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EDITORIAL

A number of new members are not in receipt of Flight Line 1, as only a limited number of these were produced, owing to the very slim budget on which the Association was launched. As a result, a large number of you are not familiar with the outcome of a meeting which was held with senior CAA Officers in January 1980. In order to clarify the situation, I am setting down the text of a proposal which the BMAA made at that meeting:

"We propose that a system be developed whereby the use of all aeroplanes within the definition below be regulated by the issue of permits to fly and some kind of pilot licence, these documents to be issued solely upon the recommendation of the British Minimum Aircraft Association.

PROPOSED DEFINITION:
1 Empty weight: single seaters maximum 100 kg; two seaters maximum 120 kg.
2 Actual climb-out angle: greater than 1 in 10.
3 Best glide ratio: better than 1 in 5.
4 Minimum wing area: 10 square metres.
5 Maximum fuel capacity: 23 litres."

Present indications are that the CAA will accept these proposals.

-- o --

I should like to recommend Eric Clutton's book "Propeller Making for the Amateur" to those of you who are going it alone, and also "Powered Ultralight Aircraft" by Dennis Pagen. The latter, I believe, is an absolute must for all of us.

Safe flying!

Dave Thomas

Opinions expressed by the authors and correspondents are not necessarily those of the Editors or the Committee of the British Minimum Aircraft Association.
CONTACT!

SOUTH LAKE DISTRICT FLY-IN

Martin Hargreaves is very kindly organising this event on the weekend of Saturday/Sunday 27/28 September 1980 at Holker Hall. This is signposted from the A6 north of Milnthorpe, to the left (the site is west of the A6). Martin describes the site as being "just below the bottom end of Lake Windermere"! Holker Hall is a stately home with open ground available. Camping will be available on the Friday and Saturday nights on the site. There is also an airfield about half a mile away for a back-up, should it be too windy to use Holker Hall. Martin can provide details of bed and breakfast facilities etc; preferably ring him during the day on Blackpool (0253) 66122, or otherwise evenings on Garstang 2023.

SMALL ADS


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LETTERS

Dear Dave

Whilst brooding the other day on trike design, I thought of a possible way to improve safety if the worst should happen and the trike and hang glider parted company in the air. (I use the word 'trike' to cover all weight-shift machines and not any make in particular.) The part of this hang glider/trike set-up that would come in for the worst hammering would be the universal/connection joint between the relative structures, and what a catastrophe if the two should part with the pilot strapped securely into the bit with no wings! (So few trikes having 'chutes at the moment). I have the following proposal (and am fully open to criticism):

1. that the pilot is not harnessed into the motorised frame;
2. that he wears a seated harness such as Wasp used to produce (all webbing) and is clipped into the hang glider as usual;
3. that a good cheap seat is employed such as that on the Hiway Skytrike (no connections!)

Thus the pilot is harnessed into the aircraft and held securely though loosely by the said seat thus encouraging safer flying - no acrobatics - and should anything part, the pilot should be left hanging seated in a glider/parachute ready to fly (not crash to earth) leaving the engine/trike unit to drop away.

This may or may not be a good idea and I would welcome replies to this letter so that we may all learn more about the engineering side of this sport.

John H Wadsworth
Caversham Reading

Dear Dave

It might be a good idea to inform all members of other members in their particular area. I am thinking that it would be a great encouragement for prospective members to be able to exchange ideas and experiences at a local level.

I would like to contact anyone in my area who is a member of the BMAA.

Tony Hindley
5 Hollins Lane
Accrington Lancs

EDITOR'S COMMENT: This seems like an excellent idea! Let's hear from anyone else who would like to contact fellow enthusiasts on a local level.
GOSSAMER PENGUIN FLIES

There wasn't room in No 3 to include a note on Paul MacReady's Gossamer Penguin, a lightweight plane driven entirely by solar power, and now we can report that this craft, which carries no batteries but drives the motor directly from 45 sq ft of cells, flew for two miles on 7 August in California, piloted by petite Janice Brown. The craft, a development of the Gossamer Albatross which made the first man-powered Channel crossing last year, covered the distance in 15 minutes and reached an estimated 16 mph.

Dr MacReady's next machine will again make use of advanced lightweight materials; called Solar Challenger, it should be able to fly over 100 miles on sunpower. MacReady has explained, "We're trying to call attention to the fact that there is an alternative source of energy of great value. People don't think that with solar power you can actually move things."

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HIWAY MAIN DEALERS Based at Bovingdon Aerodrome in Herts.
We had discussed flying Pterodactyls from Land's End to John O'Groats many times over the past six months, but had never actually done any serious planning.

At about 9.30 on Monday morning, 21 July 1980, the phone rang at Wellesbourne. It was John Leigh-Pemberton, one of our Pterodactyl customers. "I've just been talking to Heathrow Met and they say we'll be getting south-west/southerly winds for the next two or three days. How about it?" We made an instant decision to go - followed by frantic preparation.

Paul Baker and I spent the rest of the day fitting the machines with extra tanks, getting the support vehicle and equipment together and loading up. Meanwhile John was arranging St Just airfield as a starting point and buying the $56-worth of charts necessary for the trip. Myself and support crew, Mick Clay and Mick Hennessey, finally left at midnight and drove straight down to Penzance. Paul was staying at Wellesbourne to man the phone and keep everybody in touch.
TUESDAY

8.00 am: Collect John from Paddington-Penzance night sleeper and head for the airfield. It's a beautiful morning and the wind is south-west as promised. While we're rigging the machines, a local Beeb cameraman arrives and hustles everybody breakfast at the airfield café.

