured by vanes on the boom. Any or all of these can be sampled and recorded at intervals ranging from 0.2 to 2 seconds, so that details of the state and motion of the air can be investigated down to lengths of a few yards.

There are many questions about the structure and behaviour of the lowest 10,000 ft. of the atmosphere which meteorologists, as well as glider pilots,

ask. We recognise the limitations of a glider for research, but, even so, we should be able to get many useful data on a number of features. The most obvious meteorological problem is the structure of thermals and this suits us because thermals are a convenient size, and when they are active our glider can stay up. We shall probably work with accomplices to mark thermals for us, while we make straight passes through them to get the best picture we can of their shape and size.

We shall also try to examine sea-breeze fronts, with the active assistance of John Simpson. The main picture of the sea-breeze is now generally accepted, but we hope to discover more detail, and to measure the amount of mixing of "land" and "sea" air which takes place in various regions around the front.

Of course, to get accurate information on air motions we shall first have to measure the performance of the glider itself, involving us in the usual dawn aero-tows to great heights, and many short straight "partial glides" at various speeds. Fortunately, the recording system is ideal for this, and analysis programmes are already available.

The project is supported by the Natural Environment Research Council with a two-year contract. We see this as a small beginning of great things, as we develop and prove both instruments and techniques. Looking ahead, we clearly need a motor glider (see *The White Knight*, page 486, December issue). With



Trying it for size. Back Seat, James Milford (Meteorologist). Front Seat, George Whitfield and Peter Purdie.

(Photos: John Simpson)

this we should be able to fly level, and investigate large-scale phenomena, such as the transport between the ground and different layers of the atmosphere of heat, water vapour, and momentum through turbulence—and these are important data for the development of computer modelling of the atmosphere to help in weather forecasting.

General View of the Instrument System and Observer's Panel.



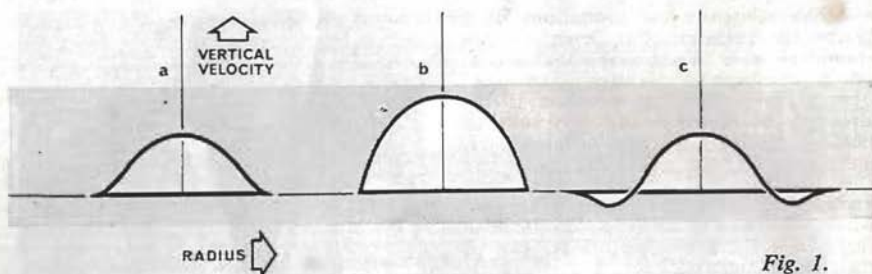


Fig. 1.

ABOUT THERMALS

By NICHOLAS GOODHART

THERMALS may be tall columns of rising air, or they may be vortex-rings, or combinations of both, but one thing is reasonably certain and that is that they have the highest vertical velocity in the middle and thus decreasing vertical velocity towards the outside. They must in other words have cross-sections like curves (a), (b) or (c) in Figure 1.

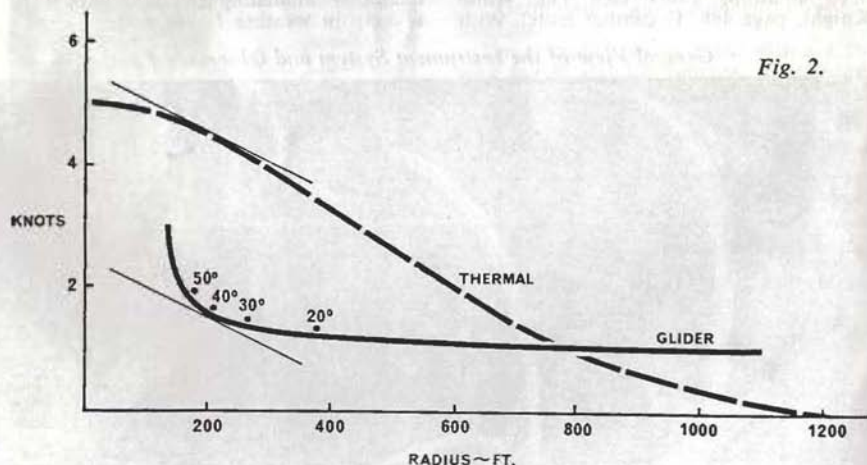
One of the things we have all found out by experience is that a fairly steep angle of bank gives the best rate-of-climb in the ordinary sort of thermal and surprisingly this one piece of information alone tells us a lot about the lift distribution in a thermal.

Figure 2 shows the sinking speed of a reasonably good glider plotted against

radius of turn for varying angle of bank. Let us assume that 40° bank is the best in a particular thermal and gives 3 knots achieved rate of climb. 40° of bank gives a radius of 200 ft. and a glider sink of 1.5 knots, hence the absolute vertical velocity of the thermal at 200 ft. radius is 4.5 knots. Much more important is the fact that we know that either more bank or less bank will give a lower rate-of-climb i.e. the thermal strength must increase with decreasing radius more slowly than the glider sink increases and *vice versa* with increasing radius. Thus a tangent to the glider curve at this radius must also be a tangent to the thermal absolute vertical velocity curve as shown in Figure 2. For practical purposes we have therefore defined the cross-section of the thermal in the range of radii of interest.

The part of the thermal outside a radius of 400 ft. or so is not significant from

Fig. 2.



the flying point of view but is of interest if we want to know more about the thermal *per se*. What does the average thermal seem like as you first enter it? My own impression is that quite a long way out the air begins to have a different feel; there is a champagne-like quality indicating that lift is being approached and soon the variometer starts to climb, slowly at first and then more rapidly; in other words I can easily talk myself into believing that the cross-section is often something like Figure 1 (a). Less frequently there is actual sink after the light turbulence has first been encountered followed by a rapid build up of lift i.e. a cross-section like Figure 1 (c). Thermals like Figure 1 (b) seem to me, on the other hand, to occur infrequently i.e. a thermal in which one flies from dead air straight into rapidly increasing lift.

It just so happens that Figures 1 (a) and 1 (c) are cross-sections of vertical velocity in vortex rings. 1 (a) is a ring rising at the same speed as its outer streamline is descending and 1 (c) is rising more slowly.

For thermals which have this form we are now in a position to hazard a guess at the likely sort of size of the bubble; a little bit of freehand curve drawing might produce a result like the dotted curve in Figure 2 which gives the radius of the bubble at around 1,200 ft. For convenience let us assume that the vortex ring is like the diagram shown in "The Vorticist's Reply" by Frank Irving, S & G June-July, 1968, reproduced here as Figure 3. Scaling from this gives an overall height to the bubble of about 1,500 ft. If cloud base is at 3,500 ft. this means that when the cumulus cloud first forms, the bottom end of the bubble is at 2,000 ft. As we have earlier decided, gliders will circle in this bubble at a radius of around 200 ft., thus, despite the flattened shape of the bubble gliders circling in it at various heights would be seen in a column 1,500 ft. high and only 400 ft. across; this seems to agree well with what one normally sees.

Now the one manifestation of a thermal that we have all had almost unlimited opportunity to study is the cumulus cloud. We can, therefore, compare what we have seen with what we would expect to see if a vortex-ring thermal reached condensation level. Let us first

assume that the inversion and condensation level are at the same height. The inversion is the height at which the bubble ceases to have any buoyancy and, therefore, stops rising any further, but it has considerable stored energy in its vortex-

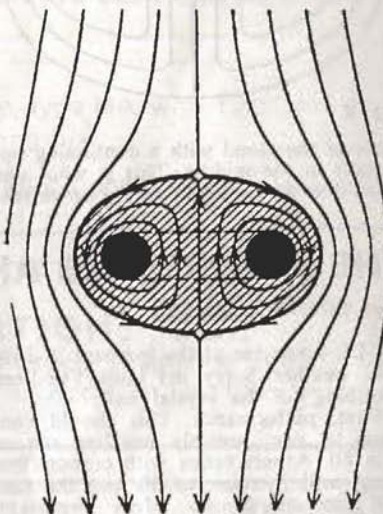


Fig. 3.

ring and this will continue to rotate, feeding a flow of air up into the small cap cumulus which will have formed. Note that the top streamline flows downwards right from the centre, thus re-evaporating the cloud quite quickly and stopping it from spreading out sideways to a great extent. This seems to me to describe the fair-weather cumulus quite well.

If the inversion is appreciably higher than cloud base, the bubble will rise sufficiently to give appreciable vertical development of cloud. This complicates the picture somewhat since the latent heat released by condensation upsets the distribution of buoyancy in the bubble and could lead to bubbles within bubbles.

Figure 4 shows a bubble which has stopped rising when the condensation level is half way up it. If this picture represents anything approaching the truth we would expect to find a weakish down-current in and under the outer

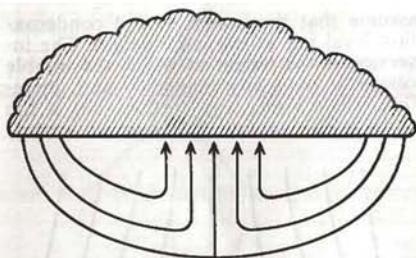


Fig. 4.

parts of the cloud with a continuing up-current in the middle. This is what one often does find except that the up-current

is seldom in the middle. But this is hardly surprising in a real situation where wind shear can and obviously does distort the bubble very considerably. Incidentally, I believe that the side of the cloud which is most likely to have the thermal under it has far more to do with wind shear than with either wind direction or the sunny side.

All this is, of course, no more than guessing; it seems to me to fit in well with the known facts but there is still a lot more to learn. The question to ask yourself next summer, as you flit gaily from thermal to thermal, is whether what you find in practice fits in with this analysis or points to something different.

THE FUTURE LIES AHEAD

says BRENNIG JAMES

ALL I can see at the moment is dirty weather. Sorry, my fault, I've been breathing on the crystal ball.

First, performance. This should continue to rise, possibly levelling out at 1 in 60. Aspect ratios with carbon-fibre wings will increase to 30 and the cost will rise enormously. More important, auxiliary power will become almost universal so that it will be possible to fly 500 miles to a weekend contest and back more or less as a matter of course. However, nothing like an improvement of an order of magnitude is foreseeable so far as performance is concerned.

In instrumentation very great advances can be foreseen in distant thermal detection. Radar has been rather ignored; one bird per square mile can, however, easily be spotted with a good set, and if that bird is circling in a thermal the problem is solved. Eastwood in his book 'Radar Ornithology' shows beautiful shots of the sea breeze front outlined by the swifts soaring in it. The Gunn effect diode makes glider-borne radar sets feasible in terms of cost and weight, but considerable development may be required. (See Proc. IEEE—Proceedings of Institution Electrical and Electronic Engineers April, 1969. Pages 468-480.) Acoustic Radar working in the frequency range 1 to 10 Mhz may well be able to make thermals visible better than any other method (see McAllister, Proc. IEEE April, 1969).

Lidar has been shown to work several years ago. A small cheap laser and photo-multiplier will detect thermals by the scattering of light by dust. Infra-red radiation by the thermal is detectable in theory using sensitive radiometers similar to those in use in the Nimbus satellite project. Though the thermal is only a fraction of a degree warmer than the surroundings, its mass is sufficient to radiate adequately in one of the CO₂ bands. Work on this application is in hand.

Horizontal component of electric potential gradient. This seems likely to work. At the moment it is too sensitive and detects a vast amount of fine detail in the atmosphere. Work is in hand to increase the time constant so that the instrument will see the wood and not the trees.

Finally, gliders will get better but, more important, they will become very much more intelligent. The amount of sensory equipment may be so much that several instrument pods will be slung under the wing. The cost of instrumentation may well exceed the cost of the aircraft itself. Detail improvements will be very important, particularly I hope in rigging. Simple hydraulic operation of controls may replace the current complicated systems of bell cranks and cables.

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CROSS-WIND RACE

By HAROLD DREW

MOST of us have speculated on the amount of the penalty which one pays for drifting down-wind excessively during a cross-wind race. Last year, at the Prairie States Regional, an excellent opportunity came my way to gather a little information on this.

