

THE PLANE MAN'S GUIDE ON HOW

TO BUILD AN AEROPLANE

For more years than I care to remember I have toyed with the idea of building myself an aeroplane, but for one reason or another it just did not happen. Thus it was a pleasant surprise when a member of our staff told us of an evening class over at Bingley which was doing just that! The very next opportunity I had I was round at the school and was most surprised to see the set-up, as well as the size of the undertaking. The group which was building the plane had the imposing title of "Bingley Centre Aircraft Construction Group"; this group consists of about twelve regular members who attend one night a week between September and July.

The school, by the way, is the Beckfoot Grammar School.

The plane is a wooden one, that is, except the engine, and every bit is being made by the members - nothing bought in kit form or anything like that. Now where have we got to? Oh yes, now I remember, the class is held in the woodwork room - very convenient .

The Space Platform

Without stretching your imagination too far, you will appreciate that you can't just leave a partly-built wooden plane lying about a day school (look what happens to our wooden chairs!), so a method was devised to cope with this problem. It was done by constructing a wooden platform about 7 ft wide by 20 ft long. Now here comes the clever bit - where do you put a platform 7 ft by 20 ft. Yes, I know (don't tell me): under the benches? Hang it on the wall? Oh dear no; you simply attach the rope at each corner, and four pulleys to the ceiling, then cross yourself that the whole place don't fall down. Then, with eight heaving bodies at the ropes, the whole lot with all its bits is hauled

to the ceiling, and secured. I wonder if you will believe me when I tell you that this ritual has been going on for two years and has proved successful, inasmuch as the place is still standing.

A Space Ceiling

As time passed, the plane bits grew larger, and the platform became a little over-crowded as a place was needed to store finished and partly-finished bits. When one tries to find anywhere in an educational place, all rooms are allocated, whether anyone uses them or not. Members racked their brains and squeezed out a brilliant idea to build a false ceiling in the passage way, just outside the woodwork room, This was in time completed and works, but it's a bit of a headache if you happen to be about seven feet in height.

I must, before I sign off, tell of the small change in the usual routine last week. Towards the end of the evening there was a bit of a panic when it was learned that the painters would be in during the school mid-term holiday (what's that, I wonder?) and, if we did not want the plane bits painted an educational off-white, the swinging platform would have to be cleared. This was managed without any of those nasty cracking sounds, and we still made the local by 9.30 for a noggin.

Oh, I just remember, the swinging platform has been left to the mercy of the painters. On second thoughts, though, it could do with a coat - it will help to camouflage it. Well, that's it for this time. Look out for the next issue which will have a further story and report on the guide to the plane man.

Peter Crediton.

- The Plane Makers - Part 2

BUILDING AN ALL-WOOD TWO-SEATER MONOPLANE IN A SCHOOL

The plane makers are a group of people in a night school class held each Wednesday at Beckfoot Grammar School, who are building from scratch an all-wood two seater aeroplane. Well, now, having got you all back on the straight and level, so to speak, we'll continue with the happenings since the last report.

Steady progress has continued and was only interrupted by the two holidays. In fact, a point has been reached where members are taking bets on the finishing date. One peasant, laughing all over his face, gave two years, but he soon stopped his laughing when we told him that he had been selected to do the test flight.

Just think he tried to make out he couldn't fly, but then we told him: 'Nor can young birds, but they soon learn!'

The large platform on which the wing was built is, I'm afraid, no more. With most of the wing centre built, the platform became too heavy, so we had a smashing time reducing it to small sections and, in the process, nearly doing the same thing to one of the members.

Now, instead of heaving and pulling like a ship's crew, we have a nice light skeleton of a wing section which can easily be managed by four people or one octopus.

ON THE WING

Incidentally, what we refer to as 'the wing' is the single-span structure which later, when attached to the fuselage, will become 'the wings'.

Most of the work lately has been on the wing outer sections, the wing being 30 feet long and in three sections (none of your old bi-planes for us!) a middle and two ends. Somewhat less work has been done on the fuselage; this, for those less plane-minded is the thing the driver sits in. Its main structure has been built and is now being covered with a skin of plywood (it's less draughty that way). The wings, by the way, will eventually be covered with fabric; funny, that I should have thought it would be the other way round.

Since last writing, Ron Normanton, that arch-filmer of ye Britishe Raile (steam, I hasten to add) has been filming our progress, the film parts being taken by people completely untrained as actors, though they are, of course, house trained. Yours truly is his accomplice (I nearly said 'assistant', but you can drive a nice chap like Ron too far with such blatant misrepresentation). The results so far have been very good, because of his single-mindedness for nothing but the best, and his clever manipulation of players and extras. No doubt the Rank people are keeping an eye on us, but I'm sure Ron will hold his hand till the price is right.