Paul rings and has arranged with Rolls Royce to use Filton as our first stopping point. We mark up the charts on the café floor and decide to fly around Land's End and return to St Just as a check flight. Everything seems fine, although the climb rate is definitely reduced with an extra four gallons of fuel.

12.45 pm: Take off, climb to just under cloudbase at 2,000 ft and head for Bristol.

12.55 pm: I turn round to check on John. No John! Crank several tight 360s looking up, down and behind. Nothing. I remember Jack McCormack's story of turning back to look for a companion who was hidden above his sail and losing him for two days. Two more 360s to check again. Still no John. I turn back, thinking, Marvellous, lost each other in the first ten minutes! Within a minute I see John down in a small field. Circle down and he waves me to land. The problem is the rubber primer bulb in his fuel line. It's collapsing and restricting the flow.

We've just finished a makeshift repair with pliers and wire when, for the first of several occasions, the two Micks appear from nowhere.

5.15 pm: Support car arrives, refuel and take off at 5.45. Following the approach instructions we've been given, we land at Filton at 6.30.

John and I decide to fly another leg to Tilstock near Whitchurch tonight. We rush around talking to the BBC, sorting our charts and topping up tanks.

7.30 pm: Take off and fly north over the Severn Bridge and along the Wye Valley at 3,000 ft. The late evening sun on the haze makes spotting landmarks quite difficult, but the air is smooth as silk - not a bump. We detour around the MATZ at Shawbury and fly in low under the stub to land at Tilstock at 9.25 pm. As we are tying the machines down Simon, whose house we are staying at, arrives and whisks us off to the pub. The ground crew arrive at 10.30 and we head for a bath and a meal.

After dinner John goes to collect the charts from the car and returns with bad news. We've left them at Filton. Disaster! An army officer friend of Simon's calls all the local army bases and turns up a military low-level chart, which is a help but not really detailed enough.

WEDNESDAY

I run up Simon's phone bill for an hour trying to locate charts at flying clubs with no success. Fortunately the last one we were using will take us through the Manchester non-radio route, so we'll press on for Lancaster and hope the ground crew have better luck.

At this point I decide to change to my own engine as the borrowed one I've been using is consuming fuel much faster than John's.
12.45 pm: Leave Tilstock. Cloud-base is fairly low and as we pass Warrington it starts to drizzle. Reaching Junction 33 on the M6, the rain gets heavier and cloud-base is down to about 700 ft. We pick a suitable field and land at 2.15. A very friendly farmer supplies tea and biscuits and doesn't seem to mind his phone being monopolised for the next hour. The ground crew arrive at 3.30, having driven at breakneck speed to Chester to pick up our charts which Rolls Royce have flown up from Filton. Thank you, Rolls Royce!

4.15 pm: In our expert opinion the front is going through, so we take off. Five minutes later the cloud is 300 ft AGL and we are dodging power lines looking for a landing field! Down again at 4.25. Twenty minutes later, Mick Clay appears, panting. He has seen us circling under the cloud, stopped the car, and run across the motorway and a mile of fields to check that we're okay. Reassured, he heads off to the next service area to wait for us.

6.00 pm: We can see blue sky and feel sure it's clearing, so take off again. This time we manage ten minutes before we start looking for another field.

6.15 pm: Land in school playing field at Carnforth. My turn to look for a phone box. A large crowd gathers and one little girl brings us a flask of tea and sandwiches. She's almost too shy to speak to us. We feel a bit like visitors from space.

The two Micks, getting bored with motorway coffee, have checked with Paul and arrive at 7.00.

7.30 pm: Take off for a last attempt this evening. Another twenty minutes sees us back on the ground near Crooklands. There's no chance of crossing the Lake District tonight. The landing field obviously had cows in it recently. Scraping the worst off, I hope the take-off is cleaner.

A very frustrating day. Only 95 miles flown.

THURSDAY

Glasgow Met raise our spirits with a good forecast for the day.

9.30 am: Take off avoiding cow-pats. Cloud base is 4,000 ft, so no problem crossing the hills. North of Carlisle, we spot the car on the A74, circle and land next to the road. Hear our first Scottish accent. This is more like it!

12.00 noon: Cross mountains at 3,000 ft, then down to 1,500 ft to pass under Scottish Terminal Area. Spot beautiful landing field next to M9 near Stirling and touchdown at 1.50. We are relaxing in the sun when the car arrives, closely followed by an irate farmer who starts shouting about crop damage. He's plainly just looking for an argument as the field has just been mown and the hay is sitting there in bales. Seeing Mick starting to get angry I hastily intervene, give the farmer a card and tell him to send us the bill. Slightly mollified he drives off muttering.

2.15 pm: Taking off, we climb to 4,000 ft. We've decided not to follow the road, but to take a direct line to Fort Augustus and then along Loch Ness to Inverness. Over the mountains we encounter quite strong turbulence and climb to 5,000 ft where everything feels a bit smoother. Definite feeling of apprehension looking down on the terrain below. Flying along Loch Trieg we see two Jet Provosts going the other way about 2,000 ft below.

Just after Fort Augustus, heading up Loch Ness, my engine misses a beat - closely followed by my heart missing several! There's nowhere to land for miles. After five minutes with no further misfires I relax and admire the view, which is magnificent. This has got to be the way to see the country. From this height every small boat wake looks like a possible Nessie!

Arriving at Inverness, there seems to be a shortage of grass
fields. We finally pick a playing field next to a circus and using the flags for wind direction, land at 5.30.