On the last day of the contest, the organizers set a short task consisting of a race to Howling Dog Airfield, which lies 63.40 nautical miles to the east (magnetic) of the contest site. The contest site and Howling Dog are at identical elevations. The met. man forecast a steady northerly (magnetic) wind of 20 knots. He thought that there would be little variation in wind direction and strength at all operating altitudes throughout the day, and he turned out to be right. He put cloud base at a little over 3,500 feet. Pilots were not permitted to enter cloud but there was no maximum altitude set for the start. The met. man expected thermal strength at all operat-

ing altitudes to be sufficient to provide a rate of climb of two knots for high-performance sailplanes. He was right in all of these things. It will be noted that conditions lent themselves admirably to the relatively simple calculation of tactics and analysis of results.

I talked with three of my friends before the start and was surprised to learn that they shared a number of intentions. They planned to cross the start line together at identical altitudes close to cloud-base. Actually, they crossed together at 3,520 feet. Thermals were obvious and plentiful. The three planned to glide until they were down to 2,000 feet and then to climb back to their start line altitude; then they were going to repeat this until they reached a point from which they could just make the goal with their final glide. Each was flying the same type of high-performance sailplane and all expected to climb at two knots and to glide at 50 knots. At this speed they would have a rate of sink of two feet per second. As a result of this remarkable uniformity and unanimity, the following factors were common to all of them:—

Glide time 1,520 ft. alt. loss	760 secs.
Distance through air mass per glide	10.55 nm.
Drift South during glide	4.22 miles
Climb time to recover 1,520 ft.	450 secs.
Drift South during climb	2.5 nm.
Distance through air on final from 3,250 ft.	24.44 nm.
Time for final	1,760 secs.
Drift South on final	9.77 nm.

This is as far as they were prepared to discuss their tactics in each other's hearing. I took each one aside and questioned him on his further plans.

I spoke first with Kevin Kempinski. He remarked — rather condescendingly — that the shortest distance between two points is a straight line. He planned to operate between two lines — one 1.25 miles north of the task line and the other 1.25 miles south of it. This would require a heading on his first glide of about 59 degrees and on subsequent glides of about 50 degrees. His heading on his final would be much more easterly since he would not be doing any climb-

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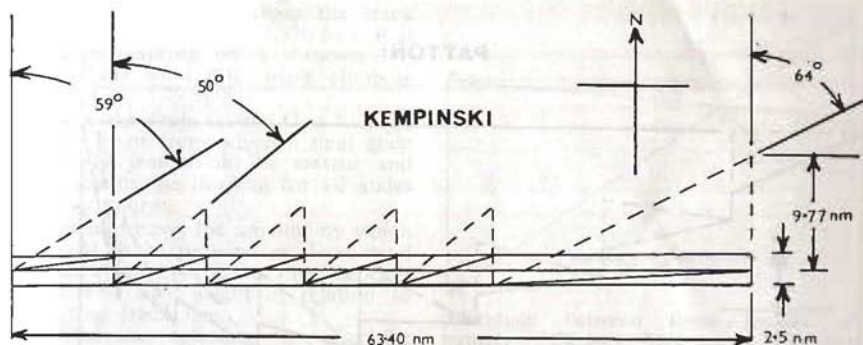
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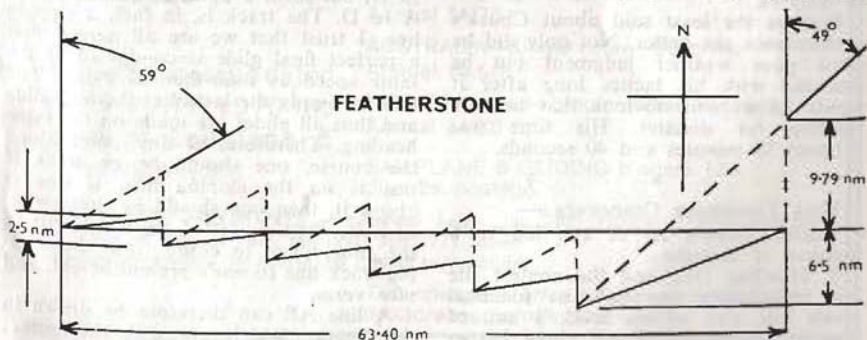
ing and also would have only 1.25 miles to make northward. This seemed to make good sense to me.

I spoke next with Monty Featherstone. "I have a feeling," he said, "that if I figure a heading which will be common to all my glides and which will take me to the goal, I can't do very much better than this." He did concede that he might need to adjust his heading for his final. "My heading will be 59 degrees," he declared, "and I am well aware that the point from which I shall start my final will be well south of the task line." I had a feeling that Kevin might do a hair better with his plan but I kept my mouth shut.

Finally, I had a word with Chuck Patton. Looking over his shoulder before speaking, he remarked, "I feel it in my bones that this lousy northerly is going to back during the next hour or so, whatever the met. man may think. I'm not wasting a lot of my time fighting my way north in the early part of the

race when the wind is probably going to end blowing from the west." I asked him what he planned to do. With another glance over his shoulder, he told me that he would head due east on his first glide. On subsequent glides, he would head in the direction of the goal when he came out of his climb and then fly steady on his compass reading until he was down to 2,000 feet. He reckoned that he could locate Howling Dog from a long way off by the well-known gap in the line of hills which lies just east of the field. I had grave misgivings about his plan but I thought it better not to voice them.

I saw the boys across the line and then headed east with Kevin's trailer. When I reached Howling Dog, Kevin and Monty were on the ground. They told me that they had closed with the field on converging courses and had landed simultaneously. Quite a while later, Chuck showed up almost from the southward. All three had judged their finals with



Perhaps the least said about Chuck's performance the better. Not only did he show poor weather judgment but he persisted with his tactics long after it would have been obvious that he was heading for disaster. His time was 2 hours 50 minutes and 40 seconds.

1. Howling Dog and the contest site are presumably not only at identical levels but also at sea level. I am, of course, assuming that our three heroes

A line AE can therefore be drawn in the diagram which represents the correct

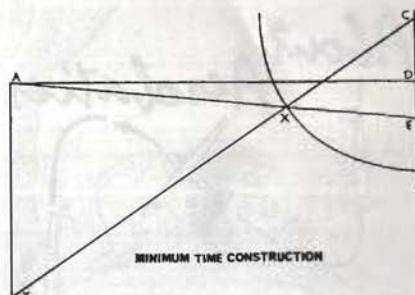
position at any point along the track when one has climbed to 3,520 feet. It is drawn by marking off a distance DE equal to the wind drift while climbing 3,520 feet — 5.79 miles.

AE cuts the circle around C at X. Thus X is the point from which a final glide from 3,520 feet would be started and XC represents the heading for all glides along the course.

As stated above, the amount by which one ought to be up-wind or down-wind of track at any particular time depends entirely on one's height in relation to the sloping track line.

To find the optimum time for the course, one calculates the time to fly the distance YC through the air mass at 50 knots. If extreme accuracy is required, the distance YC may be calculated by the use of trigonometry. It works out to 76.58 miles on a heading of 55 degrees and 53 minutes. This is the angle AYC. To this we must add the time spent in thermalling.

To fly 76.58 miles at 50 knots takes 5,514 seconds. In the process, we lose 11,028 feet. However, we started with 3,520 feet, so we have to climb the



difference between these figures — namely 7,508 feet. At 2 knots this takes 2,223 seconds. The total time for the race thus comes to 7,737 seconds, or 2 hours 8 minutes and 56 seconds.

Kevin and Monty didn't do too badly to finish in 2 hours 10 minutes and 10 seconds. Monty had the right idea — that is, to fly on a uniform heading. However, he chose too easterly a heading and therefore had to take a more northerly heading for this final glide. This cost him 74 seconds.

I will refrain from comment about Chuck's performance.

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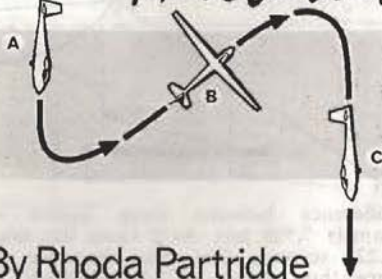
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About Aerobatics



By Rhoda Partridge

IF you actually enjoy doing aerobatics, this is not for you. Go away and read something else. This is for the rest of us, whose reactions vary from the uneasy-queasy to the panic-anguish. I was one of the panic-anguish lot.

Mind you, my introduction was unfortunate. I had loops done to me twice before I went solo—the first time by a very calm Fleet Air Arm character. "You won't feel any G" he said reassuringly. We didn't. We hung upside down in an open T-21 for what felt like ten minutes, while dust, small stones, two Biro's and the DI book floated by and drifted away to the fields above—I mean below. The second time it was a press-on type, whose loop resembled an egg with two sharp points. When it was all over—again it was in that long-suffering T-21—he said reproachfully "But, Rhoda, I don't believe you even opened your eyes." Well, it wouldn't have been worth opening them really because the G slammed my chin onto my bosom and I'd only have

seen my trembling thighs. When I went solo, I flew the Swallow with great care . . . not too fast . . . not too slow . . . not too much bank. In the back of my mind I think I had an unacknowledged fear that, if I didn't watch her closely, she'd suddenly fling herself into an aerobatic routine regardless.

After a year or two I still seemed to be flying stilted and unrelaxed, and I was still scared rigid of aerobatics. That rotten lot who've gone away to read something else didn't help much. "But, Rhoda, don't be so silly. Aerobatic flying, when you do it properly, is perfectly safe, and there's a sort of gaiety and elegance about it which is really delightful. But, of course, you have to be properly taught." All right for them, they actually enjoy aerobatics. It bothered me, though, and I started to think. "I must get myself some aerobatic training." I thought it for three years. In 1968 I did a nearly-washed-out cloud flying course



... Do something about her flying ...

at Lash'em, and we did what they laughingly called "Recovery from Unusual Attitudes on Instruments." I didn't do very well at this, partly because I'm not sure if I could have recovered even with my beady eye fixed on the horizon, and partly because I was wearing a thing called a visor which allows you to see the instrument panel and nothing else. It's a cross between the eyeshades worn by reporters in early movies and a coal shovel. I don't think I'd done the wing-nuts up properly because, as soon as the G came on, it banged down onto my nose and I couldn't see any instruments, only those trembling thighs. When it was all over, I said to myself "I really must get some aerobatic training." But, you



... I flew the Swallow with great care ...

know, when one has had the run of the sky in a charming solo glider, one doesn't fancy an instructor in behind—nor yet beside. He might get out after the flight and go over to some other of his ilk and say "You know, we're really going to have to do something about her flying..."

When I was in Aosta in March, I had to fly dual because the Italians only recognise an Italian licence and I hadn't got one. I said to Signor Balbis, the CFI, who speaks French, "Please will you teach me aerobatics?" And he said, "Certainly, there is no problem." I had five aerobatic flights and, half-way through the third, I started to enjoy it. Prior to that, I was inclined to groan aloud at critical moments. Very shaming. There was one difficult moment on the last flight. I had done my little show and Signor Balbis said, "Now I will make for you a *reversement*." I said, "What is a *reversement*?" He said, "It is very pretty. I have her in hand." I said politely "You have her in hand" and I still don't really know what a *reversement* is, but we seemed to be screaming along the valley upside down and rolling about a good deal with me groaning aloud again.

When I got home to the Mynd, I knew I had to loop my *Broomsick*—"the most beautiful Ka-6E the Schleicher works ever turned out." I asked Ernie—our CFI—for permission, and he said about height and what I mustn't do and told me to get on with it.

The first flight after I got back from Italy was in weak wave. At 4,600 feet over the valley I thought "I wonder what speed she'd like? I'm sure she'll jump out of her skin if I handle her like that Blanik in Italy, her and her all-flying tail. I wish Signor Balbis were here." I pointed her at a straight bit of road, put the speed up gently to 80 knots, stick back gently, then gently on to the stop. Too jolly gently. We stuck at the top. Head against canopy. Straps hard on shoulders. "What the hell am I doing this for?" Down the other side at last. Trembling thighs going like castanets. And never again. Up in the silky smooth air. Then for a little comforting trot around the countryside. Then a very odd thing happened. I got sort of seduced by a straight bit of road and, before I'd really thought about it, I was pointing down, speed to 80 knots, stick back gent-



... Seduced by a straight bit of road.

ly, then on to the stop... and over she goes, neat and docile as you please. Lumme! That was super! Do it again, and again, and again. She does it beautifully, light and gay and charming.

I'm writing this to tell you something remarkable. Are you ready? "Aerobatic flying, when you do it properly, is perfectly safe, and there's a sort of gaiety and elegance about it which is really delightful. But, of course, you have to be properly taught."