On going to press the whole of the main spar going through the wing, is just about finished, and under the critical guidance of Mike, our teacher and leader, it is a thoroughly good job and will never let us down.

A READY FEELING

Now I have been going on a bit but, before finishing, let me tell you about one small incident that happened a little while back. We keep our working equipment in a very large box which has a lid of such a weight that one needs two hands to lift it. Well, I bent over into the box to get something, and the wretched lid came down right on my head, nearly knocking me sillier than I already am. After recovering, I was saying to the other members that an idea had just struck me, about a method of stopping the lid bashing one's head. Did I get a sympathetic hearing? Oh dear, no! They just choked themselves laughing, - what a funny lot!

As you will all know, this is the last article before the summer holidays, but don't despair, I'll be back, (with the permission of the editor!) next term. That reminds me (will I never end?) - after our recent brush with royalty, to whom shall we give the great honour of launching us? Well, now, Prince Phillip is air minded It's a bit too much to ask, I suppose. Anyway do have a nice and, I am sure, a well deserved holiday.

THE PLANE MAKERS (Part 3)

Building an all wooden 2 seater

Monoplane in a school.

Let's see now, where did we get to in the last issue? Oh yes, I do remember, the holidays intervened. My, they do slow the work up on the plane! I do hope you all had a pleasant holiday, I did not manage to get abroad by light plane this year because the cost of hiring a plane is really too much these days, which, of course, is one of the reasons why we are building our own plane. There: I'm back on course again - plane building.

Most of the old members (they are old now, as it's a long time since the building started) enrolled again this term as well as one or two new ones. One of these is an ex-Spitfire pilot. We'll have to watch him, or else he'll be boring holes in the wings to take the cannons. We were all pleased to see one another again, in what might be called a club atmosphere. It's interesting to note, that the fee for this night class, depends on the number of people attending, and we pay for each term as it comes round.

Twisted Ribs

Now, on with the plane building. The main work since returning has been on the wing ends and this part is very complicated, as each rib (that's what gives the wing its shape) is different in shape and size. Not only that, it is set at an angle, and to crown it all, the whole lot is twisted! Now this is not just the work of a twisted mind, but is done to give stability and to save some unwary pilot getting himself into a spin. You see, it's the builders who get into a spin on the ground, trying to build it right.

As it is difficult to get the wing exactly right, the idea is to build the same error into each wing. Well, it so happened (as you can guess) that on checking we found that the wings were definitely not the same, one end being higher than the other. Now, if this sort of thing happens to the wings of a car, it does not matter; the car will run just the same, and to

put them right you bash the one you think is wrong. But on any aeroplane you have the choice of flying with cross controls, (and a very cross pilot!), or going round in circles, or even perhaps corkscrewing through the air! The long and short of all this was that as I have the weakness of opening my big mouth at the wrong time, I was given the job of putting it right. I tried to explain to them that the earth was round, so what did it matter about going round in circles.

Concorde makers worried

At the other end of the wing (the right end) work is nearly finished because the attitude of late has been "let's get the plane finished". Though we are now in our fourth year, the pace of construction is quickening and from our industrial spies we have reliable information that the makers of Concorde are distinctly worried. With this urge in mind you can imagine how we felt when, just as we are getting up steam, our leader on the project, Mike, announced that because of half-term, no building would take place during the following week. At this rate we shall be exhibiting our machine as an antique! I voiced the opinion that there ought to be some plane speaking to the education people, but the lads were so keen to get a pint at the Fisherman that my pun went unnoticed; my, am I wasted!

Well, I have not told you much as we have been back such a short time. I'll let you in the next issue know if we get the wings right, so be sure to get your copy. Goodbye now!

P. J. Crediton

ON THE WING

what we refer to when attached

THE PLANE MAKERS (Part 4)

Building an all wooden 2 seater monoplane in a school.

When the assistant editor reminded me of my next contribution (that's this one) on plane building, I could not believe that the last issue was before the summer holidays. Hold it! I'm wrong - don't want a hoard of correcting letters do I? - the last one was November. I was just testing you! No wonder I feel pushed - that's not so long since, is it?

Before I go on and on, I feel we ought to welcome any new victims to these columns, that is, those who joined us last September and Christmas. Next I ought to tell them how lucky they are to be in a fine college and to have this nearly as fine article to read, and lastly I ought to explain what on earth these articles are about.