FRIDAY

9.35 am: A strong wind gives us both interesting take-offs and as we reach 2,000 ft we can see we're going to have a fairly rapid trip. Skirting around Lossiemouth ASR we follow the coast north-east. Low cloud starts forming along the coast in a band about two miles wide. Climbing to 4,000 ft we can see enough to cruise above it. Near Helmsdale two Hunters pass about a quarter of a mile away. Wonder if they saw us?

At one stage I turn into wind to let John catch up, and drift slowly backwards. The wind must be 40 mph up here.

11.05 am: Reaching Duncansby Head, John makes a very wide turn out over the sea and for a while looks as though he might end up in the Orkneys. Opening the throttle and leaning right forward, he creeps slowly back over the cliffs.

Picking the only field without animals, we descend vertically and roll about a foot on landing.

I rush off and phone Paul with the good tidings. By the time I get back the wind has picked up to almost gale force, and there are three people hanging on to each machine.

Once they are tied down we can relax and the farmer who owns the field (a gentleman called Robbie Cowie whose hospitality was overwhelming) takes us to the hotel for "a wee one".

The total flying time for the 730-mile trip was 17 hours 5 mins. Apart from John's primer bulb and a cracked exhaust bracket we had no mechanical trouble and by and large the weather was good to us.

A good support crew is essential on a trip like this and ours was superb. I'm sure John would agree that he and I had the easy part of the job. I know both of us would like to do it again.

Or how about London - Cape Town?

Dave Garrison
The fitting of engines to modified hang gliders has opened up a whole new field of prop design with ample scope for the amateur to do some meaningful experimenting relatively cheaply. So which way to go? It is unfortunate that a slow flying speed and high prop rpm make poor companions, giving low efficiency and wasting power. Some of the direct drive conversions I have seen must be operating at efficiency levels of around 50%, and 50% of not much is b... all!

It was very quickly realised in the USA that reduction drives had much to offer, and their wide acceptance resulted in some startling increases in performance. With a reduction drive we make the prop rotate at much more favourable rpm, using a bigger diameter, while still running the engine fast enough to extract most of the power available. A large diameter slow-turning prop would be of particular advantage in a tractor layout with the prop at the front. The lower speed slipstream around all the draggy bits (pilot etc) gives less overall drag but this is not the whole story. The same low speed slipstream gives less efficient cooling, and the larger prop produces far more drag when the engine is switched off. Any reduction drive adds some weight and complexity, with increased cost and probably reduced liability.

Having put the damper on that little lot, what is the alternative? Obviously, with direct drive the only way to increase performance is to fit a larger engine, and the only way to retain a reasonable amount of prop efficiency is to aim for an operating rpm which will give a tip speed figure well below the speed of sound. With tip speeds of around 550 mph and above, the production of local shock waves results in that loud howl beloved by film producers but not local residents. Fuel consumption on a larger engine running at moderate speed will not be much different from a small engine running flat out.

So we have a choice, and much depends on the actual engine available at the time. Both approaches can be made to work well, and there were many examples of both at the Wellesbourne meet.

Now to the actual propellers. Many designs are limited as to prop diameter, so they need to absorb the engine power somehow. The best way to do this is to use wide blades with broad tips rather like those used on gyrocopters (they have the same problem!) Wide blades are generally more efficient at low airspeeds so the result is not too bad. Multi-blade props are bad news at low airspeeds; the inter-blade interference is too high to give good efficiency, and three-bladers in particular are rather difficult to make. Four-blade props are easier - the blades do not have to be 90° to each other and opposing blades need not be the same size as the other opposing pair. However they are even less efficient at our speeds than three-bladers!

Two-blade props are fairly easy to make and can be quite efficient, although the theoretical ideal is the single-blader. Single-blade props can be arranged to have automatic pitch adjustment in a number of ways and this may be the micro-light prop of the future. An alternative way of achieving a constant speed effect (the pitch
automatically goes into fine during climb and coarsens in a dive) is to make a full scimitar or 'sickle' prop. This is an attractive solution involving no moving parts to go wrong or fly off, but needs some experimenting to get it right.

I hope these notes will encourage more people to try their hand at making props (you can always put a clock in it . . .) As a further encouragement, the cost of materials for an average-type microlight prop should be less than £10 and no more than three laminations should be necessary. No kind of surface finish is necessary for a short test programme but a coat of resin can be a great help in balancing. Have a go, but be careful - centrifugal force is impressive and a rotating prop is a dangerous thing to play with carelessly.

Eric Clutton

THE RISKS OF PRIVATE FLYING

by Douglas Orgill (reprinted from a daily tabloid)

If you are flying a private plane you're in much the same position as a man driving a private car - your safety, and that of your passengers, depends on YOU.

The risks of private flying are once more being examined in the wake of the latest private plane tragedy, in which heiress Caroline Spiers survived after her husband and two children died in a crash in the Irish Sea.

Yesterday all the aviation specialists I questioned were unanimous - safety checks on pilots and aircraft are rigorous and adequate - though nobody can make allowance for unforeseen mechanical emergency or just sheer bad luck.

There are 21,155 private licence-holders in Britain. Last year, according to the Civil Aviation Authority, there were 19 light aircraft accidents involving death - compared with 23 the year before.

"The safety record is good," said Ian Parker, general aviation specialist at the air journal Flight International. "It's not as good as that of scheduled airlines of course - the airlines are able to spend millions on safety. The onus on safety in light aircraft is on the pilot and his judgement - especially where weather conditions are concerned."

The Civil Aviation Authority say it is not compulsory to carry lifejackets in a light aircraft over sea, unless the plane is involved in public transport - though the Authority recommends that lifejackets ARE carried.

In practice, lifejackets are almost universally carried - and usually worn. "We're great believers in regulations with a light touch," said a CAA spokes-

man.