"GLIDING" and "SAILPLANE & GLIDING"

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- 1969 Vol. 20 Nos. 1, 3, 4, 5, 6.

SIX FEET OFF THE GROUND

By SHEILA CORBETT

OUR six feet had been high off the ground before, on a charter flight, but never this way until we three (husband, son and self) took an *ab-initio* course at Worcester in 1968. I don't know who talked whom into it, but we turned up there never having seen a glider before.

So We Began

The professional instructor was on holiday, so one of the club's voluntary instructors filled in for him—a wartime fighter pilot with great gliding skill, and even greater enthusiasm, who immediately inspired us with confidence and, I think, hooked us on gliding for all time! He impressed us immensely on one occasion when he kept a telephone caller from New York waiting whilst he did a "quick circuit". The airfield was a wide east-west swathe cut through the middle of a cornfield with a wider piece at each end for landings and aerotows. Landing in the corn meant pints of beer all round, and this was ingeniously arranged to ensure a good evening's drinking every evening. On the last day, when four course members went solo, we went to bed with the dawn! There were nine on the course and we flew in a T-21 and T-31. The food was first rate and the beds were comfortable—in fact, it was one of the best holidays we had ever had and we all felt that gliding was a "must" from then on.

And so we joined the Essex Club at North Weald and soon club flying began to take up more and more of our time but, because of the miserable weather last winter, our progress seemed disappointingly slow. So we decided on a couple of courses this summer to hasten things along a bit.

Up to Derby

For our first week we went to Camp-hill, situated 1,300 ft. up in the Derbyshire Dales. The road up the mountain was exceedingly narrow with hairpin bends at intervals, but the club house itself, of mellow grey stone, perched in the lee of the hill top in sparkling sun-

shine, immediately won our approval. The first opinion was attenuated somewhat on closer inspection because conversion is not yet complete. The Elsans in "Rose Arbour" and the outside wash-house were a bit primitive. We looked forward to a hot shower as advertised in the brochure but found to our disappointment that the shower room was temporarily out of use and contained nothing more than a broken lawn-mower.

There were two groups of eight people on the course—one group taught by the resident instructor and the other (including us) by a visitor from Booker—a sincere and dedicated instructor who probably taught us more about gliding than anyone else will ever be able to do in the space of five days—he was the tops.

When we first saw the airfield we were shattered—a small kidney bowl set into the hill top surrounded by a stone wall with a steep cliff on two sides. In fact it seemed to be the sort of field one shouldn't choose if forced to land on a cross-country flight. How wrong we were and what an eye-opener it all was! We flew Ka-4's, which are tandem two-seaters with spoilers and most ineffective rudders. When the ridge was working we were launched across the kidney bowl by winch—the field was about 400 yards across at this point. On the signal "take up slack" the wire became tight stretched across the dip. At "all out" the glider ran two or three yards before becoming airborne. An excellent launch was 500 ft., 400 ft. was thought good, but 350 ft. was pretty uncomfortable. With a 1,000 ft. cliff in front of you, cable breaks were decidedly dodgy. There were two landing-out fields in the valley below, but nobody had to use them during our week.

Once out over the cliff, we experienced the never-to-be-forgotten joy of ridge-soaring. One of the family even experienced wave soaring—sideslipping with spoilers fully open and his vario still showing 10 up! Landing was a rather different business from the practice at North Weald. The knack was to touch

down on or after the bottom point so that your ground run was uphill—otherwise there seemed a decided risk of picking up enough speed to take off again. Flying finished at about 5.30 p.m. They were an argumentative lot on our course—nothing was taken for granted—everything discussed through and through. Some evenings we had lectures or films—other nights the discussion flowed as freely as the beer. At around 11 p.m. the one with the longest flight of the day was dispatched on the tortuous path to the village to secure fish and chips for the party. Unfortunately, the last day and a half of the week were deemed unflyable by the resident instructor and, although they were filled with lectures, we left Derbyshire with a slightly thwarted feeling. However, we were inspired with a strong determination to return one day to fly solo on their beautiful ridge.

Down to Kent

Next to Challock in Kent, which was very much in contrast. Here the accent was on flying—we each had at least 21 flights, and to achieve this meant flying until 9 p.m. on many occasions. The airfield seemed large compared with Camp-hill—again a hill site—but with a hump in the middle. The disadvantage of the hump was that you could not see the winch and had to signal to it with a morse key which flashed a lamp in the winch cabin. When this went wrong a middleman was dispatched to the tower top to relay bat signals. This was marvellous in the mid-July heat wave we experienced, but pretty horrible in the winter, I should imagine. We flew T-21's with open cockpits—a real joy in the gorgeous weather. The countryside was really beautiful and we did mostly thermal soaring because there was no wind to make the ridge work.

Retrieving cables here was something of an experience—having delivered two cables to the launch point you were supposed to drive hell-for-leather back to the winch before the next launch. The trouble was that you couldn't see the glider until it was well up because of the hump, and full throttle on a tractor downhill over very bumpy ground with the cable descending fast from the sky

in your general direction is a bit horrifying. The head of the family went solo at Challock in a T-21—the usual P.1. position being occupied by a bag of cement called Fred whom he found to be a most congenial if silent partner. The clubhouse was run by a manager who prepared an evening meal at whatever time we stopped gliding. He was an inspired if unconventional cook (his soups were a particular job) and his un-failing good humour added much to the pleasure of our stay, as did the friendliness of the other club members. We didn't drink much there—we were usually too sleepy, and we didn't have time for a single lecture all week.

Back Home

We returned to our North Weald base on the very last day of our holiday—the airfield seemed enormous and fantastically flat. Everyone looked pale beside us after our fortnight of sun. We felt disgustingly healthy—we'd had a wonderful time and we'd learnt an awful lot and yet somehow in a way we were glad to get back to North Weald—to home.

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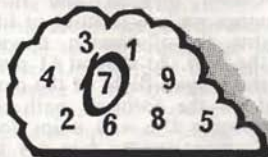
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TWO SHIVERING NUTS IN MAY

By STANLEY RACE and KEITH EMSLIE

REMEMBER the old nursery rhyme—"Here we go gathering nuts in May"? 15-knot north wind, with ten-minute showers every hour. Winch launch in our open T-21 straight into a thermal, steadily to 2,500 ft, but drifting south. Return to the airfield briskly, but down to 900 ft, then into a much better thermal and back to 2,000 ft. That was terrific—we're still over the airfield!

Pupil getting cold (sports jacket and shirt only); can we land now, please? Head into wind to fly out of thermal. Shower reaching ground about two miles upwind, will probably pass the airfield to the east, but we'll be down before it gets there, anyway. Or will we? Still heading north, climbing at . . . 10 up. Spoilers open, speed up to 50, 60, 65 knots. Rough Air Speed. Air not really rough, just mild cobblestones, but not wise to go any faster, and very draughty anyway. 3,000 ft. now, still 2 up. Check spoilers still fully open, and what a strong spring they have!

Cloudbase well clear, but for how long? Turn and slip on, erects mercifully. Precipitation starting . . . snow. Perhaps a good long spin is called for? But the pupil isn't keen to suggest it, and the instructor doesn't want to frighten the pupil, and you know how difficult it is to hold the T-21 in for more than half a turn, and it would mean flying into the heart of that shower and landing in it. Both pilots think of it separately, privately reject it and tuck it back up their sleeves.

4,000 now, still heading north, still climbing, not far from cloudbase, wisps of cloud around, too hazy to see any horizon, and now snowing really heavily. No sign of the airfield behind us, just a foul black storm. But ahead, the first lightning of the murk. Will we reach it before we go on instruments, the far edge of the squall line/minor cold front, or whatever the brute is?

Instructor flying now, both holding the spoilers out, but just try that stick force

again. What a large push to keep this speed up, relax for a second and it drops back to 60. A good demonstration of what the T stands for in CBSITCB. Wish we had one, also a second C and some decent B's.

Then at 4,500 we ran out into sunshine, the variometer relaxed back into the red, and we uncurl our fingers from the spoilers and slow down to a more gentle speed. Over the M6, beyond Longridge, and so about five miles upwind of the airfield.

It's a lovely day up here, "our" farm looks grand, though Fair Snape, Parlick and Longridge Fell look insignificant from this height. And the Ribble—when it emerges into the sunlight—looks as beautiful as ever. Did you all realise that the Ribble, running through the heart of Lancashire, is one of the most attractive river valleys in Britain? With bordering hills that defy comparison, too? Don't tell anyone, of course. Let them all gadarene up the M6 to the Lake District—the locals don't like traffic on their lanes. Why, a local Council even opposed planning permission for a gliding site solely because it might attract a few cars into their rural area!

Oh, good, there's Samlesbury again. It's a lot easier to make headway with the wind than against it today. And since it seems to have stopped snowing, shall we land? The pupil is far too cold to try any of the usual height-wasting exercises, so he merely reads the altimeter several times as it unwinds, and compares it with the changing appearance of the world around. But he must at least do the landing—he's paying for it. Now, would you believe it, that only took 36 minutes.

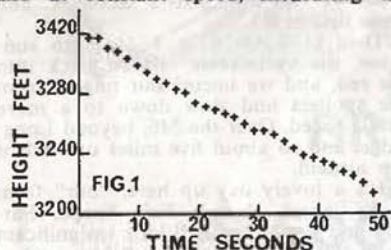
Lessons? Don't fly in an open cockpit improperly dressed. Don't underestimate the changeable air around us, and its power to lift you high against your will. And it is still possible for two staid Chartered Engineers to chalk up a High Adventure on a Sunday afternoon. Did you enjoy it? I did. Afterwards, mostly.

NEW RECORDING SYSTEM

Automatic Recording and Analysis for Glider Performance Testing

By GEORGE WHITFIELD

THE accepted method of measuring a glider's performance is to tow it to a great height and fly it down in a series of "partial glides", each straight and at constant speed, measuring the



Typical Height versus Time graph (traced from one plotted by the computer).

Note: 3420 in graph should be 3320.

rate of sink with clock and altimeter. Because of the random vertical motion of the air a great many partial glides are required, and the data handling is tedious. Also, because of the insensitivity of altimeters, partial glides are relatively long, and many flights are required to establish the polar.

The new method avoids these difficulties. The glider carries a recording system which records height and speed every 2 seconds on magnetic tape. Speech from the pilot's microphone is also recorded on the same tape. The recording system weighs about 20 lbs. with batteries, occupies less than 1 cubic foot, and is sensitive to a change of height of 3 ft. in the range 0 to 10,000 ft. The flying technique is the same as before, except that the partial glides can be shorter—as many as 25 can be made from a 9,000 ft. aerotow.

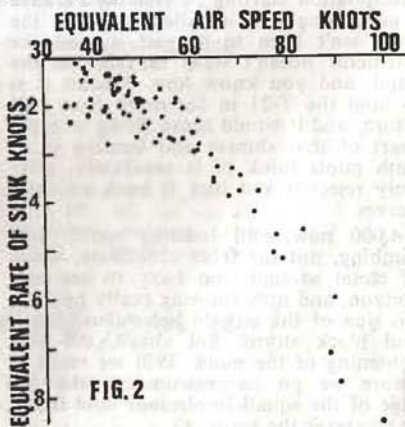
On the ground the tape is played back into a computer, which converts the recorded signals into heights and speeds. These can be plotted out directly (Fig. 1) but more usually the computer calculates the average speed and rate of sink for each run, including all calibrations and

corrections to reduce the values to sea level.

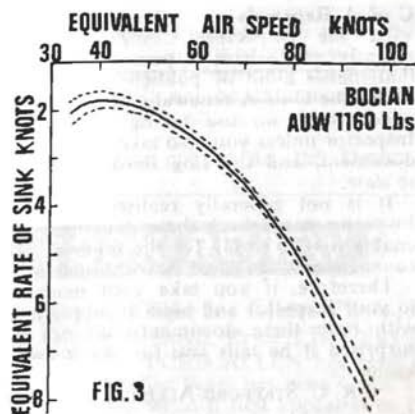
These are the raw points for the polar. They are usually very scattered (Fig. 2) because of the vertical motion of the air, and various statistical techniques are used to extract the best estimate of the polar from them. The method that seems best is to fit a polar of the theoretical form

$$V_s = AV^3 + B/V$$

to the points by the least squares method. This gives both an estimate of the polar and of the error of this estimate. At low speeds the polar bends over, leaving the theoretical curve, and this part has to be estimated by eye. It sometimes helps to use "five knot means"—the average of all points within each five knot range of airspeeds—because these show up any departure from the theoretical curve. Fig. 3 shows the polar of the Bocian estimated by these methods from the 77 points of Fig. 2. The dotted lines are displaced up and down by two standard deviations—this means there is only a 5% chance of the true polar lying outside them.