The title of these writings is straightforward: we are, in fact, an evening class making a full size, two seater, all wooden monoplane from scratch, one night a week, at Bingley Grammar School. There are about ten in the class and those who wish, pay a small sum into a fund to pay for the materials and, eventually, the engine, which cost a small fortune. The class has been going on for a long time. In fact, there was some talk that the project started as a double winger and, like the Phoenix, we joined the two wings together. I can officially deny this, although sometimes, especially when we are in difficulties, I do wonder. Really, though, building even such a simple machine is a complex matter, and we are getting a complex about the time it's taking.

Mainly on the mainplane

Now to get on with how we are getting on with the plane building. To date, all the bits that hang on are completed, i.e., rudder, elevator, and so on. The fuselage is three-quarters built; this part of the plane, by the way, is kept in a false ceiling just outside our work room and, being the shape it is, its front hangs over the side of the platform. And what do you think? Some wooden top had knocked a couple of holes (no doubt with his solid head) in the front end - a senseless act. Happily, it was not serious, and is now repaired. One never knows, the culprit might, by dropping something on his foot knock some sense into himself.

It might be put that, of late, "the work in the main, fell mainly on the main plane". Dear me! Sorry about that, but I can't help it, as my long-suffering colleagues will agree. I promise not to do it again, so please read on. The "mainplane" is the wing and it may be part of a plane, but it's far from being plain. We won't go into detail now (must leave space for contributors), as these were given in the last issue.

Recent work on the wing has progressed well, and I must admit that we have done rather better than I thought we would. This is due to the fact that when one is building something complicated there comes a point where progress seems to be faster, although one is not working any faster. Now let's get up to date with the work. The wing shape is now completed, that is, all the struts and ribs are presumably in their correct places. We are now at the fiddling part of correcting our previous mistakes and making sure it will lift us when the time comes.

Two wrongs make a right

Talking about the shape of the wing, I must not hold our regular readers in suspense, any longer. Were we able to correct the error in the wings? Well yes, that is, both wings are a bit wrong, but they have the same wrongness in them, which makes it alright and ensures that it will fly "hands off" and that we won't have to grow one arm longer than the other.

Towards the end of our last meeting, Mike, our leader and aeroplane builder extraordinary, called all hands together, then decided he had better have the bodies as well, and told us that we had come to point where work on top of the wing could be stopped in favour of work under the wing. He explained that, as the working height was three feet, short of hiring a load of pigmies, the wing would have to be turned upside-down and right round as well, because of its odd shape. The wing is about 30 ft long and a fair weight. We managed, although it was a bit of a circus. I am now an inch shorter and have a flat head, for at one time I was left holding one end by myself. When I complained they threatened me with a quick passage to the here-after if I let it go. My, you do get some funny people in this game.

Well, I'm afraid I have to get back to do my stint on teaching, so you are spared more, only till next issue though. So, till then, goodbye now!

LIGHT 'PLANE SHOULD SOON BE OFF THE GROUND

All the Work and Rubbing Beginning to Look Worth While

We come now to the last article in the 1971-72 term of the College (but not the last of all) about the progress or otherwise, and the goings on at a local school night-class, where a group of people are building a light 'plane.

Well, I think we have broken the back of the work. This session the point has been reached where the wing is nicely finished off, all varnished, ready and waiting to be covered with fabric. My goodness, though, it has been a long job - between 4 and 5 years! The biggest job this time was shaping the leading edge of the wing. (I call it the bleeding edge, after the number of lumps out of my hands). This job consists of putting a plywood cover and strengthening strips along the leading edge, so that some over-strong ox does not put his hoof through the front of the wing whilst pushing the plane on the ground. The cover will also help to maintain the wing shape, should some hapless bird choose to fly at the same height as the 'plane but in the opposite direction. Happily this rarely happens and in twenty odd years of regular flying, I have had only one bird-strike. The rarity of bird-strike is not due to the pilot's skill in avoidance, for he has very little control over his direction because of his speed and weight, but to the skill of the birds in self-preservation. Believe me, when it comes to flying we are still amateurs compared with birds.

To get back to the 'plane building: work has also been going on with the fuselage, which has been completely covered with plywood, rubbed down and doped for protection. It is now waiting to be covered with a cotton material for strength and weather protection. The rubbing down of the fuselage is an unenviable task. I reckon with the amount of wood that came off we have reduced the a.u.w. (all up weight) by 10 per cent. Mind you, it's a skilled job this rubbing down; one too many rubs and a hole appears in the plywood (to be followed later by one in your head from the other rubbers).