Britain's private aircraft are serviced by professional licensed engineers. In general there is a check on planes after every 50 hours of flying. Added to this are one-year and two-year checks, and the Certificate of Airworthiness, which must be renewed every third year.

It costs around £500 for a private person to learn to fly a light aircraft.
Dear Editor

How the early pioneers would have laughed at the whine of P W Grange in your last issue! Such petits fonctionnaires should be thrashed, not mollified, but just for the record:

1: All the technical arrangements, including the design of the fuel system, were in the hands of Jack McCormack, the world's most experienced ultralight flier.

2: The flight was accompanied by one of the most skilled helicopter pilots in the country with three light aircraft and a speedboat in attendance.

3: Each member of the flight had £500,000 public liability insurance as well as every available permit from every relevant authority bar central Paris. (where three sets of lawyers were on standby and the highest levels of the British Embassy had been informed).

4: If the wind hadn't changed at Folkestone, John and Jack would have made it and been applauded for a pioneering flight in the best British tradition (in so far as we have one for this route).

5: For myself, I found my machine nose-heavy and, because fuel wasn't transferring to the rear tanks, landed safely before the situation became worse. The only take-off point, after adjustments, was a village green. Under the benign eye of the police (who checked my papers and confirmed clearance with Biggin Hill) I attempted take-off. The green was such that I had to clear a telegraph wire half way down if I was to clear the trees at the end. Observers of my take-off at Croydon thought it would be possible, but close. When I saw myself heading towards the wire I cut the motor, swooped under then deliberately flared up into the trees, which I had inspected carefully beforehand, rather than risk damaging the wings against the treetrunks. My plane and I emerged without a scratch and everyone was well entertained. A favourable comparison could be made with certain recent landings of the RAF. At any rate, at no time was anybody, including myself, in the slightest danger. Of course I didn't have much experience; as Jack said, there was only one experienced ultralight flier in the country and that was himself. Self-justification is embarrassing but he did check me out beforehand and later was kind enough to say that I was the most naturally talented flier he had ever met. Fortunately the Dangerous Sports Club exists to disprove the experts.

6: On a point of bureaucracy, as the first person over here to appreciate the potential of the Pterodactyl, I immediately - before the formation of the BMAA - opened discussions with the CAA and was appointed CAA Liaison Officer when Steve, Paul and the boys did their good work in the initial negotiations. They like all the authorities were informed of the flight beforehand but I took the precaution of submitting my written resignation in advance (in case anything went wrong) to Dave Thomas who was there as an observer.

Finally, I believe the socio-economic implications of the England-France ultralight route are greatly underestimated over here. The only shame and embarrassment I could feel about the attempt is that out of perhaps 20 Englishmen who had the resources to attempt it, only John Leigh-Pemberton came forward. Fings ain't what they used to be.

Yours sincerely

David Kirke
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of the most sophisticated aircraft in the ultralight field.

The really well finished aircraft were the Mitchell Wings, the Lazairs, some of the Easy Risers, the Pterodactyl Fledges, the Hummers and the Humbugs. The Humbugs are being produced by two companies, one apparently paying royalties to Klaus Hill's estate and the other without payment of royalties, I believe. Happily the better-developed one by Ed Sweeney of Gemini is the one paying royalties.

Oshkosh itself really is an experience. Onto this airfield for one week in the beginning of August swarm well over 10,000 aircraft and half a million people, there being 1300 homebuilts and this year about 100 ultralights. There are about 300 trade interests represented and at least 10 restaurants offering the ubiquitous beefburgers, pizza, Kentucky chicken etc. There is a marquee for international visitors and here I met many interesting people including a gent who owns an airstrip not 15 miles from my own house. I also met ultralight enthusiasts from Australia and remained most impressed with the designs that these people have come up with under their operational rules, in particular the Cricket and the Skyrider.

Later in the week I was asked to be a judge and I helped choose by a very scientific and fair system the best-built ultralights. This award, the "EAA Golden Lindy", was won by a homebuilt Fledge derivative owned and built by Gary Evans. It was truly immaculate and knocked spots off any of the trade exhibits for detail design and finish. Jeff Hudson received an award for "outstanding craftsmanship" for his Easy Riser. Steve Grossrock of Cascade Ultralights received the "best new design" award for his Kasper Wing. This aircraft is available in kit form and apart from its excellent sink rate and glide it also has
stickers to allow machines in the air. Various aircraft were already beginning to make apparent their different clear characteristics - Steve Grossrock's Kasper Wing with its incredible climb, sink rate and fully controllable mush; Dale and Pete's Lazy's for their excellent stability and roll control despite very low available power. The Flac did not fly. John Chotia's Gypsy drove about on the ground but stopped giving power periodically (he now manufactures his own carbs but on this one the float sank!). Later in the week this was fixed and it did succeed in doing some circuits. This machine really looks the part, very nostalgic and I found myself really willing it to fly well, but also it did not nearly match the manufacturer's claims.

There were also static exhibits showing what was to come. There was Don Stewart's Puffin, a beautifully-built flying wing using two-axis control on elevons only; most parts were built but only the egg-shaped fuselage pod was on show. There were two partly-constructed Nomads, clearly well thought out aircraft that definitely will fly and looking like they will be lots of fun if a bit underpowered.