All the measured points from one set of tests (Bocian No. 196).



Best estimate of the polar of the Bocian derived from Fig. 2. Best gliding angle $1:24.8 \pm$ at 50 knots, Minimum sink 1.76 ± 0.09 knots at 40 knots.

This polar is based on 5 tows to 9,000 ft., plus one to 5,000 ft. to measure position error—a total of $5\frac{1}{2}$ hours flying, followed by about 5 hours computing.

The present state is that the system is operational (3 sets exist) and the computer programs have been written, but need a little tidying up. Three aircraft have been tested so far, and more will be tested during this year. I intend to submit a paper to OSTIV to be read at Alpine, near Marfa, this summer.

BGA NEWS

National Paper Dart Championships, 1970

This event will be held at Imperial College, 21st March, on the occasion of the BGA Annual Dinner and Dance and Imperial College Gliding Club's 40th Anniversary.

There shall be two Classes in the Championships: MEN'S Class and WOMEN'S Class. The winners of each Class shall be the person whose properly

entered darts travel in free flight for the longest time. The winners of the two Classes shall have a "fly-off" and the winner of this final contest shall be declared *The Outright British National Paper Dart Champion, 1970*.

RULES

1. Each entrant shall, before launching commences, pay to the Clerk of the Course an entry fee (minimum 5s. per dart entered); all monies received shall be put towards the World Championships Appeal Fund. No minimum qualifications to enter are required.
2. The number of entries per person is unlimited.
3. Permitted methods of launch are:
 - (a) Clean throw (for purists)
 - (b) Bungee (maximum length of elastic (unstretched, 1 foot)
 A dart may only be launched by one person who need not necessarily be the entrant. At the moment of launching the launcher need not be in contact with the floor (breath tests will not be applied). At the discretion of the Stewards a grid start may be used.
4. Darts may only be made of paper or thin card. They may be inspected by the Stewards who, depending on how stewed they are, may disqualify any dart found to contain any foreign substance.
5. Size of dart is unlimited. Handicapping will be applied by any competitor able to work out the latest formula from the Handicapping Committee:

$$\frac{\sqrt{4(H_2O)}}{\text{Strachan's Hat Size}} \times \frac{1001 - X}{X - 1001}$$

6. All results will be accepted for rating purposes. The basis of the rating system will be changed when the Chairman of the Flying Committee sees how well he has done.
7. The starting point shall be the point at which the dart crosses the starting line. There is no restriction on the height afl, of the starting point.
8. The flight time shall be measured from the time the dart crosses the starting line to the time when the dart first makes contact with any object (animate, inanimate and all persons in between).
9. The Clerk of the Course is allowed

- to alter any of these rules at any time.
10. Prizes may be awarded by the Clerk of the Course on any criteria she chooses (bribery is permitted, all bribes to the World Champs Fund).

Clerk of the Course
INGE DEEN

World Championship Appeal Fund

Donations from the following are gratefully acknowledged. (Period—23rd October-19th December).

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Vennard, D. A.

Vine, Lt. Cdr. L. D.

Walker, B.

Wall, D. H.

Ward, R. M.

Wray, A. J.

Total so far received £588 1s. 8d.

C of A Renewals

At the Inspectors Conference held recently at Lasham a point was raised that merits a bit of publicity. It is this. When the C of A renewal is due on your glider, it is no use taking it to your Inspector unless you also take the C of A document, and the Log Book *made up to date*.

It is not generally realised that the Inspector needs both these documents to enable him to apply for the renewal. He *cannot* renew the C of A without them.

Therefore, if you take your machine to your Inspector and omit to supply him with both these documents, do not be surprised if he tells you to take it away again.

R. C. STAFFORD ALLEN, CTO, BGA

Competition Calendar

The dates and venues for competitions for the year are shown on Page 39. Entry forms for the Regionals will have to be obtained from the organizing clubs. The provisional closing date for entries is 31st March.

Comp Number 7 Up For Auction

A chance of a lifetime—you can be flying with contest number

7

on your glider next season. Single numbers are jealously guarded by their owners and the opportunity to obtain one of them has never yet occurred. Here is how you can get No. 7 for your glider (and just think how easy it will be to paint on!).

The BGA is going to auction this number (with BGA competition number fee paid up for twelve months) at the BGA Dinner and Dance to be held at Imperial College, London S.W.7 on Saturday, 21st March, 1970. However, even if you can't come to the party don't worry—you can still make a bid.

What's it all in aid of? This year's good gliding cause: The World Champs Appeal Fund to get a full British Team out to Marfa.

This is how the auction will be run—If you are *not* coming to the BGA Dinner and Dance write to Mrs Inge Deen at the BGA before 18th March with a cheque/postal order for the amount you wish to bid. The money you send is non-returnable (whether or not your bid succeeds) and will help to swell the World

Champs Appeal Fund. If your bid is the highest made, you will be flying with No. 7 up next season! Naturally the highest postal bid will not be announced until after the 'live' auction on 21st March has closed.

If you are coming to the Dinner,

details of the auction will be announced on the night. The highest bid made by each person bidding will commit them to pay that sum towards the Appeal Fund.

Don't forget—send in your bid before 18th March or come to the party.

BOOK REVIEW

Theory of Flight for Glider Pilots. By RAY C. STAFFORD ALLEN. Published by Oliver & Boyd. Price 25s. (plus 2s. postage). Obtainable from the BGA.

RAY STAFFORD ALLEN has been on the gliding scene for a long time and for the past five years has been Chief Technical Officer for the B.G.A.

This book, when it first appeared in 1962, fulfilled a need for a simple account of the subject on the basis of non-powered flight. It still fulfils this rôle. It is simple and concise, equally suitable for the student or the instructor.

The first four chapters deal with the physics of air, simple aerodynamics and the laws of motion. There are chapters on control and stability, stalling and spinning. The chapter on types of gliders looks briefly at the design criteria for the high-performance glider. Instruments are dealt with at some length and the final two chapters cover pitfalls and some abnormal conditions of flight dealing with critical weather situations, turbulence, wind gradients, etc. and launching and aerobatics respectively. Finally, there are questions to test your knowledge on each chapter. If you don't know the answers a reference back to the text is given so that you can read it again.

This book will make excellent reading for all pilots, from *ab-initio* to up-and-coming instructors.

W.G.S.

Jane's All the World's Aircraft — 1969-70. Edited by J. W. R. TAYLOR. Published by Sampson Low, Marston & Co. Price £10. 10s. 0d.

THE 1969-70 edition of Jane's, printed in its Golden Jubilee year, again covers an increasing number of gliders and motor gliders in its sailplane section. Basic data relating to new types continue to improve and the serious researcher into the gliding scene will find most of the information needed to build up a global picture. Sailplane construction technology continues to expand and a comprehensive reference book of this nature becomes vital.

Types mentioned for the first time include the Braunschweig Akaflieg SB-9; the Standard Cirrus and Nimbus designed by Holighaus; the Schleicher ASW-12, FW Fokker FK-3 and the Lemke-Schneider LS-1, all from Germany. Italy: the 7 types of the Calif. series. Poland: the Kobra 15. South Africa: BJ-4. Switzerland: AN 66-2 (but not, unfortunately, the AN-17 or the 23 m. AN-66c). U.S.A.: HP-15, Schweizer 1-34 and the Kasper Bekas N. Additional information relating to the 1-34 and British Sigma is given.

New motor gliders mentioned include the German Rhein Flugzeugbau Sirius, Schleicher ASK-14, Darmstadt D-37, the twin-engined Espe-37T by Gotthold Espenlaub and Gleiter Max by Gerhard Blessing.

Although the price remains 10 gns., the new *Jane's* has added valuable new categories which increase the size by a further 250 pages. These include Aircraft Ground Equipment Manufacturers, Navigation and Control Systems, Airports, Airlines and a list of the principal aviation books published in 1968-69.

Perhaps in future editions the Publishers might be persuaded to give data relating to motor gliders in a subsection of the main sailplane category.

A. I.

NOW AVAILABLE

THEORY OF FLIGHT FOR GLIDER PILOTS

R. C. STAFFORD ALLEN

(Chief Technical Officer of the B.G.A.)

2nd ed. **25s**

This revised edition of Stafford Allen's book should arouse great interest among pupil glider pilots and all members of gliding clubs. It is the most up-to-date text on the theory of flight as it affects non-powered gliders and sailplanes. Every member of the British Gliding Association should have a personal copy. Order from the B.G.A. or from your usual bookseller.

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OPEN CLASS CREWS

Dear Sir,

It looks as though us long-suffering Open Class crews will once again have to put up with our annual non-event, non-weather and non-competition. In previous years the weather has been to blame. This year the organisers seem to be determined to keep up the tradition by sending us North at a time of year when, at best, we might get a touch of Indian Summer — you know the sort of thing — short hazy days — not much good for gliding or sunbathing. Would we have time for the latter anyway? Rumour has it that it is a full-time job keeping a white glider white in this part of the country!

Oh well, we suppose it serves us silly women right. We ought to know better by now than to try and show an intelligent interest in what our menfolk do. Instead we ought to book ourselves a week in the South of France, the cost would be much the same and we would be sure that our annual holiday wouldn't be blighted by bad weather and industrial smog.

Where will it all end — après ski in the Highlands in 1971?

Newbury, Berks.

AUDREY, ANN & JANE

MOTOR GLIDERS

Dear Sir,

Poor Chris Riddell, he's been reading Hansard again. "... careful assessment and balanced judgment of all its implications." Cor, pass the H.P. Sauce, brother. The people who will make this careful assessment are the customers. If they work, they will buy them. If they buy them they will fly them inside the BGA or not. If they are forced out of the BGA they will operate at ordinary airfields, and who will be the losers? The BGA, of course.

Nothing ever remains static. It either expands or dies. Motor gliders could bring a healthy expansion to the BGA. Without them, who is to say that in ten, maybe twenty years the fifty-metre carbon-fibre lead sleds will not be the Dinosaurs of aviation. I, for one, hope not. I would hate to see a sort of America's Cup of gliding where the three remaining people who can afford them unwrap their extravaganzas once a year to have an esoteric private comp. No, before throwing more rocks let's just wait and see what happens. We have a Flying Committee to look after competitions and badges. Leave it to them.

On the subject of sites, the problem is one of suitability. Flattish land of sufficient size is getting harder to come by. We ought to make more use of what we have. We shall be forced to in the end.

Finally, flying or gliding. I'm surprised to see this one again. When I leave the ground in a heavier-than-air machine, I'm flying. I don't know what Chris does. To hint at Mr. Warren's reasons for wanting to fly gliders neither does Chris justice, nor Mr. Warren.

Datchet, Bucks.

ROGER A. NEAVES

A PLEA FOR CLASSES

Dear Sir,

I should like to support the principle of classes for gliding competitions. While handicapping is quite acceptable for regional competitions it does not and cannot work at National and International level.

Designers are now trying to increase performance by producing aircraft with larger and larger wing spans. I believe if private owners start buying these giant

machines the effect on the gliding movement will not be beneficial; remember that more span = more weight, larger trailers, larger hangars, bigger (in both senses) ground crews and more expense.

Discussion has already taken place concerning the establishment of another class, I think the time has now come for action.

There is going to be an increasing performance gap between the Standard Class and the new Open Class gliders, and I therefore suggest an intermediate class with restriction based entirely on wing span: up to 18m without flaps, 17m with camber changing flaps, 16m with area changing flaps. There are already a large number of gliders flying which would meet these qualifications, so please BGA act now, encourage a National class of this sort in 1971 and press CIVV for its introduction at International level. If three classes are too much for one International then one class could be omitted every third championship or the Standard Class could be held every championships with the other two classes being omitted alternatively.

Hitchin, Herts.

SIMON J. REDMAN

P.S. Please could the Flying Committee use a rating system which ranks pilots approximately in order of merit as measured by performance in previous years' competitions. A glance at the list just published should convince most people that this is just not happening with the present system.

CAT'S CRADLE

Dear Sir,

I am a little disturbed at the rather one-sided promotion of the Cat's Cradle task in recent articles and feel that some of the snags need an airing.