Just a couple of small incidents happened about the time of the power strike. I had a glue pot in hand and a load of glue on a stick, and was just going to apply the stuff when the lights went out. Well, I could not see the pot and was for a few minutes in what might be called a sticky situation. Fortunately, the lights came on in a short while. We understood later that it was a line fault. Anyway that was the line that was given to us!

During the period of the power strike, we were raising the wing into its place up by the ceiling, when again, off went the lights at a critical point. It was a bit tricky. We could neither go up nor down. Talk about a wing and a prayer! But again we were lucky and the lights came back in a short while. Things are back to normal now, except that the project is now known as the dark 'plane project.

And now I'm going to let you into an exciting secret. Next week we are going to take the 'plane out of the school to the aerodrome. How about that? So don't miss the next issue. I have a feeling that the school will never be the same again (I mean structurally).

All the best for your holidays! I am certainly ready for mine this time and so are most of us, I think. - Peter J. Crediton.

THE PLANE MAKERS (Part 6)

The Light Plane Saga

For the sake of the newcomers to our halls (or should I say Faculties?) of learning, the following is the continuation of the "Light Plane Saga", i.e., the story of a group of enthusiasts who attend evening class in the hope of producing a two-seater aeroplane. The Concise Oxford Dictionary states that a saga is "a story of heroic achievement or adventure ...", so I say 'saga' as this project is in its fifth year. Fortunately, the designs of light planes change very slowly, and, because ours is a monoplane (single wing), the number of wings can hardly be reduced. Now you know what it's all about; if you don't, ask any of the time-served staff and they will put you right (off!). Anyway, welcome to these columns and to the College.

In my last article I mentioned that the wing structure was finished and waiting for its fabric covering. Well, we are now in the process of doing the covering, or rather, we have got the fabric on and now we are doing the things that keep it on.

Sew, you see!

You may or may not believe this but, after the fabric is placed around the wing, it is held to shape by sewing, yes, by sewing!, with needles that look like swords, and are almost as lethal. When one gets to work with these monster needles, people scatter. This sewing is done with a kind of string and is necessary because without it the fabric could be torn off under certain flight conditions and could float away, and what a come-down that would be! So, we work on, quoting the old saying, "What you sew you keep". Dear me, I'm at it again. I thought the holiday might have cured me, but it didn't. To put the newcomers in the picture, I had better point out that this wing is some 30 feet long, between five and six feet in cord (that's the other way) and up to 15 inches thick. So manhandling it to work on is not light work, even if it is a light plane. Besides the sewing of the wing, other jobs are going on, such as fitting of hinges and inspection holes and doping. Now doping - there's a job for you. It's horrible, apart from the smell. The dope sticks to you and if you can't find any solvent, you have to wait until it wears off. We open all the windows to try to stop ourselves being suffocated, but then the other classes kick up a stink about our stink!

A difficult extraction

The problem of extracting the plane from the school without taking a wall down has now been solved - we are taking the roof off! No, really, that's not true; we're cutting the wing in half. No, that's not true, either. The truth is that, after running like men demented round the school, carrying a 30ft long wing, with everybody shouting such things as, "A bit this way!" and "Och, ye'll not get it through, the noo!" we have at last found a way of getting the wing out. This is a great load off our minds, but I'm afraid we put a great load on others' minds, with the havoc we caused.

Enough of the wing; what about the fuselage? Well, this left the school during the summer holidays, for Leeds-Bradford Airport, to have some ironmongery attached to it. We have no facilities for this, as we only work in wood and wooden engines don't last long. When the wing is finished, the fuselage will be returned to be covered with linen for weatherproofing. I understand from reliable sources (that is, from the chap who sweeps our school room up), that the plane will be finished in the spring. Now, I know he did not say which spring, but on checking this rumour with Mike, our evening class plane maker leader, I found that it is the next spring. The launching of this plane will be a great occasion, as it will be the only plane completed by a private group of people in the U.K. to date, so it will be a much-sought-after event. Don't hesitate, buy your tickets now - you know what these ticket touts are like. But our good editor is pressing me for this article, so I'd better hand it in, or else we'll have Xmas upon us before you get it'. My, what did happen to that summer holiday? It seems so long ago now, that I can't remember it. Not long for Xmas now, though; then we can stagger to a halt for a bit. So, until the next issue, all the best!

Peter Crediton