Catto turned up with a very smartly painted CA15. This flew very like a conventional aircraft and looked most stable and controllable. On its first take-off the pilot was keen to show the controllability and turned a bit tightly after take-off; this would have been okay but (a) it took him outside the agreed circuit pattern, and (b) his engine stopped. Faced with a field of parked ultralights and a farmyard he really tested the controllability of his machine; by rapidly lowering the nose and executing a 120° left turn he did a perfect landing in a field of six-foot tall maize, damaging his undercarriage. This machine was only let down by obvious poor detail finish and thought, but otherwise was one.
I decided there was no way I could miss going to Oshkosh again, but lack of money meant that a new way had to be found of getting there (after the relative comfort of last year's trip). So one standby ticket and four lifts later, I arrived at Oshkosh holding a bag of cameras and with a pack on my back and my first beefburger and milkshake in my stomach. For such a cheap method of travel, the journey must represent some sort of record: local times, I was eating breakfast at home at 10 am, and by 2 am the next morning I was on the convention aidfield, very tired and pleased to have stopped moving.

The next day, machines started to arrive. I got my first look at the Gypsy; you didn't need telling twice that it came from John Chotia's factory as the construction techniques are so similar to the Weedhopper. One of the EAA officials who was more into the degree of excellence exhibited by the Custom Homebuilts said there were three types of aircraft - crude, simple and sophisticated; in his opinion the Gypsy didn't quite make "crude"!

Saturday saw the start of Oshkosh proper and as ultralight flying didn't start until 7 pm I spent some time looking at the exhibits. Eipper had a very good stand with films and banners and lots of professional display work obviously aiming at bringing vast numbers of people into our new sport.

Larry Newman was displaying Eagles beside his Lear Jet Tent. He told me some amazing news: Soarmaster are building a wheel-launch system for flex wing hang gliders with the engine pushing through the centre of mass - designed, he claimed, by a whizzkid from England called Chris Baker! Oh well!! Imitation must be the best form of flattery.

I had been co-opted to help Steve Patamont as Scrutineer, so the first flying on Saturday evening and Sunday meant a lot of work checking aircraft and issuing green
an amazing facility whereby it can mush, being held in the air by a powerful vortex above the wing that forms due to special aerofoil technology operating at high angles of attack.

Towards the end of the week, the weather deteriorated. On the Wednesday night the wind blew: I was just going to bed at about 11.30 pm when the PA blasted out very stern warnings about a cold front due in three hours - "Tie down all aircraft, cold front imminent!" The prudent ultralight pilots dismantled their machines but some people had already gone to motels. The wind blew 70-80 mph and we all got very little sleep; the pole of the marquee where I was sleeping was being blown around about 18" but despite rain as well, by the time I'd wrapped myself and my belongings in a large sheet of plastic I got a little more sleep.

Unfortunately about a dozen microlights were written off. Those that parked with their wings level (eg Weedhopper) were undamaged but all other types suffered badly, bulky things like Quicksilvers and Rotecs faring worst of all.

The next night was worse - not so much wind, but RAIN! Eventually the water level over acres of the field rose to several inches and came up under my camp bed. Most miserable-making, but the morning brought sun, no rain and 90°F again so me and my belongings soon dried out.

Well, apart from many ideas and films, I also bought loads of parts, instruments and propellers so hitching back to Chicago was out of the question, but a very nice guy called Gary Ballard gave me a lift all the way while I slept soundly with my dreams.

Steve Hunt
This time in my training column I am going to write about two forced landings I have had and an incident that a friend of mine had with a propeller. The idea of this is to encourage you to write and tell me about your incidents/accidents so that they can be used to prevent your fellow pilots from repeating them. (But perhaps you hate your fellow pilots anyway . . .)

My first forced landing

I had just taken off and was gaining height slowly because the engine was not running cleanly. I did not feel happy about turning because I had only reached 20 ft as I got to the edge of the airfield, so I flew straight on, feeling that the engine was about to pick up and give me some proper power. In fact it did pick up, it seized! (I discovered when I checked it that I was running it on the wrong mixture!) There I was, half way across this field, 40 ft up, with very little airspeed due to the pitch up when the power cut. I instantly put the nose down to build up airspeed and aimed at the far corner of the field. Soon I had lots of airspeed, but there was no room to turn, i.e. I was at 10-15 ft. I came down to ground level waiting to touch down, but it kept on floating. The hedge loomed up, so I sat back to "convert" over it. Up the machine went and as it crossed the hedge, the left wing tip caught a bush, spun the machine through 90° and left me sitting immaculately parked in a grassy lane the other side of the hedge. The only damage apart from the engine, was a buckled wheel due to the sideways landing.

I am very grateful to have had such an invaluable lesson at such a low cost!

Like any incident or accident, there were lots of major and minor contributory elements. Over-confidence: I had quite a lot of hours under my belt and felt that I could control the machine pretty well. I thought I recognised what the engine was doing. It seemed to be four-stroking and if that had been the case, it would have cleared up and started two-stroking as it was meant to at any moment. In other words, because of my previous experience, I didn't feel that an engine failure was at all likely.

The place from which I took off was wrong. I was being lazy. I had just done a practice landing and had come in quite a long way up the runway. With normal power there was plenty of room to gain height inside the airfield, but because of the crosswind, as soon as I took off, I had diverged from the runway in order to remain into wind and I was flying over some very muddy ground. (Quite landable-on, but very messy!) So, I had removed my options: landing was easy but inconvenient, and anyway I wasn't thinking of putting it straight down again because the engine was about to start working properly!

The mistakes:
1. Not walking the machine further back to give myself lots of room.
2. Flying over ground that I was unkeen to land on (I should have turned slightly and crabbled along above the runway to increase my options).
3. Assuming that I knew what was happening with the engine and relying on it totally (again not giving myself any alternative options).