The bulk of pilots on a set course tend to be less than an hour apart but on a 'fat' cradle can be 40-50 miles apart with a much higher chance of differing conditions.

Having the pilot decide which point to aim for entails too high a proportion of guesswork/luck to skill, especially on the sort of days cradles are supposed to be good for.

A large element of weather assessment by pilots is not desirable at Nationals level. Making the best of the day is an important pilot skill both for club and record flying, but is too intangible an art to be given prominence in a serious competition. The main emphasis should be on a pilot's ability to use a narrow band of laid down weather as the skill/luck ratio is then higher.

For similar reasons, designated starts, assuming quick launching and a skilled snifter, are fairer when averaged out over a week, than pilot selected start.

If we must have cradles because of scattered storms, let them be long and narrow ones with plenty of points, and become similar to Out-and-Return with alternative points.

'Fat' cradles, as normally set, are nearly as bad as the now dishonoured pilot-selected goal. They are unconsciously set by tasksetters because they solve the problems of tasksetters!

You could set various points round base, weeks before a competition, operate pilot selected start and do without the tasksetter altogether, but the results would contain too high an element of chance.

I concede that the definition of the 'best' pilot is a debatable one, but feel that the only fair task is speed. If it occasionally degenerates into distance, very little harm is done. The difficulties of setting speed tasks for exotics just have to be faced up to and not avoided.

Is it heresy to suggest that in the Nationals there should be less worry about getting as much flying as possible and more emphasis on 'fair competition'? If there is serious doubt about the weather, I for one would rather sit on the ground than take the risk of a large element of chance in the results. A deaf ear can always be turned to the giggles of Tutor pilots as they pass over on Silver distance!

Ripon, Yorks.

J. BARRIE GOLDSBROUGH

SPOLERONS

Dear Sir,

It is gratifying to note that one more person (A. P. Goodwin in *SAILPLANE & GLIDING* October-November, 1969) has taken up my suggestion and has called for manufacturers to give consideration to the fitting of differentially-operated spoilers—which I have dubbed spoilerons—to gliders.

Strangely enough, in America it has already been done, as anybody who takes the American magazine *Soaring* (May, 1969) would know by now. It has been done out of necessity by a private venture development of a flying-wing glider.

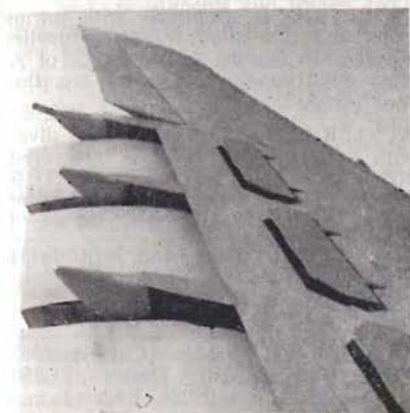
A means of counteracting aileron drag had to be devised, since there was no ruddering moment to counter-balance it.

Their flight reports show that the spoilerons did their job magnificently, and confirm that some small aileron effort would be helpful for continuous turns. The ailerons would need to be only one-tenth of their normal size, and could be fitted inboard near the flaps.

Without spoilerons there would have been little directional stability, and the flying wing would have skidded in and out of turns continuously or slithered from side to side while correcting level.

It is a great pity that the photograph which went with my article was not published; it showed the device working on a VC 10 jetliner very clearly. Perhaps *SAILPLANE & GLIDING* will even yet print it.

Alverstone, Hants. HUMPHRY DIMOCK



... And here it is!

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CLUB NEWS



WITH most clubs reporting their Annual Dinners and presentations of awards for flying in 1969, we look forward to the coming soaring season. Reports for the April-May issue should reach me by 11th February and for the June-July issue by 15th April, typed double spaced on foolscap. Please send news to me at 11 Great Spilmans, Dulwich, London, S.E.22. Tel. 01-693-3033.

3rd December, 1969

YVONNE BONHAM (MRS.),
Club News Editor

BLACKPOOL AND FYLDE

WE were delighted to hear that Lancashire County Council have granted us Outline Planning Permission for our proposed soaring site. The only serious stipulation is that we must not operate powered aircraft but this will only curtail our fun on flat calm days. Our main joy will be to step up into thermal and wave using hill lift in nearly every wind direction, from NW through S to ENE.

A new snag arose from the fact that part of the hill top is an active grouse moor, and the owner fears that his grouse will mistake us for buzzards and be scared off their nests. He has asked us to keep clear of them until we can make trials using radio contact with his gamekeepers. It is ironic that buzzards are protected birds, but we are in danger of being mistaken for grouse. However this only affects a spur of the south face, and still leaves us one piece of south facing hill.

We still await news of the remaining vital ingredient, a grant. This has now survived the early stages of scrutiny without being turned down, so we are permitting ourselves to show a little cautious optimism, and gearing up our efforts so that we would be capable of matching a grant if it was offered.

We have to limit the number of pupils while we still have only one dual trainer, but we can accept solo pilots without a spell on the waiting list. We welcome two more instructors to our ranks, Jane Murdoch and Derek Sandford, with grateful thanks to the Leicester and Burton & Derby clubs who trained them while they were living in their areas.

K.E.

COTSWOLD

WINTER circuit training continues to flourish, with really keen 'ab-initios' arriving on the airfield while it is still dusk—such enthusiasm!

The hangar doors have at last been completed, and a great engineering feat they are too. Club aircraft are being refurbished, so we will be meeting the soaring season in tip-top order.

Plans for increasing the club fleet revolve around acquiring another Ka-7, difficult to come by for love or money. Anyone knowing of one for sale is asked to contact the Secretary—if successful, we promise you a ride!

This year will see the inter-club task week with the Worcester Club, which promises to be every bit as enjoyable as before, and, we hope, the best summer yet!

G.H.

COVENTRY

A 'TRAMPS' supper was held on 29th November. Gus Cunningham in sackings as the Original Ancient Briton indubitably took the costume honours but as this is his only suit his next problem was what to wear for the Annual Dinner!

Our CFI Keith Nurcombe is departing these skies in the New Year for South Africa and we shall be hard pressed to find a replacement who will show the same amount of boundless energy and that rare capacity for enthusing others. Good fortune Keith, and thanks for everything.

Experiments were conducted in November with a Super Rallye as a new glider tug. Unfortunately our rough ground lopped a piece out of each prop tip the first week and reluctantly we decided it just wasn't on.

Shedding a few tears forlornly in our hangar is a frustrated primrose and orange Swallow anxiously looking for a new home in time for the soaring season. Any kind-hearted treasurers around?

F.W.F.

DERBYSHIRE AND LANCs

'CLAMPHILL' was our scene again in the autumn and we spent weekend after weekend without opening the hangar doors, but eventually the sun broke through and we were once more chasing clouds.

We welcomed our new resident stewards, Tom and Ida Bacon, at the end of November. They soon organised things and before long our kitchen was as bright as a new pin. One of their first requests was for a gas poker we were supposed to have. Soon sixteen able-bodied men went off in search. By the time the search was called off, three had been found. There must be a moral in that somewhere. The meals are greatly appreciated, they look good, they taste good, and by jove they do you good. How do they do it at the price? We hope to see them around for a long time to come.

1969 did not produce as many launches as usual but our soaring times were well up and there have been some way flights recently. We look forward to the

seventies and hope they will be kind to us.

Our second Rhönlerche gave us a bit of trouble by producing a most evil smell. This was soon traced to the wings which appeared to be going mouldy. It has now been sorted out and we are keeping our fingers crossed.

We are glad to see Derek Fellows out and about after breaking his hip following an argument with the road whilst riding solo on his motor-bike. Go solo on gliders lad! Much safer. P.H.

DEVON AND SOMERSET

AWARDS made at the AGM included the Francis Bustard Cup for the best recorded height—Tim Gardener (2nd year running) 9,000 ft.; the Kelsey Plate for best distance—Owen Corsbie, 306 km.; the John Kennedy Trophy for the best task week performance—Roland Trott, flight to Compton Abbas and the President's Shield for the best progress during the year—Nick Jones.

Our club year ended on 30th September and the accounts show a decrease in net surplus compared with the previous year. A study of club notes in the last issue of *S & G* discloses a number of money raising ideas ranging from bingo to the sale of waste paper and we may similarly have to augment our regular income. It is hoped, however, that when our initial heavy capital programme has been completed, the social activities centred in the new clubhouse will not only be self-supporting but profitable.

A very enjoyable dinner in Honiton was organised (and paid for) by the President for some of the senior members of the club and the annual dinner-

GLIDING HOLIDAYS

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dance will again be held at the Victoria Hotel, Sidmouth. Until the new clubhouse becomes fully functional, the regular social bean feasts continue to be held at the Carlton Hotel, Honiton.

A.E.R.H.

DONCASTER AND DISTRICT

IN spite of our long absence from these pages the club has probably been more active operationally than at any time in its history and has seen several major changes.

The most obvious of these is that we now share our airfield with the South Yorkshire Flying Club. This of course has meant certain restrictions, in particular to circuit directions, and has cut down our thermal seeking activities over Doncaster itself. By and large though the arrangement works quite well in spite of occasional friction with the fan drivers.

The second major change has been the appointment of a professional in the form of Bob McLean. This means that we can now offer the possibility of flying all week, weather permitting, and this is increasingly being called upon by those in the know. Bob fills in his spare time putting his inspector's ticket to good use in the workshop.

The last change has been the realisation that wave flying is possible at Doncaster. Whilst no Gold heights have been obtained yet considerable exploration of the system has been carried out by some members and it is gratifying to know that contact has been made from winch launches.

Otherwise flying has continued in a normal manner and we can look back on one of the best summers for some time with quite a crop of certificates and the usual stories of "I would have done it if only . . ." We have also had many new "ab-initios" in recent weeks so the two-seaters are being kept busy.

Socially we are also booming with various parties and talks being arranged for the winter months. The first of these was by Sqd. Ldr. 'Olly' Crooks of nearby RAF Finningley on 1st November with a talk on the Transatlantic Air Race. This was held in the clubhouse, newly decorated and looking as bright as a new pin, thanks mainly to the efforts of Joan Thompson and John and Betty Ashmore.

M.S.N.

DUMFRIES AND DISTRICT

SEVERAL months have elapsed since last we sent in a report the reason being primarily because of lack of action or progress with regard to improvement in both the number and duration of flights.

Only one Silver C has been completed from Heathhall in six years, and as the aerodrome has been and is being encroached upon by a Gas Works, a Housing Estate, a Technical School and a Forestry Commission Plant, all adjacent to the fenced runways, it was considered that we would shortly get the push.

When Lt. Col. Naomi Christy came up in August, she was interested in the hill site on which some of the lads were

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going to spend a week's holiday to determine its keep-up-ability, and she considered that it had good prospects in a west wind. Unfortunately, west winds were not forthcoming that week; east winds, mist—Scottish type, and a bull—Hereford type, who almost demolished a tubular steel gate which had recently been erected, but which evidently restricted his amorous adventures.

We have flown from the hill since August, and while several extended flights were flown, the days when west winds arose our winch chose to give trouble, but on the 26th October, in a 7-8 knot breeze, four Bronze C legs were obtained with gains of height of 1,400 ft., only shortage of gliders keeping the flying time down to 44 hours.

This hill, part of Criffel range, is two miles long, facing west, with possible north and south faces which may also work, are yet to be explored properly. We left the hill for the winter at the end of November, but by the time you are reading this, we are hoping to have received a lease from Mr. R. Campbell, who, while putting himself out to drag our tractor and winch out of holes, that yours truly repeatedly gets into, will not submit to being strapped into a cockpit.

The annual Arts Ball was, I think, enjoyed by the members of the club who attended, but the hard work of design and construction fell almost entirely on the shoulders of J. Reid, R. Robinson and I. Steel, and they deserve a big "Thank You".

Visitors are always welcome of course, but particularly so when we move back to the hill. D.J.

ESSEX AND SUFFOLK

THE club continues to flourish despite the lack of news from us in these last few months. Thanks to the generosity of a local farmer we are still operating from the same short strip near Hadleigh. One of the side advantages is that everyone is encouraged to try for spot landings right from the *ab-initio* stage—whether they realise it or not!

Last spring flying got off to a late start as completion of the three year C of A on the Tiger Moth—which was carried out by members themselves in the interests of club finances—took longer than anticipated.

Hours flown during the year showed only a small fall despite the late start. This was helped by the quality and length of a decent English summer. 50% of club members now have Silver or Bronze C (new Bronze Cs completed by John Burke, Michael Lee and Brian Scott) and a notable achievement was Andrew Bullock's solo shortly after his sixteenth birthday. John Thurlow has added his Assistant Power Instructor's rating to his tugging and instructing abilities. In August he declared an out-and-return in the Ka-6 to Banbury, getting as far as Old Warden on the return.

To ease the increased strain on the Ka-7 by its use for solo flying as well as *ab-initio* and more advanced training, it is hoped to get another solo sailplane to join the Ka-6 this season.

The winter's overhaul work is turning out to be somewhat less than usual following last year's efforts on the Tiger Moth and the superb re-spraying of the gliders by Ralph Brooker. Doubtless all work will stop for our next event—the annual dinner on 20th February.

M. L.

LAKES

OUR Secretary, Peter Gillett, has temporarily left the area and has handed over the job to Roger Bull. We are most grateful to Peter and his wife, Jill, for all the hard work they have put in over the last few years, and we look forward to their return next summer.

With the onset of the colder weather we are re-discovering the potential of our site at Barrow-in-Furness for wave soaring. The club has two good high performance sailplanes, a Skylark 3F and a Slingsby T-53B (Phoenix); with these we can now explore further afield. We are learning a lot more about wave and are rapidly coming to the conclusion that it occurs much more frequently than we originally suspected. In particular when the wind is between north and east we experience quite a lot of "blue" wave. Nobody has yet beaten our Chairman's record of 15,000 ft., but several flights have been made reaching heights between 6,000 ft. and 10,000 ft. On November 29th, 1969, we bagged our first 5 hour Silver C legs in wave—two on the same day! One pilot reached 9,000 ft. Whilst

on this flight we heard Portmoak pilots on the radio calling back that they were at 11,000 ft., so we have a bit to go yet. Also, our congratulations to Ian Ronald and Ron Hawkes on getting their Full Instructor Rating.

The social activity of the club has continued successfully with several well attended parties in our re-decorated clubhouse. The annual dinner and dance and presentation of trophies was held on December 5th, 1969, and was much enjoyed by all present. We were very lucky to have as our guest speaker George Burton, Managing Director of Slingsby Sailplanes Limited. It has been whispered he is also quite good at flying gliders.

R.C.B.

NORTHUMBRIA

AT the AGM Bob Cawthorn and Roy Bousfield retired from the committee. Both will I'm sure be greatly missed as they have been involved in much of the background string-pulling essential to the success of a gliding club which passes unnoticed by many club members. The vacancies are filled by Alan Brown and

Dave Osborne.

The Towneley Arms, Rowlands Gill, was filled to capacity for the annual dinner-dance at the end of November. Dave Osborne, the pilot at the top of the Club Ladder Competition was presented with the Northumbria Cup. The Cawthorn Cup, for services to the club, was awarded to Sarah Robson. Sarah has almost single-handedly managed the canteen caravan and in the past year, regardless of weather, hasn't missed a single Sunday.

Flying of late has been hampered by either equinoctial gales or low cloud. This is the usual prelude to the winter wave season when snow is underfoot and lenticulars overhead. The usual topic of conversation was how good the wave looked midweek; this has now been altered to discussions on how many times we cannot contact wave from a winch launch because we're out of phase with the system, or not launched high enough. Our aerotow strip should be ready in the spring and if all goes well with grant applications we should have a tug for the next wave season then perhaps our questions will be answered. J.R.G.

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OUSE

OUR biggest social event of the year, the annual dinner-dance, was a huge success; a great prestige occasion, with wonderful comradeship, and lots of fun. Major-General Tony Deane-Drummond was guest of honour and, unwittingly, he repeated the words used last year by Ann Welch . . . "What a delightfully, happy, friendly club you are." This pleased us enormously for we are just as proud of our friendly team spirit as we are of our flying successes. Tony not only spoke at the dinner, but stayed till the end of the dancing. To see him dancing the hokey-cokey with real military vigour was stimulating.

Air Vice Marshal Harry Burton, Commander of 23 Group RAF, emphasised that an ever-increasing danger or air collision should make amateur pilots more careful than ever before. RAF planes, he said, are travelling at high speeds and have little time to avoid other pilots. He added that he was not suggesting that the RAF had priority use of free air space—he was just pointing out the danger. "But there is no real problem in this area," he said.

The Ladder Competition Trophy was presented to John Mawson; Leslie Powell received the Coulsey Shield for devoted, dedicated all-round work; and Kevin Atkinson was awarded, for the second year running, the Forster Memorial trophy for the most promising youngster. As the CFI, James Wilfred Coulsey said, "His enthusiasm and determination, and his ability to tackle almost any job in the club, makes him outstanding."

We had a busy Christmas and New Year social programme; we enjoyed our new pulley-launching (and the latest addition to our glider fleet), a vast amount of work was done in the hangar and clubhouse, and we are looking forward to a bumper soaring season—and lots more fun! A.H.S.

OXFORD

AT the close of the soaring season the record of launches stands at 2,352 by winch and 195 by aerotow for 743 hours flying on 69 days compared with 2,980 by winch and 86 by aerotow for 827 hours on 77 days of the same period

last year. These figures indicate that people are becoming better at staying up despite the mediocre weekend weather and the unfortunate withdrawal of our tug operating licence by the Ministry of Defence (Air.)

Hearty congratulations are extended to Norman Woodward on the completion of his Silver C and initiation into our 'instructor band' following a recent course at Lasham.

The annual C of A inspections of all our aircraft are progressing under the watchful eye of 'Smokey'. The first machine on the stocks is the Skylark 2B which receives her first re-cover having been in the club since the beginning of 1958.

In 1951 when the club flew the comparatively empty skies above Kidlington, Professor George Varley, Ray Stafford Allen and others bought a maroon and silver Olympia which they flew consistently until the club added it to the fleet in May 1956. Thirteen years later we all rather regretted the sale of our much cherished Olympia to friends in Scotland and can assure them of many pleasant flights to come.

RAF Weston-on-the-Green can boast of many amusing tales during its long history. A recent 'happening' was the unintentional cross-country trip by one of the tethered balloons, normally used for parachute training. Late at night during an exceptional gust it broke loose to be contacted by radar passing over Luton at 4,000 ft. Finally it was reported low near Cambridge. The next morning it was found lying in a field 2 miles down wind of Weston!

The club takes pleasure in welcoming Flt. Lt. C. F. White, the new C.O. of Weston; and cordially invite him to fly with us on the better days of 1970.

C.J.T.

SCOTTISH AIR SCOUTS

SCOUTS Air Activities in Scotland began about a year ago equipped with a semi-vintage Auster and T-21B. The objects are to give air experience flying in powered aircraft and gliders to all eligible members of the Scout Association and gliding instruction to Venture Scouts. The latter aim has until now been sacrificed in favour of the former.

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Most flying is done (by aerotow) from Glenrothes in Fife, but the glider is looked after by the Scottish Gliding Union at Portmoak and the Auster at RAF Turnhouse. Both gliding and power flying has been greeted with enthusiasm although T-21 aerotows in the Scottish winter also require hardy instructors and large Scotch post-flight rations.

The biggest success to date has been a week of detached Camp at North Connel airfield in Argyllshire, well provided with good local hospitality and a working ridge on nearby Benlora, 1,007 ft., not to mention tantalising displays of wave cloud at all hours of day and night. The general potential can perhaps best be gauged by the fact that staff pilots obtained four Silver C legs (2 duration, 2 height) in their spare time.

Prospects and hopes for the future include taking the circus on tour around Scotland to bring gliding to the local consumers, and the acquisition of a new 2-seater to offset a lack of strong armed glider drivers.

R.D.C.

STAFFORDSHIRE

THE winter months have brought with them a revival of our social evenings which are generally held once a month at a suitable local Ale House. We hope this year to feature lectures by pundits from other clubs and organisations to supplement our own talented speakers who by now must be running rather short of new topics on which to speak. Ken Blake from Camp Hill has been our first guest speaker and his illustrated talk about wave soaring was much enjoyed.

The possible new site in the Leek area briefly referred to in the last issue now seems a less likely proposition. Before operations could commence there we should need permission from the Peak Park Planning Board as the site is within their area. An application has been submitted but unofficial sources indicate that a full scale public enquiry will probably be required—a process with which our friends at Camp Hill are well acquainted!

We had our first taste of wave soaring the other day—that is what those who flew in it said anyway! A variety of pilots claimed climbs to 2,000 ft. Just our luck to discover this on the eve of

our departure from Meir. I hope the good folk who are to be housed on a former gliding site will enjoy staring at lenticular clouds!

A.J.D.

SURREY AND HANTS

DESPITE the shorter days there has been some splendid soaring this autumn, occasional days in October and early November producing cloudbases of 4,000 ft. asl. or more. The high performance side of the fleet is now de-insured for the winter leaving the K-8s and a Skylark 3 for the circuit bashers although nowadays 'circuits' is the wrong word. On many occasions a 1,200 ft. launch in a K-8 results in a pleasant 10 minute fly round. It will stay up on almost anything, even a Dan Air Comet running up its engines into the silencer which conveniently blows the hot exhaust straight upwards! We appear to be becoming more like Heathrow every day with at least six Comets and sundry other airliners pottering about occasionally, some with engines at the back and even one with engines under the wings it is rumoured. All we need now is a mass engine test for Bronze Cs!

More high performance shippery is on its way to Lasham. Roy Cross has sold his Olympia 463 and is about to set off on a wintry journey to Schempp's to collect the very latest SHK to be built.

C.L.

SERVICE NEWS

ANGLIA

AS the first speil from the Anglia Gliding Club newly formed and based at RAF Wattisham, near Ipswich, it would seem natural to introduce some of the members. The CFI, Alan Withington, is ably supported by deputy CFI Mike Woods with Ken Stedman and Tony Milne completing the Instructional Staff. Also on hand to offer advice is John Seymour fresh from triumph at the Northern Comps, and at the moment fussing over his newly acquired Diamant. On the hardware side, the club has a Ka-6CR, a Grunau 3a and an old faithful T-21. Launching is achieved by

winch and Chipmunk. The club is the area club for the RAF Stations at Stradishall, Bawdsey, and Honington, and also attracts a sizeable following from the USAF at neighbouring Bentwaters.

B. M. M.

BICESTER

THE close of another soaring season brings with it the usual flood of accumulated statistics. This gives the opportunity to reflect on the achievements of both club and individuals; the former in comparison with the previous year, the latter in consideration of conditions at the time.

The number of days flown at the Centre during the past twelve months, 230, was 9 short of the previous year. This seems surprising until we remember how long the winter continued. When summer came it proved to have been worth waiting for. June was the most successful month when 2,233 launches produced 1,224 hours flying and 2,139 cross-country miles for club machines.

Every certificate obtained, A and B upwards, was the result of a flight which

was memorable for at least one pilot, but 300 km. Goal flights are worth a mention as being of interest to all. The first of these successful flights was made in April by Jim Wild. This completed his Gold C and was a just reward for "12 months hard tugging" at Bicester before leaving us to fly much hotter ships at Coltishall. The following day Don Hanson did a repeat performance, proving that Vice-Presidents have practical as well as administrative ability. In May, John Brownlow, "Our Man in Sweden" had the next success, and four weeks later "Doc" Saundby completed his Gold C. The flight which deserves an additional citation for tenacity was the one by Chris Gill which, on a difficult day, took over 8 hours.

Membership is now 340 and shows an increase of 90 on last year's figure. This is due in no small part to ex-members keeping in touch and encouraging others to use the centre courses to further their experience, which in turn benefits their club and the GSA in general. Strong support has come from our Army neighbours and the USAF at Upper Heyford. Amongst our American friends we wel-

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come back Bill Galt whose enthusiasm is undiminished after a year of active service in Vietnam.

At the time of going to press Andy Gough and Con Greaves are about to leave for the South African Nationals. We hope that, in addition to being successful, they gain valuable experience in the conditions they are likely to encounter in Texas next June. (See p. 84).

J. H. G.

EAST MIDLANDS

THE highlight of the last few months has been a combined expedition by the East Midlands Gliding Club and the Four Counties Gliding Club to Sutton Bank in October. The weather was excellent for virtually the whole time and as a result a total of just under 200 hours was flown by the two clubs. In particular our two members who went both gained their Gold C heights (Stella Harrison and Sid Green).