The main mistake was leaving the airfield. When the engine failed, I was in exactly the wrong place. The only place that I could land was in the field that I was crossing, but because of its shape I could only land
straight ahead. Doing S-turns didn't feel right and maybe I didn't actually know the machine that well. How do you get your steepest glide with minimum speed build-up (minimum speed in order to stop it floating on in ground effect) but still keeping adequate airspeed to avoid the possible danger of stalling, etc, and also to have sufficient speed to make a proper round-out before touching down? My skill and knowledge of the machine only enabled me to follow basic principles, but the position I had put myself into required a very high level of skill and some very precise control of the machine, coupled with considerable awareness of what was going on.

The nose had risen due to the power failure, so it would be approaching the stall. The stall requires a certain amount of height for recovery but depending on the characteristics of the aircraft, its attitude, its height, the conditions, the pilot's fine control etc, the stalled condition varies from being extremely hazardous to one of no particular consequence.

At 40 ft, with the nose only slightly too high and an adequate (if falling) airspeed, I was in a very controllable situation in my Pterodactyl. You can hold a Pterodactyl on the mush for minutes (if you have the height), directional control is no problem (I have tried hard to get it to spin out of this situation and haven't managed it). The only problem is preventing it from unstalling itself! (To do this you have to deploy both rudders which has the effect of bringing the nose up.) In this state it has a high descent rate, with very little forward movement. So, I could have mushed it for 20 ft, unstalled it gently, and had a nice amount of speed to round out for the landing. Although this works very well on the Pterodactyl, messing about on the edge of the stall is not recommended in any aircraft unless you are practising in a controlled situation.

The other way I could have coped with my predicament was to put the Pterodactyl into its high drag condition. This is achieved by deploying both drag rudders together. As they are deployed, the nose rises and the airspeed reduces; this has to be countered by moving your weight forward to bring the nose back down. With the rudders fully deployed a glide of about 3:1 is obtained in still air. Using that technique I would have been able to stop before the hedge probably without having to use the technique of putting the wingtip on the ground to spin the machine around. I allowed myself to get into a position where engine failure was going to be difficult to cope with. It was, but luck was on my side that time.

My second forced landing

I was flying off for the weekend. It was a beautiful evening. The forecast headwind was not appreciable so long as I kept low (500-600 ft). The miles were slipping by. There seemed to be plenty of possible landing fields around, but who needs a landing field? - the engine's running beautifully. Not much throttle is needed even for a fast cruise speed, so it's not working very hard. Yes, you normally get engine failures when the engine is working hard. Broadway just coming up, off to my left. SHOCK-HORROR!! The engine's stopped! How can it do this to me? Get the nose down: airspeed's okay. Where do I land? How much height have I got? The heart seems to be beating a bit fast at the moment. The mind is certainly moving fast. The field below looks good, grass not crops, lots of room, no obvious obstructions - what a relief! The road is a very long way away, though. That field over there is almost next door to the road. It's got cows in it - shame, and none of the others look okay. Why are the cows scattered around in only half of it? I glide towards it to assess better while still remaining within reach of the first large
field. Removing my shades, I realise that I couldn't see much before. Half way there and I can see a fence running along the field. Cows on one side and a couple of pieces of equipment on the clear side. With the dead engine practice I have done, this should be no problem: forget the large field with the long walk. I reckon that I want to come over the end at 30 ft, a comfortable height above the small trees, but low enough to have plenty of length to touch down and stop. I am too high to go straight in, so continue my base leg straight past the end of the field, staying a 90° turn's width back from the edge of the field. I keep looking back at the landing area. When do I make that turn? Now! I start turning, still plenty of height. Take that turn all the way back, don't let the machine creep forwards towards the field. 270° right, 90° left and I am back on the base leg exactly on line. A little high, I do an inefficient turn in onto finals. Just the right height over the trees. The first bit of the field is smooth but the gate is at the other end, keep rolling! Why did I land so far back? Now I've got to push the machine to the gate. That was a rather precise landing - though I say it myself. What a waste, nobody else to appreciate it!

Practice, not luck, made that landing work out uneventfully. Can you put it down where you want with a dead engine? You should be able to!

An incident with a Skytrike

The Trike was sitting there with the glider on top, but the wings folded in. The engine needed testing but there was nobody immediately available to help Dave. He checked over the Trike, primed it up, turned the ignition on, looked at the hand throttle. Everything seemed okay. He put one foot on the axle, one hand on the upright, shouted "Clear prop" and pulled the engine over. The engine started and the Trike leapt forward. Dave didn't let go of the upright and the Trike went round and round him, completely out of control. He eventually managed to stop it and surveyed the damage. The propeller was broken where it had hit something on the ground and the top of his thigh was heavily bruised and bleeding where the propeller had "stroked" him several times. (If he had not been so tall, he would have been a soprano!) On later examination Dave discovered that the hand throttle was in fact set rather high.

Watch out for propellers!

Let's have some more of your mistakes for us all to learn from.

Paul Baker

THE BMAA'S FUTURE

In the next issue of Flight Line there will be details of the Association's Annual General Meeting which we hope to arrange for a Sunday in November. Meanwhile, give some thought to the development of minimum aircraft in Britain.

What's been done so far - and what still needs to be done? What questions and answers will YOU have at the AGM? Can you help with the organisation of this new sport? (For that matter, do you know who has been doing it up to now?)

More people will be needed to come forward and help actively, and subscriptions will have to be increased. It would be nice to have a better magazine, but it all costs money - and (a bigger consideration in practice) takes more effort by someone.

There are already plans for some events next year, and we hope that the work being done even now will contribute towards a sound future for minimum aircraft in this country and elsewhere.
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"Hey, listen, I've decided to apply the Goldwing building techniques to a CA15-type wing to give you guys over there a chance to offer a ready-built rigid to the European market!"

"Sounds great, but our first BMAA Fly-In is in three weeks' time - could we build one in time for that?"

"We can. If you can get some of the bulky materials together over there, I'll bring across some specialist components and my Xenoah engine and prop. I guess it will take me about a week to put it all together."

"Okay, it's a deal: tell me what you need and I'll find sources over here. When can you come over?"

With that telephone conversation between Craig Catto and myself, the Catto CP16 was born. Needless to say, I didn't realize what I was letting myself and the boys at the factory in for!

Composite structure is of course not new to aviation. The most shining example of success in this field is Burt Rutan's Vari-eze. Craig Catto, well aware of the considerable advantages in achieving fairly complex shapes without massive tooling costs, had been experimenting on his Goldwing Canard prototypes for nearly two years with various forms of composite structure and had achieved satisfactory production times, relatively inexpensive development costs and what can only be described as enormous strength advantages.

In the conventional aviation world, however, there has been a considerable degree of reticence regarding the approval of composite structure aircraft since this form of construction is so radically different from conventional aircraft manufacturing techniques. In ultralight aircraft, however, no such taboos exist and we are all anxious to explore and experiment with new materials, particularly where potentially there is a happy combination of ease of construction and low cost with high strength.

To many would-be minimum aircraft pilots the idea of a rigid wing aircraft with a specific aerofoil section uncluttered by wires is particularly attractive; however, most are deterred by the commitment required in terms of hours and space to home-build such a wing. Our experience in building and flying the Catto CA15 certainly convinced us of the pleasures of getting rigid but we were well aware that the CA15 could never be a factory-built aircraft.

Since Craig Catto appeared to have devised a unique production/construction system for this type of wing producing almost unbelievably stress figures well above what has now become considered "safe" in general hang glider-type structures, we were to say the least excited at the prospect of his visiting us to show us how production of this type could be achieved.

Due to various commitments in the States, Craig didn't arrive until the afternoon of the Saturday prior to the Wellesbourne meet, and whilst I had managed to obtain most of the materials required we still had special tooling to produce, and to make matters worse Craig had been unable to bring his engine and the specialist components, resins etc on the aircraft with him as Laker Airways had decided the package was too heavy for hand luggage. These materials were therefore being sent air freight separately and we had been
promised that they would arrive in Glasgow by the following Wednesday which still gave us 2½ days to complete the aircraft and transport it to the meeting.

Sunday and Monday were spent setting up the necessary tooling and equipment — some of them the most "Heath Robinson" devices you have ever seen — and finding equivalents in Glasgow to the materials in the missing package. To add further complication, Craig was suffering seriously from jet-lag which meant we worked into the early hours of the morning and slept late every day. By Wednesday the panic was really on, Craig's box of parts having vanished completely, and I was running around shouting, "Where the hell can I get aircraft dope, micro-balloon, 3-oz woven fibreglass mat, Feather Fill and a Xenova engine in Glasgow?"!! By Wednesday night, however, the tooling we had lashed together was obviously working since the main wings had taken shape and by Thursday afternoon most of the fibreglass work was completed. Initially we had had terrible problems finding the correct resins as the reference numbers Craig had given to a Glasgow supplier had evoked the comment, "For God's sake don't use that, it does strange things to mice!"

By this time of course, apart from the effect of the resins and lack of sleep, the entire Euro Wing staff were totally confused since the production was so different from our normal hang glider techniques, and Angus Pinkerton — our friendly aerodynamicist — was to be seen talking to himself saying things like, "I don't really believe an aircraft can be built this way, but there it is ..." Before Friday some radical material substitutes had had to be made due to the missing box, but Friday morning saw the covering applied, heat-set and doped. After lunch Prestwick Airport rang to say that they had a box of aircraft parts which had been cleared by Customs and could we collect — HALLELUJAH!

Whilst Paul, my partner, collected the box, the exposed parts of the structure were painted with a first coat of a very special white paint which I had managed to achieve from a specialist stockist in Glasgow. This colour and type of paint is desirable since it reflects the sun and resists heat absorption which could cause delamination. During Friday evening the entire hang cage was built, the engine mounted and the thrust line set. Around 11.00 pm the bag which had been stitched up before the wing was even made was slid on (the paint still being slightly wet), and the entire package placed on the roof of our Marina with a trailer containing the undercarriage at the rear. This last session of building involved 36 hours without sleep and 13 hours without food.

The long drive south through the night was memorable only for the occasional surfacing of Craig Catto from fitful sleep to "take in a bit of this country" — an exercise in which he was singularly unsuccessful, falling asleep almost immediately after making the statement!

By 10.00 am Saturday morning arrived at Wellesbourne and proceeded to fall out of the Marina unshaven, unwashed and totally bedraggled right into the lens of a professional film crew who felt there must be some sort of story in this. No sooner had we crawled into an upright position than they insisted that we assemble whatever we had in the red bag on top of the car, an exercise which took precise six minutes, much to the amazement of several flex wing devotees spectating. After a few minutes' rest to draw breath, consume coffee or whatever other beverage was available, there was a sudden silence when Paul looked at me, I looked at Craig, Craig looked at Andy and then Craig said, "Well, I suppose I'd better go try fly this thing to dry the paint!"

So off we went to the very furthest corner of the airfield to see if five days' and occasional nights'
work would actually fly. Craig fired up the Xenoah, settled into the harness, lifted his feet, and the CP16 accelerated forward and without any drama at all lifted straight off, flew for 75 yards fifteen feet up and made a perfect landing near to the other aircraft at the other end of the runway. We didn't jump up and down, throw our hats in the air, hug and kiss like footballers - all we did was look at each other and smile: it was very satisfying. Craig then made two other flights, this time quietly confident that all was well and proceeded to test the manoeuvrability with equally satisfying results. The air, however, by this time was becoming rather rough and the conditions were certainly not those in which to test a new wing.