We have had a fair season, not as good as last year's but by no means as poor as many. Our plans for the winter include the completion of a two-drum winch, the respraying of the latest addition to the fleet, the Ka-4, and the reopening of the club bar.

Next season we should be able to provide aerotows on a regular basis and we hope that this will give us an improvement to our ease of soaring.

J. D.

FOUR COUNTIES

OUR A.G.M. was held on 29th November attended by our Club President, Air Marshal Sir John Baldwin, our Station Commander, Group Captain Tudor, Club Committee headed by the Chairman, Group Captain Williamson, and the majority of our club members.

The events of the past year were reviewed and the committee re-elected for a further year of office. The "Baldwin Trophy" for the best flight of the year was presented to Steve Hart and a bound Log book presented to Gerry Walker for the best progress during the previous year, from solo in March to gaining two Silver C legs in November, Air Marshal Baldwin kindly donated £25 towards the club radio fund. After the meeting a social evening was held in the club

lounge and proved to be a great success.

A recent expedition to Sutton Bank during the last two weeks of October proved highly successful. Ten club members participated and took with them the Bocian, K-8 and K-6cr. Approximately 65 hours were flown. Six 5-hour flights were made, two Silver heights gained and a Gold height climb was made by Ralph Dixon who had only soloed at the club site five weeks beforehand. One incident occurred where our CFI landed in a field and had to cough up £5 as a landing charge to secure his freedom.

At the club site, Spitalgate, flying continues as normal, our "Tea Bus" on overtime during the cold weather. A couple of recent solos include Jim Francey and Rick "Biggles" Alexander.

We hope to commence monthly club "Socials" early in the New Year, in our recently reorganised clubhouse, which features a now famous innovation known as "Arry's Door", and all visitors can expect a warm welcome at any time.

J. A.

WESTCOTT

THIS is the last newsletter from the RPE Westcott Gliding Club. Due to insufficient freedom in the running of the club it has been decided to close down. However, a new club is to be formed which will be run through the Civil Service Sports and Social Club, Bicester and the Civil Service Aviation Association (CISAVIA), operating from Enstone near Chipping Norton. We are also hoping to become affiliated to BGA. We would like to express our gratitude to the Enstone "Eagles" for allowing us to come and join them on their airfield and are looking forward to a long and happy association with them.

We have recently purchased a Ka-7 from R.A.F. Bicester, and this is now flying from Enstone. Arrangements are going ahead to take the Swallow and T-21b to our new airfield.

At long last the Reverse Tow Pulley is completed and, although it has not yet been tested, it certainly looks impressive.

We must congratulate Henry Eggleston on gaining his Bronze C at Westcott and Jimmy Hackling on his A and B certificate, gained whilst on a gliding holiday at Lasham.

Finally, we would like to thank all those members of the Westcott Gliding Club who worked so hard to keep the gliders flying. We are looking forward to seeing many old faces at Enstone (as well as some new ones) and hope that we can make a success of our new club.

E. A. C.

CRUSADERS

Dhekelia, Cyprus

OUR 1969 soaring season ended well with our Treasurer, Gordon Camp, and DCFI George Brindle making Gold C height climbs. George climbed to 12,000 ft. and then returned to the air-strip for Gordon to have a go. Gordon battled and then was thrown (he said) to nearly 16,000 ft. before setting course for the club site.

Thinking winter had arrived we started a thorough overhaul of all the club air and ground equipment. As soon as everything was stripped down we were treated to cloudless skies and daily temperatures in the mid-70s for most of November... However, all four aircraft sadly needed their overhaul after the long, dry and busy summer.

Club members thoroughly enjoyed an "end of year" dinner-dance recently at the Kyma, Limassol, thanks to Geoff Millward's organisation and to the Kyma staff and band.

Our departing Chairman, Colonel E. S.

Twiss, RE, welcomed the guests and then called upon the new Chairman of the Near East Joint Services Gliding Association, Group Captain G. J. South, DSO, DFC, RAF, to present the Club Trophies. The "Andy Marshall" trophy awarded to the member who put the most into the club in 1969 went to our recently appointed Deputy CFI George Brindle. The Club Soaring Trophy for the year's outstanding flight or progress was presented to Gary Moore for his progress from re-solo to full Silver C.

The CFI, George Ross, reported on a successful year and announced plans for courses and soaring weeks from mid-February 1970 onwards.

The RAF Akrotiri Sports Board has presented its coveted Sports Award to Tim Oulds, Bill Dickson, "Tony" Simms and Gerry Cooper for their services to gliding and the "Crusaders" from 1965 to 1969.

Our congratulations and thanks to all these worker-members and to all those not mentioned.

M. I. O.

PHOENIX

(RAF Brüggen)

ONE of the major snags to be found in operating a Services gliding club is the regular turn-over of members as a result of postings. Phoenix is suffering from this at the moment, in particular



Gliding is a family business at the Crusaders.

because of the re-equipment programme for RAF Germany which is causing an extra large turn-over of personnel. In the space of only a couple of months the club is losing its entire Committee, including CFI and Deputy CFI. However, all is not yet lost; the Rev. Graham McKenzie has agreed to become Chairman and there is no doubt that the club will go from strength to strength under his guidance. The new CFI is Roger Hodgson, and his "staff" of BGA full-cats comprise Donald Scarfe and Mike Ward.

Amongst the many members we are losing are Peter Lane, Chairman, Colin Elliott, CFI, and Malcolm Medland, DCFI. The results of their collective efforts during the past season will be of great benefit to the club during the coming year. Our sincere thanks and best wishes go to all three.

The club has had a highly successful season; it has very nearly reached its target of 5,000 launches, it has taken delivery of a new Ka-8B, and now awaits the arrival of a new twin-drum Tost winch. The club fleet now comprises T-21, Ka-7, two Swallows, Ka-8B, and Ka-6CR. Despite the excellent weather our cross-country mileage has been disappointing, but greater emphasis will be placed on this aspect in the coming season.

Our congratulations go to Geoff Matthews, who was awarded the new trophy for being adjudged the club member who put most into club operations during the past season. He is also one of the most rapidly improving of the inexperienced pilots. Many of the instructors fight shy of flying when Geoff is airborne because he generally outflies them in any thermals to be found — well done, Geoff.

Our final note is one of regret; one of our instructors is at present in hospital with a severe attack of "Martin Baker Back" incurred not in an ejection from a high-speed aircraft, but in a heavy landing in a Swallow. The injury is known as crushed vertebrae and is very painful. The Swallow was uninjured. Please, Slingsby's, whatever aircraft you build in the future, make them as strong as the Swallow.

R. M. W.

TWO RIVERS (RAF Laarbruch)

A surprisingly good start was had to our New Year when about fifteen people from Laarbruch visited the Wiehengebirge Ridge near Minden, West Germany, for the period 27th October until 7th November. During the stay we achieved six Silver C certificates for duration, two complete Bronze C and one C certificate. A further three Silver C durations and one Bronze C leg were made by members of the other Association clubs who joined us at Vennebeck. This is the third year that Two Rivers had organised an expedition to Vennebeck airfield, which is situated 3 km. from the ridge. For the ridge to work at its best the wind needs to be south-westerly, but throughout our stay the wind was never to swing that far round. Of the four days that the ridge worked the wind never came round more than west-south-west, but nevertheless as the achievements show the ridge still worked, somewhat bumpily as many of the five hour pilots found out, but they were never heard to complain after their flights, well not until they bought their rounds in the bar.

The culmination of our stay was the party which was held on Thursday and to which we invited ten of the airfield staff. To anybody who has been to Vennebeck they will no doubt remember the drink known as Finetti, which was to be our last drink at "Finetti Airfield" for another year. Our special thanks must go to the tug pilot Horst Rugge, who wasn't heard to complain once about the rough ride that we must have been giving him.

1970

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as most of us had never been aerotowed before.

Our AGM was held on 22nd November and was well attended, but I have not yet found out whether this was attributed to the fact that the instructors were paying for the party which was held afterwards in recognition of the fact that we had completed 7,000 launches for the year. For this to happen again no doubt we will have to better that number of launches. The Lister Memorial trophy

was this year won by Ray Bond; the Mercer Shield was not awarded and the CFIS Trophy, which consisted of two prizes was won by Mick Wood and Alan Bishop.

In the near future we are hoping to send at least one aircraft to Issoire on a club expedition for two or three weeks to get some experience in wave.

A. M. B.

OVERSEAS NEWS



We should be pleased to receive news for this section from every country in the world where soaring is done.—A. E. SLATER, *Overseas News Editor*.

DENMARK

SEVEN new gliders have been registered during the past year: one each of K-8, Foka-5, SH-1, SHK-1, Bergfalke 3, K-8B and L-Spatz 55.

A review of the past decade (the 1960's) shows that glider pilots have risen from 600 to 1,600, gliders from 70 to 185, and the K-8 has replaced the Grunau Baby. Launches per year have risen from 20,000 to 55,000, hours per year from 3,300 to 13,700, and cross-country kilometres per year from 12,000 to 79,000.

Flyv.

NEW ZEALAND

SOUTH ISLAND CHAMPIONSHIPS.—This event returned to Patearoa five years after the first championships were held there. In many ways the area is ideal: good landing areas are simply everywhere, and yet the ranges of rocky hills trigger off the most tremendous thermals. Many routes give tasks of up to 180 km.

without making retrieves excessively long. Unfortunately the weather cannot be so easily arranged and there were only four contest days out of the six planned; the Standard and Sporting Classes got only two contests each, so no champions could be declared.

Sunday, 26th October.—The official opening was held in a roaring gale, with pilots clustered in the shelter of the Otago Club's mobile clubhouse while lenticulars piled up overhead. Weather indicated more wave, wind speeds up to 70 knots at 20,000 feet from WNW, and a cold front expected about 2 p.m.

The task-setters had no option but to declare a no-contest day. This caused a scramble for wave flights, and Bruce Drake in the Skylark 4 set out for Wakari in North Canterbury, 215 miles away, reaching it some 3 hours later. Ken Lloyd of Otago Club took its Skylark 4 to 31,500 ft. but omitted the barograph which would have given him Diamond height. Maurie Wills in Southland's Ka-6 went to 25,600 ft. with barograph, and several other wave flights were made.

Monday, 27th October.—Snow showers but an improvement forecast, so an 88-km. Triangle was set, but this was later shortened to 68 km. and then called off when another snowstorm appeared 5 miles away.

Tuesday, 28th October.—A strong WSW airflow giving winds of 20-25 knots at 3-5,000 ft. Cumulus started with bases at 6-7,000 ft. rising to 9,000 ft. asl (airfield 1,300 ft.). Task: 129-km. Triangle.

After the pundits had waited for cumulus to show, the first launches got away, and all had left by 12.45. After one or two re-launches, the first three to complete came home, making it a contest day: Ivan Evans with a 10-mile final glide, John Goddard and Dick Georgeson. But the pundits weren't finished; they re-launched and John Goddard, after starting in a 9,000-ft. thermal, reached 10,000 ft. in wave along the second leg (St. Bathans-Chatto Creek Hotel) and shot home in fast time. His speed of 55.2 km/h. was well in advance of Ivan Evans, 46.8, and Dick Georgeson, 45 km/h. Ivan told of bucking a 50-60 knot wind on the second leg, and indeed the wind on this leg seemed to run along the valley rather than across it.

The whole field scored in the Open Class. Standard Class winner was Maurice Wills (Ka-6) with 82.5 km. The number past 2X was insufficient for a 1,000-point day, and it was devalued to 800 pts. in the Open and 240 in the Standard Class.

Wednesday, 29th October. — Strong WSW airflow, more stable, some wave possible later. Task: 101-km. Triangle with turn points in the historic gold-mining area: Pennyweight Hill and Kye-burn Diggings. Owing to a stronger wind than forecast, a race was changed to distance along the course. Only two passed 2X to make it a contest day: Ivan Evans in SHK, who won by completing the course and then going another 14 miles along it again; and Eoin Coutts in Dart 17R, who still thought it was a race and wiped off 7,000 ft. in 12 miles to land at base—his face was a picture of pure misery when he realised his mistake.

Thursday, 30th October.—This was to be the day. Wind light and variable; very hot on the ground. Task: 146-km. Triangle via Blackstone Hill and Clyde.

Thermals started quite early; launching to 2,000 ft. was quick and mostly into a thermal. Dick Georgeson had to be called back through not having been observed over the start line; this turned out to be probably the best thing that could have happened to him, as he shot off and around the triangle in what turned out to be the fastest time, 2h. 47 min. 25 sec. Thermal strengths of 8 or 10 knots were not unknown this day. John Goddard was next home, then Ivan the Terrible, then Tom Grant in the old Skylark 4. Dudley Waters had only VHF, so no one knew where he was till the Diamant's distinctive T-tail identified him 5th across the finish line. Dudley agrees that he is only now learning to fly Diamant. There's no doubt that it can go really well when pushed. The pundits set off again for the usual high-speed dash around the course, but they all landed out, so Dick Georgeson won the day. He is still getting used to the Cirrus and finds it delightful to fly, but he doesn't feel it can scrape out of a hole as well as the SHK.

Speeds in km/h.—Georgeson (Cirrus), 52.6; Evans (SHK), 51.75; Goddard (Dart 17R), 46.7; Waters (Diamant), 38.75; Grant (Skylark 4), 30.5. All ten entries scored.

Friday, 31st October.—Strong SW wind. As on the second day, a 106-km. Triangle race was set round the same course and then, as nobody could get away across the start line, it was changed to distance round the course. A 2,000 ft. launch 3 miles to the W gave some chance to get away downwind to where thermals were: M. Wills was first at the turning point, but Evans and Coutts had landed short of X and returned for re-launch and Evans got away. Jock McDonald landed short of 2X. Then Peter Cummins passed 2X. At 5.50 Evans got back and drifted away but soon landed. Dick Georgeson was seen to land 9 miles out but it only became known later that he had been right round the course first.

The day was devalued to 800 pts. for the Open Class, but it was No Contest for the Standard. Evans won with 121 km. and Georgeson made 119 km.

That night, at a sumptuous banquet provided free by Mrs. Conley of the Patearoa Hotel, Ross Macintyre, chairman of the organizing committee, presented the trophies.

Open Class winner: Ivan Evans, South Island Trophy.

Standard Class winner: Maurie Wills, Messervy Trophy.

Best Individual Performance: Tom Grant, Mt. Cook Services Trophy.

Highest Scoring Pilot Previously Unplaced: Dudley Waters, Sailplane Specialists' Cup.

Daily trophies were presented to the pilot whose daily points increased most (or decreased least!) instead of to daily winners. They went to John Goddard, Ivan Evans, Dick Georgeson and Peter Cummins.

Leading Final Results

OPEN CLASS			
1. Evans	SHK	2,720	
2. Georgeson	Cirrus	2,504	
3. Goddard & Coutts	Dart 17R	1,695	
4. Waters	Diamant 16½	1,509	
5. Grant & McDonald	Skylark 4	1,129	
6. Wills	Ka-6	798	
STANDARD CLASS			
1. Wills	Ka-6	880	
2. Marshal	Ka-6	340	
SPORTING CLASS			
Grant & McDonald	Skylark 4	1,267	
Cummins	?	827	
Wills	Ka-6	679	

ROSS MACINTYRE

AUCKLAND PROVINCIAL CHAMPIONSHIPS

This, the eighth contest of its kind, was won on total points by Peter Heginbotham of Wellington in the Open Class, though he did not win a single one of the six tasks. Leading scores were:

OPEN CLASS			
P. K. Heginbotham	Phoebus 17	4,232	
I. M. Pryde	Libelle	4,195	
A. P. Fowke	ASW-15	3,704	
P. Timmermans	Ka-6	3,405	

In the Standard Class, Fowke won, followed by Timmermans, Carmichael (Ka-6) and Cooper (Ka-6). In the Sports Class, Timmermans was followed by Carmichael, Cooper and Sheppard (Ka-6E).

G. J. Sheppard (Auckland) won the award for the pilot showing most progress, and R. G. Carmichael (Piako) the award for the most meritorious flight.

RHODESIA

Ting badges. Stephen Smith, aged 15, is the youngest C pilot in the country, having obtained the badge with a 30-minute flight. The other, Richard Pike, is aged 17.

Salisbury Gliding Club has lost two aircraft in a towing accident. A Piper Cruiser tug, flown by John Wright, hit the top of a tree at the club's Warren Hills site, and the glider it was towing, flown by Derek Ebde, also crashed. Both pilots suffered spinal injuries.

Wings

SOUTH AFRICA

STOP PRESS: The National Championships, flown on alternate days with the Competition, scored on seven days each. The only 506 km. triangle set was completed by 34 out of the 38 pilots. This included Con Greaves, who was sharing an SHK with Andy Gough, John Delafield in a Phoebus 17, and Alf Warminger, Ka-6CR. The three British Team pilots got in good practice for Marfa but had to leave before the contest was over.

World Record, Brian Stevens and Hugh Kearthland broke the 300 km. two-seater record on 10th January in a Schweizer 2-32 at 104.7 km/h.

British National Record. On 22nd December John Delafield broke the 300 km. triangle with 111.6 km/h. in his Phoebus 17.

Other National Records were claimed by Rhodesia, Germany, Belgium, Holland, France and South Africa—all subject to homologation.

Leading Final Results.

W. Gross (Germ)	BS-1	6,627
H. Heiriss (SA)	ASW-12	6,568
B. Jackson (SA)	BJ-4	6,554
B. Cole (SA)	Lib. 301	6,171
T. Biggs (SA)	Cirrus	6,103

SOVIET UNION

SAILPLANE types flown in the international competition for East European countries, described in the last issue, were: 13 A-15's, a Zefir-4 flown by the Polish champion, Kmiotek, eight Foka-4's, and two Foka-5's from Bulgaria.

The 4th task, a 518 km. Triangle, resulted in a Bulgarian national record by Stanchev, flying a borrowed A-15 (he had already broken two records in the contest).

The 31st Nationals

Just one week after the international competition at Orel had ended, the former Soviet champions Yevgeny Rudyenski and Stanislava Sudeikit raised the "flag of the meeting" and half an hour later the first aerotow of the 1969 Nationals was away.

1st Task.—Speed around a 209-km. Triangle. Due to poor weather, only 18 of the 60 competitors finished; 16 of them had started before 13.00 hrs. Results — Men: 1. Rudyenski, 3 hrs. 22 min. 2. Kuznietsov, 3 hrs. 27 min. Women: 1. Africanova, 3 hrs. 32 min. 2. Zagainova.

2nd Task.—Speed around a 300-km. Triangle. Gliders were aerotowed off at 11.15 but the start opened at 11.45. The Lithuanians used good tactics by starting first, for they got furthest; Bercezinckas and Shlioomba went 239 kms. No one completed the task. First of the women was Sudeikit (Lithuania).

3rd Task was speed around a 319-km. Triangle. Again, no one got round and it was scored as distance through two turning-points. Results — Men: 1. Bol-dini, 294 kms. 2. Rudyenski, 292 kms. Women: 1. Africanova, 293 kms. 2. Anakhova, 292 kms. 3. Sudeikit, 274 kms.

After this, it was decided to set shorter tasks.

4th Task.—Speed around a 114-km. Triangle. 57 out of 59 competitors finished. Sudeikit had bad luck, landing after 31 kms. and receiving only 5 points, so her team dropped from 1st to 5th place. Results — Men: 1. Chuvikov, 3 hrs. 6 min. 2. Kuznietsov, 3 hrs. 5 min.

30 sec. Women: 1. Africanova, 3 hrs. 19 min.

5th Task.—Speed, out-and-return of 304 kms., turn-point Yelets. First around the turn were Koval and Zagainova. The weather then got weaker and they, making a mistake, could not maintain their lead. Zaitsev miscalculated the wind strength and landed 500 m. short of the finish. 50 out of 59 pilots completed the course. Results — Men: 1. Rudyenski, 4 hrs. 34 min. 2. Kuznietsov, 4 hrs. 37 min. Women: Gorokhova, 4 hrs. 32 min. 2. Anakhova, 4 hrs. 35 min.

6th Task.—Speed around a 100-km. Triangle. Results — Men: 1. Pilipchuk, 1 hr. 46 min. 2. Rudyenski. Women: 1. Golyenko, 1 hr. 53 min. 2. Kluieva.

FINAL RESULTS

Men

1.	Rudyenski	4,355
2.	Vachasov	4,061
3.	Shiloomba	
4.	Pilipchuk	3,906
5.	Link	3,884
23.	Chuvikov	2,831

Women

1.	Africanova	3,657
2.	Zagainova	3,596
3.	Kluieva	2,961

Team Results

1.	Ukraine	11,287
2.	Lithuania	10,095
3.	Moscow	10,041

Quotation from D. Dvosnosov, author of the report: "It is a shame only that the championships had to be flown on training Blaniks and that not even our A-15's, not to speak of more contemporary designs, could be brought."

Translated and condensed from *Krilya Rodiny* by C. WILLS.

SWITZERLAND

AT Grenchen, the "Gliding Metropolis", the traditional conference of glider pilots from all Switzerland was held under the leadership of Hans Nietlisbach. The reorganised Gliding Commission of the Swiss Aero Club had found itself fighting the never-ending battle against attempts to impose restrictions on gliding.



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Participation in the Internationals at Marfa would, through lack of money, be limited to three pilots: Hans Nietlispach (Berne) and Urs Bloch (Grenchen) in the Standard Class, and Emil Ehrat (Schaffhausen) in the Open. Each would have two crew members instead of three. The party would include Markus Ritzi, the national coach; Fritz Pfeuti, the technical chief; and Adolf Gehriger, president of the Gliding Commission.

Only one new Swiss record was broken during the past year. when Margrit Sallaz set up a feminine record of 39.2 km/h. for the 100-km. Triangle. She had already set up a feminine gain-of-height record of 5,480 metres in 1964, and in 1968 she was the only woman ever to take part in the Swiss National Championships.

Press Service of Ae.C.S.

WEST GERMANY

STATISTICS. — There were 3,354 gliders in West Germany as at 31st August, 1969, it was announced at the annual November "Tagung" at Augsburg. At the same date there were 221 motor-gliders known to the German Aero Club.

CLUB CLASS PROSPECTS.—A special Class for those who do not fly "super-ships" was tried out two years ago in the Nordrhein-Westfalen Region. In *Luftsport*, the official organ of the German Aero Club in the Region, Fred Weinholz urges other Regions also to hold championships for this Class during 1970, with a view to selecting entrants for a National Championship in 1971.

The Club Class received the blessing of the German Aero Club at the "Tagung" in Augsburg. It had already been introduced in the 1969 decentralised competition (now called Deutsche Segelflugwettbewerb), the results of which in this Class are now announced. The highest scorers were the Hamburg Aero Club team, consisting of M. L. Meier, G. Amtor and G. Lau, with an aggregate score of 2170. But their entry was not in order, so the official winners are the Weiden Aero Club, of Bavaria, with 2,030 points.

Qualifications for the Club Class are a price limit of 12,000 DM for single-seaters (now to be raised to 13,500) and 18,000 DM for two-seaters, except that any type produced in series before 1st May, 1945, can qualify regardless of price.

WASSERKUPPE JUBILEE.—The annual Junior Championship on the Wasserkuppe, to be held from 18th to 30th May, 1970, will celebrate the 50th anniversary of the first German gliding meeting held there in 1920.—*Luftsport*.

YUGOSLAVIA

NATIONAL CHAMPIONSHIPS 1969.—These were held at Novi Sad on the neighbouring Comej airfield from 7th to 18th September. Twenty pilots took part, including two visitors from Poland. Sailplane types flying were: Delfin 1, Delfin 2, Ilidenka and Weihe (seven of them, all with skids!).

In the first task, a goal-and-return race of 86.4 km., Wasilige Stepanovic won at 54.6 km/h. The winners of the remaining tasks were the two Polish guests, Jerzy Adamek and Henryk Muszczynski, who far outflew the Yugoslav pilots.

Second task: goal-and-return race of 96 km. Winner Muszczynski at 73.915 km/h. On the third task, a 96.6-km. Triangle, Adamek made the best time in weak thermals at 43.863 km/h., against Muszczynski's 40.374.

The fourth task was the longest: a 170-km. Triangle, won by Muszczynski at 61.344 km/h., Adamek making 58.682 km/h. Finally came an 86-km. goal-and-return, and the two Poles again led: Adamek at 56.260 and Muszczynski at 53.333 km/h.

Final Leading Results

J. Adamek, Delfin 2	4,916
H. Muszczynski, Delfin 2	4,910
W. Stepanovic	4,128
B. Praprotnik	3,648
M. Gatolin	3,433
J. Uhan	3,307

Ostflugkurier.

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