Unfortunately our sense of euphoria was short-lived. By late evening, the conditions had calmed down and we all thought that Andy Fawcett, our most experienced rigid "pilot" should fly the CP16. Craig, not realising that Andy was experienced, suggested that he take the aircraft down the runway, rise to about 15 feet, then throttle back for a landing. Andy did as suggested but on endeavouring to throttle back and being unfamiliar with the Xenoah throttle setting, cut the motor completely and the aircraft stalled slightly making a hard landing from 15 feet which bent the undercarriage, twisted the engine mounting and allowed the prop still running to cut through the trailing edge. We were speechless. We had achieved so much and yet on the Sunday we would be unable to prove our success to the rest of the meeting.

On the Sunday, since we couldn't fly the machine, Craig suggested that we stand on it! "Just put two tyres at either end of one of the wings and we will all stand on it," he said. In total disbelief we did as we were told, took off our shoes and proceeded to stand on the leading edge which deflected only 1½" with a loading of 7 people having a total weight of just over half a ton! Now that is strong!
On return to East Kilbride we were pleasantly surprised to find that the accident damage was relatively simple to repair and certainly would have been much more difficult on a conventional rigid wing structure.

On reflecting on our week's adventure, even though the minor accident curtailed further flying, I believe that the CP16 is the first of a new breed of minimum aircraft which will enable us to break from our hang glider traditions into a type of structure which is more compatible with the aspirations of those interested in our form of flying. I make no apologies for not having disclosed any of the manufacturing techniques involved (after all, we all have to eat . . .) - all I can say at this stage is, look out for us at the next fly-in when we hope to have settled on a suitable power system for the CP16 in place of Craig's "gold dust" Xenoah.

Brian Harrison

GERRY BREEN

winner of the recent Land's End to John O'Groats Trike Race. Despite awful weather for August, Gerry completed the course with his Hiway Skytrike/Vulcan combination from Tuesday to Friday 12-15 August 1980.

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INFO:

ENGINE NOISE AND THE PILOT

On making a few enquiries recently amongst those who have been achieving several hours on a variety of minimum aircraft, it is apparent that several pilots, probably those with less tightly-fitting helmets, have noticed a temporary deafness after landing and the engine is switched off. What is perhaps not fully realised is that this can actually – over a period of time – cause permanent deafness. I recommend that you give most serious consideration to the use of ear plugs. Not only will these protect your hearing, but they will also reduce stress particularly on long flights.

There are various types of ear plug available from both sports shops and protective clothing suppliers. Some types are disposable, others washable. Either type is not expensive and well worth the outlay. If you have any difficulty in tracing a supplier, write to me stating the type you require – we have a local stockist.

Brian Harrison
Safety Officer

IMPORTED GOODS: END-USE RELIEF

A reduced or nil rate of customs duty is available for certain goods imported from third countries (i.e. not EEC members) provided the goods are used in the EEC for a prescribed purpose. One of the categories of goods are some items imported for use in the construction, repair or maintenance of particular aircraft. Traders are required to be authorised by the Customs & Excise before they import or receive end-use goods. For further information contact your local Customs & Excise office. Notice No 770 refers.

SOME NOTES FROM OUR MEDICAL ADVISER, DR DUNSTAN HADLEY

As you probably know, I am the Medical Adviser to the BHGA and I will be happy to answer any questions you may have. I am not at present planning to buy or build a minimum aircraft although one day I might, so that if you have a young doctor who is an active pilot, he might make a more suitable medical adviser, but I am willing to advise until one comes along.

I have not heard whether the CAA intends to make the pilot of a minimum aircraft have a medical examination, but I should think that the same rules that we have had in the BHGA would be adequate. Principally this is that anyone who is eligible to drive a motor vehicle is fit to fly, unless he has some disability which makes it dangerous.

I would only make one point now, which I also made at the BHGA AGM last year. There is always the possibility, not very likely perhaps, that should a minimum aircraft crash, the petrol tank might be damaged and catch fire. A pilot might be severely injured. I think that pilots should bear this in mind and (1) always have a fire extinguisher handy, at least on the ground, and (2) always keep the arms and legs covered and wear gloves.

Dunstan Hadley

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KWEERIE KORNER

The answer to last month's Kweerie is that the diameter of the moon was found to be 2160 miles. No answers AT ALL were received - either you're not very clever, unenthusiastic, or out flying all the time! Now the evenings are drawing in, try this one:

At a BMAA meet, pilots were only permitted to enter the take-off area on production of a BMAA membership card. The marshals noticed that there were five machines in the air but only four cards had been produced - a non-member had gatecrashed! But there were some clues:
1 The Eagle pilot is the oldest of the five; the Skytrike pilot is not 24.
2 Eddie, and the pilot from Shrewsbury, and the youngest pilot, are all members.
3 The non-member is younger than the Pterodactyl pilot; Clive is not the youngest and nor is he from Rochester.
4 Dennis from Telford is not the Skytrike pilot; the pilot from Glasgow is not 34 and is not called Bill.
5 The pilot from Rochester is five years younger than the Quicksilver pilot.
6 The Pterodactyl pilot is called Alan; he is older than the Quicksilver pilot who is not Clive.
7 The other machine is a Catto; the other hometown Flint; the other ages are 20, 29 and 41.

The marshals worked out the name, age, hometown and machine of the culprit and were waiting when he landed . . .

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